

Toll calls and Calls to cellular phone for all Aimag centres.

Aimag Centres compute the Bill including monthly basic fee, Telegraph fee, Manual connection fee, Additional service fee etc. in addition to the above Call rates.

Computer supporting systems such as Customer Database, Billing preparation and Payment receiving have been introduced and are used effectively.

k. Customer complaint management

The customer complaint receptions have been provided in several departments such as Telephone office, Customer Service Centre, Service Quality control Dep. Etc.

l. Resource and transportation

The procurement, store and delivery of maintenance material are managed by Ulaanbaatar procurement Department under the control of Headquarters. The yearly plan is proposed by Aimag Office and finalized in Headquarters. However, the improvement of the Budget limitation, Store management system and Transportation system are necessary for the lack of maintenance materials on the work sites.

m. Improvement of productivity

Number of staff per 1000lines are decreased year by year as shown in the Table below. The achievement in 2000 year is 40 staff per 1000 lines and still behind of carries in other countries.

Table 12.2-1 Improvement of Productivity in MT

Year	1995	1996	1997	1998	1999	2000
Staff/1000 lines	64	59	44	49	43	40

(2) Items to be improved

Considering the improvement of Operation and Maintenance in point of Effective and

efficient activity and acceptable quality of services by the international community and competitive market environment, the operation and maintenance system is still need to be improved.

In accordance to the Master Plan, the existing rural network is expected to replace to new digital network in very short time as that about half of old exchanges in Sum Centres will be changed to New digital Switches by year 2008 and Subscribers in old network will be only one forth at the year of 2004 (See Figure 12.4-1 and Figure 12.4-2). And so main subject of the improvement plan becomes for the future rural telecommunications network.

On the other hand, the improvement of present O&M is basically limited without rehabilitation or extension of the rural network because the operation and maintenance has been executing by *minimum staff* for old analogue facility in Sum Centres.

Items still to be improved found by JICA Mission are as follows

a. Items to be improved in the existing network

Te followings management systems are still need to improve in the present and future Operation maintenance activity,

(i) Review of QoS management system (Target and its level)

Since the targets are set up by MT's own definition and are limited in the part of O&M Activities, it is still not enough to grasp the service quality level of the whole O&M activities.

After digitalisation of the rural network, the quality of the network should be acceptable under the circumstance of internationalisation and competitive market environment in Mongolia and should be improved.

(ii) Review of management system on the fault in the subscriber owned facility

Since the faults occurred in subscriber owned facility are prescribed as under subscriber's responsibility in Mongolia, MT treats the faults as nontarget faults for QoS even MT repaired it. So, MT calculates Fault ratio and Fault clearance rate only for the faults occurred in MT's facility. However, especially in rural network

area, MT carries the services exclusively and subscribers cannot ask the repair work to other bodies. Therefore, it is recommendable that the fault should be the subject of QoS.

b. Items to be improved in the new digital rural network

According to the expansion and digitalisation of the rural telecommunications network planned in this Master Plan, the Operation and Maintenance system of the rural network should be reviewed and improved. The followings are expected to improve in the future Operation and Maintenance activity after the commencement of the new rural network.

(i) Restructuring of the organisation

The organisation for the future rural telecommunications network should be restructured with the feature of digital network in the point of the centralization of function, efficient resource utilization and effective management.

(ii) Billing and collection management

Billing System should be expanded to Sum centre subscriber.
Aimag centre should compute the billing up to Sum Subscriber and Sum centre would handle the bill collection in the Sum centre.

(iii) Standardization of outside plant maintenance activity

For expansion of OSP network in Sum centre areas, Standardization of Work practice for the repairing work and preventive maintenance work in OSP is necessary to reduce numbers of fault and improve the repair time.

(iv) Review of new connection activity

There is no standard practice and progress management in the rural area because of few work volume. And mass of new connection will be required at the service commencement of new rural network. Therefore, New connection activity should be reviewed and improved.

(v) Expansion of network management system to Sum switch

The NMS functions should be included in New Rural Network system and each Aimag Centre will monitor the Alarm and Traffic of Sum centre facility through the NMS.

(vi) Shortage of maintenance materials and tools

Though the resource management are being improved, OSP offices are still facing the problem of shortage or none availability of installation materials and tools. Need to improve the Procurement plan, Budget, Store management system and Delivery system to solve the shortage of maintenance material and Maintenance tools, especially for new rural network maintenance.

(vii) Necessary of additional vehicles

The vehicles for O&M are still insufficient. MT has 180 vehicles and distributes to 3 or 5 to one Aimag for maintenance of junction network. Access network is mainly maintained manually without vehicles.

(viii) Information system

Information system deals with the data collection in the field of O&M for understanding of O&M situation, evaluation of constrain and finding the solution. The system should be proper for the operation and maintenance activity spread in the vast rural area especially.

(ix) Cultivation of staff for digital technology and multi-skill

It is important to cultivate staff for the digitalisation of rural network and also multi-skill employee and technical expert for centralization of the operation and maintenance work.

12.3 Quality of Services and Network Performance Control

Quality control activities of MT have been started in 1995 and MT is trying to improve the Quality much. Each management level monitors and controls the quality of service (QoS). Headquarters (HQ) collects every kind of performance results, from the Customer satisfaction down, and reports in the monthly report. Aimags and Sums also provide the own management standard based on the Headquarters' instruction and monitor the QoS.

However, according to our study, review of performance indicators and its levels are required for systematic and efficient quality control.

12.3.1 Present Status and Target Quality

The followings are achievement of the present quality control in MT and our recommended future quality level for the main Quality Control activities.

(1) Subscriber Line Faults Status

a. Present status

Subscriber line faults ratio (Number of faults per 100 subscriber lines per year) is improving year by year due to Rehabilitation of Local network in Ulaanbaatar and reached 47.10 in MT in year of 2001.

However, this figure dose not include the faults occurred in Subscribers' owned facility and is still high as compared with other countries.

Table 12.3-1 Fault Ratio in MT

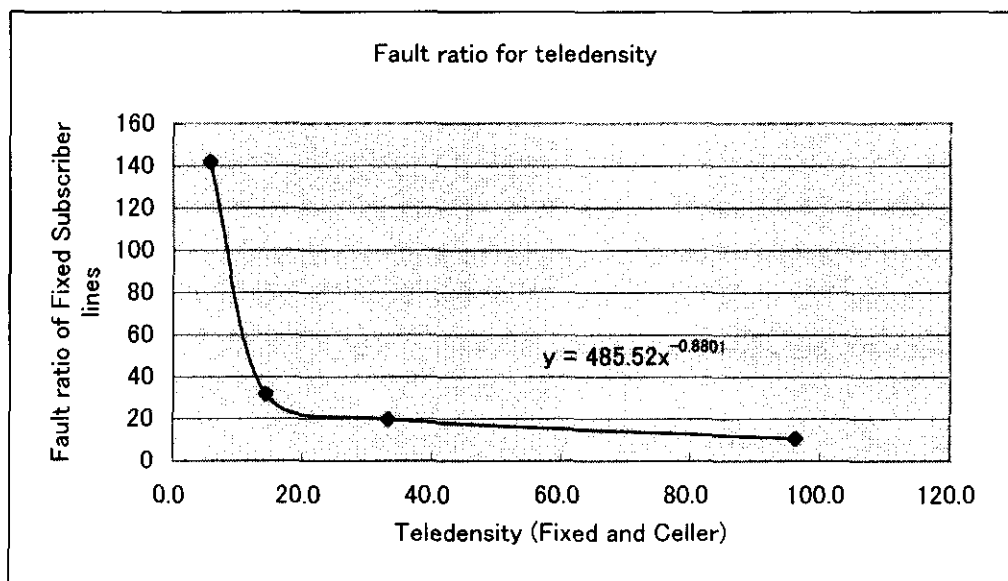
	1998	1999	2000	2001
Whole MT	120.0	74.3	52.2	44.5
Ulaanbaatar	140.1	80.5	52.4	43.7
Whole Aimag area	94.4	65.6	62.8	45.7

Source: MT Report (See Annex 12-8 (1))

b. Fault ratio in the world

Figure 12.3-1 shows the relationship between telephone density of Fixed and

Mobile subscribers and Fault ratio of fixed lines in the world. This means that the higher quality of services is required according to the increasing of telephone (Fixed and Mobile) density.



Source: ITU Data Book 2001&2002 (See Annex 12-8 (2))

Figure 12.3-1 Fault Ratio in the World

According to Table 12.3-2, the telephone density (Fixed and mobile) of Mongolia at the year of 2020, which is estimated in the Master plan, are more than 30 and the fault ratios of MT are expected less than 20.

Table 12.3-2 Telephone density of Fixed Telephone and Cellar phone in Mongolia (Medium Growth/Medium GRDP)

	Teledensity (Fixed and Mobile)			
	y2001	y2008	y2013	y2020
Aimag Total	15.2	19.7	24.1	32.2
Ulaanbaatar	23.1	27.9	33.0	43.7
National Total	16.1	20.8	25.2	33.7

c. Fault clearance rate in MT

Table 12.3-3 shows the fault clearance rate of whole MT. The faults counted in the fault clearance rate are the faults cleared within target period (maximum period is 48 hours) in MT’s facility only.

Beside, according the data of May 2002 from OSP maintenance group (ATC-32)

in Ulaanbaatar, the fault clearance rate for all faults cleared within 24 hours in MT's facility and Subscriber' facility was 50% (See Annex 12-9 (2)).

Therefore, it is estimated that the fault clearance rate in MT based on universal standard is around 50% at present.

Table 12.3-3 Fault Clearance Rate in Whole MT

	1998	1999	2000	2001
Cleared within target period (maximum 48 hours)	97%	97%	98%	98%
Cleared with more than 2	3%	3%	2%	2%

Source: MT report (See Annex 12-9 (1))

d. Target fault rate and clearance rates

Based on the above situation, the following target figures for the faults ratios and clearance rates are recommended.

Table 12.3-4 Target Fault Ratio and Fault Clearance Rate

	2001	Phase I (2008)	Phase II (2013)	Phase III (2020)
Faults /100 sub./Year				
Aimag Total	44	35	30	23
Ulaanbaatar	31	26	22	17
National Total	42	34	28	22
Faults clearance rate (24 hours)	50%	70%	80%	95%

Note: Including the faults in Subscriber owned facility

(2) New Subscriber Connections

a. Volume of new connection

New subscriber connection in MT is 7000-11000 lines per year in the whole country (70-80% in Ulaanbaatar). And Waiting is 30,000 in all country (19000 in Ulaanbaatar)

30,000 lines of New Subscriber connection in Ulaanbaatar were done after the network expansion by Ulaanbaatar project. However, nowadays, the volume of subscriber connection decreases because of no available lines for the new connections even there are 20 thousand of Waiting.

The other side, the new subscriber connection in Aimags and Sums is average 200 lines per year due to no available lines.

Table 12.3-5 Number of New Subscriber Connection

	1997	1998	1999	2000	2001	Total
Aimags	2,806	3,598	3,919	3,583	4,088	17,994
Ulaanbaatar	3,435	4,677	8,652	6,249	5,089	28,102
Total	6,241	8,275	12,571	9,832	9,177	46,096

Source: MT Report (See Annex 12-10)

Table 12.3-6 Waiting List (as of May 2002)

Aimags	19,389
Ulaanbaatar	19,529
Total	38,918

Source: MT Report

b. Service commencement

Service commencement period from the application reception to completion of installation needs 2-11 days in Ulaanbaatar and 2-4 days in Region. (See Annex 12-11)

The application job and installation work have been executing smoothly and quickly with the preparation of new connection procedure in Ulaanbaatar. The service commencement in Aimags and Sums are also smoothly done due to small work volume even without the proper procedure.

c. New subscriber connection in future

With the extension of Rural Telecommunications Network, mass of new connection will be occurred at the commencement of the network. (See Figure 12.4-3). The volume of the mass connection is not so much but spread out in all Sums with deferent time. Therefore, it is request to reinforce new connection

capability of MT for both hardware and software fields to execute the work efficiently.

(3) Network Performance

a. Present status

Call completion of the Digital exchanges in MT has been improving as reported in the following table. However, Successful connection ratio is still not enough and the main reasons are estimated due to busy number and customer error based on the Sample call completion breakdown for the exchange (ATC-3) in Ulaanbaatar.

Table 12.3-7 Call Completion of MT Digital Exchanges

	1999	2000	2001	2002
Call Completion	49%	53%	56%	55%

Source: MT Report (See Annex 12-12)

Table 12.3-8 Call Completion Ratio in Ulaanbaatar Exchange (ATC-3)

		1999	2000	2001	2002
Global effectiveness rate (Calls with answer)	GER	47.07	51.83	55.49	55.10
Outgoing ineffectiveness rate	OIR	53.27	48.37	48.46	44.36
Incoming ineffectiveness rate	IIR	47.06	46.43	43.41	45.05
Unsuccessful calls due to busy number	UC1	31.03	22.50	25.49	26.91
Unsuccessful calls due to no answer	UC2	0.33	0.53	0.42	0.39
Unsuccessful calls due to customer	UC3	44.73	50.80	43.10	45.53
Unsuccessful calls due to exchange	UC4	0.00	0.00	0.02	0.04
Unsuccessful calls due to forward	UC5	1.93	0.97	2.52	1.01

Source: MT Report (see Annex 12-12)

Note:

$$GER = \frac{[\text{Total number of completed calls (Outgoing, incoming, local)}]}{[\text{Total number of calls handled (Outgoing, incoming, local)}]} * 100$$

$$OIR = \frac{[1 - \text{Number of outgoing completed calls (outgoing and local)}]}{[\text{Number of outgoing calls handled (outgoing and local)}]} * 100$$

$$IIR = \frac{[1 - \text{Number of incoming completed calls}]}{[\text{Number of incoming calls handled}]} * 100$$

$$UC1 = \frac{[\text{Number of incoming and local non completed call due to busy subscribers}]}{[\text{Number of incoming and local calls handled}]} * 100$$

$$UC2 = \frac{[\text{Number of incoming and local non completed calls due to no answer}]}{[\text{Number of incoming and local}]} * 100$$

calls handled] * 100

UC3 = [Number of outgoing and local non completed due to customer error]/ [Number of outgoing and local calls offered] * 100

UC4 = [Number of outgoing and local non completed calls due to an exchange failure]/ [Number of outgoing, incoming and local calls handled] * 100

UC5 = [Number of outgoing non completed calls due to forward system]/[Number of outgoing calls handled] * 100

b. Call completion rate in asian countries

Table 13.3-9 indicates the relationship between telephone density and Call completion rate in Asian countries.

Table 12.3-9 Call Completion Rates in Asian Countries in 1991

	Main Telephone Line(x1000)	MTL/100 Inhabitants	Call Completion Rate (%)
Bhutan	2.40	0.15	56.10
Laos	6.50	0.15	50.00
Indonesia	1,276.60	0.68	39.40
Sri Lanka	125.80	0.73	30.00
Philippines	647.90	1.03	30.00
Thailand	1,553.20	2.73	54.50
Maldives	7.60	3.42	52.00
Malaysia	1,816.90	9.91	50.00
Singapore	1,101.10	39.85	70.00
Japan	56,252.90	45.39	83.50

Source: Data extracted from "World telecom Visual Data" issued by New Japan ITU Association, June 1993, "Asia Pacific Telecommunication Indicators" issued by ITU, May 1993 and "Yearbook of common Carrier Telecommunication Statistics" by ITU, 1993.

c. Target call completion rates

Present status of call completion rate of MT for Digital SW is 55% in 2002. Considering the other countries status and present conditions in Mongolia, following target figures are recommended:

Table 12.3-10 Target Figure of Call Completion Rate

Item/Year	2002	Phase I (2008)	Phase II (2013)	Phase III (2020)
Call Completion Rate (Successful connection)	55%	60%	64%	70%

12.3.2 QoS and Network Performance Indicator

According to CCITT Recommendations, two categories of performance measurement, i.e., Quality of Service (QoS) and Network performance (NP) are defined. The QoS is measured on customer-to-customer basis, while the NP, between the network termination A and the other network termination point B, eliminating the influence by customer’s premises equipment and customer’s human factor.

