

CHAPTER 5
TRAFFIC FORECAST

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5.1 Telephone Traffic

This chapter covers analyses performed by the Study Team based on the data provided by ETL. Traffic analysis is important for network planning, management and dimensioning. First of all, traffic characteristics for the design are stated. Then, methodology for estimating traffic matrix from the demand forecast is outlined.

5.1.1 Telephone Traffic characteristics

Traffic variation over a 24 –hour period was monitored and three peaks were identified, in the morning, afternoon and evening. The highest peak was in the morning. The morning peak should be utilized.

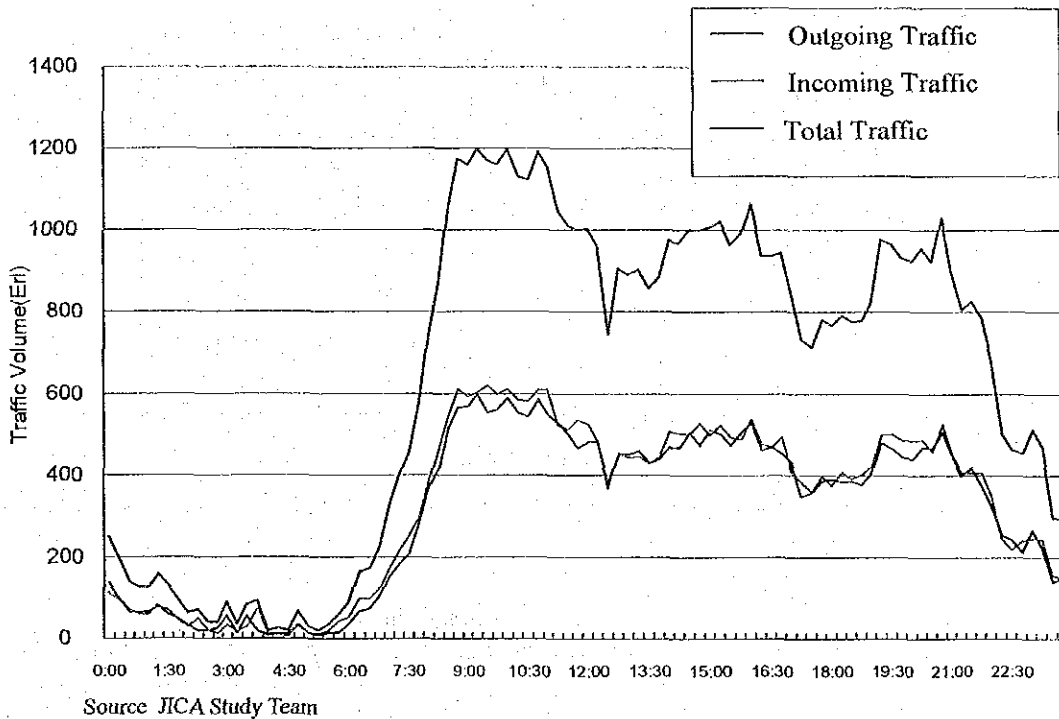


Fig. 5.1 Incoming and outgoing Traffic Variation

(1) Calling Rate

Calling Rate of outgoing and incoming for fixed telephone and cellular mobile telephone are given in Table 5.1. The Study Team considered that the average calling rate should be equal to the current calling rate until 2010 because the major

new customers use telephone line mainly for their business and the percentage of the residential customers is not large. However, from 2011 to 2015, with the increase of GDP per capita in Lao P.D.R., many people introduce telephone lines for their personal use and hence the percentage of the residential customers is increasing. The calling rate proposed for the period between 2011-2015 should be 0.07. Detail analysis is given in the supporting document.

Table 5.1 Calling Rate

Fixed telephone		Cellular mobile
2002-2010	0.12	0.02
2011-2015	0.07	

Source: JICA Study Team

(2) Proportion of International / Transit / Local

The proportion of calls for local, transit, and international is observed in June 2001 as shown on Table 5.2.

Table 5.2 Proportion of calls observed in week

	Local	Transit	International
Monday	71%	20%	9%
Tuesday	69%	20%	10%
Wednesday	71%	19%	10%
Thursday	69%	20%	11%
Friday	70%	20%	10%
Saturday	72%	18%	11%
Sunday	71%	20%	9%

Source: JICA Study Team

Based on the above observation, the proportion of calls for traffic model is chosen as shown in the Table 5.3.

Table 5.3 Proportion of Calls

Local call	Transit call (Long distance)	International call
70%	20%	10%

Source: JICA Study Team

(3) Busy Hour Call Concentration Ratio

The busy hour traffic is concentrated at around 9:00 am. Concentration ratio is about 8% as shown in Table 5.4.

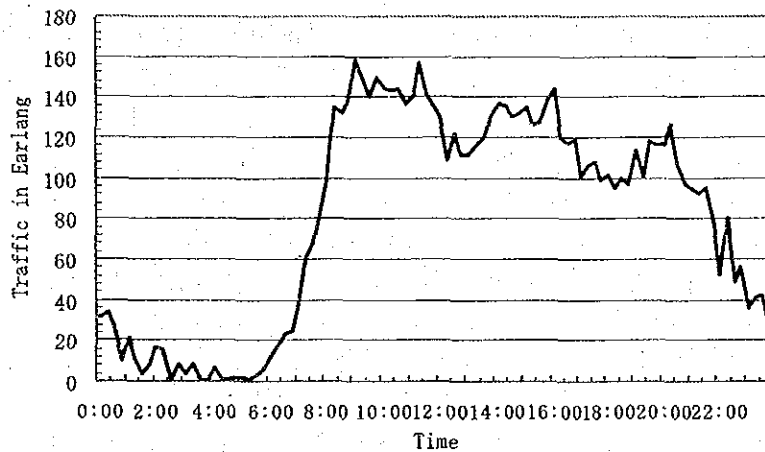
Table 5.4 Busy Hour Call Concentration Ratio (June 200)

Day	Busy Hour Call Concentration Ratio		
	8:45-9:45	Total	Ratio
Monday	4,925.39	64,856.05	8%
Tuesday	4,708.95	61,504.85	8%
Wednesday	4,823.29	63,941.45	8%
Thursday	4,702.75	61,634.97	8%
Friday	4,576.63	62,365.76	7%
Saturday	3,444.72	50,079.54	7%
Sunday	2,704.72	45,439.03	6%

Source JICA Study Team

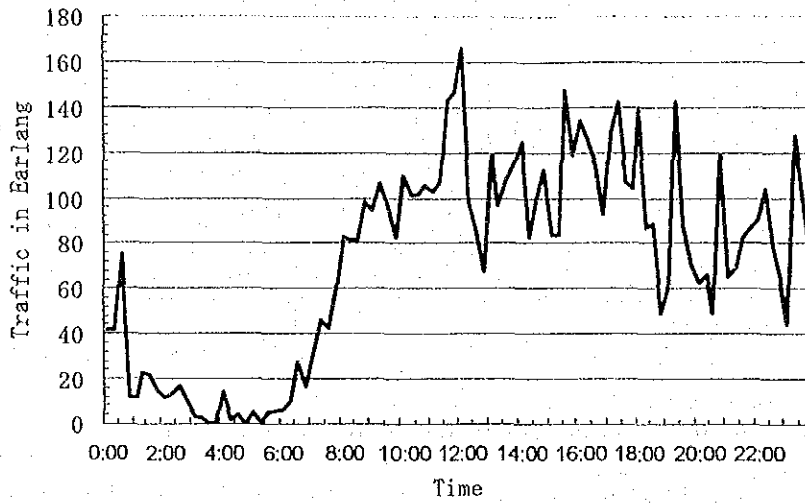
5.1.2 Mobile and Internet Inter-connecting Traffic characteristics

Traffic from fixed telephone to Mobile GSM system at Numpou exchange has similar peaks with fixed telephone as shown in Fig. 5.2. However, traffic variations of inter-connection traffic with the Internet at Numpou exchange have several peaks as shown in Fig. 5.3. The variation is bigger and there is a big peak around 23:00, which shows that users are utilizing the Internet at late night.



Source JICA Study Team

Fig. 5.2 GSM Traffic Variation (June 2001)

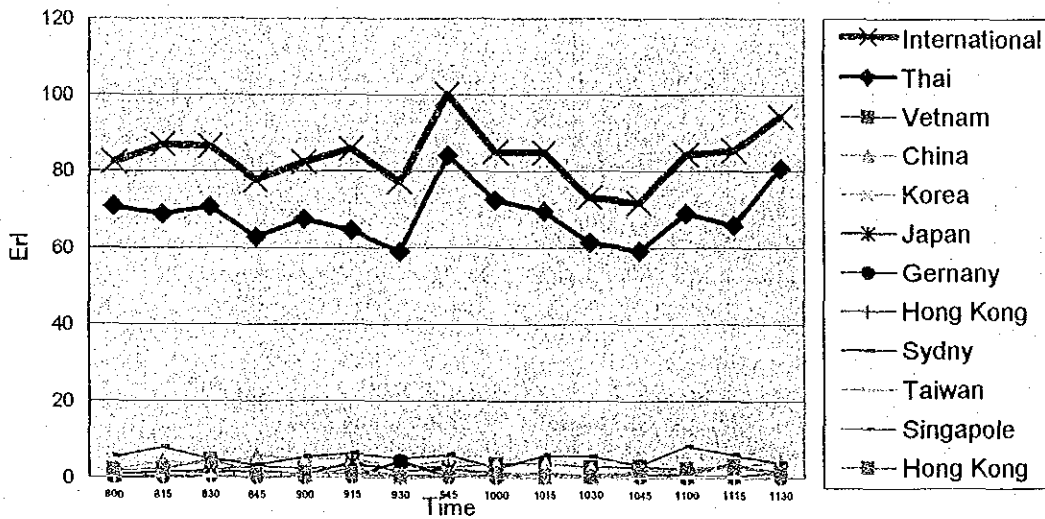


Source JICA Study Team

Fig. 5.3 Internet Traffic Variation (June 2001)

5.1.3 International Telephone Traffic characteristics

International traffic is shown in Fig. 5.4. The major portion of traffic is calls to and from Thailand.



