

Telecommunications Regulation - Competition - ICT Access in the Asia Pacific Region

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List of Acronyms and Abbreviations

BWA	Broadband Wireless Access
CDMA	Code Division Multiple Access – Wireless telephone system
CNC	China Netcom
CPI	Consumer Price Index
DSL	Digital Subscriber Line
DTS	Department of Telecommunication Services
EOIP	Everything Over Internet
FBO	Facilities-Based Operators
FCFS	First come first served
FtH	Fibre to the home
GOB	Government of Bangladesh
GPRS	General Packet Radio Service
ICNC	Information Communications Networking Company
ICX	Interconnection Exchange
IGW	International Gateway
IIG	International Internet Gateway
IP	Internet Protocol
ISP	Internet Service Providers
ITI	Indian state owned Telecom Company
KT	Korea Telecom
LDC	Least Developed Countries
LLDC	Landlocked Developing Countries
MII	Ministry of Information Industry
MIIT	Ministry of Information Technology
Mobile	Cellular Mobile
MOR	Ministry of Railways
MPTC	Ministry of Posts and Telecommunications
MSC	Malaysia Multimedia Super Corridor
MT	Mongolian Telecom Corporation
MTP	Ministry of Posts and Telecommunications
NGN	Next Generation Network
NTTN	Nationwide Telecommunication Transmission Network
PAS	Personal Access System
PHS	Personal Handy-phone System
POTS	Plain Old Telephone Service

PSTN	Public Switched Telecommunication Network
QoS	Quality of Service
SBO	Services-Based Operators
SMP	Significant Market Power
SOE	State Owned Enterprise
SSNIP	small but significant and non-transitory increase in price
TC	Telecom Cambodia
TOR	Terms of Reference
TRAI	Telecommunications Regulatory Authority of India
UCL	Unified Carrier Licenses
ULR	Unified Licence Regime
USA	United States of America
USO	Universal Service Obligation
VoIP	Voice over Internet Protocol
VSNL	Videsh Sanchar Nigam Limited
WCDMA	Wireless CDMA
MVNO	Mobile Virtual Network Operators

Glossary of Terms

DMB	Digital Multimedia Broadcasting is a digital radio transmission technology developed by Republic of Korea as part of the national IT project for sending multimedia such as TV, radio and datacasting to mobile devices such as mobile phones. Sometimes known as mobile TV, DMB is not the same as Digital Audio Broadcasting developed as a research project for the European Union. DMB has also some similarities with the main competing mobile TV standard, DVB-H.
DSL	Digital Subscriber Line (DSL) is a technology to provide digital data transmission over the wires of a local telephone network. DSL originally stood for digital subscriber loop. The term Digital Subscriber Line is widely understood to mean Asymmetric Digital Subscriber Line (ADSL); the most commonly installed technical varieties of DSL.
HSDPA	High-Speed Downlink Packet Access (HSDPA) is an enhanced 3G (third generation) mobile telephony communications protocol. It is based on Universal Mobile Telecommunications System (UMTS) but with higher data transfer speeds and capacity.
HSUPA	High-Speed Uplink Packet Access is a 3G mobile telephony protocol with up-link speeds up to 5.76 Mbit/s. The name HSUPA was created by Nokia. The technical purpose of the feature is to increase capacity and throughput and reduce delay.
Regulatory Compact	Agreement between the authorities and a telecommunications company that offers protection from competition in return for tariff and service regulation
UMTS	Universal Mobile Telecommunications System one of the 3 rd generation (3G) mobile telecommunications technologies, also being developed into a 4G technology. Being a complete network system, UMTS includes a radio access network (UMTS Terrestrial Radio Access Network, or UTRAN), the core network (Mobile Application Part, or MAP), as well as authentication of users via USIM cards (Subscriber Identity Module)
VDSL	VDSL or VHDSL (Very High Bitrate DSL) is a DSL technology. It provides faster data transmission (up to 52 Mbps downstream and 16 Mbps upstream) over a single flat pair of copper wires. It is capable of supporting high bandwidth applications such as HDTV, as well as telephone services

Wibro

and general Internet access, over a single connection.

WiBro (Wireless Broadband) is a wireless broadband Internet technology developed by the Republic of Korean telecoms industry. It is the Republic of Korean service name for IEEE 802.16e (the mobile WiMAX) international standard. WiBro was devised to overcome the data rate limitation of mobile phones.

1. Introduction

1.1 Background

1. Telecommunications began on March 7, 1876, with Alexander Graham Bell's patent 174,465, from the United States (USA) Patent Office. The patent covered "apparatus for, transmitting vocal or other sounds telegraphically ... by causing electrical undulations, similar ... to the vibrations of the air accompanying ... vocal or other sound". Undulations quickly replaced earlier forms of communication, including "Flag, signals or heliograph". By 2006, the Business was worth approximately US\$1.2 trillion.
2. Most governments transformed the first generation of operators, into state monopolies (prohibiting competition). The similarity between telegraph and telephone lines led governments to lumping them with telegraph agencies. Even in the United States of America, with the privately owned Bell Organisation, eventually US Authorities needed to use the Anti-Trust laws to ensure survival of independent operators. Bell's long-distance and international business became a regulated monopoly.
3. By the mid 1980s, both State Owned Enterprise (SOE) and regulated monopolies were unable to cope with new technology, and customers' needs. By 1994 it was said:

"In rich and poor nations alike, governments are trying to adapt their policies to meet the changing technological and economic conditions affecting the supply of telecommunications services on the one hand, and to satisfy the rising and more diverse demand for services on the other."¹
4. During the ensuing 16 years, many countries have liberalised telecoms sectors and opened them to competition. However, developments in technology, particularly broadband Internet, have shown the limitations of commercialisation and conventional regulation in promoting the uptake of ICT.
5. UNESCAP has undertaken analysis that highlights differential rates of uptake of ICT among UNESCAP member States. UNESCAP's analysis reveals wide disparities in Internet users per 100 people (New Zealand has 80; 25 countries in the region still have less than 10). UNESCAP has seen signs of slow growth of access to the Internet and information services and applications among Less Developed Countries (LDC)s, Landlocked Developing Countries (LLDC)s and Small Island Developing States (SIDS).
6. UNESCAP has shown that without widely available and affordable ICT access in under-served areas of LDCs, LLDCs and SIDS widespread application of ICT for socioeconomic development would be difficult. It will be almost impossible to take advantage of information services and applications, evidence-based sustainable and inclusive socio-economic development, as envisioned by WSIS outcome documents,
7. The disparity is even greater in the trend of broadband technologies where a converged platform is providing opportunities for UNESCAP members to skip many costly traditional ICT development modes, yet connections to broadband are lagging. The question has arisen, **is inappropriate regulation slowing progress in these member countries?**
8. As a first step in implementing the project "Strengthening ICT Policies and Applications to Achieve MDGs and WSIS goals in Asia and the Pacific" to answer this question, UNESCAP organized two sub-regional workshops, one for Southeast Asia and the Pacific

¹ *Telecommunications sector Reform in Asia, Towards a New Pragmatism*, Peter L. Smith and Gregory Staple, The World Bank, Discussion Paper 232, 1994

and the other on South and Central Asia in October 2009. Based on the discussions on technology and policy options during the workshops **this Report aims to identify possible regulatory reforms among participating member countries** to address the challenges identified by the seminar participants.

1.2 Adapt to Change

9. Disparities in the growth rate of broadband development among UNESCAP members is only one factor showing that the need to adapt is as strong today as it was 14 years ago and suggest that the scene of action has moved.

- Explosive growth of mobile phones, exceeding fixed line use in developed (e.g. Republic of Korea) as well as developing countries (Cambodia, Vietnam and most of Africa),
- In Bangladesh and Cambodia mobile phones have supplanted the fixed wire based utility for new services, and elsewhere, notably Republic of Korea are the principal competitor for voice and Internet with fixed-lines declining fast,
- Mobiles are the favoured mode of communication for voice calls as each person has unique numbers and trawls through PBX systems are unnecessary,
- 3G technologies are making wireless Internet traffic a viable option and there has been explosive growth in the demand for wireless data capacity,
- There has been an immense shift of data (e.g. Television) from broadcast to fixed and mobile broadband and of voice traffic from lines to wireless mobiles,
- Cable connections remain favoured in all applications where uninterrupted reliable data transmission is required, (e.g. banking and control systems),
- Major companies are experiencing a transformation where 85 percent of traffic is data traffic and with Internet Protocol Switching, systems are rapidly moving from Voice Over Internet Protocol (VOIP) to Everything Over Internet Protocol (X-OIP),
- An explosion of telephone handset based services is underway, moving on from services such as answering, call waiting, call forwarding etc., to Internet traffic, banking, entertainment and television,
- Lucrative revenues from international and long distance traffic are collapsing fast; the international accounting system collapsed in the early 2000's and revenues have plummeted since with services such as Skype using VoIP technologies,
- This in turn is driving a tendency to share facilities and to have specialised transmission-only operators as ways to share facilities and reduce costs, with the developing world, especially India the notable pioneer in this field,
- The most staggering development has been the explosion of new connections with more than two million new subscribers a week in India and similar figures in China; most of the subscriber's growth is taking place in the developing World.
- Not only has there been the huge increase in new connections, but the availability of wireless internet using 3G, has seen explosive growth in the demand for bandwidth, to meet the demand for data.

10. Despite this enormous progress, there are concerns that a new digital divide is opening up between the developed and the underdeveloped, with broadband connections in the developing world falling further behind the numbers in the developed. This report asks why we need telecommunications regulation and asks how telecommunications has changed since liberalisation began in the 1980s. It also seeks to identify appropriate future approaches to regulation based on the experience of several Asian and Pacific countries.

2. Importance of Telecommunications

11. Despite the rapid advance of new technologies and falling prices, many people remain surprised at the rapid growth of telecommunications since the early 1990s. Box 1 illustrates the helplessness felt by many foreigners in developing countries in the 1980s when the problems of putting in place adequate infrastructure seemed insuperable.
12. The wave of liberalisation of telecommunications markets, deregulation and privatisation that swept the World in the 1980s began to offer new hope. Instead of worrying about how to provide basic telecommunications services, the focus moved to a discussion of the potential size of the market.

2.1 Potential Market

13. Many ask, how can poor people afford what was once thought of as a luxury item? Intuitively, the reaction is to believe that poor people cannot afford a mobile telephone. However, if people share the use of a phone and the majority of calls are from relatives and friends in a more prosperous town, then the costs to the poor villager are significantly lower.
14. In a 2006 report² on the growth of mobile phones in Africa showed a transformation underway that was dramatic. The methodology taken from a study in Cambodia in 2001, applied to national data in a range of low income African countries, showed that societies that are either not well organised or very poor have a large unsatisfied demand.

15. A feature of the analysis was a situation of actual demand being larger than the estimated market. This may show up weaknesses in GDP figures, but it also shows that mobile telecommunications are not only filling a communication gap, but they are replacing other more expensive communication methods in the developing world.

Box 1: We don't need phones here!

1980's agency country manager to Consultant:

"This country does not need any telecommunications."

Consultant:

"How do you communicate yourself?"

Agency manager:

"We installed an own nationwide radio system, because the public telephone system does not work."

(Cited Arno Wirzenius – Funny Telephone Experiences)
<http://www.saunalahti.fi/~arnow/index.html> 2003

16. If researchers look more broadly at the communications market and consider the alternative methods of getting messages to or from the capital city, the popularity of mobile telephones is economically rational. In the absence of telecommunications, other options are mail, sending messages with friends and relatives or travelling, taking several days away from the farm and family. Days away can be both expensive and uncertain. Many countries do not have mail services, messages are unreliable and slow and travel is expensive and may be dangerous. All these inconveniences have now been superseded by cheap calls.

² *Review of the Regulatory, Policy and Competitive Framework of the ICT Sector in Rwanda*, Section 2, Policy and Regulatory Diagnostic, Rwanda Information Technology Agency – World Bank, DBA, 2006, P. 27

2.2 Economic Benefits

17. Recent reports of macroeconomic studies³ show that Internet availability and mobile phones provide a significant boost to economic growth. The benefits are bigger in developing countries than developed ones, due to the lack of alternative, communications infrastructure. More of a surprise may be the studies show that the effect also seems to be bigger for the Internet than for mobile phones.
18. A 2009 World Bank Study found that an increase of ten percentage points in mobile-phone adoption increased growth in GDP per person by 0.8 percentage points in a developing country and by 0.6 percentage points in a developed one. For dial-up Internet access, the figures were 1.1 percentage points and 0.75 percentage points respectively. For broadband Internet, the numbers were 1.4 percentage points in the developing World and 1.2 percentage points in the developed.
19. However, some claim that the chain of causality may be the other way around: economic growth stimulates interest in the new technology. The same report analyses the detailed microeconomic studies to test the impact of the spread of technology on the prices of particular goods. Historical data for the price of fish, as mobile phone coverage extended down the coast of Kerala in southern India between 1997 and 2001, and access to mobile phones became available, showed markets were much more efficient, eliminating wasted catches and bringing down consumer prices by 4 percent as well as increasing fishermen's profits by 8 percent⁴.
20. The same source also outlined a forthcoming World Bank report⁵ that shows how the gradual introduction of the Internet with price information affected the market for soya-beans in the Indian state of Madhya Pradesh. Data from local sources showed that the presence of Internet in a district was associated with an instant and persistent increase of 1.7 percent in the average price paid in that district in India⁶.
21. The availability of price information increased the level of competition between the traders, raised prices and reduced price variation between markets. Farmers with access to the Internet, increased profits by 33 percent and the cultivation of beans rose by 19 percent in districts with access. These studies support evidence that the Internet and mobile telephones make agricultural markets more efficient and increase rural incomes.

2.3 Challenges for UNESCAP

22. The Challenge for UNESCAP is that whereas mobile-phone access is now rapid and commercially self-sustaining, with even very poor farmers benefitting from having a phone and finding the money to buy one, access to the Internet is more problematic. The Internet requires literacy and computers cost more than handsets. How to harness benefits offered by new ICT capabilities for inclusive and sustainable socioeconomic development is a major challenge for the region.
23. Despite these problems, investors can be tempted to pay for Internet shops and kiosks where computers and the Internet are available. Entrepreneurs are willing to resell access from village kiosks, in the same way that mobile phones first penetrated villages. The World Bank's work suggests that the Internet could have an even greater impact

³ *Worth a hill of soyabeans*, Economic Focus, The Economist, 9 January 2010, Page 69

⁴ op. cit

⁵ *Information, Direct Access to Farmers, and Rural Market Performance in Central India*, American Economic Journal: Applied Economics, forthcoming, Aparajita Goyal, <http://www.aeaweb.org/forthcoming/output/accepted>

⁶ op. cit

on economic growth than mobile phones did. But that will depend upon finding sustainable business models to encourage its spread in the poorest parts of the world.