The following lists of performance indicators for QoS and Network are recommended as a first set of indicators for monitoring Operation and Maintenance activity.

(1) QoS Performance Indicator

The following indicators are useful to evaluate the subscriber’s satisfaction and to improve quality of O&M services from the subscriber’s standpoint

Table 12.3-11 QoS Performance Indicator

PRINCIPAL TASK	EVALUATION MEASURE
Service Commencement	Service order (rate of service commencement)
Telephone service supply	Rate of Completed call Operator response time
Billing	Number of fault
Customer satisfaction	Number of complaints calls
Fault repair	Number of fault occurrences Repeat faults Fault clearance time

(2) Network Performance Indicator

Network performance Indicators are the action standard for Network operation and management to upgrade the quality of subscriber service by evaluating the efficiency of Switching, Transmission equipment, circuit and path in the network.

Table 12.3-12: Network Performance Indicator

PRINCIPAL TASK CONCERNED	EVALUATION MEASURE
Traffic control	Number of traffic congestion occurrences Duration of traffic congestion
Circuit testing, supervision and control	Number of fault
Circuit control for heavy-load	Traffic carrying rate
Supervision of transmission path	Number of route down

(3) Facility Control Criteria

Facility control criteria are the action standards for maintenance of network. Important evaluation indexes for facility control are represented by availability and accommodation rate. Availability is probably working time and it can evaluate facility reliability of Outside Plant, Switching, Transmission and Power equipment. Availability is calculated as follows:

$$\text{Availability} = \frac{MTBF}{MTGF + MTTR}$$

(MTBF=Mean Time Between Failure)

(MTTR=Mean Time To Repair)

(4) Publishing of Performance Indicator

In addition, publishing of performance figures (together with international comparison) will establish pressure on operators to improve performance. Reliable statistic is one of the most important tools to monitor performance and is essential for obtaining external financing, as financiers have to know the status of the borrower before granting financing.

12.3.3 Preventive Maintenance

Equipment of telecommunications network generally becomes to obsolete, according with time passing, and it will become cause of fault occurrence. And also, it is apprehended

that they occur serious accident or extraordinary fault, if it is left without any action.

For the sake of preventing fault occurrence, the preventive maintenance is indispensable and essential in O/M work.

Though MT makes effort on the preventive maintenance for a part of network such as periodical inspection and action on Open wire line, the preventive maintenance is necessary to cover all telecommunications facility and those checking items should be clarified.

The details of Preventive maintenance method using in NTT are attached in Annex 12-14: Preventive Maintenance Method in NTT and recommendable to MT.

12.4 Operation and Maintenance System for New Rural Network

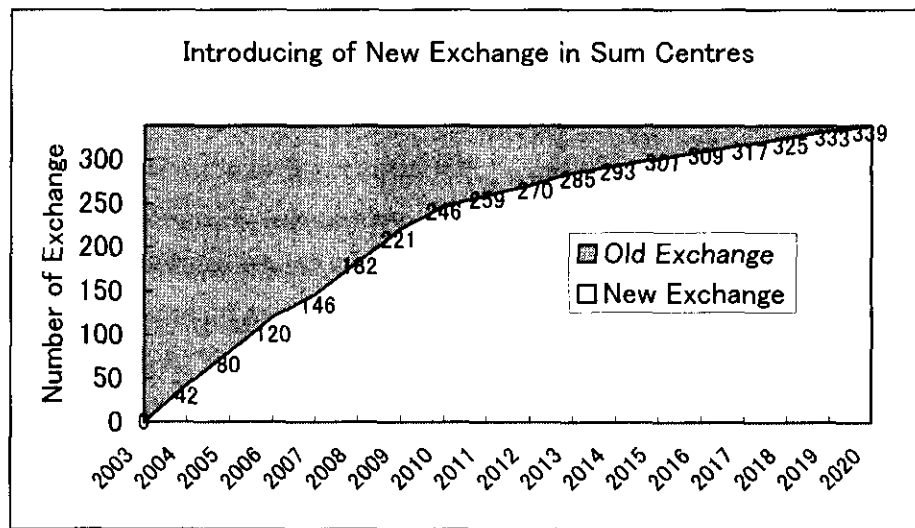
12.4.1 Items to be Improved

According to the foregoing paragraph (2.2) Items to be improved of sub-section 2.2 “Operation and Maintenance at Present”, some improvement actions are required for the following items to execute the efficient operation and maintenance in the new digital rural network.

- Restructuring of the Organisation
- Billing and Collection Management
- Standardization of Outside Plant maintenance Activity
- Review of New connection Activity
- Expansion of Network management system to Sum SW
- Shortage of Maintenance Materials and Tools
- Necessary of additional vehicles
- Information System
- Cultivation of Staff for Digital Technology and Multi-skill

12.4.2 Organisation for New Rural Network

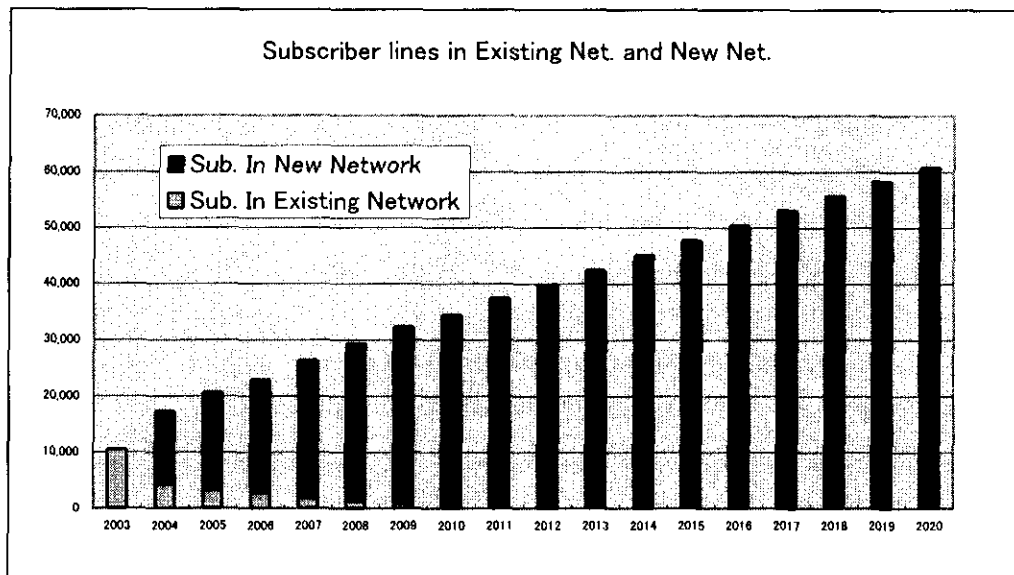
According the Master plan, the network in Sum area will be changed as shown in Figure 12.4-1 and Figure 12.4-2. About half of old exchanges in Sum Centres will be change to new digital Switches by year 2008 and Subscribers in old network will be only one forth at the year of 2004.



Source: JICA Team study (See Annex 12-13)

Figure 12.4-1 Introducing of New Rural Exchanges

For the above circumstance, the organisation for Sum centres should be restructured, especially in the points of following functions:



Source: JICA Team Study

Figure 12.4-2 Number of Subscriber Lines

(1) Job Demarcation

Some kind of jobs in the operation and maintenance of Sum Centres should be centralized in Aimag Centre in consideration with the remote alarm monitoring system of the rural network for the work efficient point of view. Accordingly, Operation and Maintenance Centre (OMC) in Aimag Centres should handle Operation and Maintenance of Sum Inside

Plant (ISP) and OSP staff in Sum centre should handle Access Network in Sum Centre. The recommendable Job demarcation is showed in Table 12.4-1.

Table 12.4-1 Operation and Maintenance work in Sum Centres

Main work		Centralized Job in Aimag Center or Large Sum	Job in each Sum Center
Network management		Alarm Monitor (SW, TR, Power)	
Facility Maintenance			
OSP	Access Network		Maintenance and repair
	Cable Junction Network	Maintenance and repair	Periodical inspection
ISP	SW	Maintenance and repair	First hand maintenance
	Junction TR	Maintenance and repair	First hand maintenance
	Power	Maintenance and repair	First hand maintenance
Facility management		Management of Plant record, Cable pair list, Telephone number	
Billing		Preparation of Bill, Management of Billing and collection	
			Collection
New connection			
	Mass connection at the new network service-in	Application reception	
		Implementation work	
	ordinary connection		Application reception
			Implementation work
Customer Database		Maintenance and management of the Database	
Subscriber fault		Reception of Fault complaint	
		Circuit test	
			Local cable repairing
			Fault repair of Subscriber premises
		Preparation of Repair report	
Maintenance Material		Management of Maintenance material, Tools, Equipment	
Sales activity			Sales office,
			Customer service office
			Public telephone

(2) Aimag Centre

Operation and Maintenance activity including Sum centre O&M support have been organized well. The subjects in future are strengthening of the organisation function and provision of the system to execute the centralization of Sum Centre works in Aimag Centres. Main items to be considered are as follows:

a. Network Management

To provide Operation Maintenance Centre in Aimag to monitor all Digital rural network elements (SW, TR and Power Equipment) covered all Sum Centre areas.

b. Inside plant (ISP) maintenance

The staff of Aimag Centre will handle maintenance work of SW, TR and Power with remote monitoring system. But Staff of Sum centre will take First hand maintenance such as checking Power condition, Detail alarm etc. with the instruction of Aimag.

c. Customer service centre

Customer service office in Aimag Centre will cover Service Order work of New connection with Customer Database, which includes Application treatment and management of Implementation work, while the staff of Sum centre will handle the reception of application in Sum centre.

d. Fault complaint reception and circuits test

Complaint desk will be provided in Aimag Centre and handle the Complaint reception, Circuit test, management of Fault repair work and also preparation of Fault statistical data.

e. Task force on mass connection implementation

Task force team will be provided for the implementation of mass connection in Aimag centre when the rural telecommunications network is commenced. Ordinary connection work will be handled by Staff of Sum centre.

f. Facility management

The facility management section in Aimag will manage Facility data such as Plant record, Cable pair list telephone Number list etc. of Sum Centre facility.

g. Junction network between Aimag and Sum

Basically Aimag Centre will handle the maintenance work including repair work of Junction Network. Sum centre will make periodical inspection of the Network of Sum area.

(3) Sum Centre

Since the volume of work in each Sum Centre will not be much because the demand after digitalisation is still small, the staffs will assign in the Sum Centre to handle only improper work for centralization. The main works handled in Sum Centre are as follows:

a. New connection

Sum centre staffs execute the ordinary connection work.

b. Facility maintenance

Maintenance of local cable network and Subscriber premises facility
first hand maintenance of ISP

c. Business office

Sales office work, operation of public telephone, collection of telephone charge and miscellaneous job.

(4) Staff Allocation

According the above job demarcation, the following staff are expected to assigned in Sum Centre as average:

- O&M (Cable) : One technician for each exchange
- Administration : One staff for each exchange
- O&M (SW, Power & TR) : One staff for three exchanges who is assigned in Aimag Centre

12.4.3 Improvement of Outside Plant Fault Repairing System

Though OSP Faults in Ulaanbaatar have been improved remarkably after rehabilitation of the local cables, Fault ratio of Subscriber lines is still higher than of similar counties in the world. As one of the countermeasures for high fault ratio of outside plant, execution of accurate repair work is essential and necessary on the site. The following work procedure, repair method and repair report are recommendable.

(1) Work Procedure for Fault Handling

Table 12.4-2 Work Procedure for Fault Handling

ITEMS	SUM CENTRE	AIMAG CENTRE	
Detecting of fault		Subscriber's claim is received at complaint centre	
		When customer complains about fault, complaint reception should clarify whether any fault is happened and if the fault is occurred in network, issue the repair order to SW section.	
Line test and arrangement of repair work		SW Section should test the line through the diagnostic function of MSU and arrange the repair work to the section concerned at the receiving of repair order.	
Fault handling of out side plant	Receiving work order from SW Section		
	Dispatching staff to DP/Cabinet/MDF		
	Execute test to find fault location between MDF and out side site with SW Test section in Aimag		Execute test according to request of Sum centre
	Change pair or repair		
Confirmation test after repairing		Confirmation test to ensure the result of repair work	
Repair report	Result of repair work is logged in logbook.		
Periodical report		Analysis fault statistic and preparation of periodical report	
		Statistic on the fault and its repair work also essential for the countermeasure on reducing the faults.	

(2) Method of Repair Work

Outside Plant is consisting of dispersed plant such as In-house, protector drop wire, cabinet, pole, secondary cable and primary cable. Therefore the method of repair is different for each plant. The followings are main faults and its repair works.

Table 12.4-3 Repair Work in OSP Area

LOCATION	KINDS OF FAULT	REPAIR WORK
Telephone set	No work	Replacement
In-house wire	Break, wear out	Replacement
Protector	Down	Replacement
Drop wire	Break, wear out	Replacement
Drop point	Corrosion, loose	Pair change
Secondary cable	Break, pair defect	Enclosure, replace
Cabinet	Break, corrosion	Pair change
Primary cable	Break, pair defect	Enclosure, replace
Optical cable	Break, loss defect	Replacement

(3) Fault Repair Report

The form of Fault repair Report is shown on Table 12.4-4 to record the result of the repair for future action.

Table 12.4-4: Subscriber Repair Order and Completion Report Form

Exchange Area	Subscriber Name					Tel. No.	
Address							
MDF Terminal No.	Primary Cable No.	Pair No.	Secondary Cable No.	Pair No.	CAB. No./RSS No.	DP No.	
Fault acceptance Time/ Date							
Name of Tester (OMC)							
Repair start (Time/Date)							
Repair completion (Time/Date)							
Name of repair man (OSP)							
Name of Tester (OMC)							
Name of Fault		Fault founded by					
Grounded	<input type="checkbox"/>	Subscriber	<input type="checkbox"/>				
Shorted	<input type="checkbox"/>	Work	<input type="checkbox"/>				
Open	<input type="checkbox"/>	Disaster	<input type="checkbox"/>				
Others	<input type="checkbox"/>						
Faulty part		Cause of fault					
in-house	Body						
	Telephone Receiver						
	Code						
Protector	Modular Jack						
	In-house wire						
Drop wire	body						
	Protector Unit						
	Ground wire						
Distribution Point	Drop wire						
	Jointed part						
Secondary cable							
Cabinet							
Primary cable							
Others							
Repair Method		Cause of fault					
Permanent repair	Replacement						
	Others						
Temporary repair	Cable pair change						
	Others						
Spontaneous recovery							
Cable pair change		Old No.	New No.				
Primary cable							
Secondary cable							
DP							
Facility assigner							
Remark							

12.4.4 Settlement of New Connections System

(1) New Connection Capability

a. Mass connection

With the extension of Rural Telecommunications Network, mass connection work will occur at the service commencement of the network. The volume of the new connection work in each Sum centre is about 200 lines but the work is spread nationwide at different times.

Therefore, it is recommendable to provide the Task Force in Aimag centre to implement the connection work of Sum centre. Otherwise, mass connection work will be included in the rural network expansion project together with the cutover work of existing subscriber lines.