Source: JICA Study Team

Note: Measurement performed for Namphou exchange on March 14, 2002

Fig. 5.4 Internet Traffic Variation (June 2001)

5.2 Telephone Traffic Estimation

5.2.1 Traffic Matrix for 2005, 2010, and 2015

The Traffic Matrix for analyzing transit network is estimated by utilizing Gravity model and algorithm shown in Fig. 5.5 are calculated in the following tables. Detail calculation is given in the supporting documents for further reference. The traffic matrix estimated are shown in Table 5.5, 5.6, and 5.7, respectively for 2005, 2010, and 2015.

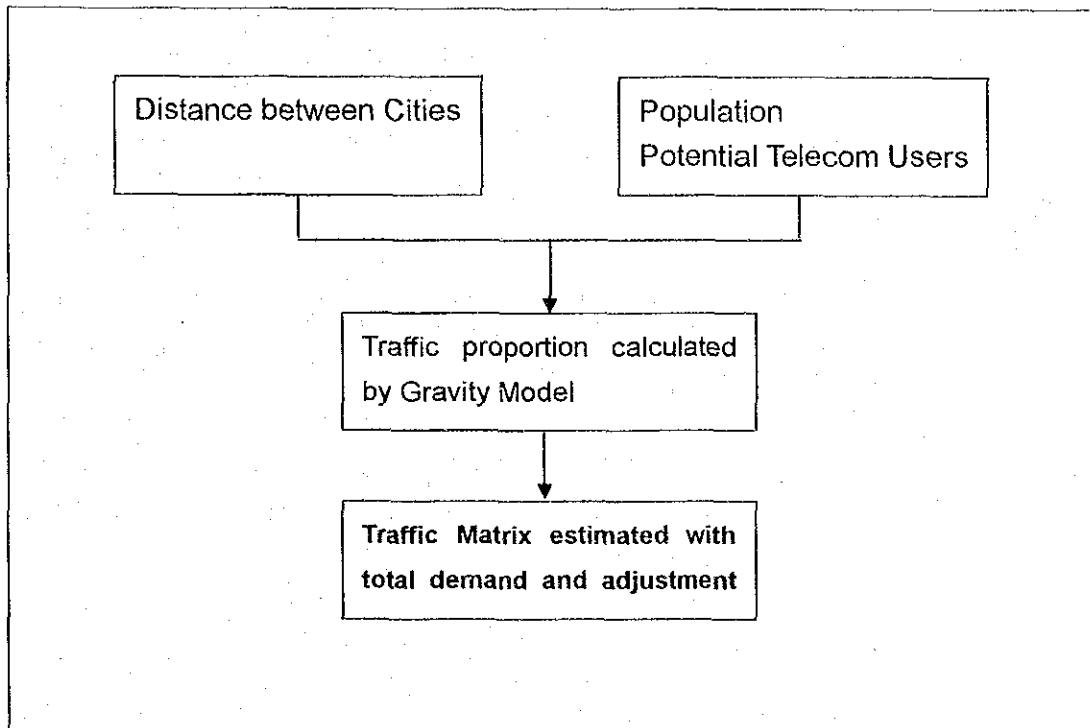


Fig. 5.5 Diagram for estimating traffic matrix

Table 5.5 Fixed Telephone Transit Traffic Matrix for Year 2005

Unit Erlang

	Vientiane muni.	Phongsaly	Luangnamtha	Oudomxay	Bokeo	Luangphabang	Houaphan	Xaiyabouly	Xiengkhuang	Vientiane province.	Bolikhamxay	Khammouane	Savannakhet	Saravane	Sekong	Champasak	Attapeu	Xaysomboun
Vientiane muni.		1.244	3.031	3.812	1.151	32.936	1.875	2.806	12.024	30.240	37.486	36.340	57.889	6.054	1.457	18.812	0.619	0.941
Phongsaly	1.203		2.363	5.444	1.925	0.494	3.743	4.940	3.016	4.139	2.074	3.138	7.367	2.515	0.627	5.116	0.846	0.754
Luangnamtha	2.925	2.281		17.428	7.237	1.307	9.295	12.572	7.462	10.163	4.988	7.457	17.420	5.887	1.468	12.015	1.979	1.839
Oudomxay	3.694	5.275	16.887		6.599	1.897	12.023	16.918	9.601	12.929	6.171	9.085	21.089	7.045	1.755	14.435	2.366	2.318
Bokeo	1.111	1.858	6.984	6.369		0.440	3.428	4.471	2.766	3.812	1.931	2.941	6.922	2.378	0.593	4.828	0.801	0.697
Luangphabang	31.745	0.476	1.260	1.828	0.424		78.197	195.072	89.582	115.958	50.890	72.186	165.137	56.570	13.378	110.972	18.007	20.195
Houaphan	1.819	3.631	9.017	11.664	3.325	75.858		6.372	6.676	6.320	3.061	4.545	10.579	3.708	0.886	7.269	1.195	1.458
Xaiyabouly	2.727	4.801	12.219	16.443	4.345	189.590	6.193		7.353	9.700	4.612	6.574	15.069	5.173	1.225	10.148	1.649	1.712
Xiengkhuang	11.652	2.922	7.231	9.304	2.681	86.810	6.469	7.125		42.276	18.543	26.307	60.206	20.624	4.877	40.458	6.565	12.457
Vientiane province.	29.403	4.025	9.882	12.572	3.707	112.750	6.145	9.432	41.106		31.050	37.291	81.995	26.345	6.091	51.759	8.170	11.253
Bolikhamxay	36.301	2.009	4.830	5.976	1.870	49.282	2.964	4.466	17.957	30.068		97.403	191.209	56.646	12.711	111.529	16.976	13.722
Khammouane	35.366	3.054	7.257	8.842	2.862	70.252	4.423	6.397	25.602	36.292	94.793		471.901	107.158	22.704	211.942	30.092	18.315
Savannakhet	57.313	7.293	17.246	20.879	6.853	163.494	10.474	14.919	59.607	81.179	189.306	467.205		221.909	45.176	440.440	59.592	30.081
Saravane	5.877	2.442	5.716	6.840	2.309	54.923	3.600	5.023	20.024	25.578	54.997	104.038	215.448		12.157	73.167	11.967	3.292
Sekong	1.403	0.604	1.414	1.691	0.571	12.887	0.854	1.180	4.698	5.867	12.245	21.871	43.519	11.711		19.595	4.558	0.795
Champasak	18.458	5.020	11.788	14.163	4.737	108.880	7.132	9.957	39.695	50.783	109.427	207.947	432.137	71.788	19.226		37.134	10.231
Attapeu	0.597	0.816	1.908	2.281	0.772	17.361	1.152	1.589	6.329	7.877	16.367	29.012	57.453	11.538	4.394	35.801		0.342
Xaysomboun	0.906	0.726	1.771	2.232	0.671	19.445	1.404	1.649	11.994	10.835	13.212	17.635	28.963	3.170	0.766	9.851	0.329	
Total	242.501	48.477	120.804	147.767	52.037	998.605	159.372	304.889	365.495	484.019	651.153	1150.973	1884.305	620.218	149.490	1178.135	202.846	130.403

Note: Vertical Axis : Originating Province Center, Horizontal Axis: Terminating Province Center