2.3.1 UNESCAP Workshop

24. The October 2009 UNESCAP Sub-Regional Workshops on Strengthening ICT Policies and Applications to Achieve MDGS and WSIS goals in Asia and Oceania received some further evidence⁷ of the magnitude of the changes underway.
25. Nineteen out of fifty-one countries analysed showed fixed telephone lines are on the decline, with negative growth in 2008, indicating accelerated transition to mobile and broadband. The highest growth rate was recorded among some LDC. Mobile technologies are expanding rapidly, especially in Landlocked Developing Countries LLDC with over 100 percent growth between 2003 and 2008.
26. Small Island Developing States generally show slower growth than the rest. The share of mobile out of all telephone lines is higher among LDC (95.1percent), LLDC (84.9 percent) and SIDS (76.9 percent) than in industrialized countries, reflecting the reality for many developing countries where there were no phones until mobiles arrived. The average share of mobile lines for the UNESCAP member countries is 75.4 percent
27. Consistent with the findings of the World Bank studies, in respect of the Internet in general and broadband Internet in particular, there is large divide among the developed countries and the rest. The lowest Internet subscriber proportion is in South and South-West Asia with 8.6 per 100 populations, but this has the highest average consolidated growth rate of 27.8 percent. The highest percentage of 44.2, is found in the Pacific (including Australia and New Zealand), with negative growth of approximately -0.4 percent. The UNESCAP average in 2008 is 17.4 percent and the LDC average is 0.6

2.3.2 Digital Divide

28. The most serious digital divide between rich and poor remains the uptake of broadband usage. There is a correlation between the decline in fixed telephone lines and growth in broadband subscription. Some countries are catching up rapidly with the leaders. However, the UNESCAP average is 3.9 per 100 populations. For the South and South-West of the UNESCAP region growth is rapid at (99.1 percent), but remains a low proportion at only (0.67) of the population.
29. In summary, these studies show that telecommunications have a strong positive influence on development. Mobile telephones have led the way, not only because of the convenience of the technology (and falling prices), but because of the lack of alternatives. Mobile phones have been popular because they have allowed a significant reduction in the cost of communications.
30. There is now evidence that the Internet can play a similar or greater development role. The Internet not only requires greater literacy, it is a tool for encouraging people to become literate and may also provide training opportunities. However, the LDC and LLDC are not benefitting from the Internet to the same extent as the developed countries. This is partly because many LLDCs and LDCs have only recently acquired telephones for the first time. Largely it is because the higher cost of computers, roll-out of facilities and the infrastructure needed.
31. Appropriate regulation has a role to play and the next sections will discuss the role regulation has and will play in the sector.

⁷ *A regional overview: the current status on ICT access and emerging issues, Information and Communications Technology and Disaster Risk Reduction Division (IDD) UNESCAP Secretariat, Atsuko Okuda, Presentation*

3. Regulation Past and Present

32. In the lives of most telephone engineers, systems of telecommunications regulation have passed through three distinct phases: 1) Monopoly Self Regulation, 2) Regulated Monopoly, 3) Competitive Regulation and now 4) Multi-service regulation. Each of these stages developed to respond to changes in markets structures, from the monopoly/ ministry control through to the fully competitive market.

3.1 Monopoly Self Regulation

33. Self-Regulation is usually by a unified Policy, Regulatory and Operational Agency. It is often a government ministry or a telecom business grafted onto a telegraph or postal service. Figure 1 illustrates the model. Several countries still have all four functions in a single agency, e.g. Myanmar.

34. The rationale for self-regulation was that the government was the only agency with the financial capacity to develop the new sector. When this proved incorrect, a further justification maintained that a monopoly was required in order to generate the capital for sector development, in particular for service to remote, sparsely populated areas. The advocates of monopoly provision also favoured cross subsidisation of lower income subscribers by higher income or business subscribers.

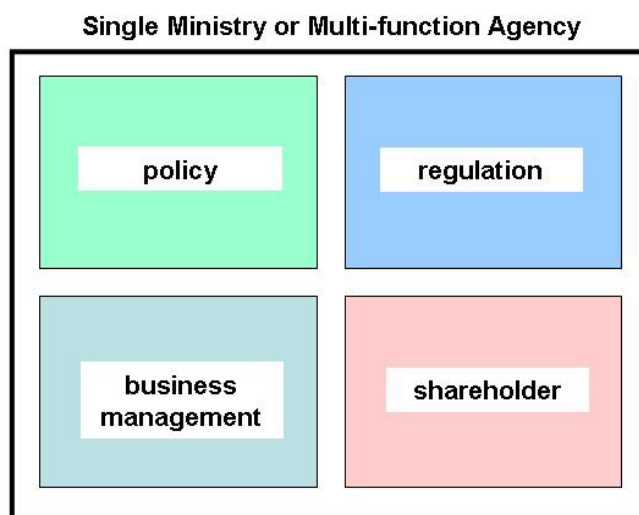
Box 2: BBC Report 2006: Somalia

Somalia has been without a government since 1991, it is in a civil war, managed by gangs in a gun culture and has a shattered economy, BUT despite all that: mobile telephone calls in SOMALIA are:

- **the cheapest, best quality (clearest) in Africa,**
- **there are 12 private operators and**
- **approaching 50,000 subscribers.**

Source: BBC World Service:
Winter, Joseph (2004-11-19). "[Telecoms thriving in lawless Somalia](http://news.bbc.co.uk/2/hi/africa/4020259.stm)".
<http://news.bbc.co.uk/2/hi/africa/4020259.stm>.
Retrieved 2010-02-02.

Figure 1: Ministry or Agency Self Regulation



3.1.1 Regulation by Minister

35. Governments assumed that the minister-in-charge would guard consumers' interests from the monopoly with his regulatory powers. In theory, ministers could supervise the entity. In practice, ministers gained advice from the regulated parties. With no independent advice on which to make judgements, agencies were unregulated.

36. The model lacks transparency. Regulatory intervention can mask business failures, and policy can block alternatives. As the same agency is making policy, there is no voice independent to question what is happening and the consumer usually pays for mistakes. Self-regulation took other guises. The most notable was in the United States of America. Essentially, the most powerful company made the rules, most often by denying or impeding interconnection with less powerful rivals.
37. Overall, the self-regulatory, integrated model contains poor incentives for quality sector performance. Major issues are resolved internally and mistakes easily concealed. Eventually, the competition authorities sought alternatives.

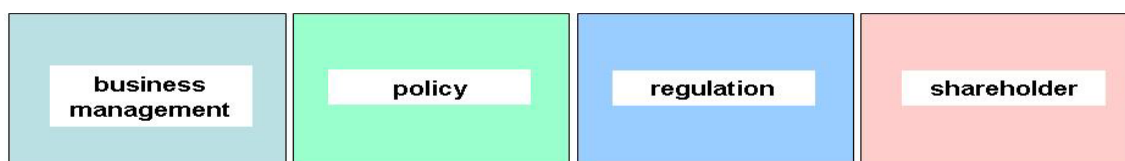
3.1.2 Unified Agency

38. Despite the move to liberalisation, the unified agency has been staging something of a comeback in the IT sector. Many countries anxious to increase the speed of adoption of knowledge based economic activities have set up agencies to promote the spread of e-government, e-learning and many other activities.
39. The danger posed by these agencies is that unless the mandate is both closely circumscribed and rigorously policed, the ICT agency will tend to dabble in all areas of business management, policy regulation and shareholder responsibility confusing lines of accountability and responsibility for outcomes.
40. It was concerns about lack of accountability that led the move away from the integrated model. In several countries, agencies designed to promote ICT have caused confusion by simultaneously offering policy advice, promoting new investments and becoming involved in Regulation. In one country, the agency promoted new policies every day⁸, undermining the regulator and causing mayhem in the private sector.

3.2 Functional Separation

41. Confused accountability and conflicts of interest inherent in the integrated model led to arguments in favour of functional separation. Figure 2 shows how the four functions of the single agency model are divided into separate agencies (one each for policy, regulation, business management and ownership) each responsible for one function. In principle, functional separation can take place in any market structure. In practice separation increases as the market-structure becomes more competitive.

Figure 2: Functional Separation: Single Purpose Agencies



42. With functional separation, the regulator is separate from the policy ministry, enterprise and ownership. The regulator should act without interference from government or any operator. Issues that cut across the responsibilities of the separate agencies are not resolved in secret by officials but rise to the top leadership whose responsibility it is to make the necessary trade-offs between desirable objectives. This adds confidence to the sector companies that they will be fairly treated.
43. Functional separation (separation of the business) is desirable for competition in telecoms but it is neither an essential nor a sufficient condition. It is still possible to have functional separation and a monopoly, or unfair competition between the ministry

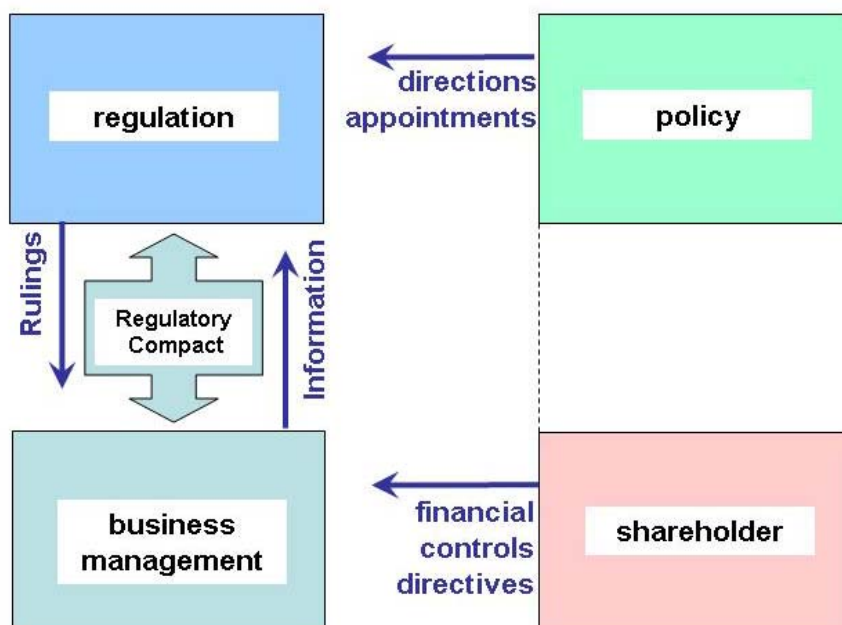
⁸ Interview with experienced consultant, 2005

owned utility and a private competitor. Rather than this being a handicap for the private sector it is usually the ministry owned business that fails, because of a lack of expertise and access to capital.

3.3 Regulated Monopoly

44. Many jurisdictions replaced self-regulation with the regulatory compact or the regulated monopoly. Regulated monopolies exist where there is a regulatory deal between one entity and one regulator. A single company dominates the sector and the government sets up a sector specific regulator to monitor the monopoly's activities. Figure 3 illustrates this model. It was the model chosen to regulate the national and international business of the Bell Organisation in the United States of America.
45. Regulatory Compacts govern the regulated monopoly. In exchange for legal protection of its monopoly, the company accepts intrusive regulation of many aspects of its business including tariffs. The government appoints the members of the Regulatory Authority and provides it with policy directions. If the government owns the company, it may have financial controls in place too. Several countries copied this model in the early days of liberalisation and it endures today including in countries where there is a powerful incumbent, and small competitors.
46. The idea underlying this model is that a well informed and well resourced body can monitor the performance of the regulated party and ensure that it keeps to its undertakings in the regulatory compact and any tariff or other regulations the regulatory body imposes.
47. The model's principal weakness is that the regulated party has all the information needed to regulate its activities. Commonly, the regulatory agency finds itself playing "cat and mouse" making a succession of additional rules to patch up holes in existing rules only to find that for every loophole closed, several more open up.

Figure 3: Monopoly Regulation



48. There is a small enhancement in transparency compared with self-regulation. However, if the policy agency and the shareholding in the business enterprise are in the same ministry (the dotted line represents this situation, common in former centrally planned

economies) there is only a small advance in transparency and the incentives for good sector performance are barely improved.

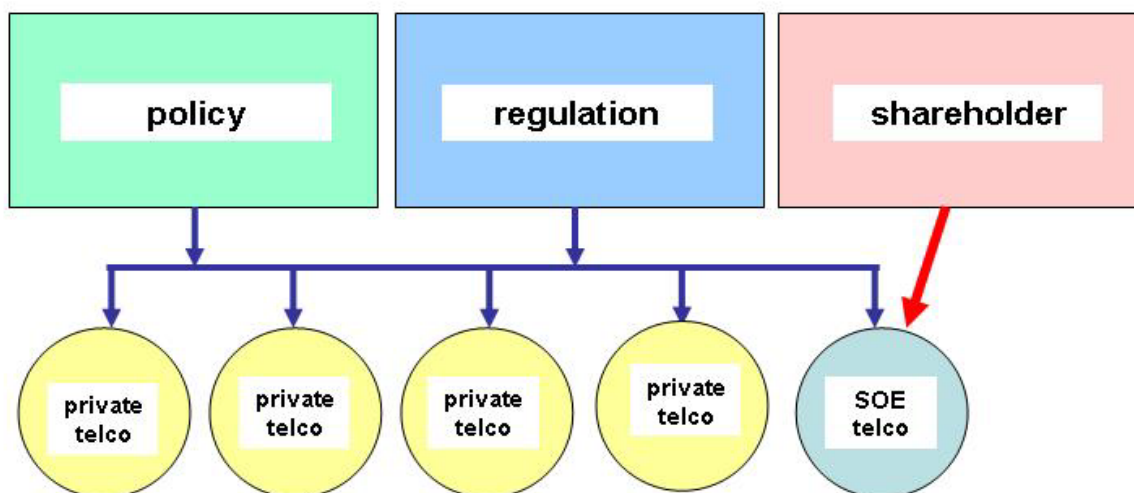
3.3.1 Regulatory Capture

49. A danger of both of these forms of regulation is regulatory capture. One example of regulatory capture is where the regulator gets so close to the sector it loses sight of consumer protection and protects the incumbent rather than the consumer. Alternatively, the regulator may set tariffs so low the financial status of the company is undermined. This is what happened in many of the soviet economies. The Regulator may also follow government directions on all matters, making independence a farce resulting in on or other of the above results, with no gain in transparency.
50. By the 1980s, there was an accumulation of experience showing that not only do governments seldom have capital to develop the sector⁹, monopoly profits for sector development easily divert to the national budget, higher company salaries or larger company work force (often with ghosts on the payroll!). In addition, most incumbent monopolies were slow to extend to rural areas and cross subsidies were inefficient transfers. Many countries in Asia began their move away from a state monopoly with a variation on the regulated monopoly model. Myanmar is the closest to this model now. Concerns that there were major problems with existing regulatory models led to the next form of regulation.

3.4 Competitive Regulation

51. Whatever the reasons for government involvement in telecoms, by the 1980s, evidence showed that benefits from monopolies came at a heavy price in terms of lack of access to private capital, low investment, high prices, poor customer service and minimal innovation. Governments realised that competition is possible in telecommunications and offers efficient protection for consumers. Competitive regulation is qualitatively different to both self-regulation and monopoly regulation.

Figure 4: Competitive Regulation



⁹ The government is "always a rotten shareholder": it has a vision of about 18 months, being constrained by the distance to the next election, it is rapacious for dividends, niggardly with new capital, and always wants to second guess management and influence their decisions on behalf of their constituents". *Comment*, by J Third, Guinness Gallagher International, Wellington, New Zealand, June 1994

52. The World Bank¹⁰ and other agencies promoted competitive regulation to oversee the increasingly diverse telecommunications sectors of the region. Figure 4 illustrates this configuration. To achieve Independent Competitive Regulation functional separation of policy, regulation, business management and ownership are essential.
53. With Competitive Regulation, Regulatory Authorities change their orientation from tariff control to promoting competition. The regulator becomes referee in a market where competition is the primary regulator. The focus of the Regulator's activity is to ensure that all competitors, large and small receive fair treatment from the law and each other. Competitive regulation recognises the reality that no matter how well resourced a regulator; it will never have the resources of the sector companies themselves and it is best to let the players compete with each other.

3.4.1 Policy Advice and Ownership

54. Competitive regulation depends upon a defined legal mandate for the regulator. Advice to the government on what that mandate should be comes from the policy adviser. Policy advice to the government and the Parliament are roles for a policy focused ministry.
55. Similarly, protection of the state's investment is a function of a finance ministry or property agency. Agencies often overlook Investment protection. In fact, ICT agency officials have said "we will structure the sector the way we want it; it is over to the property agency to sell what is left".¹¹ It is a core function of government to preserve the value of the public investments. Someone other than the enterprise should be tasked with oversight of that interest.