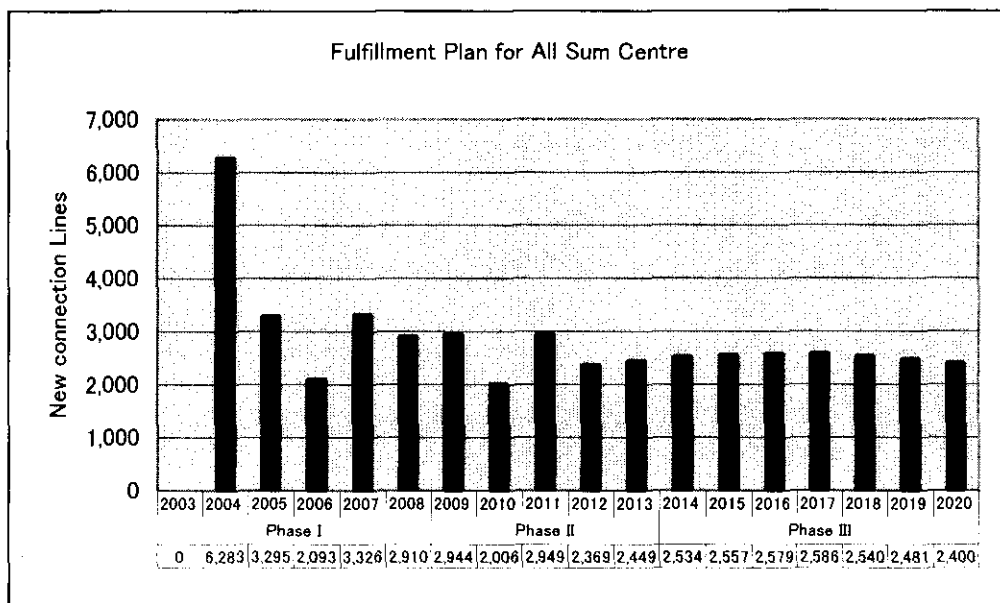


Figure 12.4-3 New Connection Schedule

b. Ordinal connection work

Ordinal connection works after the mass connection, which is estimated only few lines per year, will be handled by Sum Centres.

(2) Work Procedure of Service Order

The following Table shows the process of main work items and the sections in charge on service order.

Table 12.4-5 Work Procedure of Service Order

Item	Sum centre	Aimag Centre
Application	Customer fills in confirmation form and Sum staff sends the form to Aimag Centre	Customer Service Center (CSC) staff inputs customer record into customer database and prepare service order format
Facility assignment	Check OSP Condition on site if needed. Sum centre prepares each out side plant record together with property map and also controls line assignment record as follows;	Facility management section assigns a telephone number,. terminal number of cabinet and distribution point with road name.
Installation payment	When customer gets notification from Sum Centre, customer goes to Sum Centre to pay installation fee and deposit.	CSC notifies telephone number and notification of payment to Sum centre
Service order preparation		CSC issues service order (SO) to the sections concerned (OSP maintenance (Sum Centre), ISP maintenance (OMC) etc.) after confirmation of completion of payment from customer
Implementation	Execution of new connection. Inspection is done after finishing of the installation including circuit test.	
Line testing		Line testing from switching system to telephone equipment is done from switch terminal.
Completion	When service order is finished after testing, Sum centre prepare the completion report into CSS.	
Service commencement		After receiving of service order completion from Sum centre, CSS notifies customer service commencement and "customer" becomes "subscriber"

12.4.5 Network Management and Operation in Aimag Centre

OMC in Ulaanbaatar is managing the digital network and digital switch between Ulaanbaatar and Aimag Centres with monitoring alarm, fault repairman dispatch, traffic measurement and quality control etc.

Aimag Centres should manage and operate the new rural network for Sum centres by the followings.

(1) Introducing of Network Management System

The following NMS functions should be included in New Rural Network system and each Aimag Centre will monitor the Alarm and Traffic through the NMS.

- Supervision of alarm in switching system by itself and NMS (SW) in Aimag Centre.
- Supervision of traffic flow in switching system by NMS (SW) in Aimag Centre.
- Supervision of alarm in Transmission system by itself and NMS (TX) in Aimag Centre.
- Supervision of alarm in Transmission system by itself and NMS (TX) in Aimag

Centre.

(2) Rural Network operation in Aimag

The followings are necessary jobs to operate rural network in Aimag Centre.

- Routine work
 - Monitor the alarm of Switch, TR and Power facility in the rural network through the NMS
 - Traffic measurement
 - Systems back up.
 - Handling of magnetic tape
 - Collection of charging data

- When trouble happened
 - Diagnosis of Fault
 - Request the first hand action to the staff in Sum Centre
 - Arrangement of fault repair work to the staff in Aimag Centre.
 - Monitoring repair work progress
 - Confirmation of recovery status

- Control of service quality
 - Analysis of fault statistic and preparation of periodical report
 - Preparation of Improvement Plan

- Management of the facility data
- Management of spare parts

12.4.6 Tools, Equipment, Maintenance Material and Vehicles

(1) Tool and Equipment

Since old type of tools and equipment are using for existing analogy network and still shortages on site, it is necessary to review the allocation of suitable tools and equipment for the operation and maintenance of the new digital rural telecommunications network. These should be basically stored in the technical department of each Aimag centre.

(2) Maintenance Material

Proper volume of Maintenance material should be secured in the Aimag Centre for Rural Network. It is recommendable to procure the Materials for three years in the rural network Project.

(3) Vehicles

2-3 Vehicles for site work are located in each Aimag and the number of cars still not enough for the site work covered all Aimag areas.

In the New rural telecommunications Network, Aimag centre and Sum centres will be connected with high technical digital system. However, stand-by system or the diversion route will not be provided in the junction Network due to the cost point of view. Accordingly if the network is down, all Sum centres after the fault point are affected

Therefore, the shortening of repair time become very important and especially, the increasing of the number of vehicle are absolutely necessary. We recommend the arrangement of 2-3 vehicles in each Aimag for the maintenance group of rural network as minimum requirements.

12.4.7 Information System in Sum Centre

For the smooth and accurate execution of O&M, it is desirable to introduce the Computer network with E-Mail system between the Aimag centre and Sum centres, otherwise, fax machine for small Sum Centres.

The following information is necessary to communicate between Aimag and Sum centres in Operation and maintenance activity.

- Customer database
- Billing management system (Expression of Bill amount, Input of Bill receipt)
- Fault repair order and repair report
- Service order

12.4.8 Cultivation of Staff for Digital Rural Network

The staff training is required to cultivate staff for the following areas:

- Reinforcement of staff converted from analogue technology to the digital technology area by providing training.

- Cultivation of Multi-skill staff to handle the first hand maintenance for SW, TR and Power adding to outside plant maintenance in Sum centres.
- Cultivation of high skill expert to arrange and solve the complicated trouble for centralization of the operation and maintenance work.

In-house training and Supplier training should be considered.

12.4.9 Billing and Collection Activity

(1) Current Status

Billing and collection for the customers in Ulaanbaatar and Aimag Centres is proceeding well. Billing for the subscribers in Sum Centres is still handled by manual because PBAX in Sum Centres are not linked to ITC due to no Output or only Paper print out of charging data.

Details of billing and collection process in Ulaanbaatar and Aimag Centres is as follows:

a. Billing

- (i) Information technology Centre (ITC) collects Call Data Records (CDR) from Aimag Digital Switch through NMS and computes Call rates on International calls, Toll calls and Calls to cellular phone etc. for Ulaanbaatar and all Aimag centres.
- (ii) Aimag Centres compute the Bill including monthly basic fee, Telegraph fee, Manual connection fee, Additional service fee etc. in addition to the above Call rates with Billing computer system and Customer Database.
- (iii) Computer supporting systems such as Customer Database, Billing system (Billing preparation and Payment receiving) has been introduced and are used effectively.

b. Collection

- (i) Since Sales Offices collect the bill using terminal equipment of billing system, which shows monthly telephone charge of each subscriber,

Customer visits the Sales office to confirm monthly telephone charge and pay it every month.

- (ii) MT doesn't delivery the bill to the customer's premises except public organisations and large business offices because of no Post mail delivery system in Mongolia.
- (iii) In case of payment delay, Outgoing call is suspended for more than two weeks delay and Contract is cancelled for more than two months delay.
- (iv) Collection ratio in whole company is high and 90% at 2001. However, Payment of Government organisation is constantly delayed, especially the delay is much in rural area (80% as average).

(2) Billing and Collection for Sum Centre Subscribers after New Rural Network

Present Billing and collection System is basically acceptable and the system should be expanded to Sum Centre subscribers with the following manners:

- (i) Digital Switch in Sum centre should have the function of charging data (CDR), which is linked to ITC.
- (ii) ICT computes Call rates on International calls, Toll calls and Calls to cellular phone etc. for all Sum centres also.
- (iii) Aimag centre should compute the billing up to Sum Subscriber based on the Customer database.
- (iv) Sum centre would handle the bill collection in the Sum centre Telephone Office.
- (v) Aimag Centre should manage the Billing and Collection process of Sum Centres to improve the collection rate.
- (iv) Computer supporting systems such as Customer Database, Billing preparation and Payment receiving should cover Sum Centres Subscribers.

CHAPTER 13

HUMAN RESOURCE DEVELOPMENT PLAN

CHAPTER 13

HUMAN RESOURCE DEVELOPMENT PLAN

13.1 Present Status of Organisation and Staff

As described in Chapter 3, Mongolian telecommunications operators consist of MT (Mongolian Telecom Co. Ltd.) which provides majority of basic telephone services in whole country, MRC (Mongolian Railway Company), Civil Aviation Authority and Incomnet company who also provide basic telephone service in some areas recently, and other private companies such as Mobicom, Skytel, Mobinet, etc. who provide cellular service, internet, data, etc.

This study covers a human resource development plan, especially focusing on rural areas, for MT who is basic telephone service provider for whole country, i.e. all Aimags and Sums.

13.1.1 Staff Structure

The total number of the existing staff of MT is 4,508 at the end of 2001 and the structure of the staff is as follows:

- (1) Structure by skill/title category such as Engineers/Technicians, Customer service, Administration, Accounting, etc. and by Aimags/District/HQs, Structure by detailed Aimag/Sum level staff, Structure by age and Past trend of human resources is shown in Table 13.1-1, 2, 3 & 4.
- (2) Analysis on staff

Through the above data, the followings are analysed:

- (a) Whole Country Level (Table 13.1-1, 3, 4)
 - Aimag/Sum level employees are 66.3% of the total
 - Average number of employees per one Aimag is about 100 and about 50-60% out of it is operators

- Customer service employees (mainly operators) are 37.5% and Engineers /Technicians are 43.9%
- Average age of employees are about 36.3 years old and about 40% are 30-39 years old

(b) Aimag/District/Sum Level (Table 13.1-2)

- Aimag/District/Sum level employees are 2,751 in June of 2002.
- Ration of Aimag/District and Sum employees is 66% and 34%
- Eng./technicians/cableman are about 37% of the total
- Operators are about 19% of the total
- 356 employees are decreased from 1999 to June of 2002

Table 13.1-1 Human Resources of MT (By Skill/Title)

As of End of 2001

	No.	Aimag/Division	Eng./Technician	Financial/Ac counting	Customer Services	Market	Human Resources	IT	Administration/ procurement	Total <end of 2001>	Total <10-May. 2002>	Ratio(2001)
Aimag	1	Arkhangai	46	4	59	1	1	1	15	127	104	2.8%
	2	Bayankhongor	61	4	48	1	1	2	22	139	131	3.1%
	3	Bayan-Ulgii	59	3	46	1	1	2	21	133	130	3.0%
	4	Bulgan	45	8	48	1	1	1	11	115	110	2.6%
	5	Govisumber	29	2	17	0	1	1	6	56	55	1.2%
	6	Govi-Altai	70	3	59	1	1	3	11	148	138	3.3%
	7	Darkhan-Uul	84	12	77	1	1	0	29	204	197	4.5%
	8	Domod	64	7	35	1	1	1	21	130	117	2.9%
	9	Domogovi	72	5	49	1	1	2	19	149	147	3.3%
	10	Dundgovi	54	3	50	1	1	0	14	123	115	2.7%
	11	Zavkhan	34	5	93	1	1	0	9	143	135	3.2%
	12	Orkhon	74	11	53	1	1	4	19	163	155	3.6%
	13	Uvurkhangai	67	6	53	1	1	2	31	161	165	3.6%
	14	Umnugovi	51	3	37	1	1	1	11	105	103	2.3%
	15	Sukhbaatar	72	3	31	1	0	1	20	128	115	2.8%
	16	Selenge	52	5	41	1	1	2	16	118	112	2.6%
	17	Khovd	82	5	45	1	1	1	16	151	149	3.3%
	18	Khuvsgul	54	7	69	1	1	1	15	148	142	3.3%
	19	Khentii	71	5	70	0	1	2	35	184	182	4.1%
	20	Uvs	45	5	44	1	1	2	11	109	104	2.4%
	21	Tuv	32	3	50	1	1	3	15	105	93	2.3%
District	22	Baganuur	42	4	30	1	1	3	13	94	91	2.1%
	23	Nalaikh	10	4	32	1	1	0	10	58	64	1.3%
		Sub-total	1,270	117	1,136	21	22	35	390	2,991	2,854	66.3%
Headquarters/UB	1	Switching Div.	389	0	0	0	1	1	31	422	418	9.4%
	2	Transmission Div.	173	0	0	0	1	0	41	215	200	4.8%
	3	Customer Service Div.(UB)	14	26	467	1	1	1	19	529	456	11.7%
	4	Procurement Div.	29	8	85	0	1	1	6	130	127	2.9%
	5	Radio/Broadcasting NW Div	71	15	4	0	1	0	10	101	99	2.2%
	6	Headquarters(Other Div.)	33	30	0	10	19	17	11	120	120	2.7%
			Sub-total	709	79	556	11	24	20	118	1,517	1,420
		Total	1,979	196	1,692	32	46	55	508	4,508	4,274	100.0%
		Ratio(2001)	43.9%	4.3%	37.5%	0.7%	1.0%	1.2%	11.3%	100.0%		

Table 13.1-2 Detailed Human Resources of MT (By Aimag Centre/Sums)