Source: JICA Study Team

Table 5.6 Fixed Telephone Transit Traffic Matrix for Year 2010

Unit Erlang

	Vientiane muni.	Phongsaly	Luangnamtha	Oudomxay	Bokeo	Luangphabang	Houaphan	Xaiyabouly	Xiengkhuang	Vientiane province.	Bolikhambay	Khammouane	Savannakhet	Saravane	Sekong	Champasak	Attapeu	Xaysomboun
Vientiane muni.		5.739	11.081	14.171	5.307	75.776	6.812	11.404	19.341	74.692	56.988	66.594	123.942	13.985	5.988	76.203	2.598	9.100
Phongsaly	5.516		7.276	16.764	5.929	1.521	11.527	15.212	9.291	12.748	6.392	9.669	22.694	7.746	1.931	15.737	2.607	2.321
Luangnamtha	10.656	6.997		42.555	17.671	3.192	22.698	30.698	18.229	24.819	12.187	18.219	42.551	14.378	3.584	29.304	4.834	4.490
Oudomxay	13.630	16.124	40.928		16.381	4.710	29.850	41.999	23.845	32.100	15.328	22.567	52.373	17.492	4.358	35.793	5.874	5.755
Bokeo	5.102	5.700	16.987	15.747		1.354	10.557	13.770	8.523	11.741	5.952	9.062	21.326	7.324	1.827	14.851	2.466	2.145
Luangphabang	73.135	1.468	3.081	4.546	1.307		120.134	299.672	137.670	178.150	78.230	110.959	253.782	86.917	20.552	170.280	27.666	31.024
Houaphan	6.549	11.081	21.819	28.694	10.148	115.483		15.460	16.203	15.335	7.431	11.032	25.676	8.998	2.150	17.617	2.899	3.538
Xaiyabouly	10.965	14.626	29.516	40.382	13.240	288.133	14.865		19.962	26.326	12.524	17.849	40.910	14.041	3.323	27.507	4.474	4.647
Xiengkhuang	18.604	8.936	17.534	22.936	8.199	132.424	15.585	19.201		45.396	19.924	28.263	64.669	22.148	5.237	43.391	7.050	13.376
Vientiane province.	71.899	12.271	23.891	30.900	11.302	171.489	14.762	25.342	43.699		51.243	61.540	135.283	43.456	10.046	85.266	13.476	18.560
Bolikhambay	54.869	6.154	11.734	14.758	5.730	75.321	7.154	12.058	19.183	49.338		98.876	194.059	57.477	12.897	113.019	17.225	13.921
Khammouane	64.226	9.325	17.571	21.764	8.740	107.012	10.640	17.215	27.258	59.351	95.359		577.364	131.076	27.769	258.912	36.807	22.400
Savannakhet	120.047	21.981	41.214	50.727	20.656	245.805	24.869	39.624	62.636	131.031	187.960	559.217		317.198	64.569	628.754	85.179	42.991
Saravane	13.451	7.451	13.829	16.824	7.045	83.600	8.655	13.506	21.303	41.798	55.284	126.075	305.096		18.751	112.725	18.461	5.078
Sekong	5.756	1.857	3.445	4.189	1.756	19.756	2.067	3.195	5.034	9.657	12.397	26.694	62.069	18.025		53.718	12.511	2.183
Champasak	73.656	15.211	28.324	34.597	14.354	164.588	17.028	26.588	41.940	82.416	109.241	250.257	607.735	108.957	51.923		100.572	27.706
Attapeu	2.497	2.505	4.645	5.645	2.370	26.587	2.786	4.300	6.775	12.951	16.553	35.371	81.857	17.741	12.023	96.650		0.959
Xaysomboun	8.747	2.231	4.316	5.532	2.062	29.820	3.401	4.466	12.857	17.840	13.381	21.531	41.323	4.881	2.098	26.632	0.922	
Total	559.305	149.657	297.192	370.731	152.199	1546.573	323.391	593.709	493.749	825.690	756.375	1473.776	2652.711	891.840	249.025	1806.359	345.622	210.194

Note: Vertical Axis : Originating Province Center, Horizontal Axis: Terminating Province Center

Source: JICA Study Team

Table 5.7 Fixed Telephone Transit Traffic Matrix for Year 2015

Unit Erlang

	Vientiane muni.	Phongsaly	Luangnamtha	Oudomxay	Bokeo	Luangphabang	Houaphan	Xaiyabouly	Xiengkhuang	Vientiane province.	Bolikhamxay	Khammouane	Savannakhet	Saravane	Sekong	Champasak	Attapeu	Xaysomboun
Vientiane muni.		17.706	31.389	44.837	13.922	137.842	25.138	33.756	34.206	192.409	77.311	122.137	254.986	33.173	15.500	157.297	9.771	28.110
Phongsaly	17.026		15.674	36.112	12.776	3.278	24.834	32.772	20.020	27.460	13.777	20.835	48.881	16.690	4.162	33.899	5.617	5.001
Luangnamtha	30.199	15.080		84.160	34.958	6.316	44.895	60.720	36.065	49.084	24.118	36.046	84.146	28.441	7.089	57.955	9.562	8.882
Oudomxay	43.155	34.757	81.003		36.201	10.409	65.953	92.802	52.700	70.918	33.887	49.875	115.697	38.652	9.630	79.079	12.982	12.717
Bokeo	13.386	12.283	33.610	34.805		2.480	19.335	25.220	15.615	21.502	10.906	16.602	39.051	13.415	3.346	27.196	4.517	3.929
Luangphabang	133.028	3.163	6.095	10.046	2.393		152.551	380.550	174.868	226.197	99.393	140.939	322.201	110.382	26.101	216.210	35.137	39.400
Houaphan	24.178	23.885	43.179	63.433	18.596	146.721		39.837	41.760	39.509	19.157	28.435	66.146	23.188	5.541	45.388	7.471	9.118
Xaiyabouly	32.470	31.524	58.408	89.268	24.259	366.059	38.320		41.269	54.405	25.898	36.901	84.537	29.024	6.870	56.847	9.249	9.605
Xiengkhuang	32.901	19.256	34.689	50.689	15.019	168.196	40.167	39.694		56.039	24.610	34.903	79.824	27.346	6.466	53.565	8.705	16.515
Vientiane province.	185.353	26.453	47.284	68.317	20.713	217.903	38.060	52.410	53.984		92.235	110.740	243.326	78.184	18.075	153.379	24.247	33.393
Bolikhamxay	74.394	13.257	23.208	32.608	10.495	95.643	18.434	24.921	23.682	88.755		93.640	183.698	54.424	12.212	106.996	16.311	13.182
Khammouane	117.789	20.094	34.763	48.100	16.011	135.921	27.422	35.588	33.660	106.798	90.306		739.073	167.837	35.559	331.463	47.131	28.683
Savannakhet	247.196	47.388	81.576	112.162	37.858	312.358	64.126	81.954	77.385	235.892	178.085	716.493		455.810	92.789	903.339	122.405	61.778
Saravane	31.917	16.058	27.364	37.189	12.908	106.203	22.310	27.925	26.311	75.225	52.364	161.484	438.556		31.060	186.677	30.579	8.410
Sekong	14.903	4.001	6.816	9.259	3.218	25.096	5.327	6.605	6.217	17.379	11.742	34.189	89.215	29.864		97.076	22.615	3.946
Champasak	152.145	32.789	56.056	76.489	26.305	209.128	43.902	54.985	51.810	148.355	103.491	320.606	873.750	180.562	93.896		144.995	39.943
Attapeu	9.392	5.399	9.191	12.478	4.342	33.774	7.181	8.890	8.367	23.307	15.678	45.304	117.659	29.393	21.738	139.374		2.518
Xaysomboun	27.028	4.809	8.540	12.227	3.778	37.882	8.767	9.235	15.879	32.107	12.674	27.578	59.399	8.087	3.794	38.405	2.422	
Total	1186.460	327.903	598.847	822.181	293.751	2015.211	646.723	1007.865	713.799	1465.341	885.632	1996.706	3840.146	1324.47	393.82	2684.144	513.714	325.131

Note: Vertical Axis : Originating Province Center, Horizontal Axis: Terminating Province Center

Source: JICA Study Team

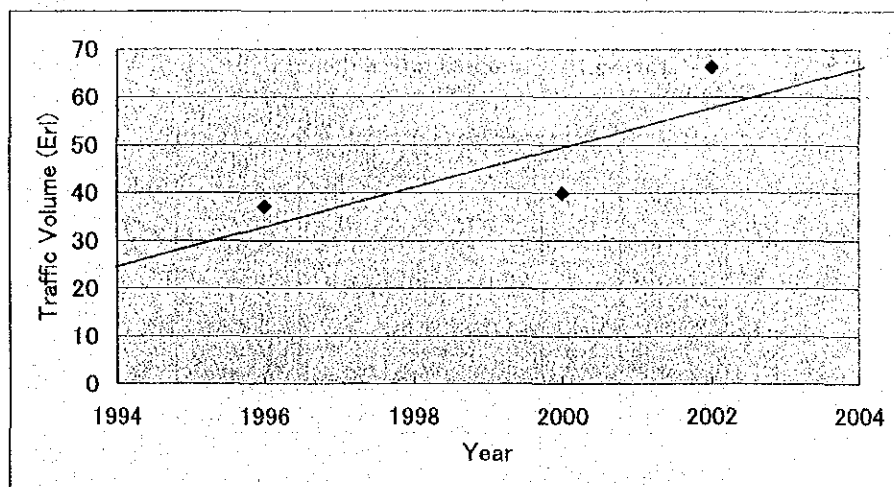
5.3 International Telephone Traffic

International telephone traffic is increasing during the observation by the Study Team and C/P.

Table 5.8 International Telephone Traffic (outgoing traffic)

1996	2000	2002
37.15	39.89	66.34

Source: Traffic measurement in 2002 was carried out by the team and C/P, measurement data of 1996 and 2000 are provided by Lao side.



Source: Traffic measurement in 2002 was carried out by the team and C/P, measurement data of 1996 and 2000 are provided by Lao side.

Fig. 5.6 International Telephone Traffic (outgoing traffic)

For estimation of the outgoing traffic, the Study Team estimates the number of total calls on target year first from the target demand stated in Chapter 4. Calculation is made based on ITU E-506. The average holding time for each destination is used. The traffic and number of calls are calculated for 2005, 2010, and 2015 shown in Table 5.9 and Table 5.10. Also, the traffic for each destination is also calculated shown in Table 5.11. The detail calculation is given in the supporting document.

From the traffic analyses, the Study Team strongly suggests early introduction of international switch by 2005.