3.4.2 Business

56. Experience shows that a government trading entity runs best as an agency with commercial objectives (financial profits from satisfied customers). Business management may be a function of a state agency, state owned enterprise or better still a private company. Competition from new entrants, international or local, mobile or fixed line is the main feature of the model.
57. In monopoly regulation, the majority of the information the regulator needs to do its job is in the possession of the sector players. Companies will do everything possible to avoid or delay handing over that information to the regulator, if they believe the regulator's decision will advantage a competitor. Companies can use lobbying and litigation to avoid and delay regulatory oversight.
58. If there is competition in the marketplace, companies cannot avoid competition. Competition means that other companies may take away customers. To avoid loss of customers and revenue, companies will rapidly reduce prices and improve services to match the competitor sparking innovation, network expansion and service improvement.
59. The threat of competition is a much stronger spur to improvement than any regulator can be. Competitive regulation moves the emphasis from tariff regulation, capital investment and detailed regulation of retail offerings. The regulator's job is to be the impartial referee.

¹⁰ See *Telecommunications Sector Reform in Asia*, World Bank Discussion Papers 232, Smith and Staple, 1994

¹¹ Discussion with agency official, Ulaanbaatar, Mongolia 2005

4. Regulatory Issues

60. Today, just as in 1994 governments are searching for policies designed to ensure that all citizens gain access to a wide range of ICT services and regulators everywhere are asking what is the best way to regulate the system and what should be the objectives of regulation¹².

4.1.1 Focus on Competition

61. Countries where there is a history of central planning often encounter a particular problem with the role of regulation. Accustomed to planners telling them what to do in detail, many officials understood that the regulator would be the new central planner.

Box 3: Regulation is Easily Misunderstood

Consultant Report:

"I propose deregulation, with a new and detailed telecom law, a new regulatory body, comprehensive licenses, reporting to the regulatory body on financial results and cost accounting by service, mandatory standards and mandatory type approval. All this deregulation is new and required for competition."

Quoted in: *Handbook on Competitive Activities, Asia-Pacific Telecommunity*, Arno Wirzenius, October 1994, Bangkok

62. In the early days of liberalization, it is easy to see how this misunderstanding took place. Box 3 illustrates one example of an enthusiast for regulation giving the wrong impression, as reported by a very experienced observer.

63. The evidence from around the world is conclusive: if regulators want their telecommunications sector to provide the services subscribers need, to innovate improve quality, cut costs and still expand coverage - competition is essential. Several sections so far have discussed aspects of competition. To achieve the goal of competition it is essential that a regulator focus all its activities on the measures that will improve the competitive environment. Sometimes that will require regulatory action. More often than not, it will require regulatory restraint and reliance on competition.

64. Few regulators today believe that narrow regulation of sector tariffs and services is either necessary or beneficial. Technological innovations have reduced many barriers to new telecommunications services. Monopolies are increasingly contestable, particularly with the use of broadband Internet. Local networks are upgrading to take fast broadband, wireless and WIMAX. These are as widely used now as the Public Switched Telephone Network (PSTN)s of the past. What will be the appropriate shape of telecommunications regulation in the future?

4.2 No Regulation – option?

65. Somalia is an instructive example¹³. It last had a government in 1991, but by 2006, there were 12 mobile competitors with 50,000 subscribers. Despite an ongoing civil war, establishing a new service was easier than in many other countries. There was no need for a license; there is no state-run monopoly to obstruct establishment of competitors. There was no-one to demand taxes, bribes or officials to please, but armed security guards were useful.

66. It took just three days for installation of a landline in Somalia, compared with waiting many years in neighbouring Kenya, where there was a stable, government in place. Local calls were free for a monthly fee of just \$10. International calls were 50 US cents

¹² This discussion draws on *Telecommunications Sector Reform in Asia*, World Bank Discussion Papers 232, Smith and Staple, 1994

¹³ <http://news.bbc.co.uk/2/hi/africa/4020259.stm> a 2004 article accessed 30/1/2010

a minute, while surfing the web was 50 US cents an hour - "the cheapest rate in Africa" and the best quality.

4.2.1 Anyone to Anyone

67. Somalia is an interesting extreme case. Not many countries wish to follow examples from a devastated country like Somalia. Other countries have to deal with massive obligations to legacy investors, employee pensions and legal and political issues. While quality voice calls are important customers in sophisticated economies now demand broadband and other advanced services that Somalia and the like cannot provide.
68. Most importantly, any subscriber of one company will want the ability to connect to any subscriber of any other company, the so-called "anyone to anyone" principle. There is always an ongoing struggle for an advantageous position between the parties that want to protect their market leading position on the one hand and the need of all parties to connect their subscribers with all other subscribers.
69. Every since the Bell Organization was stopped from absorbing all the opposition, the rights of the new entrant have needed legal protection. Promoting competition is at the heart of the need for a regulatory framework in modern telecommunications.

4.2.2 Regulatory Laws

70. A clear legal mandate is a prerequisite for transferring the telecommunications operations of a ministry to a SOE or to a private company. A set of headings found in most telecommunications regulatory laws is set out in Appendix 1. Modern laws take it for granted that most of the sector will be in private hands and SOEs organized and registered as normal companies. The Telecommunications law will set up a regulatory authority and authorize the regulatory body to oversee the sector.
71. The law that lays down the mandate for the regulator will also set the basic competition rules for the telecommunications sector. It should state the powers and responsibilities of the regulator in respect of the ministry, other government bodies and the judiciary. In many countries, the regulatory mandate is drawn very widely offering considerable flexibility. On the other hand, too wide a mandate can lead regulators to move into areas that do not need to be regulated and causing confusion over the real function of regulation. Interconnection
72. UNESCAP member States mostly now have a telecommunications law. Others such as Cambodia have been struggling for more than 10 years to update their law. In Myanmar, India and Bangladesh, some of the relevant laws are documents that have their origins in Colonial times.

4.2.3 Interconnection

73. The activities authorized by the operator's license and its obligations (e.g., regarding service standards and tariffs) are usually spelled out in the license or concession or in the company's articles of association, rather than in the telecommunications law, although the law may required them to be included in licenses. Many rules relate to interconnection.
74. The experience of UNESCAP countries has been that interconnection between networks is critical to the success of new entry and competition. If there is no regulatory intervention new, competitive service providers are likely find many obstacles in their way. New Zealand is the only developed country so far, to manage for several years without any regulation, but experienced extensive litigation over interconnection. However, even there, following a change of government the sector has been comprehensively re-regulated. Interconnection prices and rules were the fundamental issues driving the call for regulation.

75. A failure to interconnect is a classic example of discrimination. A fundamental telecommunications regulatory principle was that there should be non-discrimination. Some laws and the outline in Appendix 1 contain a non-discrimination clause. When only fixed line networks existed, the principle embodied in a rule that telephone companies would not interfere with or degrade service for customers of rival operators.
76. Today non-discriminatory regulation means that regulators must treat all networks equally, rather than distinguishing between the different technologies providing access, cable, fibre, wireless, power-line or DSL over copper wires. Discrimination often arises where one provider dominates the market.

4.2.4 Dominant Provider

77. While there are now mobile and Internet based options for telecommunications users monopolistic aspects of the sector remain important, including gateway and routing facilities, expensive to replicate networks and often a lack of alternatives to the local loop.
78. One of the main reasons why countries regulate interconnection is that, a dominant telecommunications provider, like the Bell Organization mentioned above, may use its dominance of these facilities to restrict competition. It also may have an incentive to raise prices, restrict output, refuse interconnection and discriminate among users.
79. Some laws make a leap from the reality that some providers are dominant and say that any dominant company must by virtue of dominance subject itself to regulation and have its activities curtailed. However, the company may be dominant because it has invested substantially more than its competitors have. It may offer better payment plans, or simply the quality of its technology offerings may be better than from other companies.
80. Curtailing an efficient firm in favour of inefficient competitors will result in a net reduction of public welfare. For that reason, much of competitive regulation focuses on promoting competition after determining whether a dominant operator is abusing its dominant position. This analysis determines the existence or otherwise of Significant Market Power (SMP).

4.2.5 Significant Market Power

81. Jurisdictions that distinguish operators that are dominant from those that abuse their SMP to reduce competition, empower their regulators to investigate dominance. The regulator by its own motion or following a complaint may determine whether the company is operating its business in such a way that it is exercising SMP to create barriers to competition.
82. The empowering law will require the regulator to use a public process to define the market or markets in which the complainant alleges the existence of SMP. Having determined the market, the regulator will identify the technical and practical potential for competition in that market. The potential for competition they compare with the existing situation in the relevant market or the markets.
83. If there is the potential for competition, but no or limited competition the regulator will then determine whether the Licensee has the ability in that market or markets to increase profits by imposing a "small but significant and non-transitory increase in price" (a SSNIP) above the price level that would obtain in a competitive market.
84. The existence of SMP and the power to impose a SSNIP are the building blocks for a remedial measure. If the regulator finds a company has SMP it may take steps to offset the impact of that market power upon other companies. If the regulator finds

that the company has SMP and has created barriers to competition in the market, it must assess whether any regulation would promote competition in that market.

85. Before imposing a regulation, the regulator will still need to assess whether the overall benefits of regulation outweigh the costs of regulation to the Licensee, the regulator and any other affected parties. This should include the cost of reductions in competition and the increase in the regulatory risk perceived by potential market entrants. The regulator may decide to refrain from action unless the benefits of regulation substantially outweigh the benefits of no regulation. For the sector to accept the decisions, the basis of this decision should be transparent.
86. Many UNESCAP countries are contemplating adopting SMP rules and many, such as New Zealand use a SSNIP rule as a basis for regulatory decisions.

4.2.6 Transparency

87. Telecommunications is capital-intensive with long lead times for new facilities and cost recovery. Investors need fair rules and stability to recover their money and make a profit. New entrants confident of fair and equal treatment under established rules and transparent procedures, create the most important preconditions for investment.
88. The reverse is also true. If rules are consistently bent to award contracts to favoured parties the average quality of potential investors may fall to the detriment of the quality of service and the quality of infrastructure installed.
89. Support for the regulator from companies in the sector and its ability to act in the general public interest are to a large extent dependent upon the manner in which the regulator makes decisions (i.e. the process it employs). The regulator needs to recognize the limits of regulatory influence on a market. Even a competent regulatory decision will not be accepted unless it is supported by relevant facts and figures.
90. There is a scope to employ conferences and seminars and similar information sharing opportunities to foster participation by the operators in regulatory decisions. When difficult decisions have to be made the issuing of consultative documents add confidence that the regulator is taking the matter seriously and giving due consideration to all points of view.
91. Transparency also requires that Governments should not hide behind their regulator. Some regulatory laws focus on the appointment of the commission and its terms and conditions, but the detail of the limitations on the powers of the Commission are briefly stated and unclear¹⁴. Similarly, issues such as the extent of foreign ownership are political policy issues. Governments should not hand them to regulators to determine¹⁵.
92. A fair and transparent regulatory process is likely to enhance the regulator's autonomy and effectiveness and is sensible because it is respectful of the rights of regulated parties and exercises due courtesy. Many UNESCAP countries have laws providing transparent processes. In the case of Malaysia the 1998 Act¹⁶ provided a great deal of transparency. Although the Commission set up by the law was an advisory body to the Minister, if the minister rejected its decisions he had to publish his reasons why.

4.2.7 Licensing

93. Competitive regulation brought with it a new set of challenges. If competitors are allowed, how many should there be and how to select them? Should there be licenses

¹⁴ An early draft of the Thai Regulatory Law, 2001 is one case. Subsequently, the mandate of the regulator has been more clearly defined.

¹⁵ Various drafts of the Cambodian Telecommunications Law give this function to the regulator.

¹⁶ Communications and Multimedia Act of 1998

restricting the number of entrants to the sector? If so, how should the regulator allocate licenses? Should new competitors be encouraged to enter the market and if so what encouragement is required?

94. Some large jurisdictions, such as the EU, no longer require operating licenses. In countries with slowly developing legal systems, investors like licenses as an added layer of security against the seizure of their assets. Mobile companies need access to spectrum to operation and in many cases spectrum allocations are incorporated in the licenses.
95. While offering maximum security to the license holder including spectrum in the operating license substantially reduces the flexibility of the system. For this reason, many jurisdictions now issue individual licenses for spectrum separate from the operating license.
96. Well-qualified and well-financed operators can have a positive impact on the overall performance of the telecommunications sector. The licenses they receive may have very high value. A fair and quality focused selection process is an important national objective. Various methods allocation methods are used: (i) first come; first served, (ii) direct allocation, (ii) lottery or (iii) competitive bidding.
97. **First Come, first served** (FCFS) is where a license is issued to the first party to ask for it. While not official policy anywhere, there are jurisdictions where licenses are available to anyone at a price. FCFS has the disadvantage of not providing for the systematic review of alternative applicants and proposals. Unsolicited offers of this kind need careful consideration and having alternatives available increases the bargaining power of the party issuing the license. A process that allows unsolicited offers may provide the basis for allegations of corruption undermining the regulator's legitimacy.
98. **Lottery** is a fairer method and avoids some of the risks of FCFS. A Lottery approach recognises that the regulator may not be able to make a merit based distinction between the applicants. However, it has the danger that licenses could end up in companies with no intention or capability to provide service. Some lottery winning licensees quickly sold them to other parties. In these cases, the scarcity value of the licenses went to the lottery winners. For this reason lottery is seldom used.
99. **Competitive Bidding** is the most transparent process and thereby gives legitimacy to the award. Fair, well managed bidding processes, tend to select the applicant that can create the most value in providing the service. Since this approach involves paying the government for the license, it not only results in very wealth transfer to the government (and citizens), it also creates a strong incentive for the franchisor to invest quickly to provide service in order to recoup the money paid for the license.

4.2.8 Multi-Service Licensing

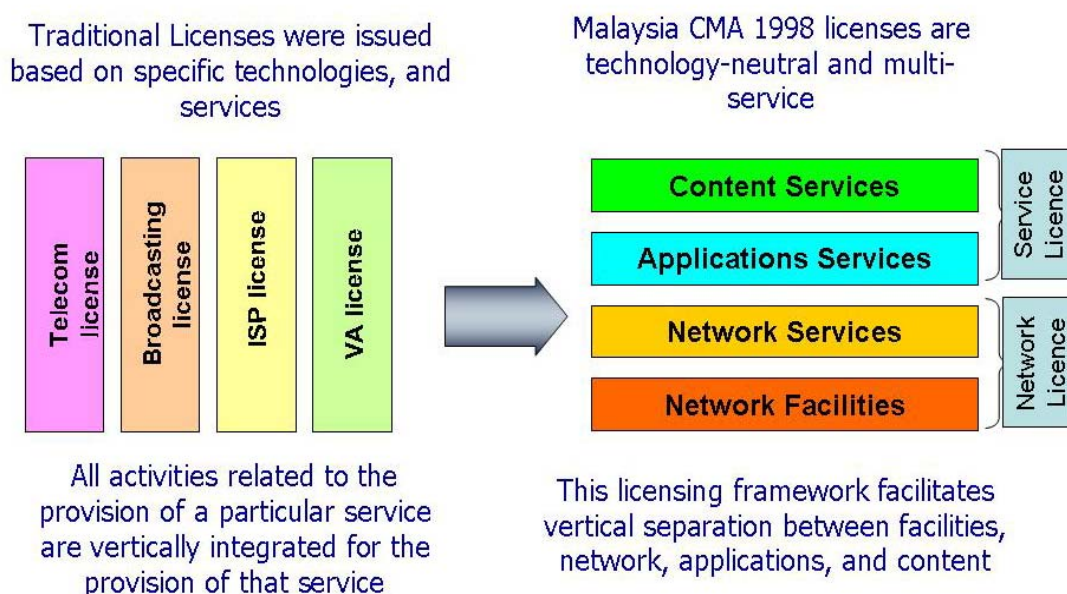
100. The biggest drawback of regulation of any kind is that with the rapid advance of technology it can quickly become inflexible. For most of the last thirty years, regulators have issued licenses based on specific technologies. Every time a company introduces a new service, it has to obtain an additional license.
101. The 1998 Malaysian legislation began a trend away from licensing by technology. For the first time in Asia, the authorities licensed companies to provide network services or customer services or both. Sometimes called "horizontal regulation, but most appropriately called multi-service regulation these licences are completely neutral with respect to technology.
102. Figure 5 illustrates the difference. Instead of licensing each technology separately, the regulator issues the company with a license to offer services and to operate a network.