As of June 2002

No.	Aimags/Division	No. of Telecom offices	No. of employees (by Skill)								Vehicles		Total number of employees					
			Manager	Engineer	Technician	Cableman	Operator	Accountant/billing	Driver	Others	Car	Motorbike	1,999	2,000	2,001	2,002	26-Jun-02	
1	Arkhangai	Center	1	2	5	18	4	6	4	4	17	4		71	71	70	64	60
		Sums	18	18	1	16	4	17	4	4	17	4		57	57	57	52	52
2	Bayankhongor	Center	1	1	9	10	8	8	6	4	46	4		128	128	127	116	112
		Sums	20	20	6	34	4	23	4	4	46	4		100	100	100	92	92
3	Bayan-Ulgii	Center	1	1	13	28	10	5	4	5	12	5		142	142	139	130	130
		Sums	14	14	18	28	7	4	5	12	5		110	110	101	95	78	
4	Bulgan	Center	1	1	8	16	5	9	4	3	22	3		68	68	68	68	68
		Sums	16	15	13	28	28	7	4	5	12	5		144	142	133	127	112
5	Govisumber	Center	1	1	7	19	3	4	5	2	3	2		51	51	49	47	44
		Sums	2	2	2	6	1	4	5	2	3	2		58	58	56	54	51
6	Govi-Altai	Center	1	1	9	57	2	6	6	5	10	5		114	104	104	96	96
		Sums	19	19	9	63	2	21	6	5	10	5		46	46	46	40	40
7	Darkhan-Uul	Center	1	1	10	13	31	35	12	8	21	8		160	150	150	136	136
		Sums	4	8	1	10	11	22	3	2	9	2		141	139	135	131	131
8	Dornod	Center	1	1	10	45	4	8	3	3				107	106	101	91	74
		Sums	14	15	13	58	4	9	3	3				29	29	29	29	29
9	Dornogovi	Center	1	1	9	40	2	12	4	4	13	4		106	97	99	85	85
		Sums	17	14	1	15	2	14	1	4	4	0		61	57	56	65	49
10	Dundgovi	Center	1	1	16	9	1	7	4	3	56	3		89	89	86	88	97
		Sums	14	14	10	55	2	26	5	4	17	4		167	154	155	150	134
11	Zavkhan	Center	1	1	9	9	6	17	9	3	7	3		66	65	65	61	61
		Sums	23	23	1	10	18	19	1	1	1	1		79	78	78	74	74
12	Orkhon	Center	1	7	12	15	27	41	12	4	4	4		145	143	143	135	135
		Sums	2	2	2	1	2	2	2					11	10	9	7	9
13	Uvurkhangai	Center	1	1	7	3	1	5	4	46	4		89	88	90	85	72	
		Sums	19	19	7	3	2	32	7	5	68	5		165	164	166	159	144
14	Umnugovi	Center	1	1	8	27	5	8	10	3	7	5		69	69	69	70	68
		Sums	15	15	10	10	10	10	3	7	5	1		36	36	36	35	35
15	Sukhbaatar	Center	1	1	6	18	2	8	3	4	44	7		90	90	92	86	86
		Sums	13	13	6	18	2	16	3	4	53	7		128	128	128	116	116
16	Selenge	Center	1	1	11	8	1	12	5	4	28	3		70	70	70	70	70
		Sums	20	15	11	8	1	11	5	4	16	3		48	48	48	42	42
17	Khovd	Center	1	1	11	44	3	14	5	3	20	3		110	106	105	101	101
		Sums	16	16	11	55	3	21	5	3	20	3		54	47	46	44	44
18	Khuvsgul	Center	1	1	11	7	12	12	4	4	28			164	153	151	145	145
		Sums	24	25	1	21	16	16	4	4	28			71	69	67	63	63
19	Khentii	Center	1	1	9	19	2	16	5	5	42	4		123	119	114	99	99
		Sums	21	21	2	7	2	26	1	7	8			77	77	70	65	65
20	Uvs	Center	1	1	6	9	2	4	5	3	10	3		200	196	184	164	164
		Sums	19	19	1	6	5	5	3	10	3		46	45	45	43	41	
21	Tuv	Center	1	1	8	7	1	12	4	4	20	4		65	65	62	56	57
		Sums	27	20	2	4	6	6	4	9	9			48	46	43	37	41
22	Baganuur	Center	1	1	13	13	2	5	9	4	32	3		113	111	105	93	98
		Sums	3	3	3	3	3	3	3	3	3		7	7	7	6	6	
23	Nalaikh	Center	1	1	5	8	6	9	3	3	19	3		56	56	56	54	54
		Sums	4	4	13	13	2	8	9	4	32	3		95	91	91	88	85
Total	Center	23	29	212	442	140	263	131	89	503	87	0	2,078	2,052	2,025	1,907	1,809	
	Sums	344	337	12	113	91	255	8	4	122	4	2	1,029	1,007	987	939	942	
	Sub-total	367	366	224	555	231	518	139	93	625	91	2	3,107	3,059	3,012	2,846	2,751	

Note: The data is reported from each Aimag center and the figures may include some mistakes(not coincident with other data)

Table 13.1-3 Human Resources of MT (By Age)

As of January 1, 2002

No.	Aimags/Division	Age distribution(range)						Total	Average
		below 20	20-29	30-39	40-49	50-59	Over 60		
Aimags	1 Arkhangai	18	56	39	11	3	0	127	29.7
	2 Bayankhongor	0	30	61	42	6	0	139	36.7
	3 Bayan-Ulgii	0	8	80	35	10	0	133	38.5
	4 Bulgan	0	17	54	37	6	1	115	38.0
	5 Govisumber	0	24	30	1	1	0	56	31.3
	6 Govi-Altai	0	28	76	36	8	0	148	36.6
	7 Darkhan-Uul	0	40	97	48	19	0	204	37.3
	8 Dornod	0	27	50	42	10	1	130	37.9
	9 Dornogovi	1	35	74	19	19	2	150	36.7
	10 Dundgovi	0	22	51	42	7	0	122	37.8
	11 Zavkhan	0	25	68	36	14	0	143	37.7
	12 Orkhon	0	38	65	51	9	0	163	36.9
	13 Uvurkhangai	0	34	75	42	10	0	161	36.7
	14 Umnugovi	0	25	41	33	5	1	105	37.0
	15 Sukhbaatar	0	21	55	44	8	0	128	38.0
	16 Selenge	0	23	52	37	4	2	118	37.3
	17 Khovd	1	15	53	58	23	1	151	41.0
	18 Khuvsdul	0	37	70	38	3	0	148	35.5
	19 Khentii	0	54	77	45	8	0	184	35.4
	20 Uvs	0	9	52	41	7	0	109	39.2
	21 Tuv	0	20	46	32	7	0	105	37.5
District	22 Baganuur	4	23	39	21	6	1	94	35.6
	23 Nalaikh	0	23	28	5	1	1	58	32.7
Sub-total		24	634	1,333	796	194	10	2,991	36.8
Headquarters/UB	1 Switching Div.	2	119	188	68	45	0	422	35.8
	2 Transmission Div.	0	19	95	72	25	4	215	40.3
	3 Customer Service Div.(UB)	2	349	89	67	22	0	529	30.4
	4 Procurement Div.	1	23	33	59	11	3	130	39.9
	5 Radio/Broadcasting NW	2	28	31	29	11	0	101	37.0
	6 Headquarters(Other Div.)	0	17	40	34	25	4	120	41.4
	Sub-total		7	555	476	329	139	11	1,517
Total		31	1,189	1,809	1,125	333	21	4,508	36.3
Ratio		0.7%	26.4%	40.1%	25.0%	7.4%	0.5%	100.0%	

Table 13.1-4 Past Trend of Human Resources of MT

	Skill	1995	1996	1997	1998	1999	2000	2001
Aimag/District	Eng./Technician	1,167	1,072	1,103	1,090	1,008	950	1,270
	Power supply	446	334	341	309	302	337	*1
	Finance/Accountant	150	138	136	123	113	111	117
	Customer service	1,171	1,316	1,229	1,229	1,181	1,199	1,136
	Market	0	18	17	19	21	21	21
	Human resources	19	16	18	19	21	21	22
	IT	0	7	15	11	10	22	35
	Administration/Procurement	445	451	410	427	411	379	390
	Sub-total	3,398	3,352	3,269	3,227	3,067	3,040	2,991
HQs/UB	Eng./Technician	663	698	628	689	672	665	709
	Power supply	44	45	75	74	56	53	*1
	Finance/Accountant	51	47	55	62	66	66	79
	Customer service	507	491	482	481	566	588	556
	Market	6	7	9	9	9	12	11
	Human resources	9	11	10	14	24	23	24
	IT	6	17	9	18	18	20	20
	Administration/Procurement	203	257	257	220	90	89	118
	Sub-total	1,489	1,573	1,525	1,567	1,501	1,516	1,517
Grand-total	4,887	4,925	4,794	4,794	4,568	4,556	4,508	

Note: *1: No. of Eng. /Technician in 2001 includes Power supply staff

13.1.2 Recruitment and Retirement

Recruitment of staff is done on contract basis with students in universities before graduate, in order to keep capable personnel and to dispatch engineers to Aimag areas for some years.

Especially young people hope to stay in Ulanbaatar but in rural areas, even they are from rural areas and also want to transfer to other companies such as Mobicom and Skytel offering higher salary, therefore MT human resource department is tackling on how to keep young staff in whole country.

MT is decreasing staff through automation of call connection and digitalisation of systems and is shifting skill of staff to new fields and also is planning to transfer retired staff to new established subsidiary companies such as pre-paid card phone company.

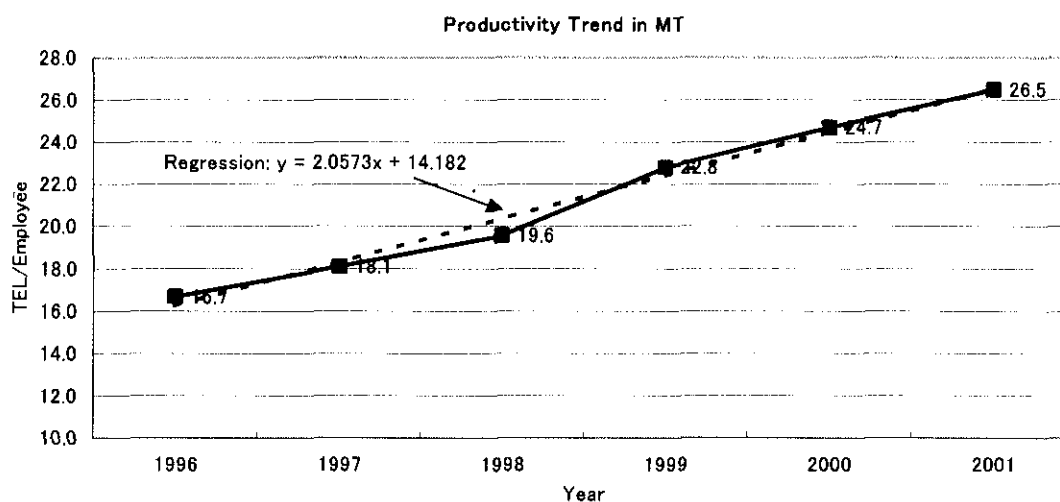
13.1.3 Productivity of Staff

Past and present productivity data of MT is shown in Table 13.1-5 and the features are analysed as follows:

- The current productivity in 2001 is $119,357/4,508=26.5$ TEL/Employee
- The productivity of MT is very low, compared to the world trend (refer to Table 13.1-6)
- Main reasons are due to:
 - *small size services,
 - *many O/M points(Sum centre offices),
 - *many operators for manual connection and
 - *vast/spread/long distance O/M. area
- Improvement of productivity from 1996 to 2001 is only approximately 2 TEL/employee and very small

Table 13.1-5 Trend of Productivity of MT

Year	1995	1996	1997	1998	1999	2000	2001
No. of main TEL		82,100	86,800	93,800	104,100	112,486	119,357
Population(thousands)	2,234	2,245	2,270	2,291	2,313	2,380	2,413
TeleDensity		3.66%	3.82%	4.09%	4.50%	4.73%	4.95%
No. of employees	4,887	4,925	4,794	4,794	4,568	4,556	4,508
Productivity(TEL/employee)		16.7	18.1	19.6	22.8	24.7	26.5
Productivity(employees/1,000TELS)		60.0	55.2	51.1	43.9	40.5	37.8



Forecasted value in 2020 by the regression: $Y = 2.0573 \times 25(2020 \text{ year}) + 14.182 = 65.6$

Table 13.1-6 Comparison Table with Similar Countries

<u>Country</u>	<u>Density</u>	<u>Productivity(Fixed TEL)</u>
<i>Mongolia</i>	<i>4.95</i>	<i>26.50</i>
<i>India</i>	<i>2.66</i>	<i>62.97</i>
<i>Indonesia</i>	<i>2.91</i>	<i>135.12</i>
<i>Thailand</i>	<i>8.57</i>	<i>153.41</i>
<i>Pakistan</i>	<i>2.22</i>	<i>50.61</i>
<i>China</i>	<i>8.58</i>	<i>158.71</i>

13.2 Present Human Resource Development Plan

13.2.1 Policy, Strategy and Target

MT is planning human resource development according to the Telecommunication State Policy Statement and the business plan, and has been implementing the plan as follows:

Promotion of productivity/effectiveness through:

- Digitalisation of facilities(Digital automatic exchanges and transmission systems),
- Automatic connection for long/international calls from Sum centre operators
- Introduction of jelly filled cables
- *Appropriate distribution of staff to telecommunication offices and sites*
- Staff and manager Skill-up by Training/Seminar
- Introduction of fault index as Norma to cable workers

13.2.2 Results and Issues

MT has been implementing the human resource development and the results are as follows: (refer to Table 13.1-1 to 13.1-4)

- (1) About 300 employees(6.2% of the total) are decreased from 1995 to 2001 and main contribution is decrease of employees of administration, procurement and cleaning.

- (2) About 300 employees are decreased from 2001 to 2002 by introduction of automatic connection for toll and international calls through Sum centre operators in 17 Aimags in 2001.
- (3) In 2002 about 300 operators will be decreased by review of shift time, and also staff(average 3 to 4 persons) in very small telephone offices with only 1 telephone line will be decreased to average 1 to 1.5 persons including seasonal temporarily workers.

However, the productivity is not enough, especially in Aimag level, so MT has to raise up more productivity by automatic connection of calls, digitalisation of facilities. Introduction of digital transmission systems between Aimag centres and Sum centres is most important factor for automatic call connection and modernization of facilities, i.e. improvement of productivity

13.3 Present Status of Training

At present the training of MT staff is carried out in the manner of the followings:

- Training in the own training centre(for technicians, operators, etc. except for specialists such as engineers, accountants, etc.)
- Training abroad by foreign countries programs
- Training by suppliers
- Seminar/On-the Job-Training at Aimags

This covers training in the Training Centre and OJT (On-the- Job-Training) in Aimags.

865 staff were trained in MT training centre in 2001 according to both requested and planned training programs(40 courses). MT is going to introduce a remote training system at Aimag centres in order to reduce training costs.

13.3.1 Training Policy and Target

MT's current training policy and strategy are that:

- Training of new technology(from analogue to digital)
- Training of IT(Computer operation/software, internet and IP)
- Managers' training
- English language(for technical terms and new technology)

Training for Aimag level staff

13.3.2 Education/Training System and Hierarchy

Education hierarchy for telecommunication employees is illustrated in Figure 13.3-1

Combined primary and secondary school(for 8 years) is normal education system, and moreover high school(for 2 years), vocational school(for 2 or 3 years) and university(for 4 to 6 years) are higher education system in Mongolia.

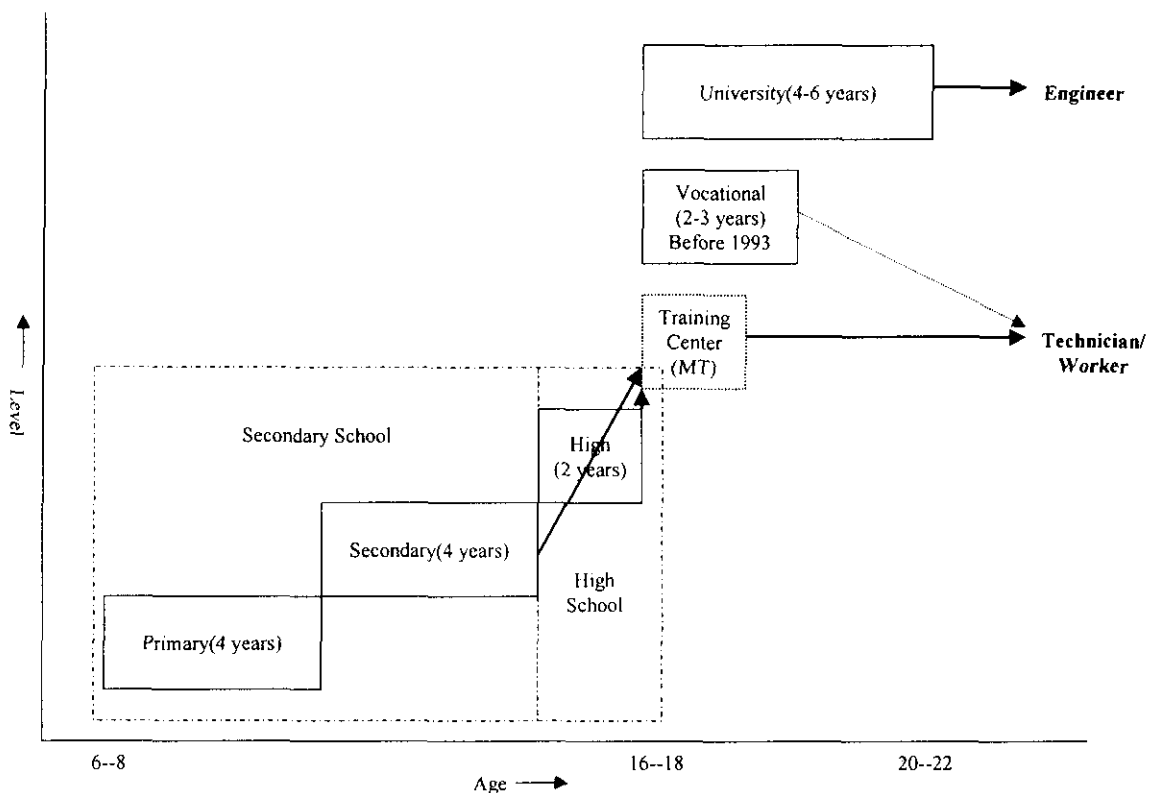


Figure 13.3-1 Education Hierarchy for Telecommunication Employee

Telecommunication technicians/workers are trained after secondary/high school, and engineers, accountants as specialist graduate universities and in principle they are trained On-the Job in the fields, however they sometimes have new system and technologies training as level-up.