Table 5.9 Estimated International Traffic

	Unit :erl		
	Outgoing	Incoming	Total
1,998	172	158	330
1,999	185	171	356
2,000	195	188	384
2,005	490	473	962
2,010	796	768	1,565
2,015	1,317	1,271	2,588

Source: JICA Study Team

Table 5.10 Estimated International Calls

	Unit : 1000 calls		
	Outgoing	Incoming	Total
1,998	2,793	2,559	5,352
1,999	3,007	2,766	5,773
2,000	3,168	3,057	6,225
2,005	16,550	15,971	32,521
2,010	26,909	25,966	52,874
2,015	44,512	42,952	87,464

Source: JICA Study Team

Table 5.11 International Traffic Estimation

Country	Traffic 2005		Traffic 2010		Traffic 2015	
	Outgoing	Incoming	Outgoing	Incoming	Outgoing	Incoming
Australia	9.23	8.90	15.00	14.47	24.81	23.94
China	9.64	9.30	15.67	15.12	25.92	25.01
Germany	14.66	14.15	23.84	23.01	39.44	38.06
Hong Kong	1.51	1.46	2.45	2.37	4.06	3.92
Japan	8.02	7.73	13.03	12.58	21.56	20.80
Singapore	3.32	3.20	5.39	5.20	8.92	8.61
South Korea	2.36	2.28	3.84	3.70	6.35	6.13
Taiwan	2.18	2.11	3.55	3.43	5.87	5.67
Thailand	153.28	147.91	249.21	240.48	412.24	397.80
Vietnam	36.44	35.16	59.24	57.17	98.00	94.56
Total	240.63	232.20	391.23	377.52	647.17	624.50

Source: JICA Study Team

CHAPTER 6

TELECOMMUNICATIONS POLICY, LAWS AND REGULATION

CHAPTER 6 TELECOMMUNICATIONS POLICY, LAWS AND REGULATION

6.1 Information Society and Infocom Policy

- (1) Due to a rapid progress in computer and communication technologies, in the beginning of the 21st century, the world is getting into the information society, where information plays a quite important role for the society. The information society consists of three major factors, which are alternatively considered as the elements of ICT:

Significance, Development and Success of Information society
= Content × Computerization × Telecommunication

The first is a content of information, which must be transmitted and disseminated. The content may be only data such as the withdrawal amount from saving accounts, but also may be TV news and documentary programs as well as educational materials for e-Education. The second is a computer, which is a quite powerful device to process, retrieve and store information. Utilization of the computer, namely, computerization has been improved widely and deeply in the society. Computerization can be represented and depicted by often-called information system such as online banking system, POS system, management information system, distant learning system and the like. The third is telecommunication, which concerns network to transmit and receive information, namely, to communicate. Without such networks, today's computerization must not be achieved, so that the information society would not be established. Telecommunication network is essential and is a key factor for the information society to be established and secured.

- (2) More applications of the Internet have been developed in wide areas such as voice and video communications. Those applications will have a great deal of impacts on PSTN for telephony or mobile telephone as well as on conventional broadcasting system. Especially, telephony with PSTN is expected to be taken over by Voice over the Internet, VoIP, which is much more economical.
- (3) The information society has already come to some extent or is about to come to developing and least developed countries. Led by Singapore, Malaysia, Thailand, Indonesia and Philippines, ASEAN countries have made a resolution to establish the information society with cooperation. Other ASEAN member

countries like Laos, Vietnam, Cambodia and Myanmar as well have to be involved in such programs to establish the information society in the region.

- (4) For least developed countries like Laos, Cambodia and Myanmar, the telephone density is still very low, so that those countries have to provide the basic telephone service with the first priority. But new services with new technologies also must be introduced especially for those business customers, who are competing with foreign companies of the developed countries.
- (5) Hence, as the world has rapidly been transforming to the information society, even least developed countries like Laos have to be ready and to make any development plan to include the information society to come. Telecommunications development plan also has to include the formation of the information society in prospect. And role of telecommunications must be well recognized and fully identified in the information society.

6.2 Aims and Roles of Telecommunications Policy

Aims and roles of telecommunications policy have been changing as socioeconomic situations have developed as well as telecommunication technology has been changing so rapidly. And those of the policy may differ among countries, depending on their socioeconomic, geographical, and political conditions as well.

Today, the information society is with us, which may yield some common issues for policy making on the one hand but may provide opportunity to make different infocom policy on the other hand. Telecommunication policy must be an important part of infocom policy.

Three important aims of telecommunication policy will be discussed below, namely, consumer protection, contribution to socioeconomic development, and national security. National security may be not much so critical in developed countries but is essential for least developed countries like Lao P.D.R..

6.2.1 Consumer Protection

The consumer protection and the consumer satisfaction are two sides of the same coin. They are the most highly emphasized in the market economy, since consumers by themselves are people of the country. People are ultimate the entity in the democratic society. It is common understanding in the market economy that no business may exist and survive without any support of consumers.

In telecommunications sector, it is also true, even though consumers are called users or subscribers of telecommunications services. Since the "New Economic Mechanism" of economic reform in the socioeconomic development is explicitly targeting to establish a market-oriented economy, in which telecommunication policy has to be made.

The following three aspects are major concerns of consumer protection.

- a) Better service with lower price with better channel of complaints
- b) Universal service
- c) Privacy

6.2.2 Contribution to Socioeconomic Development

Telecommunication policy as a part of socioeconomic development policy is quite important. It is better for the policy to contribute to socioeconomic development, and not to be bottleneck to the development. Especially, in the information society, backbone network can be very helpful to provide the Internet network. The followings may concern as a contribution to the development.

- a) Infrastructure
- b) Leading industry
- c) Appropriate Technology and Efficient Resource Allocation

6.2.3 National Security

Controlling information flow is more common in the socialistic nation such as Lao P.D.R. and Vietnam. But due to technological change and faster growth of telecommunications services, controlling and limiting communication are almost impossible. Rather, free communication must be accelerated so that the market-oriented economy is working. National security may be improved by the following two items.

- a) National unity
- b) National sovereignty

6.3 Direction and Prospect of Telecommunications Sector Development

In the world, there have been big changes in telecommunications sector since the early 1980, starting with a divestiture of ATT in the USA. There are three major changes, which have given a great impact on a development course of telecommunications sector in the world. Three changes are liberalization with competition, mobile communication and the Internet.

(1) From POT to Mobile Telephone and to IP Telephony

The increase in the number of mobile telephone was explosive since installation of the system was much easier and faster than POT installation. User charges went down so much, and became more or less equivalent with those of POT. Thus the mobile telephone service is now provided not only in developed countries but also in developing countries and even in least developing countries. And in those countries, the penetration speed is much higher than that of POT.

Meanwhile, the Internet service has also been growing explosively since 1990. The Internet shows a lot of application system to develop from e-mail to e-commerce. In the Internet network, virtual world of commerce, business and education is available, and has significant impacts on socioeconomic development. It will occur not only in developed countries, but also in both developing and least developed countries. And as one of the Internet application, voice communication is developed and widely spread. Now voice over the Internet, namely VoIP, is provided publicly with revolutionary lower tariffs.

(2) Narrowing the Digital Divide

Due to such a rapid increase in the Internet users, it is pointed out that having PC makes people different potentiality. Those who have PC with the Internet service will communicate with others, have education, and even run their businesses.

Having access to the Internet network or not, which is called a digital divide, is so critical for people to become rich or poor. The digital divide may be considered as an Internet version of universal service problem.

(3) Further competition with regulatory reform

Still both mobile and the Internet communication systems as well as other communication system are developing, and various services may be expected. In order to accelerate and introduce smoothly, further liberalization with more competition will be required. Hence regulatory system must be reformed accordingly.

(4) Convergence of telecommunication and broadcasting

The Internet technology allows telecommunication as personal communication media and broadcasting as mass communication media to converge. Specifically, the Internet technology enables us to have broadcasting, either radio or TV, over the Internet of telecommunications network.

This may require also regulatory system as well as policy making system to reform because there are normally different organizations between telecommunications and broadcasting in many countries.

6.4 Guidelines for Telecommunications Policy in Lao P.D.R. towards Year 2015

Taking the above changes into account, the guidelines for telecommunications development in the Lao P.D.R. by year 2015 will be discussed below.

6.4.1 Liberalization and Competition Policy

It must be emphasized that the telecommunications sector in Lao P.D.R. has already been liberalized to some extent. But still one of the biggest policy issues is whether Lao P.D.R. will take competition and liberalization policy or not.

- (1) Two operators are providing the fixed telephone service, namely ETL and LTC. There are three mobile telephone companies, ETL, LTC and one new comer (maybe one more). Basically, ETL and LTC are main players in telecommunications sector. ETL is a state owned enterprise while LTC is a joint venture enterprise with Shinawatra Company of Thailand. LTC was established in 1996 with 25 years operation contract. ETL at present started in 2001 to provide the telephone service.
- (2) Concerning telecommunications policy, the problem is whether liberalization policy may be better policy to meet the future demand and the future trend of telecommunications development as well as socioeconomic development. Starting with the present status, three possible type of liberalization policy may be considered and studied analytically since liberalization is inevitable, by considering the world trend of liberalization policy and Lao's economic reform towards the market-oriented economy. The matter is when, what services, and to what extent liberalization may be enforced. It must be noted that the BOT contract with the joint venture of LTC between the government and Shinawatra will be effective until 2020.
- (3) In urban areas, besides the telephone demand, the Internet demand may be expected to arise from private businesses and government organizations at first. To meet this demand is also important not only for telecommunications businesses but also for socioeconomic development and national unity. Provision of public services such as education and healthcare services in nationwide may improve people's concern of national unity.

In Laos, 85% of population lives in rural areas, which covers vast areas of

Laotian territory. In order to provide rural telephone service effectively and smoothly, the first stage of rural telephone may be given to those areas capable to access to highways within a certain distance, say, one-hour walk.

Furthermore there is critical factor to be considered. It is VoIP service, the telephone service over the Internet network. VoIP is fully recognized once, and then VoIP will be dominant quickly because VoIP is much more economical.

For the network development, the backbone network must be the most important and the first priority. The backbone network with enough transmission capacity may be flexibly utilized when unexpected or uncertain demand may arise.