Some companies will have both licenses others will have one or the other. In each case the license authorises the company to offer the whole range of service.

103. The Malaysian Act reflects the interrelated effects of technology, economics and regulation that are rapidly changing the structure of telecom markets. For its time this legislation was very forward looking. The subsequent explosion in the use of Internet based technologies has only confirmed the appropriateness of the approach. Four major structural changes have effected transformation:

- Network Infrastructure Facilities enable telecom connections. This includes cables, wires, microwave towers, mobile cells and satellites.
- Network Management, standards and protocols permit the routing and determine the technical quality of network services; Internet Protocol (IP) switching permits unbundling of network services from infrastructure facilities.
- Applications Service represents the provision of Communications Services using IP (previously referred to as Value-added services, because it did not include the basic public voice service) but now includes all types of communications.
- Content is the Information Services, such as websites, that are accessible on a network using IP¹⁷.

Figure 5: Technology Specific to Multi-Service Regulation



104. These layers facilitate new opportunities for increased participation by new service providers with a variety of offerings using a common converged digital platform. Digitalization and the expansion of network capacities enable convergence of a wide range of services onto the same infrastructure. IT transmission, telecommunications and broadcasting all use the same network, transmitting similar digital signals.

105. Some UNESCAP jurisdictions, e.g. Singapore have two different licenses: one for Facilities Based Operators (FBO), which licenses them to operate facilities and provide services. The other is for Service Based Operators (SBO) for operators that use

¹⁷ See *ICT Regulation Toolkit, Module 7: New Technologies and Their Impacts on Regulation*, Technical University of Denmark 2007

facilities provided by other carriers. This configuration is compatible with IP technology. It is leading to experiments with shared infrastructure and outsourcing.

4.3 Behavioural and Structural Regulation

4.3.1 Behavioural Regulation

106. Given the origins of telecommunications regulation in the United States with the monopoly, regulatory model, much early regulation focused on BEHAVIOURAL regulation.
107. In Behavioural regulation, the regulator set out to alter the behaviour of the regulated party, contrary to the financial incentives that party faced. Price controls, quality of service standards and equipment type approvals are all examples of behavioural regulation. To change behaviour it used the threat of prosecution or penalties. There was the final threat of the loss of a license.
108. Old style licensing and behavioural regulation may also often have vague underlying principles, leaving all the difficult issues for the regulator to determine. Regulators were often required to set a "fair and just price", with no further guidance.
109. Behavioural regulation's lack of focus on competition led to strange decisions. It led in at least one case to regulators debating whether they should license individual call boxes¹⁸. In another case, the regulator licenses call-centres, vehicle tracking and ISPs. These services USE telecommunications to provide end user services; they are not telecommunications providers of networks or exchanges as such.

4.3.2 Structural Regulation

110. Increasingly, the focus has moved to STRUCTURAL regulation or setting up the market structure so that the incentives faced by operators are supportive of competition and government policy objectives.
111. Changes in technology¹⁹ are important in driving this change in style of regulation. Traditional regulation was technology specific. Structural regulation is technology neutral. As technologies are converging on digital platforms it is easier to make general rules to cover all eventualities.
112. The principal objective of structural regulation is to increase the transparency between the cost of operating the network and the costs of the services provided to the consumer. In Europe, in 2007, the EU promoted Structural Regulation²⁰ as a way to increase competition in states where a strong fixed-line incumbent was frustrating the entry of new competitors to the sector. In Cambodia, in 2001, the idea Structural Regulation was a manageable response to the lack of regulatory capacity²¹. In Mongolia in 2005, the Hural (Parliament) passed a privatisation guideline that had an emphasis on structural separation as a way to economise on investment.
113. Fixed line incumbents opposed structural separation because they saw quite rightly that they would face additional competition and anticipated declining revenues and a need for additional investment in their networks. Mobile companies generally saw their network as their competitive advantage and also opposed separation through regulation

¹⁸ Witnessed in South East Asia in 2002

¹⁹ See for example: *Why a light touch is best*, The Economist print edition, May 26th 2005

²⁰ Finally embodied in the EU Electronic Communications Regulations 2009-12-18, Vol. 52 L337

²¹ *Cambodia: Networks, Services and Regulatory Reform*, University of Hong Kong, Telecommunications Project 2001

4.3.3 Separation by Outsourcing

114. Developing countries are approaching separation from a different angle. Their challenge is running the network profitably²². In Europe, mobile subscribers typically spend about US\$36 a month, or the average revenue per user (ARPU). In America SRPU is \$51 and in Japan \$57. But, in China it is only around \$10, in India less than \$7 (in some African countries even lower). With mobile phones get cheaper and more poor people subscribing, ARPUs are falling.
115. India, in particular has accepted the challenge by reducing costs. Despite ARPUs of \$6.50 and call charges of \$0.02 per minute, Indian operators have operating margins of around 40 percent comparable with leading operators. Outsourcing is the core of the model pioneered by Bharti Airtel, India's biggest mobile operator. Bharti's outsources all information-technology (IT) operations to IBM. Ericsson and Nokia Siemens Networks (NSN) handle its mobile network. Bharti outsources customer care to IBM and Indian firms.
116. Outsourcing passes many risks of coping with a growing subscriber base to other parties and leaves Bharti to concentrate on marketing and strategy. Bharti has outsourced network construction under a scheme known as "managed capacity" now copied by several Indian operators. When entering a new area, Bharti requests a certain amount of calling capacity and pays for it three months later at an agreed price per unit of capacity.
117. The equipment vendor handles the business of designing networks and putting up base stations. It has an incentive to build the network as cost effectively as possible. The vendors run a network with 25 percent fewer staff than an operator, keep operating expenses are around 15 percent lower than the would, if it were to build and run its network itself, and IT costs are around 30 lower²³.

4.3.4 Infrastructure Sharing

118. A second aspect of the Indian approach is infrastructure-sharing. Many countries regulate to encourage sharing to reduce the number of towers littering their cities. Tower-sharing happens in Britain and America and China and Bangladesh, have made sharing compulsory. In India, voluntary sharing has gone much further.
119. In 2007, three Indian operators, Bharti, Vodafone Essar and Idea Cellular, pooled 100,000 of their towers in a single company, Indus Towers. On average is about 1.5 operators use each tower. The arrangement saves the three companies having to find new sites and build their own towers. Indus Towers will also lease tower capacity to other operators.
120. Similarly, Reliance Communications set up its towers as a separate unit that will offer tower capacity to other operators. Sharing turns operators' assets into a source of new revenue. It allows the mobile operator to concentrate on serving customers. What is unusual about India is the extent of voluntary, market-led sharing as a way to reduce costs.
121. Other Indian innovations include "lifetime" prepaid schemes, in which customers pay a one-off fee and can then receive incoming calls indefinitely. It is widely recognised that for rural subscribers as many as 80 percent of calls originate in cities or even overseas. Recognition of this fact and turning it into a cost saving innovation is unique.

²² See: *The mother of Invention*, (network operators in the poor world are cutting costs and increasing access in innovative ways), *The Economist* September 24th 2009

²³ Ericsson say the Indian outsourcing model should be their model, because this firm developed it and first deployed it on a small scale in New Zealand.

4.3.5 Other Cost Saving Innovations

122. African operators, with many similar difficulties to those in India, have also devised some cost-lowering innovations. "Dynamic tariffing", pioneered by MTN involves adjusting the cost of calls every hour, in each network cell, depending on the level of usage. Customers can check on line the discount they are getting and this generates calls during low network use time.
123. Another African innovation "borderless roaming", introduced by Celtel (Zain) in late 2006 allows customers in Kenya, Tanzania and Uganda to move between these countries without paying roaming charges to make or receive calls and the ability to top up their calling credit in any country.
124. In China tower-sharing is mandatory. This helped reduce the cost of expanding into rural areas. The Chinese mobile operators are state-owned and the extension of coverage is co-ordinated from the centre. China uses its own particular strength as a low-cost manufacturer rather than the cost saving innovation seen in India.
125. In India in the first auction, for the right to build shared towers in 8,000 rural locations, the average subsidy requested was 35 percent, much less than expected. In the second auction, for the right to offer mobile services, many operators submitted zero bids or even negative ones—in effect offering to pay for the right to set up in rural areas. Subsidies required are small or zero because there is a business case in being present in rural areas first.
126. Vodafone and Telefónica agreed in March 2009 to share towers and other network infrastructure in four European countries. The confidence to do it at this scale, and with a competitor, came from India. The challenge facing UNESCAP now is to encourage operators to apply these cost-saving lessons to connecting the world's remaining 3 billion people and achieving universal mobile coverage. Appropriate regulation can help.

4.3.6 Regulatory Implications

127. In the early days of liberalisation, some regulators prohibited facilities sharing²⁴. We have now turned the full circle; regulations now seek to promote it in the name of competition. However, many regulators still lack a focus on competition. There are practical issues, such as language and access to the internet, that make it difficult for developing country regulators to keep up with changes in technology, regulatory styles and even readily available new magazines. It is not surprising that old styles of regulation remain potential impediments to development.
128. Even in developed countries, many regulatory decisions remain based on three assumptions about the sector that no longer reflect reality. Some regulators assume that telecommunications mainly concerns voice calls. They also act as if telecommunications networks remain natural monopolies. Thirdly, they assume the firm that owns the network also provides the service.
129. Broadband technology in particular has made all three assumptions invalid. Networks now carry voice, video, data and a long list of other services. They also provide most customers with a choice of ways to get on to the network, fixed line, the Internet, through a computer or a mobile phone. In addition, there are wholesale carriers in the market, which mean that when a subscriber makes a call from Bangkok to London, the originating service provider may have no idea which networks are passing the call to the terminating network.

²⁴ The early British legislation prohibited sharing. The result of some crafty lobbying, this rule reputedly set back the cause of competition by several years.

130. While networks have monopolistic characteristics and are expensive to reproduce, with the availability of excess capacity that network owners are keen to resell, the age of monopoly telecommunications networks is transforming quickly. The reselling of excess capacity at bargain prices was the foundation of Internet telephony. This has led to a rapid technology driven decoupling of the firm that owns the physical network from the company that supplies the services that run across it. This in turn has led to outsourcing network management and the creation of opportunities for wholesaling traffic. According to some estimates, in Europe €123 billion could be saved by sharing networks²⁵.
131. In an environment of rapidly changing technology, it seems futile for regulators to try and second-guess the emergence of particular services. The Internet provides a good model for the future. In the 1970s, the designers of the Internet deliberately made it simple and did not design support for specific services into its architecture. This approach opened the opportunity for innovation, both commercial and technological. The first priority of telecoms regulators, particularly among UNESCAP member States should be to facilitate innovation. This means as far as possible "keeping hands off".

4.4 Tariffs

132. The type of tariff rules applied to telecommunications operators also significantly affects the regulatory process. Originally, there were two main approaches: a rate-base approach, or price caps. The rate-base approach allows the operator a maximum allowable return on a specified base of capital invested to provide service (i.e., the rate base). This has been the most common approach in North America's privately provided services.

4.4.1 Rate Base

133. The rate-base approach was successful in generating the capital required for the development of the telecommunications sector in North America. However, it is labour-intensive work for the regulator. The dominant carrier's accounts need to be studied to ascertain the allowable rate base (i.e. the percent of return allowed on the asset base agreed by the regulator to be the appropriate basis for calculating a rate of return).
134. More than anything the "cost-plus" nature of rate-base regulation in North America provided little incentive for productivity improvements or innovation. The regulated party had an incentive to "gold-plate investments" to magnify the size of the rate base so the subscriber paid twice: unnecessary investment and higher charges to pay for that investment.

4.4.2 Price Cap

135. The shortcomings of rate-base regulation increased support for the price-cap approach." The main benefit of a price caps is that the cap provides a significant degree of automaticity to price adjustments. Regulators need not police carrier costs to keep rates reasonable. Rather, regulators fix rates directly by setting a "cap" on the carrier's prices for a given period. The cap is the consumer price index (CPI) minus an "x" factor where x is an estimate of the carrier's expected annual productivity gain in comparison to the economy as a whole.
136. Price caps reduce both the detailed investigation and the political pressures on regulators. Deciding which bundles of services to cap, whether to cap different bundles of services, the size of the x, how frequently to revise caps; these are difficult decisions. With parameters of the cap resolved, tariffs lose political scrutiny until the cap revision

²⁵ See *Wholesale Salvation*, Bear and Sterns, Report on Telecommunications in Europe, 2006-08-18

takes place at three to five year intervals. Not only is the role of the regulator simplified, it creates a degree of regulatory certainty unavailable under a rate base approach.

4.4.3 Modern Pricing Policies

137. Modern regulatory practices are moving away from price setting and many sectors are managing without price controls. In an environment where there are more than two or three mobile companies competing with a fixed line operator for voice calls there seems to be little point in tariff regulation. Competition is the principal regulator of economic activity and it is as effective in telephone calls as it is with other goods and services.
138. In New Zealand, in the total absence of regulation, the price of a national toll call came down by 70 percent and for international calls came down by 60 percent during the 10 years from 1984-1994. For much of this time there was little actual competition. Falling prices were a response to the THREAT of competition because at that time anyone could set up a telecommunications company and offer services, no license was required. This experience shows that "cutting prices keeps competition out".
139. Mobitel Cambodia noted²⁶ that in the five years to 2007 mobile call prices fell by 78 percent, interconnect rates at 4.65c were comparable to benchmarks with other countries and at the same time access to mobile networks grew fast as operators competed in rural areas. This was a case where four mobile companies, later seven and now nine, competed for a total market of up to 6 million subscribers. Similar stories are available from around the region.
140. Many countries in the region confine price regulation to monitoring the prices charged by companies, requiring notification of tariff changes to the regulatory agency or confining regulation to networks owned by one party and used by others.
141. The principal losers from price regulation tend to be the fixed line operators owned by the respective governments. There is always a temptation to keep fixed line charges low in the belief that this will assist the poor. In fact, uneconomic rates destroy the capital of the regulated company, depriving it of the capital it needs to modernize and compete effectively²⁷.

4.5 Regulatory Fees or Taxation

4.5.1 Cost of Operation

142. In many countries, traditional practice was that the national budget would pay for all aspects of public administration, including sector regulation. If citizens funded functions such as defence, police, courts and prisons by voluntary contributions "free loaders" will get off with paying nothing and good citizens who meet their obligations will end up paying more.
143. As government budgets have come under pressure, governments now cover more and more costs with user charges (departure taxes at airport, fees for court documents, airport landing fees and bio-security etc). In each case, the cost of sector regulation is now a charge on the sector regulated as a cost of the business.

²⁶ CamGSM response to stakeholder consultation 26 September 2007, David Spriggs, General Manager, Mobitel

²⁷ In Mongolia price controls on Telecom Mongolia kept fixed line rates below the cost of services provision. In Cambodia in 2001, price controls on MPTC (later Telecom Cambodia) and a large number of post-paid subscribers who did not pay their bills, meant that each interconnected call caused the fixed line company to lose money.

144. A competitive telecommunications sector functions best if there is a neutral referee to help resolve disputes and lay down the rules under which competition will operate. Regulation of the sector by an impartial referee is part of the cost of operating the sector competitively.
145. It is fair that companies regulated should help defray the regulator's costs by a "user charge" imposed to cover the cost of regulation. However, there has to be a balance between reasonable recovery of costs and the extent to which the revenues contribute to the national budget.