Before 1993 a vocational school for telecommunication trained technicians and MT recruited them, but after 1993 the school was abolished and MT training centre is taking over the role.

Most of MT engineers are from Mongolian University of Science and Technology which has 4 faculties such as telecommunications, radio telecommunications, IT, electronics and 200 graduates per year (total students: about 1,000), and also a laboratory with practical/experimental facilities such as EWSD exchange.

The career development system for staff in MT is not clearly established.

13.3.3 Training Organisation

Human resource department in MT Headquarters makes annual training policy and the policy/programs are established/implemented by own training centre, which was established in 1997, and trained about 865 staff in 2001. Staff in the training centre are only 16 and 6 of them are instructors (Switch, transmission, IT, English, radio, centre master). Lecturers for specialist training are from outside such as universities and teach digital, switching, transmission, microwave technologies, English language, etc.

The centre does not have training facilities such as exchanges, transmission system, wireless system, etc. except computers and outside plants. Therefore trainees are dispatched to Mongolian University of Science and Technology which has these facilities.

Training abroad by foreign countries programs and Training by suppliers are very few for MT, and at current there is no outsourcing training in other institutes such as computers, languages training, etc.

13.3.4 Training Programs and Courses

There are 2 categorized training programs in the training centre:

- (1) Requested program(about 90-95% of the total)

Training courses for necessary skill-up in fields requested by Aimag centres such as OSP, transmission, TV & wireless, Computer operation, etc.

(2) Planned program:

Training courses of Level-up for specialists such as managers, finance & accountants, etc.

Table 13.3-1 Training and Number of Trainees of MT in 2001

No	Course name	No. of trainees in Aimag/District								No. of trainees in HQ and others								Total															
		Arkdang	Bayan-Ulgii	Bayan-Olgii	Govisumber	Darbhan	Dornod	Dornogov	Zavkhan	Oshon	Uvurkha	Umnogovi	Saibbat	Sevenger	Thuv	Uvs	Khovd		Khovsgu	Khovd	Bayanul	North	Service	Finance	Technology supply	Private expense							
1	English (primary)	1	1			3	2						1	3				3	3							19							
2	English (primary)																										20						
3	English (profound)																										14						
4	PC (primary)												3	3					2	1							19						
5	ADMOSS/Naalth																										12						
6	ADMOSS/Umnogovi																										11						
7	ADMOSS																										9						
8	ADMOSS/Thw																										19						
9	Basic digital technology							2				1		1											2		10						
10	Human resources																										23						
11	Operator																										9						
12	USAT																										17						
13	English (profound)																										12						
14	New technology																										11						
15	Digital switch																										2						
16	Operator																										12						
17	Chief engineer																										21						
18	English (profound)																										23						
19	English (primary)																										7						
20	English (primary)																										40						
21	Operator																										33						
22	English (profound)																										18						
23	ADMOSS																										6						
24	ADMOSS																										11						
25	Division manager																										2						
26	Operator																										28						
27	Internet operator																										24						
28	Division manager																										21						
29	Operator																										20						
30	PC repair and maintenance																										19						
31	English (profound)																										16						
32	English (profound)																										33						
33	English (profound)																										31						
34	ADMOSS																										86						
35	English (profound)																										17						
36	Cableman																										22						
37	Chief Training																										10						
38	English (primary)																										49						
39	English (mute)																										23						
40	Electrician training																										13						
Total		15	24	71	14	27	8	58	50	21	20	42	19	12	52	77	9	53	25	25	28	28	29	48	18	32	14	3	61	0	1	11	865

1: ADMOSS means Training of digital SW at Aimag . 2: Private expense means Training of own expense by whom is expected to be recruited to MT

The number of courses is 40 and the total number of trainees is about 865 in 2001.

The details of courses and trainees are shown in Table 13.3-1.

13.3.5 Training Facilities and Materials

MT's Training Centre was established 4 years ago and at present facilities are very poor as follows:

- (1) MT's training rooms are 3 with the total capacity of about 80 trainees;
 - Normal training room: for normal training with 40 capacity
 - Computer training room: for computer, LAN, software with 20 capacity
 - Language/basic telecommunication training room: for English language and telecommunications

- (2) Telecommunication facilities
 - 20 PCs and one printer with LAN
 - Outside plant(2 poles and 2 manholes)
 - Basic telecommunication circuits

- (3) Training materials
 - Projector, printer, copier(No Audio-video, etc.)

- (4) Accommodation
 - Accommodation facility in PTA building with the capacity of 24 persons

13.3.6 Instructors

Instructors are engineers from graduates of universities and have no field experience, therefore they can teach theories, but not practical matters.

Training and level-up of instructors is absolutely necessary for new technologies and systems through abroad training and/or supplier training

13.3.7 Training Issues

Through the above mentioned present status, there are many training issues to be tackled as follows:

(1) Training plan

- To increase Aimag level basic training such as computer, digital technology, etc.
- To increase English language training through AV equipment, etc.
- To introduce customer service training for competitive market
- To introduce a career path system

(2) Training facilities

- To introduce and increase practical training facilities such as switches, transmission system, radio system, optical fiber system, LAN, etc.
- To increase training rooms
- To increase AV equipment

(3) Instructor

- To increase instructors
- To train instructors for new technologies

13.4 Human Resource Development Plan

13.4.1 Estimation Method of Necessary Telecommunication Staff

(1) Macroscopic Estimation Method

According to the ITU data, the number of staff for telecommunication sectors has a close correlation between the number of fixed telephone lines per 100 inhabitants (teledensity) and the number of telephone lines per employee, which normally represents the productivity of employee(staff).

The above correlation means that in general, if the teledensity is going up, the productivity is going up too as the actual world trend.

In case of making a human resource plan, the required number of employees can be estimated by using this correlation, if no big deviation factors with this correlation. This estimation approach is called as a macroscopic estimation method which is used at large in the world, although other methods are also recommended in some cases where the financial data and information of telecommunications operators would be sufficiently available for the planner.

On the other hand, this Macroscopic Method will provide a long-term planning target in human power planning and strategy, but another method will be necessary to calculate a required number of staff on a short-term basis and on a business category basis for the management purpose. For this reason, a microscopic estimation method must be studied in this report.

(2) Microscopic Estimation Method

For the purpose of estimate, the necessary number of telecommunications staff by using a microscopic method, a work/job classification and description have to be clarified at the beginning. After this process, an estimation criteria and/or regulations must be standardized to eventually calculate the necessary number of staff in each organisational unit or work group. The typical methods will be described in Section 13.4.5.

13.4.2 Staff Plan by Macroscopic Estimation Method

(1) International model data

In order to apply a regression formula for Macroscopic Estimation, 139 world countries data and 39 Asian countries data in relation between “Fixed Telephone Density(per 100 inhabitants)” and “Number of Fixed Telephones per Employee” has been obtained as available data from ITU 1999 Data and given in Vol. IV Part-1 Annex 13. In case of MT, Asian countries model is appropriate due to considerably similar conditions.

(2) Correlation formula for teledensity and productivity (No. of Fixed telephones per employee)

According to the above data, the correlation between “Fixed Telephone Density(per 100 inhabitants)” and “Number of Fixed Telephones per Employee” is illustrated in Figure 13.4-1 & 2.

The correlation is clearly observed as linear relation in logarithm of Density and Telephones per Employee.

The correlation formula is obtained as approximation of regression from 39 countries data as below.

$$Y = 39.727X^{0.3909}$$

Where, Y: Number of Fixed Telephones per Employee
X: Fixed Telephone Density(per 100 inhabitants)

In case of MT macroscopic estimation, the above regression is not simply applicable, because the present value is lower than the regression value, so following three (3) regression formulas should be considered:

- ①: Optimistic regression where the productivity will reach about 120 TELs/employee at teledensity 20 in order to catch up the above regression ($Y=3.6215X^{1.0684}$)
- ②: Medium regression where the productivity will reach about 200 TELs/employee at teledensity 60 in order to catch up the above regression ($Y=19.031X^{0.7179}$)

- ③: Pessimistic regression where the productivity will reach about 80 TELs/employee at teledensity 70 in order to catch up the above regression ($Y=61.63X^{0.0796}$)

Comparing to the above 3 regressions and considering geographic conditions of network in Mongolia, realistic and objective one will be **Medium regression** ②.

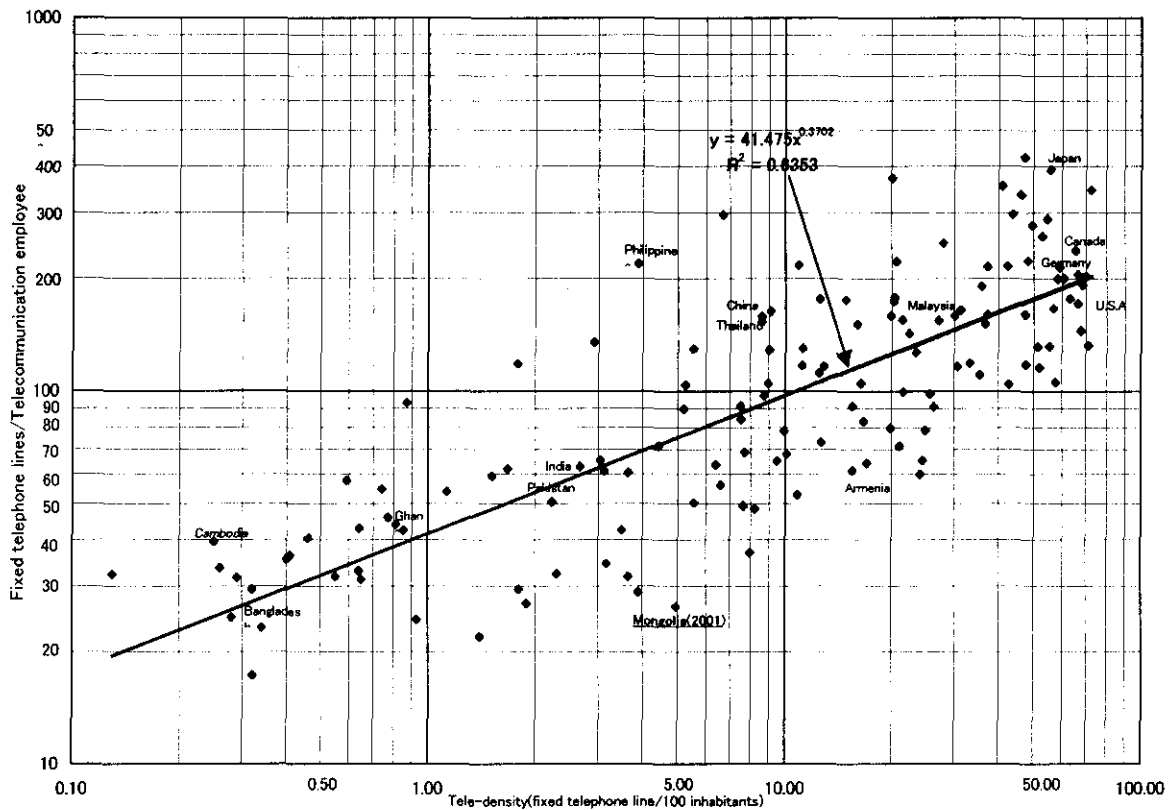


Figure 13.4-1 Telephone Lines per Employee
(by ITU 1999 World Data: 193 countries)

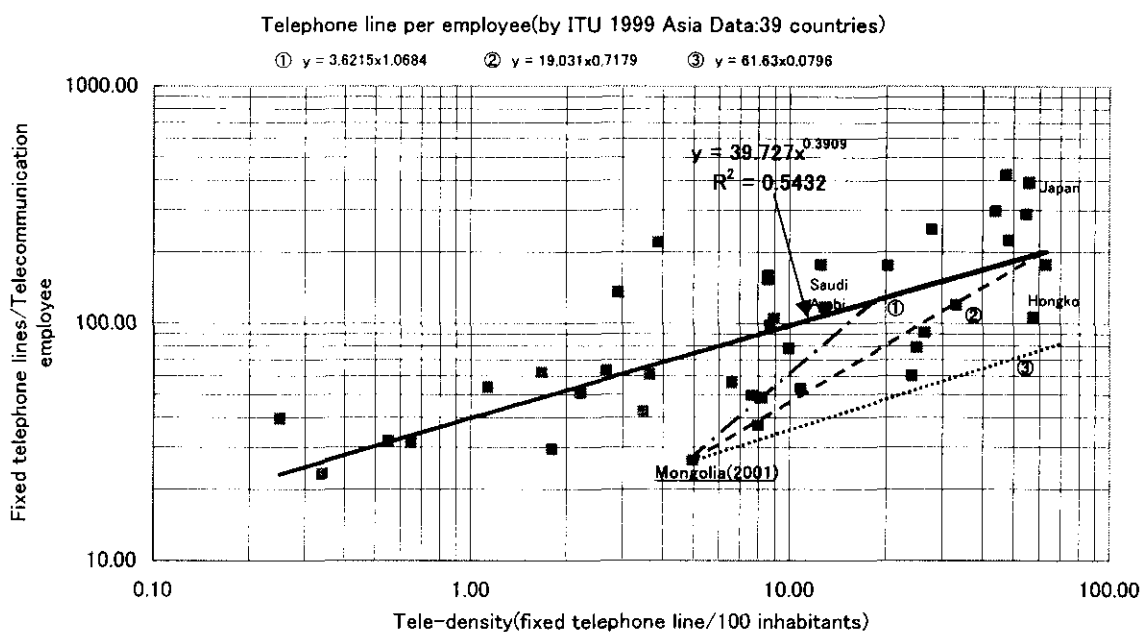


Figure 13.4-2 Telephone Lines per Employee
(by ITU 1999 Asia Data: 39 countries)

(3) Required Number of Employees in MT (by scenario of demand forecast/fulfilment)

The required number of employees in MT can be obtained from the equation $Y=19.031X^{0.7179}$ (Medium regression) in relation to the productivity, demand forecasting results mentioned in Chapter 9 in this Volume from the past time 2001 up to year 2020 covering the telecommunication development plan.

Table 13.4-1 shows interrelated indicators of three(3) demand forecasted scenarios, the number of employees and the productivity for the Human Resource Development up to 2020.

(4) Estimation for Staffing Plan and Productivity

Relationships between the time and the productivity are illustrated in Figure 13.4-3 in relation to the demand forecasting scenarios up to 2020.