6.4.2 Tariff Policy including Interconnection Charges

- (1) Tariff policy is also very important in telecommunication policy. Lower tariff will enable more people to use the telephone service. More telephone service with cheaper charges is the most important aim of telecommunication policy. Tariffs may be closely related to telecommunication business management.
- (2) In the course of liberalization, tariff policy has to be reformed. The full-cost allotment principle must be abandoned and be replaced by a new principle of incremental cost pricing, which is more rational. Besides setting the tariff, the tariff structure also must be straightened up to be rational, so that policy makers can keep accountability of tariff policy to customers. There are two issues to be discussed. The first is concerned a cross-subsidization issue. The second is a new interconnection charges issue due to liberalization.
- (3) As often aforementioned, in Lao P.D.R., there is a strong tendency towards liberalization and competition even in telecommunications sector. Under such pressure, current tariff structure must be reviewed and revised. Specifically, tariff of international call is too expensive, comparing with domestic call tariffs as well as international call tariff of ASEAN countries. Too high international call tariff may harm socioeconomic development since foreigner's investment would be curtailed.

6.4.3 Financing Policy

- (1) This is the most difficult matter for least developed countries like Lao P.D.R.. The meaning of least developed countries includes not only being poor

without money, but also poor development of infrastructure, lack of people's education and experience needed to develop, and many others. Liberalization policy may solve a lack of financing to develop telecommunications sector by allowing foreign private investment to come in. Telecommunication sector must be very attractive in urban areas, but not in rural areas, so that foreign investment cannot help a full development of telecommunication in Lao P.D.R..

- (2) Domestic investment fund is quite limited, and private investment from abroad also seems insufficient. Alternative source of investment funds must be considered. There are funds from international organization such as IDA, ADB, and World Bank, and also bilateral official development assistance funds from Germany, Sweden, Norway, Japan, China and other countries.

These funds may be helpful to achieve national telecommunication development plan, because those funds offer normally lower interest rate and longer period of repayment with some grace periods. Especially, those funds are targeting to support to develop infrastructures, one of which is telecommunications network.

For many cases, bilateral official development assistance may require the recipient to be the government itself or at least to be guaranteed by the government.

6.4.4 Policy for bridging the Digital Divide

- (1) In 1980's, ITU had initiated the movement for solving missing link, based on the idea that telephone is BHN (basic human needs). The movement had made people in the world aware of helping those people to have telephone in even remote area.
- (2) Today the information society is with us. Comparing with missing link for universal services, we have a digital divide. In order to make use of the Internet, PC, PC skills and access to the Internet are required, and there exists much difference in job opportunity and earnings between those who are good at those skills and those who are not good. In the information society, it is quite crucial and critical for people to enjoy their lives.
- (3) Rural telephone as universal service is only verbal communication, but the Internet access as digital divide is concerned with information exchange not only verbal but also still pictures and even motion pictures. On the Internet

network, we can learn a lot at virtual school and have shopping at virtual department store. Hence those having access to the Internet and those not having access must have a big gap. Those having can get a lot of information needed so quickly while those not having cannot.

- (4) Now there are many proposals of such systems, submitted various ministries such as the Ministry of Education and Science, Technology & Environment Agency. Those information systems can only be successfully achieved when coordination and cooperation among MCTPC, STEA and the concerned ministries. Those information system needs development of contents, computerization, and telecommunication. In order to make use of limited human and financial resources efficiently, there must be a strong steering committee or organization for coordination and cooperation.

It seems STEA keeps data base of proposals of information system from all the Ministries. MCTPC may cooperate with STEA and other ministries in the field of networking.

6.4.5 Specific Measures of Telecommunications Policy for Development of the Laos

Based on the consideration in the previous section, more concrete policy measures are going to be spelled out in this section. As stated before, it must be kept in mind that the most important objective of telecommunications policy is to protect interests of customers in the market-oriented economy while the most important requirements for the policy are accountability, transparency and fairness under liberalization and competition.

(A) Policy measures for promoting ICT introduction into the Lao P.D.R.

At present, the most urgent issue is to remind the high-level officials of the government to be aware of importance of ICT for the national socio-economic development. Utilization of ICT shall be quite beneficial for the Lao P.D.R. in order to achieve a high productivity of workforce since the size of the population is not so large. Besides this issue, however, the present level of readiness for ICT introduction is quite low so that the government must take a strong action to put every available resource together to work on promotion of ICT introduction as a first priority of the national socio-economic policy.

The following policy measures shall be required and recommended to adopt in order to achieve objectives of the ICT policy, which the telecommunications policy must go along with.

- (1) Strengthening ICT promotion committee

Currently the Prime Minister's Office has organized Lao National Internet Committee (LANIC), which is a steering and coordinating committee for introduction and promotion of ICT in the country. The Committee consists of representatives from five Ministries such as STEA, MCTPC, MIC, MOI and MOFA. There are six committee members, which consist of one representative from each Ministry except two members from STEA. The organization structure of the Committee consists of Network Operation Center, Administrative Center, Engineering Center and Technology Research Institute.

The Committee, however, is not so active for these days and tends to be politically influenced. It may be due to a lack of leadership of the Committee and a lack of awareness and knowledge of ICT among high-ranked government officials. Therefore it is necessary to strengthen the position of the Committee and to assign more experts as the Committee members. Furthermore, in order to get much cooperation and support from Ministries as well as the public, it shall be necessary to provide a legal foundation for the Committee such as, say, Basic ICT Promotion Act in which objectives and roles of the Committee must be defined explicitly and obligations of governmental offices must be clearly stated.

(2) Developing human resource by introducing National Test for Qualified ICT Professionals

Utilization of ICT in the country requires a lot of qualified experts with sufficient knowledge of information system. There will be many institutions to be established in order to provide training and learning courses of ICT at different levels. In order to keep qualification of ICT experts, it shall be better to hold National Test for those who are going to be engaged in developing information systems as a profession. It may also have a quite effective impact on people's attitude towards ICT.

Such a nation-wide Test for Qualified ICT Professionals has been conducted in Japan by non-profit independent organization. Taking the test is not free of charge but is not so expensive. There are many ranks to be qualified from beginners to well-advanced engineers. And there are many types of the test such as qualification test for System Engineers, System Operators, Telecommunication Engineers and the like.

(3) Providing a full support of the back-bone network by telecommunications sector

Optical fiber network among provincial capitals in the Lao P.D.R. will be constructed by year 2010, and its back-up network by year 2015 or so. This

network will provide PSTN services to the public and will also provide the backbone network for IP services at the same time. The construction of the backbone network is quite an essential for IP service-provision as well as ICT development.

Meanwhile many information systems, some of which will be under experimental or pilot projects, will be proposed and implemented. Those systems will surely include transmission networks among offices. Some networks by operators ETL or LTC may be available to serve but some others may not be available yet and to be constructed. The problem is the latter case, in which operators have to construct or users have to construct by themselves. Since the transmission networks of the system must be operated and maintained by operators most likely, the networks shall be better owned by the operators regardless of whoever will construct the networks. In another words, the networks must be better to be owned, operated, and maintained only by operators except mere experimental projects, which is rather temporary. It implies that operators should have a full responsibility to provide the network services.

(4) Liberalizing the one-gateway policy

The one-gateway policy is adopted at present in principle but is not strictly kept in reality. An increase in demands for IP services and international telephone calls with Thailand, Vietnam, China and other neighboring countries will allow many gateways thorough terrestrial transmission and via satellites to exist. It is neither safe, nor practical nor economical to have one gateway when IP services will become more dominant and will be provided by some Internet service providers (ISPs) under competition.

The one-gateway policy depends on telecommunications policy towards liberalization. Only when all international gateway facilities are owned and operated only by ETL, then the one-gateway policy would be easily adopted. But since IP services via satellites shall be liberalized, there shall be other gateways to exist and to operate. This will be more practical and economical and will help telecommunications sector to develop.

(5) Protecting intellectual property rights and privacy as well as customers from offensive contents

The IP communication enables the people to send and receive messages, pictures, movies and even voices together. Hence the IP communication is a very powerful communication medium. There are, however, many cases where copy rights and privacy are invaded. Also violent and offensive contents are easily accessed by anybody.

Some measures of protecting copy rights and privacy as well as limiting children to access to offensive contents shall be required. There are those measures such as establishing Telecommunication Business Act to allow providers to refuse any offensive contents to transmit and regulating access to violent contents by scrambling.

(B) Policy measures for liberalizing the telecommunications sector

As mentioned in the previous section, liberalization and competition of telecommunications sector has been the trend of development in the world in 1990s. Many developed and developing countries have introduced liberalization and competition policy. The policy has developed in such a way that initially introducing competition in long-distance call service market with monopoly of local call service market, then having also competitive local call service market with mobile telephone service providers and now getting into further competitive markets among fixed telephone service by PSTN and mobile telephone service as well as the IP telephone service near future.

It is expected most likely that IP related services must be dominant in the near future before year 2015 even in the Lao P.D.R. The telecommunication policy for liberalization and competition must take this expectation into account, so that telecommunication development in the Lao P.D.R. may go along with socio-economic development and may catch up with ASEAN countries as well as other developing countries.

(1) Regulating PSTN services of ETL and LTC

ASEAN member countries has adopted the liberalization and competition policy towards telecommunications sector. All of the dominant operators, however, have not been privatized like TOT in Thailand. The telecommunications policy of developing countries is no the same as the policy adopted by developed countries.

Regarding of the Lao P.D.R., its economy is the least developed economy at the transitory towards the market-oriented economy. The telecommunication sector is less developed with the telephone density of about 0.9 per 100 persons in year 2000, which is far behind other ASEAN countries except Cambodia and Myanmar. It is the most urgent issue to develop the telephone network to provide the services to the people at both urban and rural areas. Furthermore, the IP network will also be developed at the same time. The telecommunication sector has a lack of development finance and will depend on soft loans or grant of ODA as well as ADB and WB. These imply that ETL must operate together with LTC until the back-bone network and nation-wide telephone service provision to be completed.