4.5.2 Pay for What?

146. In most countries fees and charges seems to have evolved over time. As regulators issue licenses to cover particular technologies they implement charges when that technology comes into use. Charges may bear no relationship with previous technologies.
147. It is appropriate that regulators should develop a framework for setting fees and charges in fair, transparent, consistent and non-discriminatory way. A lead into this analysis is to ask what regulators expect sector operators to pay for? There are five areas where operators can anticipate regulators calling on them to pay contributions towards to the cost the sector imposes on the institutions of the state:
- Government Policy Functions
 - Universal Service Levy
 - License – Operator's License
 - License – Spectrum
 - Overall Regulatory Costs (not included above)
- Table 1 illustrates a generic model illustrating the distinctions between the methods used to justify governments taking revenue from telecommunications sectors and shows the probable sources of revenue taken.

4.5.3 Framework for Fees and Charges

Table 1: Generic Model of Fees and Charges

Revenue Justification	Regulator's Revenue Source		
	Property Rights	User Pays	Taxation
Government Policy Functions			budget payment to regulator
Universal Service Levy		levy based on capital budget	
License – Operator's License	property right	one off payment plus annual charge	
License – Spectrum	property right	one off payment plus annual charge	
Overall Regulatory Costs (not included above)		levy based on cost of regulatory operations	
Revenue Share			% of gross revenue payment i.e. tax

148. Government Policy Functions: Policy functions are a prime responsibility of the central government. In most countries, governments pay for policy advice primarily through the budget of the relevant ministry. It is international best practice that if the

government seeks policy advice from a regulator it is appropriate that the government should pay for that service, however, this seldom happens in practice.

149. Universal Service Levy: In many countries, the sector is required to contribute to a Universal Service Obligation (USO). This is normally a charge on the sector as it is a capital cost to network expansion. In countries where several companies serve rural areas there is seldom a universal service obligation (USO) policy in operation and none of the fees and charges should be attributed to a USO if one does not exist.
150. Operator's License - License fees: In respect of the Operator's License, License Fee and Spectrum License these have both *property right* and *operational* implications.
 - Overall Regulatory Costs: Regulatory Operation Costs, Annual License Fee and Spectrum Annual Fee are Annual Fees paid by the operator. The size of these is policy matter but international best practice would indicate that these should reflect the costs borne by the regulator.
 - The Property Right: by contrast the licensee purchases a license (a PROPERTY RIGHT) enabling it to operate a business. The regulator determines the price in some cases or may determine it by the market in a competitive auction (subject to safeguards, e.g. requiring purchasers of licences to use that licence within a set time – "use it or lose it").
 - Spectrum License fees: The same principle applies in respect of Spectrum. In most countries, spectrum ALLOCATIONS are handled separately. A different department of the regulatory authority manages the spectrum and offers available spectrum for competitive bids to obtain the best financial benefit for the country. As in respect of licenses, spectrum is a PROPERTY RIGHT. It is best allocated for use by auction. The money paid by operators for access to spectrum benefits all citizens. Issuing spectrum separately also enables the regulatory authorities to assess the relative national benefits. Safeguards such as "use it or lose it" requirements are put in place to ensure that speculators do not squat on spectrum in the hope that its price will rise.
151. Revenue Shares are a sector specific tax and are a policy matter. In most countries, revenue sharing was introduced because prior to corporatisation or privatisation of the telephone company all telecom revenue appeared in the national budget. Governments feared that the new state company may make losses. Revenue shares were to ensure that national budget contributions were the first change on the revenue stream.
152. As most telecommunications enterprises, particularly mobiles, are now in the private sector the revenue share policy is unequivocally an aspect of national taxation policy. Appendix 2 shows how different countries handle revenue sharing as a percentage of the income from the operators. In most developed countries, telecommunications companies only pay normal taxation of a regular company

4.5.4 Future Fees and Revenue Sharing

153. The Asian and the Pacific region is a text book example of the wisdom of low tariffs and high turnover. Competition led to lower tariffs and low tariffs have dramatically expanded the market for telephony from as little as 1 subscriber per hundred of population to 50 percent or more.
154. This increase in the size of the market has increased the revenue to the government as normal company and value added taxes have captured large portions of company revenue. In some cases special sector taxes have collected even more, Bangladesh, for example, is taking as much as 8 percent of all government revenue from the telecommunications sector. There are doubts as to how sustainable this level of

contribution will be as 6 of 7 mobile companies and all fixed line companies report that they are loss making.

155. The rates of fees, charges and revenue shares are political decision. However, charges imposed on the principle of non-discrimination should impose equally on all operators across the whole sector.

4.5.5 Focused Regulation

156. In most markets, retail competition is sufficient to permit the removal of price regulation. The importance of backbone networks means that any price regulation may need to focus on monopolistic aspects of wholesale markets. Termination and roaming charges are monopolistic in the sense that there is only one supplier for each call.
157. Convergence of services and networks, discussed in paragraph 4.2.8 above necessitates convergence of pricing schemes. As long as telecom service products are clearly distinguishable and serve different purposes, different pricing schemes can co-exist. The problems arise when new service applications such as VoIP and IPTV become more widespread.
158. The fact that substitutes for as Plain Old Telephone Service (POTS) are using very different and usually unregulated pricing schemes complicates regulation of prices for traditional telecom products. This threatens the underlying business model for the provision of fixed voice telephony. Operators will need to redesign pricing schemes by the introduction of a flat rate or substantial reductions in usage charges.
159. Operators can recoup substantial reductions in revenue from POTS through higher subscription charges, capacity charges or by usage charges. Revenues from the provision of Internet access are likely to be offset losses in POTS revenues. Most of these revenues will go to other infrastructure providers, e.g., cable operators, electricity companies, or providers of wireless access.
160. While competition will be the retail price regulator of the future, there may be an ongoing need to investigate abuse of SMP and to monitor termination charges for price fixing and collusion.

5. Asian Experience

5.1 Regional Problems with Regulation

161. While the principles of efficient telecommunications regulation are well known and discussed extensively over many years, regulation in many UNESCAP member States falls short of best practice. These problems extend to developing countries.

5.1.1 Independence

162. In some countries, like Cambodia and Myanmar, policy and regulation remain inside the ministry. A unified ministry conflicts with the principles of regulatory functional separation (enunciated in paragraph 50 above). It may also undermine the independence of the regulatory process in relation to the political system.
163. A regulator either within a ministry or if separate lacking a firm legal mandate or political independence, will inhibit efficient regulation. Problems pile up and the sector's investment patterns become distorted. Independent regulation is best practice in Asia and the Pacific as elsewhere. How to achieve independence may vary.

5.1.2 Mission

164. The lack of a mission statement or clear guidelines on the functions of the Commission may be indicators of a lack of regulatory independence. Unless there is a clear, agreed mandate, there is an organizational tendency for regulatory agencies to become dependent on political authorities for policy directions. This will undermine the respect for the regulator and defeat the objective of functional separation.

5.1.3 Technical Expertise

165. Efficient regulation needs skilled staff and clear leadership. Leadership is important because on many occasions regulators will have to admit that while they can take action on the complaint before them, the cost of doing something will be substantially greater than the benefits of taking action or the cost of doing nothing at all.
166. In the days when electric signals passed down telephone wires, it was important that inappropriate equipment, with the potential to blow up expensive equipment should not connect to the network. This resulted in many countries introducing Type Approval systems so that any equipment passed fitness tests before approval for use. Malaysia has one of the most sophisticated laboratories in Asia, at SIRIM Berhad.
167. Type approval is beyond the expertise of most regulators and many countries can achieve all that is required by recognizing the approvals of a competent regional testing agency or of a major international operator. With changes to fibre optic cables using light pulses rather than electricity, if nobody in the sector is prepared to pay for type approval it is probably not necessary.

5.1.4 Regulatory Leadership

168. Leadership is also required to recognize where the regulator's employees lack essential technical experience and training. In a situation of rapidly falling prices, prices control is not a major priority. Where regulation is required, leaders can develop strategies to bring this information into the open while recognizing the limitations of analytical skills available.

169. Disclosure regimes in which put the onus on the companies to publish information about their activities brings information into the open, with little input required from the regulator. If there is more than one company, each will scrutinize the other's disclosure documents and comment on them.
170. The regulator can commission international expertise to analyze the various disclosure documents and report if the issue at hand is important. In Mongolia, rather than use regulatory regimes to create access to the local loop, the government set up its backbone network and the local loop it owned as an independent company with a mandate and incentive to offer access to everyone at the same rate.
171. Another problem occurs in some regulators, particularly where there are several full-time commissioners. Once basic policies and procedures are agreed and the staff trained to operate them, the commission only needs to meet monthly at most. If there are too many commissioners on the premises, they tend to get drawn into minor administrative matters. This has proven very destructive in several cases²⁸. This suggests that part time commissioners supported by a full-time executive director may be the optimum organisation for a regulator.

5.2 Country Examples

172. Many UNESCAP member States have experienced rapid growth in their telecommunications sector since 1994. This section looks at some of the countries in the region and seeks to assess their successes and failures in dealing with some of the major issues raised in the past. Some of the institutional information comes from Wikipedia Online Encyclopaedia, checked where possible from other sources.
173. In the following paragraphs, the introductory table provides a brief glimpse of the overall market in the respective countries. Most countries spend between 3 percent and 6 percent of GDP each year on electronic communications, mainly on telephony. Dividing 3 percent and 6 percent of GDP figures by the annual cost of maintaining a mobile phone for a year it is possible to arrive at a ballpark figure for the possible market for telephones. In previous studies, such as that described in 5.8.2 below, this mode of approximation has consistently outperformed other methods of market estimation.

5.3 China

Table 2: China

Country	China	Comments
Average Cost/ use pa US\$	130	Economist/Telegeography
Population	1,337,411,000	ESCAP Statistical Yearbook 2009
Subscribers	982,040,000	Calculation 2009
Fixed Lines	340,810,000	ESCAP Data 2009
Mobiles	641,230,000	ESCAP Data 2009
Potential Market (3%)	2,023,153,846	Estimate using PPP 3% GDP figures
Potential Market (6%)	4,046,307,692	Estimate using PPP 6% GDP figures
Growth of Market	1 million plus per week	CIA Factbook Figures 2009
Fixed Lines per 100 people	25.48	ESCAP Data 2009
Mobiles per 100 people	47.95	ESCAP Data 2009
Average annual + subscribers	52 million	Interpolated figures
Internet Users	298 million	CIA Factbook Figures 2009
Regulation	Ministry of Information Technology	2008

²⁸ Discussion with the CEO of ICASA South Africa in 2003

5.3.1 Introduction

174. The figures in Table 2 show the enormous impact of telecommunications in China. Mobile lines outnumber fixed by 2:1 (albeit a relatively low ratio for a developing country – this illustrates a relatively large fixed line business). Given the rate of growth in mobiles, it is probable that China is at about or has exceeded the figure of 3 percent of GDP spent on telecommunications. 6 percent of GDP on telecommunications is now an unlikely outcome. The Chinese telecommunication sector's growth rate was in excess of 20 percent a year between 1997 and 2009.
175. China fixed line and mobile operators invested an average of US\$ 25 billion on network infrastructure in recent years, more than all western European carriers *combined*. Only one out of ten Chinese citizens had a phone in 2000. Today more than one out of three have a fixed telephone subscription and more than 1.25 million cellular subscribers sign up in China every week.

5.3.2 Overview

176. Before 1994, the Ministry of Posts and Telecommunications (MTP) provided telecom services through its operational arm, China Telecom. Following pressured from other ministries and customers, the Chinese government started industry reforms in 1994 by introducing a new competitor: China Unicom.
177. In 1998, in a ministerial reorganization, the Ministry of Information Industry (MII) replaced MTP. The MII undertook two large scale reshuffling actions targeting competition for the state-monopoly. The Ministry of Industry and Information Technology (MIIT) established in March 2008 replaced MII and followed a process of gradual liberalization.
178. In 1999, China Telecom's business split into three (fixed-line, mobile and satellite). China Mobile and China Satcom, the mobile and satellite sectors. China Telecom retained a monopoly of fixed-line services.
179. In 2002, China Telecom split geographically into North and South: China Telecom. The North China Telecom kept 30 percent of the network resources and formed China Netcom (CNC) and China Telecom retained 70 percent of the resources of the new China Telecom. At the same time the telecommunications division of the Ministry of Railways (MOR) established a new company China Tie Tong.
180. In 2008, a further restructuring began designed to consolidate six telecom service operators into three, China Telecom, China Mobile and China Unicom, each providing both fixed-line and mobile services. Previously, the Chinese telecom industry had moved from a state-run monopoly to a state as main/controlling shareholder with monopolies maintained in geographic areas and technologies.

5.3.3 Principal Operators

181. China Telecom is one of the largest SOE in China, and one of the largest companies in the world. It runs land-line and mobile phone networks, operates a Personal Handy-phone System (PHS)²⁹, (marketed as Personal Access System (PAS)) and provides telecom network-based voice, data, multimedia and information services.
182. In 2008, the company acquired the CDMA network from China Unicom. It also provides broadband based on Ethernet and ADSL. In Jan 2009, China Telecom was one of the three companies having 3G license, CDMA2000.

²⁹ Mobile systems operating in the 1880–1930 MHz frequency band, used mainly in Japan, China, Taiwan Province of China, and some other Asian countries and territories.

183. China Mobile operates basic GSM services and value-added services such as General Packet Radio Service (GPRS) data transfer, a TD-SCDMA 3G network³⁰, IP telephony and multimedia; it ranks the first in the world in terms of network scale and customer base.
184. China Unicom merged with China Netcom in Oct 2008 and obtained WCDMA license in Jan 2009. The company offers mobile phone services, operates domestic and international landline network and provides broadband multimedia services, IP telephony and value-added services.
185. Other companies include China Satcom, formerly licensed to engage in all kind of satellite related services. In March 2009, the company's basic telephone services merged with China Telecom. Its satellite related services will merge with China DBSat. China Tie Tong formerly affiliated with the national rail network, merged with China Mobile in May 2008.
186. China Voice Holdings involved in broadcasting and IP telephony and satellite based high-speed Internet access is the largest corporation in conjunction with foreign owned corporations which hold many of the state run contracts for the Chinese government.

5.3.4 Issues and challenges

187. The MIIT is responsible, for regulations, allocating resources, granting licenses, supervising competition, promoting research and development and service quality as well as for developing tariff rates. Following WTO accession, China started to plan to adopt western-style telecommunications law and setting up an independent regulatory and arbitration body to deal with the telecom operators.
188. Prior to its WTO accession, China's policy protected the national emerging telecom industry as a national priority sector. Huge unmet demand for telephony in the booming Chinese economy has driven the expansion of the sector. From 2005, foreign investors could form joint ventures, investing up to 50 percent in Internet services in the whole country, up to 49 percent in the mobile sector in 17 major Chinese cities and up to 25 percent in fixed-line basic services in Beijing, Shanghai and Guangzhou.
189. The speed of the opening of the market and dividing the market by technology and region remain major issues with China's trading partners. The reliance on SOE as an ownership vehicle may pose a challenge to innovation, as they do not face the same cost pressures described in section 4.3 above. A ministry remains responsible for both policy and regulation and the distinction between business management and ownership may be unclear. Despite its lower income levels, lower literacy levels and smaller population, India expects its mobile market to be larger than that in China within ten years.
190. Notwithstanding these factors, China now has more Internet users than any other country and the reach of basic telephony is expanding fast. There is time during the next ten years for further liberalization to drive a further surge in growth, although as will be seen below, much of the intellectual capital driving that surge may come from India.