Table 13.4-1 Required Number of Employees and Productivity in MT

Year	Scenario-1(Medium Growth/Low GRDP Growth)				Scenario-2(Medium Growth/Medium GRDP Growth)				Scenario-3(Medium Growth/High GRDP Growth)			
	No. of lines (thousand)	Teledensity	Productivity (No. of TELS/staff)	No. of employees	No. of lines (thousand)	Teledensity	Productivity (No. of TELS/staff)	No. of employees	No. of lines (thousand)	Teledensity	Productivity (No. of TELS/staff)	No. of employees
2001	119,360	4.95	26.48	4,508	119,360	4.950000	26.48	4,508	119,360	4.95	26.48	4,508
2008	190,566	7.13	77.96	2,444	218,424	8.170701	85.98	2,541	216,698	8.11	85.52	2,534
2013	220,447	7.66	82.08	2,686	270,212	9.384401	94.96	2,845	274,387	9.53	96.02	2,858
2020	294,811	9.27	94.13	3,132	370,489	11.64348	110.87	3,342	414,197	13.02	120.13	3,448

Note: No. of lines and Teledensity is based on the demand forecast data(except 2001)

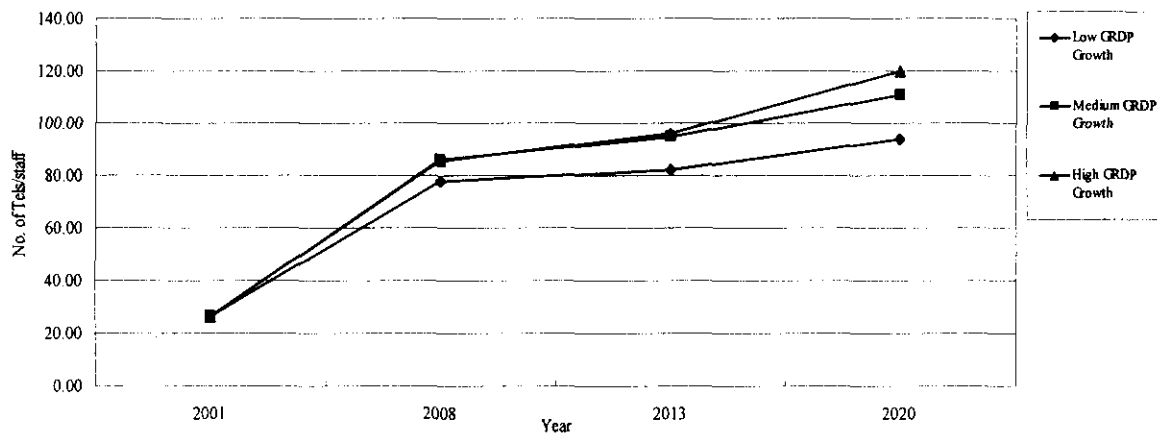


Figure 13.4-3 Growth of Productivity in MT

13.4.3 Transition of Productivity and NTT’s Experience, and Factors of Productivity

(1) Transition Examples of Productivity of Developed and Asian Countries

Table 13.4-2 shows Transition example(10 years from 1989 to 1999) of telephone density, employees and fixed telephones per employee in Developed Countries and Asian Countries(Developed & Developing countries). In general, the followings are analysed:

(a) Developed Countries:

- Telephone sectors are already privatised
- Increase ratio of telephones is small
- Employees are decreasing
- Productivity is increasing, but the ratios are small

(b) Developing Countries:

- Telephone sectors are under privatisation or not privatised
- Increase ratio of telephones is significant
- Employees are slightly increasing
- Productivity is drastically increasing

In order that Developing Countries increase productivity, policies such as promotion of privatisation, expansion of telephones without increasing employees, modernization or improvement of O/M by centralization and introduction of new technologies, and improvement of management will be strongly required.

Table 13.4-2 Transition Example of Telephone Density, Number of Employees and Productivity (fixed telephone per employee)

Country	Fixed telephone density(/100)			No. of Employees (thousand)			Productivity (Fixed TEL/employee)		
	1989	1999	Annual increase ratio(%)	1989	1999	Annual increase ratio(%)	1989	1999	Annual increase ratio(%)
1. Developed countries									
Japan	42.60	55.75	2.73%	277.0	180.0	-4.22%	189.36	391.83	7.54%
French Republic	47.75	58.17	1.99%	157.3	170.5	0.81%	171.26	200.00	1.56%
United States of America	53.17	66.44	2.25%	886.0	1,070.0	1.90%	148.43	171.51	1.46%
Federal Republic of Germany	42.19	59.03	3.42%	216.0	226.0	0.45%	133.56	214.60	4.86%
Kingdom of Sweden	67.30	66.46	-0.13%	43.5	28.7	-4.08%	131.30	205.19	4.57%
United Kingdom of Great Britain and Northern Ireland	43.23	56.72	2.75%	245.7	202.4	-1.92%	100.92	166.75	5.15%
2. Asian countries									
Republic of Singapore	37.70	48.20	2.75%	11.0	8.4	-2.63%	91.03	223.45	9.40%
Kingdom of Thailand	2.10	8.57	15.10%	18.2	34.0	6.42%	63.48	153.41	9.23%
Malaysia	8.00	20.30	9.76%	28.0	25.4	-0.98%	49.50	174.45	13.42%
Republic of Indonesia	0.49	2.91	19.50%	41.8	45.0	0.74%	20.66	135.12	20.66%
People's Republic of China	0.50	8.58	32.88%	496.0	685.0	3.28%	11.45	158.71	30.07%

Source : ITU statistics book

(2) NTT's Productivity Trend in the past

Transition of TEL/Teledensity/Employee/Productivity in NTT is illustrated in Figure 13.4-4 and Table 13.4-3.

This is a history of business activities and also human resource development and its features are as follows:

- Significant increase of telephones: 1967 to 1982
- Increase of employees according to expansion of telephones: 1957 to 1977
- Decrease of employees by integration/centralization/reduction of offices & organisations, Direct dialling by automatic exchanges, introduction of new technologies & services, digitalisation of networks, computerization of O/M & management systems, transfer/retirement of employees, etc.: 1977 to 1997
- Significant increase of productivity as a result of the above

Remarkable contribution points to productivity improvement are as follows and shown in Figure 13.4-5.

Reduction of:

- No. of branches for customer services
- No. of attended maintenance exchanges
- No. of directory service offices
- No. of telegram service offices

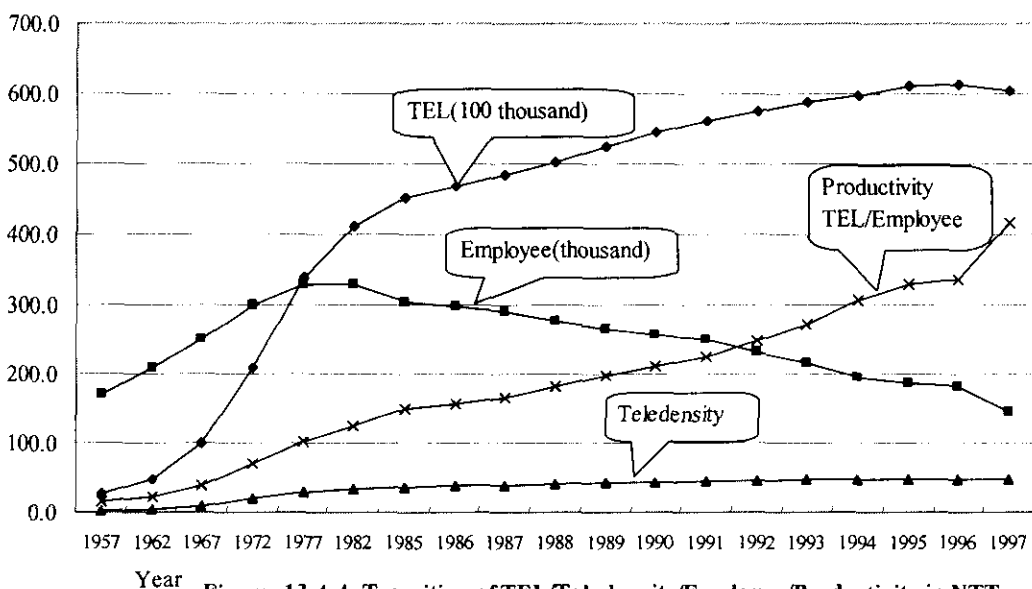


Figure 13.4-4 Transition of TEL/Teledensity/Employee/Productivity in NTT

Table 13.4-3 Transition of Number of Telephones, Density, Employees and Productivity of NTT

Year	1957	1962	1967	1972	1977	1982	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	
No. of TEL(thousands)	2,638	4,781	9,889	20,985	33,945	41,104	45,300	46,772	48,419	50,337	52,408	54,480	56,208	57,600	58,777	59,878	61,042	61,457	60,381	
No. of TEL(100 thousands)	26	48	99	210	339	411	453	468	484	503	524	545	562	576	588	599	610	615	604	
Density	2.9	5.0	10.2	20.8	30.6	34.9	37.4	38.4	39.6	41.1	42.5	43.8	45.2	46.0	46.9	47.7	48.4	48.6	47.7	
No. of Employees(thousands)	170.0	210.0	250.0	300.0	330.0	330.0	304.0	297.6	291.1	276.7	266.0	257.6	249.9	232.2	215.6	194.7	185.5	182.5	145.4	
Productivity (No. of TEL/Employee)	15.52	22.77	39.56	69.95	102.86	124.56	149.01	157.16	166.33	181.92	197.02	211.49	224.92	248.06	272.62	307.54	329.07	336.75	415.28	
Topics	*SXS:100% *Automatic exchange: 57.2%	*CCP Cable *Automatic exchange: 75.4%	*SXS:68% *XB:32% *PCM *Automatic exchange: 91.5%	*Coaxial cable *Automatic exchange: 97.8% *Time meterlag for local call *Analog ESS	*Automatic exchange: 99.9% *Elimination of backlog	*Peak of employees *Digitalization start *New Computer systems: Customer service, In-c test, direct ory, billing, traffic	*Privatization													

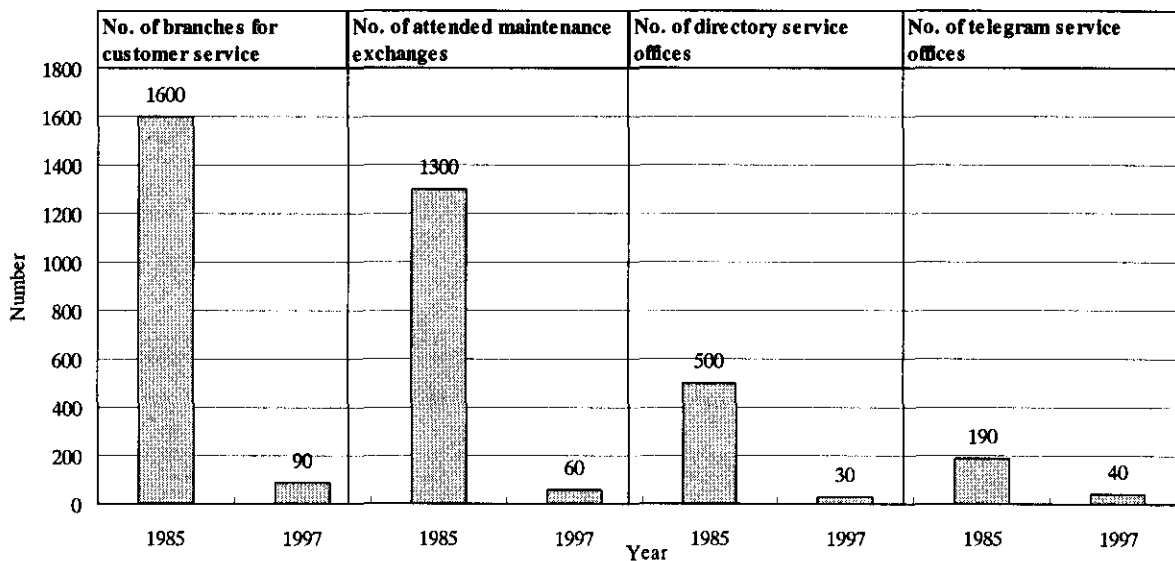


Figure 23.4-5 Transition of Integration/Centralisation/Reduction of Offices and Organisations of NTT

(3) Factors of Productivity Improvement

As mentioned above, developed countries have been improving the productivity by taking various policies and strategies. Factors of productivity improvement are summarized below:

- Sector reform:
- Privatisation
- Competition in the market
- Management agreement
- Expansion of networks & telephones
- Introduction of new technology & services
- Introduction of Automatic exchanges
- Direct dialling for long distance and international calls
- Digitalisation of networks (switches and transmission)
- Introduction of Customer oriented services
- Centralization/Modernization of O/M
- Centralization of Operator assistance call(local/domestic/international)
- Centralized reception of complain calls
- Centralization/modernization of Telegram/telex service
- Centralization of Supervision, test & control of switch/transmission
- Centralization of Outside plant works(line-men centre)
- Introduction of O/M and management systems
- Introduction of Network management system (NMS)
- Introduction of Customer service system (CSS)
- Centralization/modernization of Billing system
- Introduction of Traffic management system
- Introduction of Automatic directory system
- Introduction of Accounting system
- Introduction of Management information system
- Human resource management system
- Computerization of office works
- Introduction of LAN/WAN systems in offices
- Integration/Centralization/reduction of offices and organisations
- Staff mind change and skill-up
- Clear demarcation of jobs and job description
- Promotion of Retirement and staff shift to subsidiary companies
- Delegation of authority from HQs to Regions

13.4.4 Adjustment of Number of MT Staff and Productivity

As described in Section 13.4.2 Staff Plan by Macroscopic Estimation Method, the long term plan is based on Asian countries data, however, Mongolia has the different conditions for productivity:

At present, the MT's productivity is very low due to the vast land and less population density, i.e.;

- Distribution loss by many small offices,
- Non-automatic call connection
- Ineffective mobilization for O/M work

However, in near future, especially by 2013, the networks will be digitalized and most of Sums calls will be connected automatically, and there will be many no-attended maintenance exchange offices, so the long-term productivity is expected as Medium regression (Scenario-2) in Section 13.4.2, even a little bit ambitious.

The required productivity in Table 13.4-1 needs an intensive catch-up to the target productivity, i.e. intensive decrease of employees in a few years, therefore practically a smoother improvement of productivity should be implemented during each phase as follows:

- (1) Phase 1 to Phase 2 (2001 to 2013) : linear improvement of productivity (productivity: 26.48 to 94.06)
- (2) Phase 2 to Phase 3 (2014 to 2020) : linear improvement of productivity (productivity: 94.06 to 109.27)

And considering the current distribution, No. of Sums and future improvement of productivity, a macroscopic distribution of staff to HQs, Aimag centres and Sums should be as follows:

- Ratio of HQs/UB:Aimag/Sum = 40%: 60%
- Ratio of Aimag Centers: Sums = 70%: 30%

According to the above, the required productivity in Table 13.4-1 and distribution plan are adjusted and shown in Table 13.4-4. MT should implement the staff plan based on this table.