Table 6.1 Types of Liberalization Policy according to ownership of facilities

	Present status	Type A	Type B	Type C	Type D
International	ETL	ETL	LTC ETL	ETL	ISC
Transmission	LTC ETL	ETL	LTC ETL	ETL	LTC ETL
Junction	(LTC) ETL	ETL	LTC ETL	ETL	LTC ETL
Subscribers line	LTC (ETL)	LTC ETL	LTC ETL	LTC/others	LTC ETL
Mobile	LTC (ETL)	LTC/ETL/others	LTC/ETL/others	LTC/others	LTC/ETL/others
Internet	LTC (ETL)	LTC/ETL/others	LTC/ETL/others	LTC/others	LTC/ETL/others

Note: * 0 means historically involved /: free entry for others as well

*The degree of competition may not be necessarily the same.

*ISC is International Switching Center, owned by national authority.

Table 6.1 shows a possible assignment of the telecommunication services between operators. Due to reorganization of ETL and LTC, there is some ambiguity and complexity in assignment at present. In order to accelerate the development of the back-bone network and the telephone services, three types of the service assignment between ETL and LTC may be compared.

Type A shows that ETL will own all facilities and provide all services from international services to local telephone services to the Internet services while LTC will provide international and long-distance call services through ETL facilities. This assignment scheme takes the case, where ETL has a full responsibility to develop the back-bone network. Regarding fairness for competition in terms of service provision from end to end, ETL has more advantageous than LTC, so that some regulatory measures to guarantee equal-footings for competition must be applied. In order to avoid dual investment of local facilities and human resources, service areas must be geographically separated, say, by province or by region. There will be the allotment problem of service areas, which also concerns cream-skimming to avoid. This case may be better for rural telephone development since the State enterprise ETL will provide the back-bone network.

Type B is the case that ETL and LTC will own all facilities to provide all services from end to end. Therefore equal footing of competitive ETL and LTC is kept, but a waste of dual investment will be expected to be very large, comparing with the market size even at year 2015 or so. Therefore this type is not recommended even though driving forces to lower tariffs may be expected due to competition.

Type C is the case that ETL will provide international and long-distance telephone services while LTC will provide all services with its own local facilities and being rented facilities from ETL. This is some clear cut between roles of ETL and LTC, especially if ETL is limited to own and maintain facilities without providing services, which are supplied by LTC. In order to avoid double investment of human resources as well, this may be alternative choice since the role of ETL is a provision of facilities while LTC and possible other competitive operators are the service provider.

Type D is the case that ETL and LTC will operate under competition while ISC, operated by the national authority, shall provide international switching service to these two operators. This scheme is better to guarantee equal footing for competition, comparing with the present situation where ETL provides the international switching service to LTC. At the same time, this scheme is well suited in order to carry out the one-international-gateway policy.

(2) Liberalizing mobile telephone services and IP related services

Since mobile telephone services and IP related services are new services and require rather less investment on fixed facilities comparing with PSTN, it is better for those services to be provided under liberalization. In order to protect the interest of customers, both service providers must be given license by MCTPC of the policy-maker and regulator. Concerning mobile telephone service, licensing with allotment of radio frequency must be issued, so that availability of radio frequency will limit the number of operators.

Liberalization scheme is quite critical for IP related service providers. IP world is still developing technologically, so that more new services may be available out of their free and creative works. The new issue for IP related services will arise as mentioned at paragraph (5) of item (A). IP service providers must protect interest of customers from offensive customers and hackers.

As one of IP related services, it could be expected that various access services like ADSL services with CATV, wireless network services, VSAT services and the like. For those services, even under liberalization, those providers must get a radio spectrum license and/or register as the providers who are privileged to have a right-of-the-way and are allowed to use public roads. Hence licensing and registration procedures are very important in telecommunications sector, so that they must be clearly defined in the Telecommunications Act. Also those procedures must be well open to the

public and must be coordinated with other government offices such as CIC, Committee for Investment and Cooperation.

(3) Securing to protect privacy and interest of customers

Under liberalization and competition policy framework, more operator and service providers will run their businesses. It is quite important for them to keep privacy of customers as a business moral at first. Interconnection shall be also a very critical aspect of telecommunications businesses for customer's interest. Furthermore many new services will appear and old services may cease to provide. There will be a lot of complaints about quality of service, contract of new services, termination of old services and errors of billing and the like, so that there must be the Office of Complaints and Disputes in MCTPC to keep telecommunication businesses to be straighten up.

(C) Policy measures for developing rural telephone as universal service

(1) Further development of rural telephone

By the assistance of ODA from Germany, rural telephone services have been developed in almost all districts of about 110 or so with 10 telephone lines to 48 lines per district. The digital radio multi-access telephone system (DRAMAS), known as a rural telephone system in 1980s, has been effective and useful technology to access to remote rural areas where small villages are scattered widely with geographically and economically handicapped. Although such facilities are not much produced nowadays, the facilities are still effective to provide rural telephone services to villages in mountainous areas in the Lao P.D.R.

On the other hand, the cost of mobile telephone system is coming down a lot due to mass production of the system, so that the mobile system may be introduced into those rural areas along the highways and roads as "fixed" telephone without any roaming. This kind of application has been adopted in Malaysia in 1980s and also now again.

(2) Establishing the universal service fund

Under liberalization of the telecommunications sector, rural telephone services may not be provided due to a probable loss with the high cost and the low revenue. Under monopoly with regulation, rural telephone services would be provided by cross-subsidization from other profitable service revenues. The cross-subsidization can be no longer possible under liberalization. Therefore there must be some alternative scheme to finance

rural telephone services, that is, the universal service fund. The fund is also called as the universal access fund or the development fund.

There is a country like Philippines, Ghana, and South Africa where common carriers can operate with a license. In order to get the license, every common carrier must provide rural telephone services as a condition. This means every common carrier must exercise cross-subsidization even under liberalization and competition in Philippines. But this leads an efficiency loss in resource allocation, which must be avoided by economic sense.

The concept of the universal service fund is relevant to liberalization and competition. Many countries like Peru, Chile, USA, EU and Japan are favor for establishing the universal service fund. Peru and USA are actually running the universal service fund while others are still under preparation.

In order to establish the universal service fund, there are a couple of points to be defined.

- (a) The fund must be managed by an independent organization, say, a regulatory body. In case of Peru, the law states that the regulatory body OSIPTEL is responsible for management of the fund called FITEL. In case of USA, the Universal Service Administration Company, USAC, is established to be an independent fund administrator.

For the Lao case, MCTPC as policy-and-regulatory body is better to manage the fund.

- (b) How to raise the fund is very critical for the fund to be successful or not. The universal service fund can be relevant to liberalization and competition only when the fund raising must be neutral to competition, which implies that the competitive operators must contribute to the fund equally, namely, with an equal burden share basis. This means those telecommunications service providers who provide competitive services must equally contribute to the fund. In the case of Peru, OSIPTEL collects 1% of gross revenues from the telecommunications sector. In the case of USA, first, there are two levels of the contributions, federal and state. The federal level collects 25% of total subsidies needed to provide the universal services as the fund mainly from the interstate revenue of all carriers. The state level collects the rest of 75% of total subsidies. The state regulatory body used to allow the local operator to adopt internal subsidization in order to provide the universal service while now the state

regulatory body also is moving to collect the fund money from the revenue of the local carriers.

In the case of Lao, the amount of the fund needed must be large so that it may be better to collect the contribution from all telecommunications service providers including mobile telephone companies and ISP service providers. The fund administrator may collect some portion out of gross revenues of the service providers.

- (c) For what universal services the fund must be used is another critical matter to consider. The rural telephone services, which the fund supports, must be clearly defined. The telephone services provided by the rural telephone system to those remote areas must be distinguished from the telephone services provided as a result of the rollout of the telephone development of the operators. Namely, the telephone services to the remote village by the rural telephone system in the Northern mountainous area is different from the mobile telephone service by the mobile telephone company to the villages along the highway or roads in the Southern flat area. Hence the universal services under the fund must be clearly defined.
- (d) To whom and how to allocate the fund is another problem to be solved. First, the rural telephone development projects, which apply for the fund, must be studied or prepared or proposed by potential providers (or by the fund administrator). Then reviewing the proposals from potential providers, the administrator will evaluate them from financial, economic, political and social aspects and will choose the most cost effective projects. The procedures seem to be more or less open tender and bidding procedure.
- (e) Those common carriers that provide local telephone services are eligible to apply for the fund. The rural telephone system including VSAT system must be connected to local telephone switching so that the local telephone operator is eligible to apply. In the case of Laos, ETL and LTC are eligible to apply for the fund.

The universal service fund shall depend on contributions from other telecommunication service providers than ETL and LTC, and will be used for ETL and LTC to construct rural telephone system including VSAT system. Accurate cost estimation and calculation will be required to make use of the fund.

Concerning to the fund raising, it may also possible to ask for provincial offices or municipality to contribute to financing rural telephone services in their provinces. It may also be a good idea that the fund administrator charges some kind of tax on communications equipments in order to raise the fund.

The discussion above is an example and not the only way, so that there are many ways to raise the fund and many options to attach. Anyway most important and urgent matter is to estimate total investment amount of rural telephone development and to estimate possible amount of the universal service fund, and then the concrete framework of the universal service fund management may be clarified such as what is the appropriate percentage to apply for revenues, how many years to take in order to provide telephone services to every villages and the like.