Sources include:

ESCAP Statistical Yearbook 2009

ESSCAP data on ICT for 2009

CIA Fact Book

Assessing the Development Model of China Telecommunications, Authors: Lee, Paul.

http://www.allacademic.com/meta/p_mla_apa_research_citation/1/7/1/5/1/pages_171-515

³⁰ GPRS data transfer is charged per megabyte of traffic transferred. Data communication via traditional circuit switching is billed per minute of connection time, whether or not the capacity is in an idle state.

5.4 India

Table 3: India

Country	India	Comments
Average Cost pa (USD)	90	Economist/TeleGrography
Population	1,181,412,000	ESCAP Statistical Yearbook 2009
Subscribers	384,790,000	Calculation
Fixed Lines	37,900,000	ESCAP Data 2009
Mobiles	346,890,000	ESCAP Data 2009
Potential Market (3%)	1,182,666,667	Estimate using PPP 3% GDP figures
Potential Market (6%)	2,365,333,333	Estimate using PPP 6% GDP figures
Fixed Lines /100 people	3.21	ESCAP Data 2009
Mobile per 100 people	29	ESCAP Data 2009
Average annual increase	50% per year	Calculation based on recent years
Internet Users	81,000,000	CIA Estimate 2009 ³¹
Regulation	Independent Regulator (TRAI)	Set up under statute

5.4.1 Introduction

191. Table 3 shows that India is now increasing its uptake of telephones faster than China the estimate of a market at 3 percent of GDP almost matching the actual number of subscribers. In one month alone, November 2009, operators added 17.65 million new subscribers. Given India's lower GDP per person and vigour with which Indian companies have addressed the issue of costs, an assumed annual cost of using a mobile phone of \$90 is appropriate. Six percent of GDP spent on telecommunications is a feasible but unlikely outcome.
192. Liberalization started in 1981 when Prime Minister Indira Ghandi signed contracts with Alcatel of France to merge with the state owned Telecom Company (ITI), in an effort to set up 5,000,000 lines per year. After the assassination of Indira Gandhi, under the leadership of her son Rajiv many technological developments took place, but foreign players were unable to participate in the telecommunications business.
193. Progress continued in 1994, when the Indian government introduced a National Telecommunications Policy that changed ownership, business management and regulation of ITI. Complete ownership of facilities was restricted only to the government owned organizations. After 1995, the government set up the Telecommunications Regulatory Authority of India (TRAI), which reduced the interference of Government in deciding tariffs and policy making.
194. During this period, the World Bank and ITU had advised the Indian Government to liberalize long distance services in order to release the monopoly of the state owned companies and to facilitate competition in the long distance carrier business, which would help reduce tariffs. The government instead liberalized the local services. It made a special effort to keep opposition parties committed to this policy by taking them into the government's confidence and assuring foreign involvement in the long distance business after 5 years. For cellular service, the government allowed two service providers and gave a 15 years license to each provider. During all these improvements, the government did face oppositions but manage to persevere.

195. Following political change in 1999, the new government introduced deeper liberalization policies. They functionally separated the ministry into two, one policy maker and the other service provider Department of Telecommunication Services (DTS), later renamed Videsh Sanchar Nigam Limited (VSNL). In April 2002, the government decided to cut its stake in VSNL from 53 percent to 26 percent and to throw it open for sale to private enterprises. TATA took a 25 percent stake.
196. After March 2000, the government adopted a more liberal stance and issuing licenses to private operators. The government reduced license fees for cellular service providers and increased the allowable stake to 74 percent for foreign companies. Because of all these factors, service fees reduced rapidly and the tariffs cut, enabling every common middle class family in India to afford a cell phone.

5.4.2 Overview

197. A large population, low telephony penetration levels and a rise in consumers' income and spending during years of strong economic growth have helped make India the fastest-growing telecom market in the world (albeit from a low base).
198. The former wholly state-owned incumbent VSNL, is the 7th largest telecom company in the world in terms of its number of subscribers. Subsequently, companies such as Vodafone, Bharti Airtel, Tata Indicom, Idea Cellular, Aircel and Loop Mobile have entered the market. So important has telephone become that in the years 2008-09, rural subscriber increases were greater than those from urban India. India's mobile phone market is the fastest growing, with record monthly totals of new customers.
199. The total number of telephones in India exceeded 543 million in Oct 2009. The overall tele-density exceeded forty four percent in November 2009. Total wireless subscribers are now more than 543.20 million. Consistent with patterns elsewhere, fixed line subscribers declined 0.13 million in November 2009.
200. The total subscriber base for Internet in India is 13.54 million. After economic liberalization in 1992, many private ISPs have entered the market, many with their own local loop and gateway infrastructures. The number of broadband connections in India has grown continuously since the beginning of 2006. At the end of November 2009, total broadband connections in the country have reached 7.57 million. Many ISPs advertise their service as broadband but don't offer the suggested speeds. Broadband in India is more expensive compared with Western Europe/ the United Kingdom and the United States, although they are comparable with rates in other parts of Asia
201. The growth of mobile technology has been the major feature of the Indian market. India has become one of the fastest-growing mobile markets in the world because of competition and falling prices. Mobile services were launched in August 1995 and in the initial years the average monthly subscribers additions were around 0.05 to 0.1 million. The total subscribers' base in December 2002 stood at 10.5 million. The most recent month saw an increase of more than 17 million. India now ranks second in mobile phone usage to China.

5.4.3 Issues and challenges

202. One of the main reasons for India's success has been the steadily falling tariffs. At the UNESCAP sub-regional workshops on expanding ICT access in October 2009, reports of innovation in India showed that although it would be expensive and difficult to roll out a completely new network, the expansion in rural areas of India became possible by a policy known as "PTB" - Power, Tower and Backhaul. UNESCAP urged member countries to learn from India's experience with infrastructure sharing and outsourcing of its IT infrastructure management as a way of leveraging additional services from already available facilities and ultimately maximizing productivity of the equipment. Section 4.3.3 above describes India's innovations in some detail in and it is now the

world intellectual leader in terms of seeking out ways to reduce the cost of delivering telephony to a large rural hinterland.

203. India is a prime example of a country that followed the line advanced by the World Bank and other international institutions in respect of corporatization and progressive liberalization. Liberalization has been a driver of service expansion, greater coverage and better quality and now is driving dramatic cost reductions using outsourcing of the management of networks to professional easement managers and network operators.
204. A critical step was to put space between the sector and the political infrastructure by separating policy and regulation. This had the effect of making it harder for politicians to influence regulatory decisions on behalf of constituents. The corporatization of the government owned operating company had a similar effect on that organization. Corporatization proved to be an intermediary step to privatization and this too has had the beneficial effect of making the sector more open to new approaches.
205. Given the need to offer service to the millions of Indians who had none, the private sector in Indian has proven to be very innovative in sharing infrastructure and economizing on investment. Outsourcing to professional asset managers has had an effect of allowing companies to provide maximum service with minimum investment – boosting revenues and profits in the process. India can still learn lessons from innovations in Africa, but has done extraordinarily well.

Sources:

ESCAP Statistical Yearbook 2009

ESSCAP data on ICT for 2009

CIA Fact Book

5.5 Republic of Korea

Table 4: Republic of Korea

Country	Republic of Korea	Comments
Average Cost pa (USD)	600	Assumption
Population	48,152,000	ESCAP Statistical Yearbook 2009
Subscribers	66,932,000	Calculation
Fixed Lines	21,325,000	ESCAP Data 2009
Mobiles	45,607,000	ESCAP Data 2009
Potential Market (3%)	67,150,000	Estimate using PPP 3% GDP figures
Potential Market (6%)	134,300,000	Estimate using PPP 6% GDP figures
Fixed Lines /100 people	44.29	ESCAP Data 2009
Mobile per 100 people	94.71	ESCAP Data 2009
Average annual increase	Saturated Market	
Internet Users	37,476,000	CIA Factbook Figures 2009
Regulation	Mixture of Ministry and Regulator	Set up under statute

5.5.1 Introduction

206. The figures in Table 4 show that Korea has one of the most developed telecommunications markets in the world. Although the country already has a mobile penetration rate of 95 per 100 people, at the 3 percent of GDP level of expenditure on telecommunications there remains scope for some additional expansion, at the assumed cost per annum of a connection. Korea has relatively high average incomes so 6 percent of GDP spent on telecommunications implies 2.6 phones per person so it is an unlikely outcome. Fixed lines remain important at nearly one for every two persons, but mobile subscribers exceed this by 2:1.

207. The Republic of Korea's success derived from a system of close government and business ties including directed credit and import restrictions. It also stemmed from favourable post war access to World markets, particularly the United States. From a very low base, Korean telecommunications services improved dramatically in the 1980s with the assistance of foreign partners and as a by-product of the development of the electronics industry. The number of telephones in use in 1987 reached 9.2 million, a considerable increase from 1980, when there were 2.8 million subscribers (which, in turn, was four times the number of subscribers in 1972).

5.5.2 Overview

208. Republic of Korea's progress was slowed by the 1997 Asian Financial Crisis; the worst in its post-war era. It resulted in an output fall of almost 7 per cent in 1998, a tripling of unemployment and a current account surplus of almost 13 per cent of GDP, primarily due to a sharp contraction in imports. The Crisis exposed longstanding weaknesses in Republic of Korea's development model. With the economic reforms implemented after the financial crisis, the information technology (IT) sector was one of several targeted and considered an important factor in the recovery of the nation's economy³².

209. License allocation was traditionally by a "beauty contest". This laid down a checklist of factors, met by a successful applicant. One of the criteria was "experience" making entry difficult for new competitors. In 2000, KT had 99 percent of fixed line business. However, its dominance was falling as more and more people used mobile phones. Controls on foreign ownership were relaxed post the 1997 crisis. Direct investment controls remained but were gradually relaxed.

210. Of particular importance is the popularity of mobile phones in Korea. The mobile sector was slow to develop. By the mid-1990s, only two million people were subscribers. However, very rapid growth took place in the late 1990s and early 2000s. With the world's first CDMA mobile phone service in 1996 and the availability of mobile number portability from 2004, the number of mobile subscriber reached 48 million in January 2010. Moreover, a large proportion of these subscribers used their mobile phones for data applications.

211. The three mobile operators based their 2G networks on CDMA technology, which allowed an incremental transition to the provision of data services. Republic of Koreans, were quick to take advantage of the more advanced data applications when they became available. SK's 45 percent market share merged in 2001 with the third player giving it a 57 percent share of the market. Everyone sees mobile phone and third generation as the key to future progress.

212. An important factor in Government telecommunications policy has been the economic and social policy aspect of telecommunications. Since the mid-1990s, the Ministry of Information and Communications (MIC) has pursued a policy of high-speed telecommunication infrastructure as a foundation to build a "knowledge-based society". In March 1995, Korea Information Infrastructure (KII) was established. KII's goal was to advance the nation's IT infrastructure. In August 1995, government enacted the Framework Act on Information Promotion.

213. In 1999, the government also implemented the program known as Cyber Korea 21, intended to accelerate IT development. It provided US\$77 million in loans with preferential rates to facilities service providers (FSP). In 2000, the Government provided another US\$77 million in loans for suburban areas, small cities and towns, and regional industrial areas. Another US\$926 million allocated until 2005 was to supply the rural areas with broadband.

³² UNESCAP (2009) [Korean Experience of Overcoming Economic Crisis through ICT Development](#) (WP7-2-909 / PB126886)

214. The government also introduced InVil (information network village building project) to address the “digital divide”, especially in rural area. The aim was to increase the availability of e-government services and to increase income levels of local residents by boosting regional economy through e-commerce aimed at an improved quality of life in rural communities and balanced national development.
215. The programme has involved building broadband Internet access, 358 IT centres, and PC distribution to the selected households. The communication network allows use of high-speed Internet with low costs, building home Internet systems provides high-performance PC to individual households. The total participation included 233,540 local residents in 79,279 households in 280 villages (as of 2006). PC penetration increased from 21.0 percent to 72.1 percent.
216. The Power Company, Powercom’s debut into broadband services in late 2005 put additional pressure on other providers. Republic of Korea’s broadband market, including cable modem, DSL, Fibre-to-the-Home, WLAN, WiFi, Broadband Wireless Local Loop, broadband via satellite and the much anticipated WiBro. A competitor to the dominant KT Hanaro acquired Thrunet, another competitor in early 2005 to compete more strongly against KT. The mobile operator SK Telecom acquired a controlling stake in Hanaro in 2008, renaming the company SK Broadband.
217. Partly resulting from all this active government policy, Republic of Korea now has the world’s highest number of broadband services per capita. By early 2009, over 30% of the population and nearly 85% of households were broadband subscribers. Deregulation has created a greater willingness among operators to invest in infrastructure and to be innovative, providing the basis for a booming telecoms market.
218. Of particular interest are the developments in broadband technologies. These include VDSL, the shift away from DSL and the move to FttH services. Powercom’s entry into the market, the development of mobile DMB services, the launch of WiBro services, the upgrading of 3G networks using HSDPA and the introduction of HSUPA. The remarkable penetration of broadband services in the community and the avid use made of these services has reinforced a trend away from basic fixed lines.
219. In 2009, the biggest telecommunication operator KT amalgamated with mobile operator KTF to cope with a depressed IT market and new convergence technology in 2009. Also, LGT, LG Powercom and LG Dacom amalgamated in 2009. Through the amalgamation of telecom operators, Republic of Korea’s IT market was reorganized into three main operators which can provide various wire, wireless and convergence services such as 3G mobile, VoIP, IPTV, FMC(Fixed Mobile Convergence), FMS(Fixed Mobile Substitution), Mobile IPTV. These mergers have led to greater competition among three major operators offering a full range of services. They have also laid the groundwork for the development of convergence and bundled services, such as 4PS (mobile telephony + Internet telephony + high speed Internet + IPTV) and FMC services.
220. In addition, the National Assembly passed the Telecommunications Business Act 2009, aiming to introduce Mobile Virtual Network Operators (MVNO) during 2010. This will also accelerate competition, in fields such as CATV. Policy makers expect finance and retail companies to expand their operations into the telecommunications market, actively launching convergence services between telecommunications and non-telecommunications sectors. Changes in the telecom market have led to promotion of convergence services, such as 4PS (fixed telephony + mobile telephony + high speed Internet + IPTV) and FMC services.

5.5.3 Issues and challenges

221. Economic growth in Republic of Korea moderated to about 4-5 percent per annum between 2003 and 2007. With the global economic downturn in late 2008, Republic of

Korean GDP growth slowed to 2.2 percent in 2008 and declined 0.8 percent in 2009. In the third quarter of 2009, the economy began to recover, in large part due to export growth, low interest rates and an expansionary fiscal policy.

222. The Republic of Korean economy's long term challenges remain. They include a rapidly aging population, an ongoing inflexibility in the labour market, and overdependence on manufacturing exports to drive economic growth. The substantial government investment in telecommunications, particularly in broadband has given Republic of Korea an enormous competitive advantage and has had a symbiotic relationship with the growth of electronics manufacturing and exports.
223. However, Korea is one of the most developed countries in Asia and the model that worked in the 1960s and 1970s does not transport readily to other countries. Similarly, most UNESCAP members cannot sustain the enormous investment in InVil, broadband and other economic and social policies. More thorough liberalisation and added competition may well have achieved similar results at a significantly lower cost, albeit over a longer time-frame. Korea has not faced the cost pressures that have led to the institutional innovations we have seen in India³³.
224. Policy makers are hoping that revived heated competition among telecom operators to will result in tariff reductions and enhanced services competition. Meanwhile, it is also necessary to reorganize the framework of telecommunications regulations, in order to encourage market entry of new service providers and to create innovative technologies and a variety of new services.
225. To this end, workable competition polices to protect late-comers are necessary, to gradually reduce policy support for late-comers, while continuing to enhance their competitiveness. In the mid-to long-term, a new framework of telecommunications regulations that reflects the new trend of convergence should be prepared to effectively respond to the convergence trend between telecom services, technologies and industries as well as between telecom and non-telecom industries. The ICT sector in Korea exhibits the same characteristic of many of its other sectors: a focus on expanding capacity; it remains to be seen if this has a long-term economic payoff.