Table 13.4-4 Adjusted Number of Employees and Productivity in MT

Year	Required No. of employees by Scenario-2				Adjusted No. of employees			Distribution Plan			
	No. of lines (thousand)	Teledensity	Productivity (No. of TELS/staff)	No. of employees	Productivity (No. of TELS/staff)	No. of employees (calculation)	No. of employees (round)	HQs	Aimag Center	Sums	Total
2001	119,360	4.950000	26.48	4,508	26.48	4,508	4,510	1,517	2,004	987	4,508
2002	174,849	7.120697	77.89	2,245	32.11	4,369	4,370	1,420	1,912	942	4,274
2003	182,112	7.295697	79.26	2,298	37.74	4,230	4,230	1,692	1,777	761	4,230
2004	189,374	7.470698	80.62	2,349	43.37	4,092	4,090	1,636	1,718	736	4,090
2005	196,637	7.645699	81.97	2,399	49.01	3,953	3,950	1,580	1,659	711	3,950
2006	203,899	7.820700	83.31	2,447	54.64	3,815	3,810	1,524	1,600	686	3,810
2007	211,162	7.995700	84.65	2,495	60.27	3,676	3,680	1,472	1,546	662	3,680
2008	218,424	8.170701	85.98	2,541	65.90	3,538	3,540	1,416	1,487	637	3,540
2009	228,782	8.413441	87.80	2,606	71.53	3,399	3,400	1,360	1,428	612	3,400
2010	239,139	8.656181	89.61	2,669	77.16	3,261	3,260	1,304	1,369	587	3,260
2011	249,497	8.898921	91.41	2,729	82.79	3,122	3,120	1,248	1,310	562	3,120
2012	259,854	9.141661	93.19	2,788	88.43	2,984	2,980	1,192	1,252	536	2,980
2013	270,212	9.384401	94.96	2,845	94.96	2,845	2,850	1,140	1,197	513	2,850
2014	284,537	9.707126	97.30	2,924	96.23	2,916	2,920	1,168	1,226	526	2,920
2015	298,863	10.02985	99.61	3,000	98.40	2,987	2,990	1,196	1,256	538	2,990
2016	313,188	10.35258	101.90	3,074	100.58	3,058	3,060	1,224	1,285	551	3,060
2017	327,513	10.67530	104.17	3,144	102.75	3,129	3,130	1,252	1,315	563	3,130
2018	341,838	10.99803	106.42	3,212	104.92	3,200	3,200	1,280	1,344	576	3,200
2019	356,164	11.32075	108.65	3,278	107.09	3,271	3,270	1,308	1,373	589	3,270
2020	370,489	11.64348	110.87	3,342	110.87	3,342	3,340	1,336	1,403	601	3,340

Note:

1. Ratio of HQs/UB:Aimag/Sum = 40%: 60%
2. Ratio of Aimag Centers: Sums = 70%: 30%
3. In year 2001& 2002(Jun.): actual figures

13.4.5 Staff Estimation by Microscopic Method

(1) Reference and example of Microscopic method

In order to review the result of macroscopic estimation and staff estimation by division/section, following Microscopic method is applicable.

The followings are references or examples for the estimation of Microscopic Method which are described in mentioned Section 13.4.1 (2).

(a) Customer Section

The number of required employees is estimated according to efficiency defined by using quantitative indexes such as the number of subscriber lines and the number of subscription requests.

Efficiency must be defined and calculated for group categories such as regional groups and customer groups.

(b) Telephone Directory and Dial Service Assistant Section

The number of required employees is calculated by the following formula:

Operating load = 60 minutes / Average time when the operator service was required for one call

The number of required staff = Average number of calls per hour / Operating load

(c) Switching Section

Estimation of the required number of switching section:

The total number of required staff for a given line capacity is calculated by summing up the number of required employees in all job categories. One of the calculation examples for three cases of line capacity is shown in Table 13.4-5.

Table 13.4-5 An Example of Switching Section Staff (Unit: person)

LS (Line Capacity)	10,000	20,000	30,000
Maintenance Repairs	0.2	0.4	0.5
Regular Maintenance Tests	0.2	0.2	0.2
Regular Maintenance Jobs	1.4	2.1	2.7
Attached Jobs	0.5	0.8	1.0
Total	2.3	3.5	4.4

(d) Outside Plant Staff

An example of methods by which the required number of staff can be estimated for the ordinary telephone maintenance job is given in the followings:

$$E = F / (W \times D / P)$$

where

- E : Required number of employees
- F : Number of faults (a year)
- W : Working days in a year, xxx days assumed
- P : A repair job is handled by x persons.
- D : Number of dealings in a day for repairs, x assumed.

(e) Administration Section

The necessary number of staff for this section can be obtained from an experienced data and an approximated estimation in which 10% of the total number of staff counted up in the four (4) sections mentioned above.

The present situation with staff allocation must be reviewed in order to make the necessary improvements to increase productivity. Since the number of administrative staff (specially clerks) is rather high, they should be reduced to a more appropriate level for its roles and functions.

(2) Correlation by using the existing division/section data

For the purpose of examination and estimation of the current staff, correlation examples by using the existing staff data of Aimags/Districts are calculated and shown in Table 13.4-6.

Correlations and regressions result in the followings:

- Relation between No. of Sub. and Sub./Eng&Tech. in Aimag (District)/Sum centres:

$$y = 0.0172x, \quad R^2 = 0.0386$$

- Relation between Semi-automatic/Manual Sub. and Sub./Customer service staff in Aimag(District)/Sum centres:

$$y = 0.0211x - 0.2856, \quad R^2 = 0.9381$$

- Relation between Sub. and Sub./Total staff in Aimag(District)/Sum centres:

$$y = 0.0049x + 5.9866, \quad R^2 = 0.703$$

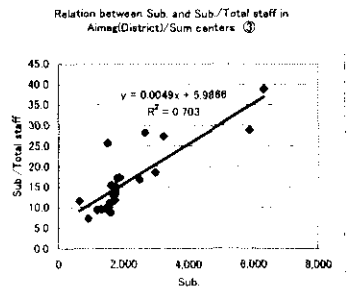
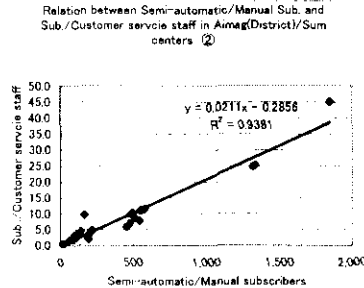
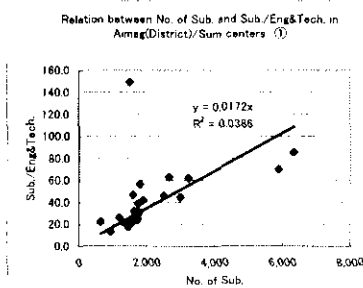
Except for Eng./Technicians of Nalaikh district, each relation is linear with close correlation. The above regressions will be utilized for estimate of human resources as far as big improvement factors are not implemented.

Number of subscribers is bigger, number of subscribers per staff is bigger, and in case of many small Sums like in Mongolia, the productivity is very disadvantageous.

Table 13.4-6 Human Resources of MT (Aimags/District)

As of end of 2001

No.	Aimags/District	No. of Subscribers			Eng./Technician	Financial/Accounting	Customer Services	Market	Human Resources	IT	Administration/procurement	Total <end of 2001>	Total <10-May, 2002>	Sub./Eng. & Tech. ①	Non-automat. c Sub./Customer service	Sub./Total staff ③
		Full automatic	Semi-automatic/Manual	Total												
1	Arkhangai	995	192	1,187	46	4	59	1	1	1	15	127	104	25.8	3.3	9.3
2	Bayankhong	1,106	214	1,320	61	4	48	1	1	2	22	139	131	21.6	4.5	9.5
3	Bayan-Ulgii	1,666	89	1,755	59	3	46	1	1	2	21	133	130	29.7	1.9	13.2
4	Bulgan	1,247	494	1,741	45	8	48	1	1	1	11	115	110	38.7	10.3	15.1
5	Govisumber	479	164	643	29	2	17	0	1	1	6	56	55	22.2	9.6	11.5
6	Govt-Altai	1,227	510	1,737	70	3	59	1	1	3	11	148	138	24.8	8.8	11.7
7	Darkhan-Uul	5,417	454	5,871	84	12	77	1	1	0	29	204	197	69.9	5.9	28.8
8	Dornod	1,596	91	1,687	64	7	35	1	1	1	21	130	117	26.4	2.6	13.0
9	Dornogovi	1,054	488	1,542	72	5	49	1	1	2	19	149	147	21.4	10.0	10.3
10	Dundgovi	1,145	581	1,726	54	3	50	1	1	0	14	123	115	32.0	11.6	14.0
11	Zavkhan	1,394	193	1,587	34	5	93	1	1	0	9	143	135	46.7	2.1	11.1
12	Orkhon	5,004	1,319	6,323	74	11	53	1	1	4	19	163	155	85.4	24.9	38.8
13	Uvurkhangai	1,644	1,335	2,979	67	6	53	1	1	2	31	161	165	44.5	25.2	18.5
14	Umnugovi	1,555	63	1,618	51	3	37	1	1	1	11	105	103	31.7	1.7	15.4
15	Sukhbaatar	792	137	929	72	3	31	1	0	1	20	128	115	12.9	4.4	7.3
16	Selenge	1,376	1,849	3,225	52	5	41	1	1	2	16	118	112	62.0	45.1	27.3
17	Khovd	1,241	215	1,456	82	5	45	1	1	1	16	151	149	17.8	4.8	9.6
18	Khuvsgul	2,014	476	2,490	54	7	69	1	1	1	15	148	142	46.1	6.9	16.8
19	Khentii	1,064	545	1,609	73	5	70	0	1	2	35	184	182	22.7	7.8	8.7
20	Uvs	1,858	25	1,883	45	5	44	1	1	2	11	109	104	41.8	0.6	17.3
21	Tuv	1,249	551	1,800	32	3	50	1	1	3	15	105	93	56.3	11.0	17.1
22	Baganuur	2,550	99	2,649	42	4	30	1	1	3	13	94	91	63.1	3.3	28.2
23	Nalaikh	1,472	18	1,490	10	4	32	1	1	0	10	58	64	149.0	0.6	25.7
	Sub-total	39,145	10,102	49,247	1,270	117	1,136	21	22	35	390	2,991	2,854	38.8	8.9	16.5



Note:
 1. Eng./Technician means Engineer, technician and cableman for O/M
 2. Customer services means Operator and others than the above categorized skills

(3) Service Indicators Necessary for the Number of Staff and Their Duties

The number of staff and their duties are closely related to service quality. The quality control of services must be uniformly administered throughout the country by universally setting standards which are coordinated with expansion of facilities.

Table 13.4-7 shows an example of service indicators.

Table 13.4-7 An Example of Service Indicators

Customer Section	Completion Rate for Service Orders within a Certain Period
Dial Assistance Section	Response Rate
Maintenance Section	Fault Frequency Rate, Fault Recovery Time

(4) Establishment of Staff Relocation and Re-assignment System

In order to develop the capabilities of staff and utilize the present human resource as much as possible, it is necessary to establish a method to relocate and re-assign staff.

Taking into account of rural telecommunication development, the following attentions should be paid to:

- By introduction of automatic exchanges, Operators in Sums to be shifted to marketing, accounting, etc. with skill of computer operation
- Engineers and technicians of Analogue/digital systems to be shifted to IT and IP network maintenance

13.4.6 Staff Allocation in Headquarters and Aimags/Sums

The long term staffing plan(macroscopic estimate) should be appropriately allocated to headquarters and Aimags/Sums by each phase, based on the policy and strategy:

The present staff allocation is in Table 13.4-8.

The policy and strategy for staff allocation should be as follows:

- Most of Sums will be automatic call connection by 2013 and the operators will be drastically decreased
- Engineers/technicians in Aimags/Sums will be slightly decreased, although systems will be digitalized and modernized
- Engineers/technicians in UB will be slightly decreased by centralization of maintenance
- All Engineers/technicians skill will be shifted to IP technology
- Enhancement of customer services (marketing) and IT will be strengthened
- Administration/procurement will be decreased

Considering the present allocation and the above strategy, the long term staff allocation plan roughly will be Table 13.4-9 and should be reviewed every year as to be practically implemented.

Table 13.4-8 Present Staff Allocation

End of 2001								
	Eng./Technician	Financial/Accounting	Customer Services	Market	Human Resources	IT	Administration/procurement	Total
Aimag center	1,270	117	1,136	21	22	35	390	2,991
(Ratio)	64.2%	59.7%	67.1%	65.6%	47.8%	63.6%	76.8%	66.3%
HQs/UB	709	79	556	11	24	20	118	1,517
(Ratio)	35.8%	40.3%	32.9%	34.4%	52.2%	36.4%	23.2%	33.7%
Total	1,979	196	1,692	32	46	55	508	4,508
(Ratio)	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

	Manager	Engineer	Technician	Cableman	Operator	Accountant/billing	Driver	Others	Total
Aimag/ center	29	212	442	140	263	131	89	503	1,809
(Ratio)	7.9%	94.6%	79.6%	60.6%	50.8%	94.2%	95.7%	80.5%	65.8%
Sum	337	12	113	91	255	8	4	122	942
(Ratio)	92.1%	5.4%	20.4%	39.4%	49.2%	5.8%	4.3%	19.5%	34.2%
Total	366	224	555	231	518	139	93	625	2,751
(Ratio)	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Table 13.4-9 Staff Allocation Plan to Aimag/Headquarters

Skill		2001	PH-1(2002-2008)	PH-2(2009-2013)	PH-3(2014-2020)
Aimag/District	Eng./Technician	1,270	28.2%	25.0%	25.0%
	Financial/Accounting	117	2.6%	3.0%	3.0%
	Customer Services	1,136	25.2%	20.0%	15.0%
	Market	21	0.5%	0.5%	4.0%
	Human Resources	22	0.5%	0.5%	0.5%
	IT	35	0.8%	3.0%	5.0%
	Administration/procurement	390	8.7%	8.0%	7.0%
	Sub-Total	2,991	66.3%	60.0%	60.0%
HQs/UB	Eng./Technician	709	15.7%	15.0%	13.0%
	Financial/Accounting	79	1.8%	2.0%	2.0%
	Customer Services	556	12.3%	12.0%	8.0%
	Market	11	0.2%	3.0%	4.0%
	Human Resources	24	0.5%	0.5%	0.5%
	IT	20	0.4%	5.0%	8.0%
	Administration/procurement	118	2.6%	2.0%	2.0%
	Sub-Total	1,517	33.7%	40.0%	40.0%
Total	Eng./Technician	1,979	43.9%	40.0%	38.0%
	Financial/Accounting	196	4.3%	5.0%	5.0%
	Customer Services	1,692	37.5%	32.0%	23.0%
	Market	32	0.7%	3.5%	8.0%
	Human Resources	46	1.0%	1.0%	1.0%
	IT	55	1.2%	8.0%	13.0%
	Administration/procurement	508	11.3%	10.0%	9.0%
	G-total	4,508	100.0%	100.0%	100.0%

13.5 Training Plan

As a result of analysis of the current training and overview of future management and technology trend, Basic Policy of Training and Framework of Training are roughly illustrated as shown in Figure 13-5-1 and 13.5-2.

The detailed recommendations are as follows:

(1) Training Policy and Target

- To skill up Aimag/Sum level staff, especially for digital, Computer, IT and English in order to develop rural networks
- To increase training of IT operation to cope with modernized office works
- To introduce training of IP network(including VoIP)
- To enhance and increase customer service training in order to overcome competitive market
- To introduce skill shift training(e.g.; marketing) for operators
- To introduce manager training based on quality control for maintenance, accounting, etc.
- To introduce outsourcing training programs for IT, etc. in order to reduce the cost and deepen speciality
- To expand training rooms and facilities for more training

(2) Education/Training System and Hierarchy

MT does not have clear CDP(Career Development Program) for each skill as exemplified in Figure 13.5-3, so it should be introduced and managed for more utilization of human resources.

(3) Training Organisation

MT has 23 Aimags and 132 Sums in the vast area, therefore collective training of many staff is not cost/time effective, so it is necessary to introduce regional training system, i.e. one region centre in geographically integrated Aimags gives general training such as computers, digital technology, etc. for Aimag/Sum level staff. For this purpose, rooms and facilities should be established in regional centres, and also communications facilities such as WAN between Ulanbaatar training centre and regional centres are required.