(D) Policy measures for improving tariff formation

Under socialist economy, prices of necessary goods and services for a life tend to be kept lower than their costs of production. Tariffs for telephone services are not the exception, so that tariff structure has been quite biased. The following policy measures for improving tariff formation will be recommended.

(1) Setting tariffs based on costs of the services

As indicated in rural telephone and discussed at the next item of (E), estimation and calculation of cost of services must be done as accurately as possible. It will be the base to determine retail tariff of each serviced for customers, namely, end users, as well as whole-sale tariff for other operators and service providers.

This is quite urgent matter for operators and service providers to have reasonable and acceptable interconnection charges and to strengthen the revenue sources to run healthy business.

(2) Rebalancing tariff structure

It is clear that LTC revenue depends heavily on international telephone services with a high tariff on international call and lower tariff of domestic telephone services. The tariff revenues of the domestic telephone services mainly consist of monthly fixed charge, local call service revenue, and long-distance call service revenue and besides, once-for-all payment, installation charge.

Among them, tariffs for local call service and long-distance call charge as well as monthly fixed charge are set so low that revenues from them share a smaller portion out of total revenue. Furthermore tariffs of international telephone services are given by hard currency, US\$, while tariffs of the

domestic services are set by local currency, Kip, so that continuous devaluation of Kip may increase a divergence between tariffs for international telephone services and tariffs for the domestic telephone services. Therefore it is strongly recommended to have rebalancing of tariffs as soon as possible.

(3) Adopting a price-cap regulation

As stated above, tariffs for telephone services in the Lao P.D.R. are given by double standards, Kip and US\$. The exchange rate has been deteriorated for Kip, some time steadily but some time sharply.

In order to keep up with such a change with a possibility of cost reduction efforts in management and technological development, it is better to recommend that the price-cap regulation will be adopted in stead of rate-of-return regulation under political pressure.

(E) Policy measures for securing interconnection

To have the better quality of telecommunication services under liberalization, interconnection among networks of each operators and service providers must be secured, so that communication among users in different networks are completed. Interconnection must be the most important in liberalized telecommunication sector.

Since many operators and services providers are privately run, any negotiation of setting conditions for interconnection must be voluntarily done between concerned parties in principle. Any negotiation between ETL and other operators and providers may also follow the similar procedures.

(1) Securing interconnection by law

The obligation of interconnection is stated in Communication Act, but not so in details. The requirements for negotiation and the public announcement of conditions as well as other related matters shall be explicitly stated in the Law.

It is recommended to spell out the requirements for negotiation and the public announcement of conditions in Telecommunication Business Act, which is also recommended in the section 6.5.

(2) Setting rules and procedure for negotiation of interconnection

By rules and regulation, rules and procedures for negotiation of interconnection conditions must be opened to the public, so that every concerned party must know what to prepare and how to set interconnection charges and other related matters as well. It is recommended to set rules and

procedures to be open to the public by stating explicitly in such as Telecommunication Business Law.

(3) Establishing the committee for a dispute settlement

It is also necessary to provide the rules and procedures for dispute settlements whenever negotiations may not reach to any agreement. Besides them, it requires to set up any organization to settle the dispute between concerned parties.

It is strongly recommended to spell out those rules and procedures of dispute settlements as well as the organization and conditions for appealing the dispute in Telecommunications Business Law.

6.5 Legal System

The telecommunications related law in Lao P.D.R. is only TELECOMMUNICATIONS ACT enacted on the 10th of April in 2001. However, the Radio Act and Telecommunications Business Act to supplement such fundamental law shall be enacted for the implementation of the terms of TELECOMMUNICATIONS ACT. The former is the basic law for wireless telecommunications and the latter will regulate the telecommunications service operation. The laws needed for now in Lao P.D.R. are Radio Act on the radio frequency usage and radio station administration, and Telecommunications Business Act that defines roles and obligations of ETL, LTC and other telecommunications operators. The relationship between three laws is shown in Fig. 6.1.

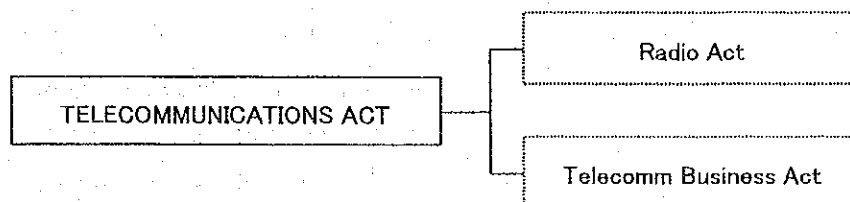


Fig. 6.1 Law System

6.5.1 TELECOMMUNICATIONS ACT

As TELECOMMUNICATIONS ACT was enacted very recently in April 2001, e-mail, Internet and VoIP are already included and various telecommunications related structure and activities are expressed in not specific but general terms.

Therefore, TELECOMMUNICATIONS ACT can play the role of fundamental law on telecommunications in Lao P.D.R. for a while without any modification.

MCTPC is the responsible ministry for telecommunications administration in Lao P.D.R., and TELECOMMUNICATIONS ACT, Article 18 stipulates nine items as Rights and Duties of the MCTPC such as studying and defining the strategic plans for the development of telecommunications.

Regarding MCTPC's jurisdiction covers the Internet as well as ICT development strategy, it is difficult to even catch up with rapid progress of ICT for only 16 staffs of the Department. It may be said that TELECOMMUNICATIONS ACT proposes the future plan, even so there is the gap between ideal and reality.

6.5.2 Radio Act

(1) Importance of Radio Act

The most important objectives of this Radio Act are to establish national policy for radio frequency management because of the following reasons;

- (a) Limitation of radio frequency
- (b) Space occupancy of radio frequency
- (c) Internationality of radio frequency
- (d) Assurance of uniformity of communication.
- (e) Security of human life

(2) Present situation of radio spectrum management

There are about 2,000 existing licenses for the low range MF-HF and VHF-UHF bands. Most of these licenses are national licenses. The Division of Radio Frequency Management processes the application and issues an import license.

As the demand for the use of radio frequency is expected to increase dramatically in the near future with the expansion of the mobile service, the ongoing management style of radio frequency based on an individual approval is due to reach an impasse and cause an extended review period for approval, inconsistency of administrative procedures, and thereby delay in introduction of a new mobile system and other technologies and reduced incentive for investment in technological development.

(3) Major articles which should be included in Radio Act

The major structure of Radio Act in Lao P.D.R. will be as follows:

- Part 1 General Provision
- Part 2 Opening of Radio Stations

- Part 3 Radio equipment
- Part 4 Qualification of operator
- Part 5 Operation
- Part 6 Charge of frequency use
- Part 7 Arbitration

6.5.3 Telecommunications Business Act

(1) Telecommunications History in Lao P.D.R.

In 1993, the government entered into a Memorandum of Understanding with Shinawatra, which included introducing private investment through a joint venture. In 1996 the government and Shinawatra signed the Master Agreement on Telecommunications Development in Lao P.D.R.. Under this Agreement, Lao-Shinawatra Telecom merged to form Lao Telecommunications Co. Ltd. (LTC), of which the government owns 51%, while Shinawatra owns the remaining 49%.

Although BOT agreement with LTC expires in the year 2021, monopoly of LTC ends in October 2001. The telecommunications market will be open for investment and joint partnerships. ETL is planning to enter the telecommunications market as a 100 percent state owned enterprise.

(2) Major Problems to be made clear

The following items shall be clearly defined for the smooth development of telecommunications in Lao P.D.R.:

- (a) Clarification of business area of telecommunications operators
- (b) Avoidance of cream skimming
- (c) Responsibility of rural telecommunications services
- (d) Possibility of cost shearing or rural development fund

(3) Major articles which should be included in Telecommunications Business Act

This ACT is related mainly to such Articles of TELECOMMUNICATIONS ACT as Article 12 Scope of Telecommunications Services and so on.

An example of the major structure of Telecommunications Business Act will be as follows:

- Part 1 General Provision
- Part 2 Definition and establishment of telecommunications business
- Part 3 Business
- Part 4 Interconnection

Part 5 Arbitration of dispute

6.6 Regulations

6.6.1 Principles of Regulations

The laws define the fundamental rule governing the duties of government and also the rights and obligations of people. But the real situation of socio-economic activities moves towards to the new situation and the detailed items to be expressed under the spirit of each law have to be modified along with the change of environment. To comply with these conditions, the details will be governed by Regulations which can be enacted by the minister's order.

- (1) The government regulates telecommunications operators based on the power delegated to it by people under TELECOMMUNICATIONS ACT. The framework of telecommunications regulations refers to regulatory relationship between the government and telecommunications operators. The regulatory administration refers to how the government regulates and controls actual business activities of telecommunications operators within the regulatory framework based on the stipulated enforcement power, discretionary regulation or rule-based regulation.

It cannot be said either one of the discretionary regulation or the rule-based regulation is always better than the other. As shown in Table 6.2 both have merits and demerits.

Table 6.2 Discretionary and Rule-based Regulation

	Merits	Demerits
Discretionary regulation	the regulatory authority can respond flexible	liable to limit operators' competition
Rule-based regulation	promote operators' competition	Lack of flexibility of the regulatory authority

A regulatory framework suitable for Lao P.D.R. should be decided by taking into account the following factors comprehensively: the way and degree of the government intervention into the industry at large; the developmental stage of its telecommunications industry; and the degree of maturity of the telecommunications market.

- (2) As for the regulatory body, there are two kind of structure: independent organization such as FCC, Oftel(renamed as Ofcom in near future) and

others, or organization inside government such as Japanese government.