Sources include:

ESCAP Statistical Yearbook 2009

ESCAP data on ICT for 2009

CIA Fact Book, <http://www.budde.com.au>

DBA – Report on Study Tour 2000, Sang-yirl Nam, KISDI, UNESCAP Seminar October 21-22, 2009

<http://www.marketresearch.com/product/display.asp?productid=1299377>

³³ In 2005, the author was surprised to read a media report where a minister described the already privatised KT as a "State Owned Enterprise."

5.6 Malaysia

Table 5: Malaysia

Country	Malaysia	Comments
Average Cost pa (USD)	450	Assumption
Population	27,014,000	ESCAP Statistical Yearbook 2009
Subscribers	32,005,000	Calculation
Fixed Lines	4,292,000	ESCAP Data 2009
Mobiles	27,713,000	ESCAP Data 2009
Potential Market (3%)	25,260,000	Below the actual figure
Potential Market (6%)	50,520,000	Unlikely situation 2 phones pp
Fixed Lines per 100 people	15.89	ESCAP Data 2009
Mobile per 100 people	102.59	ESCAP Download Data 2009
Average annual increase	Saturated Market	Mature Market No figure available
Internet Users	16,903,000	No figures for broadband available
Regulation	Malaysian Communication and Multimedia Commission (MCMC)	First Multi-Service Regulator

5.6.1 Introduction

226. Malaysia is also in the position where the number of subscribers already exceeds the number of people in the population. Long before the growth of the mobile phone sector Telkom Malaysia had taken advantage of the country's relatively compact geography and laid lines to most parts of the country. Given that Malaysia is already above the number of subscribers generated by the 3 percent of GDP calculation, its total market will lie somewhere between today's 31 million subscribers and the calculation of 45 million. The 6 percent potential market is an unlikely outcome.
227. The Malaysian government has generally taken an activist role in the development of telecommunications in the country and has adopted policies designed to encourage Malaysians to be telecommunications and technology literate and to be comfortable in a knowledge based economy. Large, state-funded infrastructure and training projects are characteristic of the government's policy. These include the Malaysia Multimedia Super Corridor (MSC) Malaysia's Silicon Valley, and the promotion of broadband services. The government's National Broadband Plan aims to extend high-speed access and content services nationwide and deepen usage. Most of the increase in subscribers will be based on broadband related services.

5.6.2 Overview

228. The Malaysian government has been heavily engaged in industrial policy for many sectors including telecommunications and information. The government liberalized Network services were in the early 1990s although critics view these early stages of market opening as being characterized by a regulatory environment that favoured political supporters, limited foreign investment and support for Telekom Malaysia, the incumbent state fixed-line network.
229. The Asian financial crisis of 1997-1998 forced a rethink and eventually stimulated an era of market restructuring. The government engineered a dramatic consolidation of the telecom services, effectively reducing it to three large players, but simultaneously introduced the institutional framework for progressive policy reform.
230. The critical step was setting up the Malaysian Communications and Multi-Media Commission as a sector regulator under the 1998 Act of the same name. The creation of MCMC has brought transparency and public accountability to technology sector

administration. The MCMC aims to facilitate the efficient allocation of resources such as skilled labour, capital, knowledge and national assets.

231. MCMC also aims to promote the development of capabilities and skills within Malaysia's convergence industries and to ensure information security and network reliability and integrity. Therefore, MCMC is a promoter of the communications and multimedia industry rather than a regulator in the traditional sense. However, the real significance of the 1998 Act was that it was the first identified instance in Asia of a system of multi-service licenses. It had as its goal the normalization of the telecommunications sector; eventually its regulation will be that of a normal sector. Although unique in the 1990s similar policies are now in place around the World.
232. Government owned Telekom Malaysia remains the sector leader. It has a nationwide full service network born from its period as the national monopoly and covers all regions. Despite partial privatisation, it still carries the national universal service obligation. Despite Malaysia's big project approach to infrastructure development, the Telekom has been slow to develop broadband networks in the local loop. Several national trunk and submarine optical fibre networks exist and companies can access fibres from Fiberail (a subsidiary of Malaysia Railway) as well as from front the electricity grid and from the national highways.
233. TM's effective monopoly over fixed line services, including broadband and Internet access services was also its weakness. There was little pressure from domestic competitors to innovate. Pressure came instead from falling international revenues and Malaysia's commitments to the WTO to open its market and create an independent regulator. TM's strategy is falling in line as it plans a migration to Next Generation Network, the bundling of domestic services such as telephony and Internet access and a restructuring of its services into wholesale and retail divisions.
234. Telekom Malaysia is looking in its regional hinterland for expansion and improved standing among equity investment analysts. It has made investments in Bangladesh, Cambodia, Indonesia and Pakistan. It has now set up Axiata as a subsidiary company of Telecom Malaysia International to manage these investments. It is difficult to discern a business strategy behind these moves as all the above mentioned markets face challenges with major institutional weaknesses.
235. The continued close ties between Government and Telekom on the one hand, and Telekom's dominance on the other hand leave few choices for MCMC. The MCMC has asserted the importance of competition promoting clauses in Telekom's license and has assumed powers to impose fines. Both political and industry influence on the sector remains strong, but the solid legislative framework for regulation ensures that MCMC remains an effective body.

5.6.3 Issues and challenges

236. Malaysia has simultaneously been a leader in institutional development while relatively slow to use competition to shape its telecommunications sector. The tendency to support and maintain the fixed line monopoly for Telekom Malaysia may have set the sector back and slowed the introduction of broadband both fixed and wireless. There was government support to the reduction in the number of companies in the sector from six to an effective three.
237. With recent intensive efforts to boost Malaysia's investment in ICT for the third year in a row it gained the highest score for deployment and usage among 25 resource and efficiency-driven countries in the Nokia Siemens Network's Connectivity Scorecard 2010. The Scorecard is a global ICT index, an annual study which ranks countries not only on their deployment of ICT infrastructure but also measures the extent to which governments, businesses and consumers make use of useful connectivity technologies to enhance social and economic prosperity. Malaysia topped the group of resource

driven economies with a score of 7.14 ahead of South Africa (6.18), Chile (6.06), Argentina (5.9) and Russia (5.82), which made up the rest of the top five.

238. Malaysia has traditionally been sensitive to allowing majority owned foreign companies into the sector. The benefits that competition from new companies with new technologies will bring in terms of a more flexible, customer focused and dynamic sector may in future outweigh concerns that exist about the dangers of allowing foreign companies into the sector.
239. Compared with its neighbours, Malaysia has a sound system with a strong base in the fixed line business. Ongoing government support to the incumbent operator may reduce the dynamism of the sector. This would carry long term costs for Malaysia, as it is in the dynamism to reduce costs (as in India) and the drive to survive vigorous competition that is stimulating progress in some of the smaller neighbouring countries.

Sources include:

ESCAP Statistical Yearbook 2009; ESCAP data on ICT for 2009

CIA Fact Book 2009, Malaysia Telecom Brief 2005, Network Dynamics

Telkom Malaysia, MCMC

5.7 Mongolia

Table 6: Mongolia

Country	Mongolia	Comments
Average cost pa (USD)	250	Assumption
Population	2,641,000	ESCAP Statistical Yearbook 2009
Subscribers	1,164,000	Calculation
Fixed Lines	165,000	ESCAP Data 2009
Mobiles	999,000	ESCAP DData 2009
Potential Market (3%)	1,257,600	Estimate using PPP 3% GDP figures
Potential Market (6%)	2,515,200	Estimate using PPP 6% GDP figures
Fixed Lines per 100 people	6.25	ESCAP Data 2009
Mobile per 100 people	37.82	ESCAP Data 2009
Average Annual Increase		No figures available
Internet Users	330,000	CIA Figures 2009 ³⁴
Regulation	Communication Regulatory Commission (CRC)	Nominally Independent

5.7.1 Introduction

240. The analysis above shows that Mongolia has a very high uptake for mobile telephones with nearly half of the population already mobile subscribers. By contrast, fixed line numbers are small and barely increased. The growth of the mining sector has undoubtedly been a factor in development as the existing subscriber numbers are those for a country that spends 6 percent of its GDP on telecommunications.
241. The Mongolian telecommunications system is characterised by low fixed-line density, multiple mobile cellular service providers with subscribership increasing rapidly. Fibre-optic networks exist widely and they are increasing broadband uptake and communication services between major urban centres with multiple companies providing inter-city fibre-optic cable services.

³⁴ <https://www.cia.gov/library/publications/the-world-factbook/geos/my.html>

5.7.2 Overview

242. In an effort to speed up the pace of telecommunications sector reform, in 1995 the Mongolian Government (with the assistance of the World Bank) privatised 40 percent of its then telecommunications monopoly, Mongolian Telecom Corporation (MT) to Korea Telecom (KT) for US\$ 4.5 million. As MTC was using equipment donated by the Japanese Government it was not possible to privatise equipment so all major switches, gateways and backbone infrastructure were placed in another company, whose assets were then leased to MTC for 20 years.
243. Within months of the deal being signed Mobicom Corporation was incorporated in 18th March of 1996 as a Mongolian-Japanese joint venture to become the first operator to introduce cellular telecommunication services to Mongolia. Mongolian Newcom Company has a 40 percent share and Japanese corporations Sumitomo and KDDI the balance. It quickly became the largest provider of telephony in Mongolia and currently provides a wide range of services including GSM cellular, international, Internet, satellite communications, wireless local loop or WLL and other services for both corporate and personal customers.
244. Three years later, the Communications Regulatory Commission for the Mongolian Government selected Skytel Co., Ltd, for a mobile telecommunications license tender to run the second mobile telecommunication service with CDMA technology. Skytel is a joint venture between the Korean companies SKT and Taihan Electric Wire, and the Mongolian UnivCom."
245. New entry had the effect of breaking the monopoly enjoyed by MT while simultaneously KT was both upgrading its technical capability. However, despite the lease of government assets to MTC for 20 years MT was placed poorly to compete and develop. While the joint venture with KT had many advantages, it was not flexible enough to cope with the new situation.
246. At least three advisers suggested sale of the paper company and its assets to MT and privatisation. Finally, in 2005, the Hural (parliament) passed a privatisation resolution in favour of a network only company (later called the Information Communications Networking Company - ICNC) and service only company structure for MT (service only).
247. KT expressed interest in buying the government's "service only MT" if it included GSM 900 spectrum and a mobile license. When a deal was close it derailed when the decision of the Information Communications Technology Agency blocked the still government owned company from bidding for the remaining block of GSM 900 spectrum, subsequently awarded to a company with strong, local, private, backing. Despite this setback, KT resumed negotiations and in early 2007 indicated its willingness to purchase the government shares, provided MT obtained GSM 1800 spectrum. The parties reached a deal incorporating these principles.
248. ICNC, designed as a lean operation, shorn of unnecessary staff and free of debt, in the event, was formed with too many staff and carrying all outstanding government sector related debt. Notwithstanding these drawbacks, the government revamped the company was revamped in early 2009.
249. The designers of the company also aimed to keep costs down by economising on the roll out of fibre across Mongolia's vast spaces and sparse population. This did not happen because ICTA in particular has been very active in creating new fibre optic linkages in pursuit of an e-Mongolia strategy. Private companies also have laid their own cables and on 16 June 2009, SkyTel announced that ZTE will launch a nationwide commercial UMTS network for the company.

5.7.3 Issues and challenges

250. The netco – servco structure in Mongolia aimed to encourage facilities sharing and cost effective access to far flung corners of a sparsely populated, enormous country. Because of different objectives among the different agencies a far more capital intensive approach has been chosen. This is contrary to the approach in India where a high priority attaches to cost effective network construction and operation. Mongolia has been fortunate in attracting investment from neighbouring countries, donor support and private investment associated with the rapidly developing mining sector.
251. The private sector remain largely unaffected by the restructuring issues in the state sector and have invested heavily in bringing basic mobile services to even very remote communities. In addition there has been a willingness by investors and government agencies to invest in fibre connections that may be underused in the foreseeable future. This provides Mongolia with a solid infrastructure and several well organised companies with strong support from neighbouring countries, even though the investments may not be very profitable in the short to medium-term.
252. Looking ahead the sector will benefit from clarification of the roles of the respective government agencies and a withdrawal of government from ownership in the sector. These will begin to drive cost reductions, probably learning from the experience of India in cost effective service delivery to remote and small population centres.

Sources include:

ESCAP Statistical Yearbook 2009

ESCAP data on ICT for 2009, CIA Fact Book, CRC Regulator Statistics, Field Work

5.8 Cambodia

Table 7: Cambodia

Country	Mongolia	Comments
Average cost pa (USD)	150	Assumption
Population	14,562,000	ESCAP Statistical Yearbook 2009
Subscribers	5,057,181	MPTC figures
Fixed Lines	42,035	ESCAP Data 2009
Mobiles	5,015,146	ESCAP Data 2009
Potential Market (3%)	5,590,000	Estimate using PPP 3% GDP figures
Potential Market (6%)	11,180,000	Estimate using PPP 6% GDP figures
Fixed Lines per 100 people	0.3	ESCAP Data 2009
Mobile per 100 people	29.1	ESCAP Data 2009
Average Annual Increase	34%	Latest year only
Internet Users	74,000	CIA Figures 2008 ³⁵
Regulation	Ministry of Post and Telecommunications (MPTC)	Part of the Ministry

5.8.1 Introduction

253. Cambodia's modern history in telecommunications dates largely from the early 90s and the restoration of order following many years of genocide and war. The figures above indicate that 34 citizens of every 100 is a mobile subscriber (although, many carry more than one handset). Based on the MPTC figures, Cambodia has already passed the

³⁵ <https://www.cia.gov/library/publications/the-world-factbook/geos/my.html>

potential market expected from a country spending 3 percent of GDP on telecommunications and is approaching the 6 percent market estimate.

254. Soviet and Vietnamese advisers restored postal, telegraph and telegram services in Cambodia, throughout most of the country in the early 1980s after being disrupted under the Khmer Rouge Regime and the ensuing civil war. In January 1987, the Soviet-aided Intersputnik, space communications station restored the telephone and telex links from Phnom Penh, to Hanoi, Paris and other destinations for the first time since 1975. With the conclusion of the Paris peace settlement in October 1991, the United Nations installed a thin V-sat network to allow telecommunications throughout the country.
255. In 1994 – 1995, the ITU and the United Nations Development Programme (UNDP) jointly³⁶ prepared a Masterplan for the telecommunications sector of Cambodia. The Plan's aim was to lift Cambodia from its then level of customers to a position of 1.2 telephones per 100 of population by 2009. In fact, by 2010 Cambodia has achieved more than 5 million subscribers, although contrary to the plan's expectations more than 95 percent of the phones in use are mobiles.