In Lao P.D.R., experienced and capable personnel are scarce in telecommunications area, and the function division for policy making and regulation cannot accommodate adequate number of officers and will result in less efficiency. Therefore, the policy making and regulatory functions shall be kept in the MCTPC for while. After recruiting enough number of capable officers, Lao P.D.R. will follow the world trends in future.

6.6.2 Telecommunications Business Regulation

This regulation will define detailed items expected in Telecommunications Business Act, and the important items to be included in this Telecommunications Business Regulation are as follows;

- (a) Licensing or approval procedure of telecommunication business
- (b) Service provision areas shall be clearly defined, so as to avoid cream skimming and inefficient business overlapping for wired telecommunications service providers.
- (c) Adjustment of above service areas will be considered when a telecommunications service provider's service provision is inferior to another.
- (d) Submission and approval reception of annual service provision plan
- (e) Free competition will be allowed for mobile telecommunications.
- (f) Admission of lease of spare capacity of telecommunications facilities to other telecommunications service provider.
- (g) Quality of Service (QoS) assurance
- (h) Structure and duties of regulatory body

6.6.3 Tariff Regulation

- (1) In Lao P.D.R., the tariff of telecommunications services provided by LTC are decided under the procedure of being fully checked initially by the MCTPC and finally approved by the General Meeting of Ministers.

However, any tariff regulations are not yet prepared in Lao P.D.R., and it may be said that this Article 11 is merely the ex-post authorization of the procedure already undertaken for tariff change.

MCTPC check the tariff change proposal mainly from the viewpoint of appropriateness of business plan while MOF checks it from the viewpoint of its influence on financial revenue. While this procedure for tariff change is cautious enough, it is extremely time consuming in light of the substantial fluctuation in the exchange rate shown in Fig. 6.2.

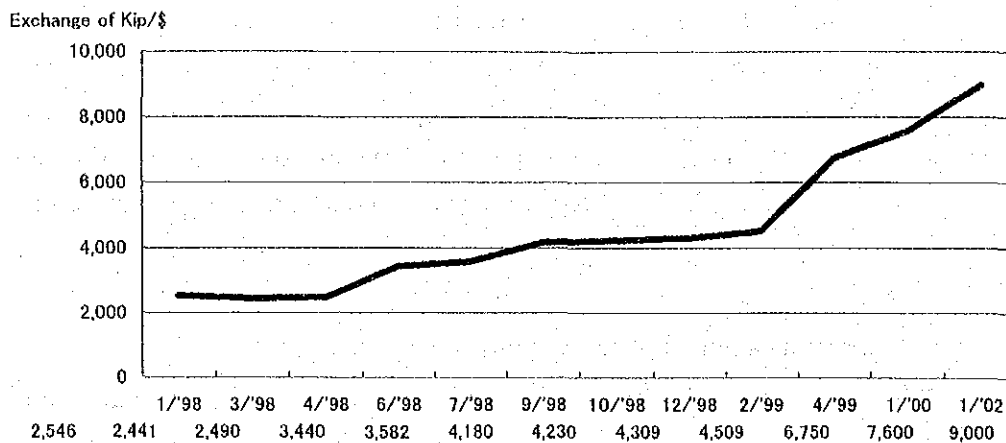


Fig. 6.2 Exchange rate of Kip/\$

In addition, the following three problems must be addressed in today's tariff system in Lao P.D.R..

a) Dilemma of raising the domestic telephone rate

The domestic telephone rates of Lao P.D.R. are substantially lower compared with Cambodia. As seen in Fig. 6.3, the revenues from the domestic call service, in particular, from the local call service are on the decline and they are heavily cross-subsidized by the revenues from the overseas call service.

The LTC's dilemma is that even if intends to increase the rates of the domestic call service to increase the revenues, the speed of approval must be adequate otherwise the effort of raising the tariff will be offset by the inflation. The method to counter to this problem will be explained later as the policy of Ofel of UK.

Million \$

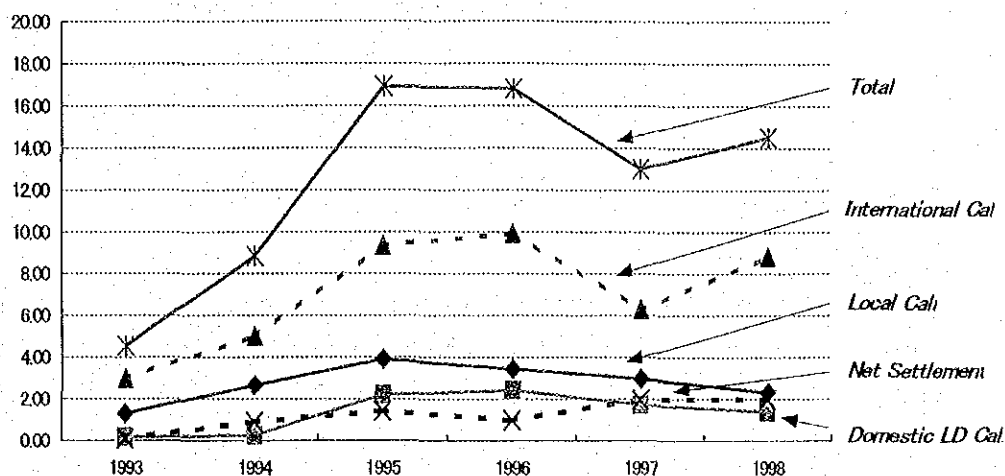


Fig. 6.3 Telephone Revenue 1993-1998 (Source : LTC)

b) Decrease of the revenue from overseas call service

Lao P.D.R. is typical of many developing countries where overseas call service have been used to keep local call service affordable.

Influenced by the reduction of international settlement charge by ITU and advanced countries, as well as the technological innovation as represented by the Call Back and VoIP, the overseas call rate from Lao P.D.R. was reduced and the call zones were increased from 10 to 15. The reduction of the revenues from the overseas call service, which account for more than 70% of the total telephone call revenues, casts a dark shadow over the prospect of telecommunications industry in Lao P.D.R., where the construction and expansion of the domestic telecommunications network has been financed by the revenues from the overseas call service.

c) Review of the Internet access charge

Dial-up Internet pricing is relatively expensive for the South East Asia region with Lao P.D.R. having the second most expensive tariff after Cambodia. Internet access charge approved in September, 1999 may have to be reviewed depending upon the Internet penetration ratio in the future. Its regulation method will have to be studied, too.

As for countering inflation, Oftel of UK has shown formula which allows charge increase of multiple (inflation rate minus productivity increase) and productivity increase figure is decided by Oftel every year. This is called price cap tariff regulation. Where exchange rate is unstable like Lao P.D.R., such system shall be considered seriously, so as to assure stable revenue to

counter inflation.

The important items to be included in this Tariff Regulation are as follows;

- Classification of tariff which requests approval or only reporting
- Procedure of tariff change including period limit from application to approval
- Price cap tariff regulation to be considered

6.6.4 Interconnection Regulation

Normally the incumbent operators' reluctance to interconnection is the largest obstruct for the new comers, and only the guidance of the regulator can solve this problem. According to ITU surveys, almost half of all countries in the Asia Pacific region indicated that interconnection issues were a top regulatory priority. The important items to be included in this Interconnection Regulation are as follows;

- a) Obligation of establishing the interconnection (non-discriminative base)
- b) Prohibition of unfair conducts
- c) Technical standard for interconnection
- d) Quality of service
- e) Boundary of interconnection
- f) Cost settlement incurred from modification of network for interconnection
- g) Payment term between telecommunications operators
- h) Billing procedure
- i) Settlement of dispute between telecommunications operators

6.6.5 Licensing of spectrum usage

As the regulation under Radio Act, detailed procedure of licensing and supervision of spectrum usage, this regulation shall be enforced. The setting of appropriate charge will compensate the cost of spectrum administration and usage monitoring and supervision. Important items to be included in this Licensing of spectrum usage are as follows;

- a) Responsibility of MCTPC
- b) First come, first served base to competitive approach for the allocation of spectrum
- c) License fees
- d) Inspection

6.6.6 Standards

Telecommunications facility is interconnected each other in the end making world largest single system as the interconnected worldwide telecommunications network. The establishing the interconnected network needs the smooth interconnection of various systems, equipment and terminals supplied by many

different suppliers. Therefore, every concerning item needs standardization. The important items to be included in this Standards Regulation for Lao P.D.R. are as follows;

- a) Adaptation to ITU Recommendations
- b) Respect of international standards
- c) Standards setting for terminals
- d) Approval procedure of equipment and terminals (if needed, setting up of approval organization)

6.6.7 Qualification

Because of adherence to spectrum usage regulation, maneuvering of sophisticated equipment, keeping high reliability of communication system, staff or operators of telecommunications system need high qualification. On these reasons, the only qualified personal shall be allowed to engage in specific jobs. Therefore the government shall define such jobs and execute adequate qualification test and issue official certificate. The important items to be included in this Qualification Regulation are as follows;

- a) Qualification for radio engineer and technician
- b) Qualification for amateur radio operation

6.6.8 INTERNET

The Internet network, usage and contents are rapidly expanding and being diversified. The world trends and policies on the Internet are to give freedom as much as possible for the fast development of efficiency, culture, science, education, administration and so on.

However, some undesirable aspects in this direction shall be seriously studied and countered. Therefore, the following important items shall be included in this Internet Regulation:

- a) Fair competition
- b) Registration of the Internet service provider
- c) Prohibition of display or communication of socially harmful contents
- d) Respect of intelligent property rights