5.8.2 Overview

256. The first mobile telephone company Camtel offered services based on analogue technology under a Joint-Venture Agreement, in August 1992. This was quickly followed by SAMART (previously called CASACOM) in October 1992 using GSM. Camshin backed by the Shinawatra Group of Thailand began its operations in March 1993, also using GSM
257. Camintel, a fixed line joint venture agreement with Indosat of Indonesia, began in December 1994. The future market leader CamGSM (a joint venture of the Royal Group of Cambodia and Millicom Ltd) opened in 1996 also using GSM and trading as Mobitel. The former trading arm of the Ministry of Posts and Telecommunications (MPTC) that also managed the various joint-ventures became Telecom Cambodia (TC), in 2006. TC is the operator of the cable donated by the German Government that connects Cambodia to both Vietnam and Thailand. It is also the owner of Camnet, the first Internet provider in Cambodia.
258. In addition to these early movers, a bewildering variety of licenses has been issued. These include Internet provision of all kinds, Mobile GSM 900, Mobile CDMA, Mobile/Fixed, Mobile GSM 1800, Fixed Telephony, Cellular G3, GSM 900 and 1800, Mobile Wi Max and Mobile CDMA 2000, broadband cables, between the major cities and their respective access networks and access to the submarine cable. The problem is that nobody knows how many licenses MPTC has issued or on what terms as the sector's institution structure has not kept pace with technology.
259. Cambodia currently operates under a law passed in 1996 that mainly related to postal services. It also operates under Sub-Decree No.5 of 1987, which allows it to be both a regulator of the market and a participant. MPTC carries out its regulatory function under these laws and issues regulations and licenses under its authority
260. The MPTC Minister can promulgate regulations without the need for consultation. Aside from some procedural regulations designed to address specific issues, and setting up TC, there is little legislation governing the telecommunications sector. Since 1995, a new Telecommunications Law has been seen as a high priority although progress has been slow. A new law has been in draft form since 1999. In 2007 its passage was imminent, but in 2010 an argument over the status of the regulatory agency (should it be a statutory agency or an agency attached to the Ministry) has held up its passage.

³⁶ UNDP/ITU Project CMB/93/006

5.8.3 Issues and challenges

261. The lack of progress with the law has had substantial implications for the economy because large donor grants were conditional upon passage of the law and setting up an independent regulator. With the licensing of foreign companies to create Cambodia's broadband backbone infrastructure the opportunity has been lost to create a locally owned backbone asset that could have dominated the market.
262. Cambodia has gained benefits from the foreign investments by Fibre Optic Cable Ltd (CFOC – a Chinese company) and the Vietnamese Military's company Viettel. The loser has been Telecom Cambodia (TC), which has struggled to advance beyond the 19,000 customers it had in 2001 and has missed the opportunity to become the unrivalled manager of a nationwide broadband network.
263. If the government took a strategic decision to rely on the private sector and state enterprises from neighbouring countries then at least businesses and individuals in Cambodia have gained the benefits of investment by substantial partners. In addition to Mobitel, CFOC and Viettel (Metphone), substantial investors from Malaysia (Telkom International) and Singapore (TEMASEK) have entered the market and revamped the former SAMART (now Hello) and CamShin (M-fone).
264. With competition, subscriber numbers rocketed up from barely 3 million in 2008 to more than 5 million in 2010. Mobitel, the unambiguous market leader since 2000, is now facing a strong market challenge from BeeLine, a Cambodian-Russian joint venture as well as existing competitors now under new ownership. Their ability to offer substantial amounts of free calling has seen challenges and the ministry have introduced a minimum tariff to protect the position of other investors. The sector is likely to undergo a major rationalisation in 2010-2012. The political process has still failed to deliver a fair law and a set of ground rules. MPTC remains responsible for policy and regulation combined.
265. In the early days of sector development, the ministry decision making was largely driven by the need to get any kind of service. The time has long since passed when Cambodia needs some clear rules and effective administration of the sector. Telecommunications is now a significant player in the national economy and many other critical industries are dependent upon it. Slow and poor quality decision making will put increasing costs on service providers and subscribers and lead to poor investment decisions and ultimately poor service to critical consumers.

Sources Include:

ESCAP Statistical Yearbook 2009
ESCAP data on ICT for 2009
CIA Fact Book
MPTC Figures
Field Work

6. Bridging the Digital Divide

266. The sections above have shown that since 1994 when the World Bank advocated functional separation of policy, regulation, business and ownership, corporatisation, commercialisation and independent regulation, many UNESCAP member States have moved strongly in the direction of liberalising their telecoms sectors and opening them to competition.
267. Other sections have shown that technology is not only forcing a separation between networks and the services that run over them but also making conventional regulation obsolete.
268. Despite the excellent progress, UNESCAP has identified an ongoing problem of the digital divide between advanced and slower developing economies. It has also identified that ICT access can happen efficiently with effective telecommunications regulation.

6.1 Role of Competition

269. Many countries have approached this problem of expanding ICT access by expensive, government led initiatives to bring "fibre to the home" and creating a national broadband network. Relatively affluent countries like Malaysia, Republic of Korea and Australia have promoted government led initiatives to speed up to narrow the digital divide and to make sure their citizens have access to fast broadband.
270. Other countries like Mongolia have also committed to heavy investment in fibre, thanks to investments from their neighbours, donors and commercial investors. For most countries in the region, this is less likely; governments do not have the funds and donors are unable or unwilling to make up the difference in the short-term.
271. At the time the World Bank advocated liberalisation of telecommunications, an ongoing debate was still underway regarding the impact of liberalisation. Pessimists claimed that liberalisation would see telephone companies retreating to their core markets as a defensive measure against "cherry picking by their competitors" who would enter only the most lucrative markets³⁷.
272. The counter argument was summarised by Chuck Hoppe, of Booze Allan³⁸, who said: "Any network facing competition will expand." It has to, because the extent of its coverage is its competitive advantage, particularly during the early phase of liberalisation. His assertion has since acquired the title of Hoppe's Law.
273. What the above examples show is that Hoppe's Law applies to telecommunications as much as any other network industry. New Zealanders got an early sample of evidence. When Bell South (later Vodafone New Zealand) entered the market, the incumbent operator immediately advertised "We have nationwide coverage"³⁹. In India, paragraph 125 above shows that a business case can be made for entering almost any rural area.
274. In many of the cases above it was only when competition was vigorous that the incumbent fixed-line operator began to expand the reach and quality of services. These are now facing intensive competition from wireless alternatives. The first lesson for LDCs, LLDCs and SIDS that cannot expect to fund the infrastructure necessary to bridge the digital divide is that they should encourage competition.

³⁷ For example: *Who Killed Ma Bell*, Greenfield 1984

³⁸ At the 1985 Railway Summit in New Zealand

³⁹ Coverage was Telecom NZ's comparative advantage. It had to make big investments to make sure that it retained this advantage.

275. While facilities based competition may not happen as was originally anticipated, lessons from India and other countries show that where companies share the management of networks or outsource, it is possible to have service level competition over shared network facilities.
276. Secondly, the argument above has shown that the effect of the Internet and broadband is to force a technical separation between the backbone and access infrastructure on the one hand and the services that run on it on the other hand. This is another manifestation of the same trend. Authorities need to foster a regulatory environment that encourages infrastructure and facilities sharing.
277. Owners of facilities should be encouraged not to regard sharing as an imposition; rather it is an opportunity for the owner to share in the revenue of every competitor using his facilities. One operator in Cambodia that is currently sharing infrastructure on all available sites hopes to be able to reduce the number of proprietary sites by half in the next 2 years.
278. Thirdly, sharing of infrastructure (or outsourcing it to specialist easement managers and cable network specialists) is a critical step in reducing costs. Countries that overload the sector with underused capacity will face a cost disadvantage, compared with those countries that only invest in capacity when a market forecast shows that the demand for capacity is coming in the foreseeable-future. In general, if no private party is prepared to pay to build infrastructure the commercial justification for the investment must be questioned.
279. Finally, if governments do see the need to get involved, they should base involvement on reforms to the regulatory framework to emphasise competitive bidding for spectrum, licenses and easements, rather than direct ownership. The reason for this is to both keep prices down and to ensure that there is no favouritism for particular services, suppliers and technologies

6.2 Non-discrimination

280. If competition is one precondition for bridging the digital divide, then non-discrimination is another. Again the examples above provide ample evidence that governments that believe they know better than the private sector are engaging in "DIY or do it yourself economics". DIY economics is practiced by officials and governments that believe any person of experience or influence knows what customers want, better than markets.
281. Examples above have demonstrated the costs of do it yourself solutions. In some countries where for years officials divided the market geographically and institutionally, they created local monopolies rather than encouraging competition. A similar pattern exists among the fixed line (PSTN) operators in some other countries. Regional franchises have done nothing to stimulate competition but have increased costs and all PSTN operators are unprofitable.
282. China is now forcing competition, but the more rapid increase in subscribers by the more competitive Indian market is possibly a warning that China could gain greater benefits from expanded coverage and reduced costs if it allowed more competition and investment by substantial competitors, even if foreign owned.
283. Similarly, there is some evidence that other countries in the region that have favoured local champions have less dynamic domestic markets as a result of government protection for the incumbent, or engineered mergers of competitors. It has also proven expensive as the governments seek to make up time lost in delays to broadband roll outs and adoption of new technologies.

284. As was noted in section 4.2.5 above when imposing any kind of regulatory solution, the regulator should assess whether the overall benefits of regulation outweigh the costs of regulation to the licensee, the regulator and any other affected parties. This should include the cost of reductions in competition and the increase in the regulatory risk perceived by potential market entrants.
285. As a general principle, the regulator should refrain from action unless the benefits of regulation substantially outweigh the benefits of no regulation.

6.3 Fair and Transparent Processes

286. What does show from the examples above is that regulators with clear mandates, open and transparent processes and open and frank interaction with sector players consistently seem to achieve better outcomes than those that engage in arbitrary and high handed decision making.
287. The reason for this is clear. Investment in telecommunications is capital intensive with long payback periods. Investors, above all else, need to minimise regulatory risks. If regulators have a clear, mandate and focus on simple, consistent (Non-discriminatory), flexibility and equitable-rules, they will increase the attractiveness of their country to major investors.

7. Conclusions

288. The report has shown that telecommunications regulation is a complex and demanding task even where competition already exists and resources are plentiful. Everyone involved in building regulatory institutions in the 1990s face the problem of building competence. For developing countries, the challenge was even greater. Many had no tradition of private enterprise, a limited understanding of the benefits of competition and narrow concept of an independent legal system or judiciary. There is always a shortage of regulatory human capital and the vitally necessary experience. Even in the most developed countries, there are many examples of regulators getting it wrong.
289. The question this paper implied to answer is "is inappropriate regulation slowing progress in UNESCAP member States?" The answer is that while progress in the sector has been enormous since 1994, in some countries inappropriate regulation may hold back the sector through suboptimal or inappropriate decisions.
290. Excessive government involvement in and management of the sector is as big a threat to achieving development goals as inappropriate regulation. The faster take up of ICT and the greater focus in India on lowering costs than other countries are some evidence of this case. The report has also sought to identify possible regulatory reforms among participating member countries to address the challenges identified by the ESCAP sub-regional forum participants.
291. The principal requirement is clear legislative authority to regulate, giving a clear mandate and delineating the authority of the regulator with a clear focus on competition. With essential elements in place, the regulatory tasks are manageable, provided regulators recognise the power of competition in regulating telecommunications markets.
292. When the regulator takes a decision to investigate or act, it should make use of discussion documents, calling for submissions from affected parties. Also if the regulator is adequately funded by the sector, it should make use of outside advisers and contractors from local and international sources.

293. The World Bank approach of 1994 was appropriate for its time. Times have changed but most of the good advice offered then remains relevant today. The biggest danger today is of the regulator trying to do too much rather than not enough. In competitive markets, regulation should focus on ensuring that competition can occur. SMP is a significant issue and processes should be in place to investigate and take action if necessary to prevent abuses of SMP.
294. Regulators need to act with flexibility, but within their mandate. Much of their flexibility will involve understanding the impact of the new technologies in making the sharing of infrastructure possible, desirable and economical. Regulators also need to beware of vested-interests seeking to gain advantage by regulatory lobbying that will disadvantage their competitors. They should also beware of people and companies who want to shuffle financial responsibility onto the government or the regulators.
295. Overall the regulators need to make it easy for people and companies to invest in ICT, even if there are limits on the number of competitors possible caused by limitations of spectrum available or similar issues. In these cases, policies that facilitate sharing of infrastructure and spectrum make a lot of sense. Regulators facilitating investment also means having clear ground rules and processes in place and using regulation sparingly and relying on competition as the prime regulator, as much as possible.

8. Appendixes

Appendix 1: Headings commonly used in Telecommunications Laws

Telecommunications Act of 20--⁴⁰

- Article 1. Purposes of Act
- Article 2. Definitions (e.g., telecommunications, public networks, private networks)
- Article 3. Authorization to regulate the sector: application of other laws
- Article 4. Creation of independent regulatory commission
- Article 5. Powers and duties of commission (re licensing, tariff review, equipment approval, frequency management, right to gather information)
- Article 6. Appointment of commissioners, resignation, removal and management and staff compensation
- Article 7. Independent Funding of commission (e.g., by license fees), audit, financial provisions
- Article 8. Objectives Power and Functions
- Article 9. Non Discrimination
- Article 10. The telecommunications services to be licensed; Types of licenses; exemptions
- Article 11. Application for licenses; process, public notice and comment
- Article 12. License terms and conditions: equitable, consistent
- Article 13. Modification of licenses; assignment; suspension; revocation and renewal
- Article 14. Price control
- Article 15. Radio Frequency Spectrum Management
- Article 16. Dealing with Complaints from Consumers
- Article 17. Right of licensees to use public way-leaves; access to private property
- Article 18. International agreements; non-discrimination; overriding national security interests
- Article 19. Enforcement of act; violations; criminal and civil penalties
- Article 20. Jurisdiction of courts
- Article 21. Repeals and amendments of existing laws; other transitional provisions

This outline drew on the Telecommunications Authority of Singapore Act 1992, the Sri Lanka Telecommunications Act of 1991, the Telecommunications Bill 1992 (Australia), and the draft Telecommunications Bill 1992 for Pakistan, Bangladesh Telecommunications Act 2001

Australia, Bangladesh, Singapore, Sri Lanka and Pakistan all have a common law tradition; the legislative elements of a sector restructuring program may differ somewhat in civil law countries.

⁴⁰ Adapted from *Telecommunications Sector Reform in Asia*, World Bank Discussion Paper 232, Smith and Staple, 1994

Appendix 2: Examples of Revenue Sharing Around the World

Country	Licence Fee Mix	Type	Application
Austria	0.1 – 0.2 % of gross turnover	Revenue sharing	All licences
Bangladesh	nearly 8% total government income	Auctions, fees, RS sim tax etc	All licenses
Bahrain	1% of gross revenues	Revenue sharing	Mobile
Bhutan	Pre-determined fixed amount	Annual licensing fee	All licences
Chile	Variable fixed fees	Annual licensing fee	All licences
Croatia	USD 6.6M	Annual licensing fee	3G Mobile
France	1% of 3G revenues	Revenue sharing	3G Mobile
Greece	.025 – 0.5% of gross turnover	Revenue sharing	All licences
Hong Kong, China	15% of gross revenues with escalating annual minimum payment	Revenue sharing	3G Mobile
India	6% - 10% of gross revenues	Revenue sharing	Fixed and mobile
Ireland	0.2% of gross turnover	Revenue sharing	Fixed and Mobile
Italy	EUR 38 million	Annual licensing fee	3G Mobile
Jordan	10% of gross revenues USD 100,000, 5% gross revenues	Revenue sharing, Annual licensing fee.	Mobile, Fixed monopoly
Kenya	0.5% of gross turnover	Revenue sharing	All licences except paging
Luxembourg	0.2% of gross turnover	Revenue sharing	Mobile
Maldives	5% of gross turnover	Revenue sharing	Mobile, Fixed and ISP's
Oman	12% gross revenues	Revenue sharing	Mobile
Korea (Rep.)	Approximately 1-3.0% of GR (annual adjustment.)	Revenue sharing	All licensed operators
Spain	0.2% of gross turnover	Revenue sharing	Fixed and Mobile
Tanzania	1.0% of annual turnover	Revenue sharing	Fixed, long distance,
	1.5% of annual turnover	Revenue sharing	Mobile
Venezuela	5.3% of gross revenues	Revenue sharing	Mobile

Source: <http://www.ictregulationtoolkit.org/en/PracticeNote.1225.html>