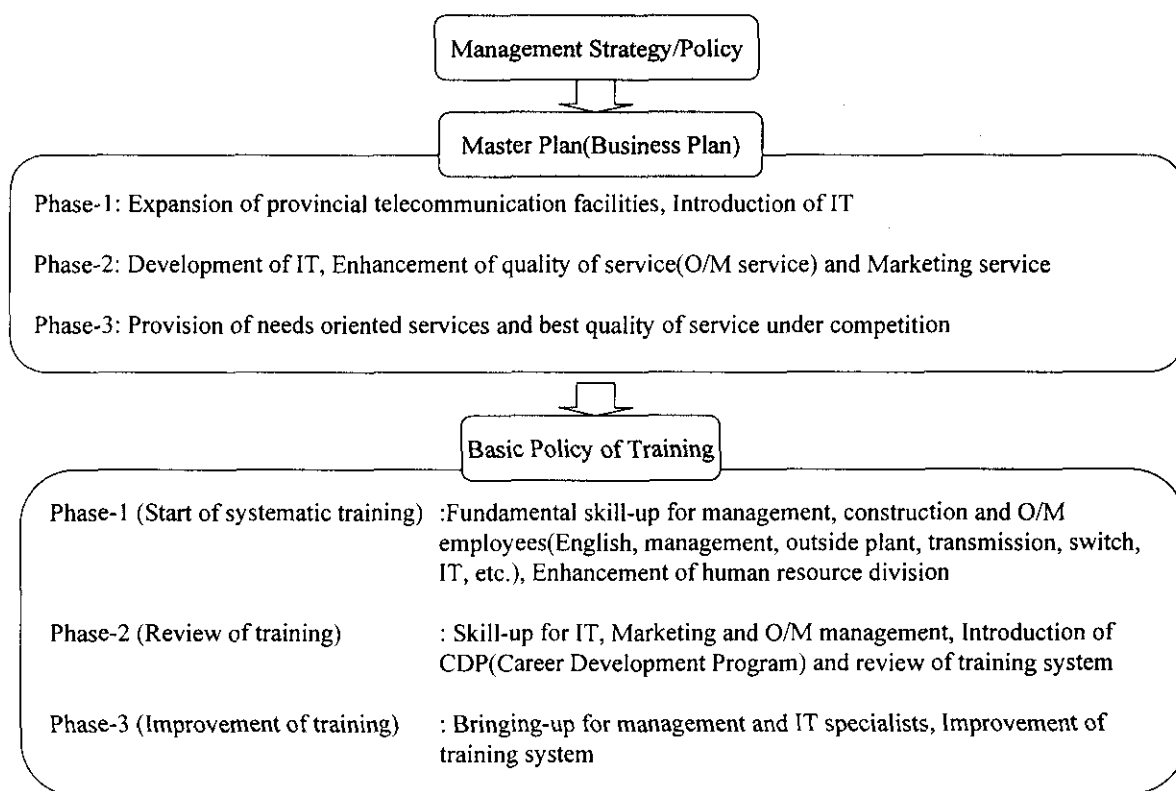


Figure 13.5-1 Basic Policy of Training

Period		Phase-1 (Start of systematic training)	Phase-2 (Review of training)	Phase-3 (Improvement of training)
Senior manager	Management skill	•Management training(High level)	→	
Manager	↑	•Management training(Normal level)	→	
Engineer Administrator		•Technical training(IT, Outside plant, Transmission, SW) •Marketing training	•Marketing management training •IT, O/M management training →	
Technician Clerk	Technical skill	•Fundamental skill training	•Skill-up training	
Training system		Enhancement of human recourse Division	Introduction of CDP and review of training system	Improvement of training system
Master plan(Business plan)		Expansion of provincial telecommunication facilities, Introduction of IT	Development of IT, Enhancement of quality of service(O/M service) and Marketing service	Provision of needs oriented services and best quality of service under competition

Figure 13.5-2 Frame Work of Training

(Phase, Skill level, Training system & Master plan)

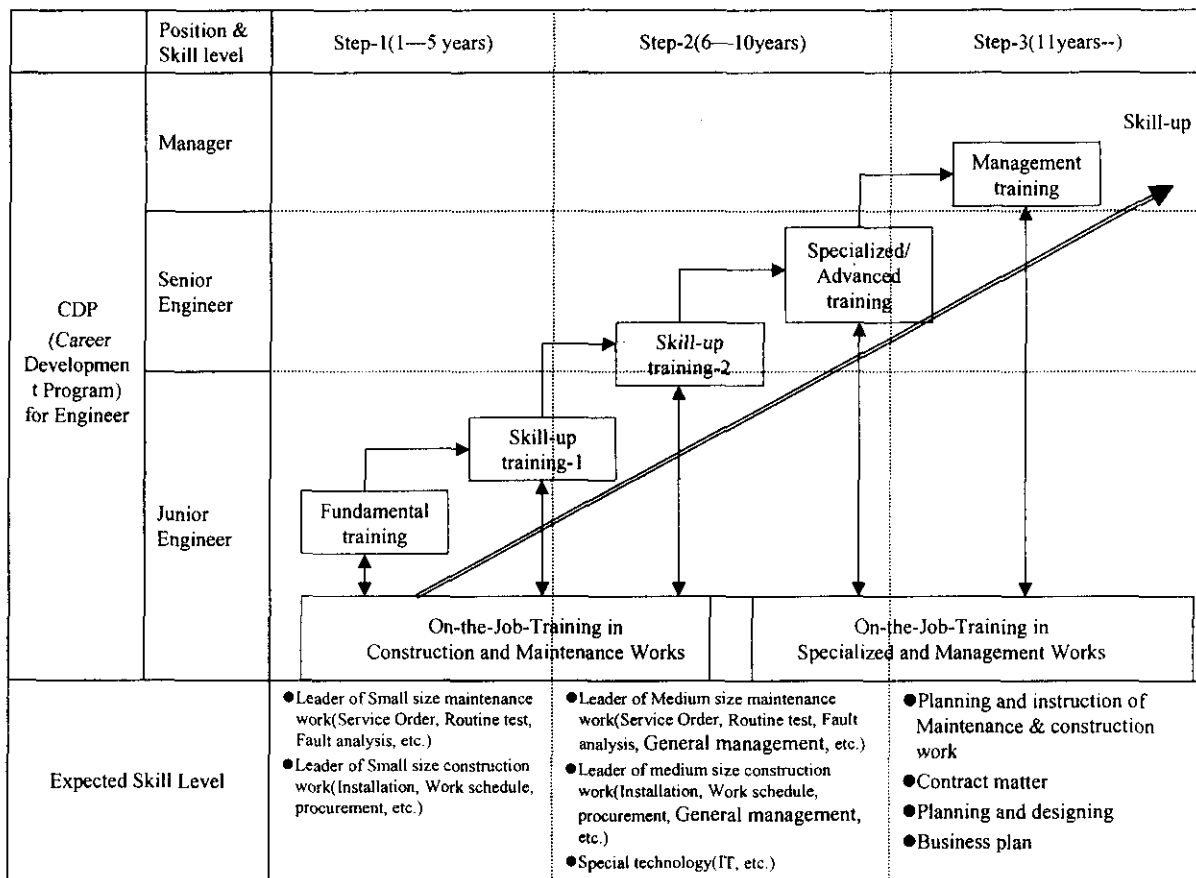


Figure 13.5-3 Engineer's CDP Example

(4) Training Programs and Courses

Requested training programs from Aimags are almost 95% at present, however MT should have a training policy and strategy as mentioned in this plan and should implement mainly the planned training programs according to the plan. Currently English language, digital switch, operator and PC trainings are major programs, more technical trainings such as digital, radio and IT will be increased. Table 13.5-1 shows an example of training courses.

(5) Training Facilities and Materials

MT training centre is a very small and does not have enough facilities for practice, therefore it should be enhanced the followings:

- Rooms with twice capacity
- Digital transmission, micro wave equipment
- OSP facility

- PCs
- Audi-video equipment

(6) Instructors

Instructors should be increased and trained for more speciality.

Table 13.5-1 Example of Training Courses

No	Field	Field of speciality	Detailed speciality	Level (Note-1)	Expected skill after training	Application & Qualification of trainees	Training facility (Note-3)	Training place (Note-4)	
0-01	Education	Language	English	Fun	Basic communication	All	No	Outsourcing	
0-02				App	Conversation & documentation	Part	No	Outsourcing	
0-03		Computer	Computer	Fun	Basic knowledge & operation of application software	All	No	Outsourcing	
I-01	Technology	Basic telecommunication	Telecommunication network & service	Fun	Basic knowledge of network and services	All	Yes	Center	
I-02				Gen	Normal operation & maintenance work	All	Yes	Center	
I-03				App	Clearance of complicated faults & facility expansion	Part	Yes	Supplier /Center	
I-04		Switch	Digital switch	Gen	Normal operation & maintenance work	Part	Yes	Center	
I-05				App	Normal operation & maintenance work	All	Yes	Center	
I-06		Transmission	Digital transmission	Gen	Normal operation & maintenance work	Part	Yes	Center	
I-07				App	Clearance of complicated faults & facility expansion	Part	Yes	Supplier /Center	
I-08		Wireless	Digital radio transmission	Gen	Normal operation & maintenance work	All	Yes	Center	
I-09				App	Clearance of complicated faults & facility expansion	Part	Yes	Supplier /Center	
I-10		Outside plant	WLL	Short wave radio	Gen	Normal operation & maintenance work	Part	Yes	Supplier
I-11					Gen	Normal operation & maintenance work	Part	Yes	Supplier
I-12					Gen	Normal operation & maintenance work	Part	Yes	Supplier
I-13					Gen	Normal operation & maintenance work	All	Yes	Center
I-14					Gen	Normal operation & maintenance work	All	Yes	Center
I-15					Gen	Normal operation & maintenance work	Part	Yes	Center
I-16					Gen	Normal operation & maintenance work	All	Yes	Center
I-17	Gen				Basic knowledge & operation of application software	All	Yes	Center	
I-18	IT (Information technology)	Computer	App	Operation of operating system and programming of visual basic, etc	Part	Yes	Outsourcing		
I-19			Gen	Operation & setting for E-mail & Internet	Part	Yes	Outsourcing		
I-20			Spe	Designing and setting of LAN, server and Router	Part	Yes	Outsourcing		
I-21	Power supply	Billing Computer	App	Normal operation & maintenance work and fault clearance	Part	Yes	Supplier		
I-22			Gen	Basic knowledge and Normal operation & maintenance work(RF, Batt, Eng.)	All	Yes	Center		
I-23			App	Normal operation & maintenance work and fault clearance	Part	Yes	Outsourcing		
I-24	International	Solar battery	App	Normal operation & maintenance work and fault clearance	Part	Yes	Outsourcing		
I-25			Gen	Normal operation & maintenance work and fault clearance	Part	Yes	Supplier		
I-26			Gen	Normal operation & maintenance work and fault clearance	Part	Yes	Supplier		
II-01	Administration & operation	Customer service & Marketing	Customer service & Marketing	Gen	Sales work, customer services and demand treat	All	No	Center	
II-02				App	Customer negotiation, Account Manager	Part	No	Center	
II-03		Billing & collection	Billing & collection	Gen	Billing & collection work	All	No	Center	
II-04				Gen	Accounting work	All	No	Outsourcing	
II-05				Gen	Financing work and finance plan	All	No	Outsourcing	
II-06		Human resource	Personnel administration	Gen	Personnel administration work(Evaluation, promotion, recruitment)	All	No	Outsourcing	
II-07				Gen	Training plan, training and assessment	All	No	Outsourcing	
II-08		Procurement and supply	Human resource	App	Human resource development plan	All	No	Outsourcing	
II-09				Gen	Procurement plan, purchase and stock/supply	All	No	Center	
II-10				App	Management of contract	All	No	Outsourcing	
II-11		Operator	Telephone directory & assistant call operation	Gen	Operation work	All	No	Center	
II-12				Gen	Fault/complaint reception	All	No	Center	
II-13				Gen	Telegram operation	All	No	Center	
II-14		Administration	Administration	Gen	General administration	All	No	Center	
II-15				App	Corporate strategy planning and business plan	All	No	Outsourcing	
III-01	Management	Manager	Gen	Manager mind and practice	All	No	Outsourcing /Center		
III-02			Refresh	Business/Management issues and New technology & service trend	All	No	Outsourcing /Center		
III-03			Refresh	Business/Management issues and New technology & service trend	All	No	Outsourcing /Center		

- Note-1** Fun.: Training for Fundamental theory and knowledge
 Gen.: Training for General practical work
 App.: Training for Application/high level work after Fun. And/or Gen. Training
 Spe.: Training for specialized skill
 Refresh: Training for refreshment of knowledge and practice
- Note-2** All: All employees in division/section
 Part: Qualified employees only in division/section
- Note-3** No: Facility is not required
 Yes: Facility is required
- Note-4** Centre: Training in MT training centre
 Supplier: Training by suppliers in Mongolia and/or foreign countries
 Outsourcing: Training in training institutes in Mongolia
 Supplier /Centre: Training by Supplier and/or Centre
 Outsourcing /Centre: Training by Outsourcing and/or Centre

13.6 Implementation of Human Resource Development Plan

In order to implement the human resource development plan, the following improvement and introduction are summarized and recommended:

13.6.1 Summary of Human Resource Development Plan

(1) No. of Staff and productivity

Based on the adjusted staff plan for the long term (Table 13.4-4), MT should implement annual plan, reviewing business policy/strategy, the actual progress of network expansion, centralization of O/M, etc., introducing factors of Productivity Improvement and referring to developed country histories.

(2) Staff allocation

MT should allocate staff to headquarters and Aimgs/Sums by each phase, based on the Microscopic staff estimation and long term staff allocation plan (Table 13.4-4 & 9)

(3) Training

MT should implement training policy and target as annual training plan, based on Basic Policy of Training and Framework of Training.

13.6.2 Introduction of Human Resource Management System

In order to manage human resources at present and in future, it is necessary to monitor:

- Capability of staff(including career development program)
- Work volume of divisions/departments/jobs
- Service levels required(fault rate, etc.)
- Required manpower for divisions/departments/jobs(microscopic estimate)

For this purpose, a computerized human resource management system (mainly database) should be introduced and maintained.

13.6.3 Staff Structure and Job Classification

To keep well organized and functioned business, a proper size and structure of organisation is necessary, i.e. well allocated numbers of managers, engineers, technicians, operators, etc. from viewpoints of work volumes and effectiveness are important. A detailed staff allocation plan should be examined. And also clear job classification will avoid duplication of works and responsibilities, therefore detailed job description with clear demarcation is needed.

13.6.4 Improvement of Productivity

Improvement of productivity is made by introduction/implementation of several effective tools such as digitalisation, automatic calls, centralization, re-organisation, etc., therefore it is important to seek and implement effective and practical tools.

13.6.5 Reorganisation

Restructuring and re-organisation will be done based on the business strategy and plan in Chapter 14.

CHAPTER 14

INSTITUTION, ORGANISATION AND MANAGEMENT PLAN

CHAPTER 14

INSTITUTION, ORGANISATION AND MANAGEMENT PLAN

14.1 Institution Plan

Policies of telecommunication sector in Mongolia have been decided by Telecommunication Sector Policy Statement in 1994, 1998 and 2001, and also the organisations of regulatory body and operators have been changed according to the policies. The government policies are summarized as follows:

- Establishment of telecommunication development strategy
- Development of sector structure and management (Policy making body, Regulatory body, Operators)
- Privatisation
- Introduction of fair competition
- Sector legislation (Telecommunication Act)
- Mobilization of financial resources
- Development of human resource

Based on the above policies, privatisation and deregulation for telecommunication sector in Mongolia has been promoted and telecommunication networks and services have been developed.

14.1.1 Present Status of Telecommunications Institution

(1) History of the Institutional Aspects

The history of the institutional aspects in Mongolia is below:

- MRTC(Ministry of Roads, Transport and Communications) operated all telecommunications services as government sector until 1989.
- MTA(Mongolian Telecommunications Authority) was established in 1990 and took over the operation from MRTC.
- MTC(Mongolian Telecommunications Company) was established in 1992 and took over the operation from MTA.

- Mongolian Telecommunications Sector Policy Statement was issued on April 19th, 1994 and Telecommunication Act of Mongolia as legislation of the Statement was placed on the Parliament.
- Mongol Post Company was separated from MTC in November 1994.
- Introduction of competition (MTC monopolies the basic services until the end of 1998. Promotion of new competition by new service providers and value-added services such as mobile communications, paging and personal communication, etc. which started in 1994.)
- Establishment of Stake-holders Board for MTC
- MTC was divided into “MCAC (Mongolian Communications Asset Company)” as telecommunications asset company and “MTC(Mongolian Telecommunications Company)” as operating company on September 1st, 1995.
- Privatisation of telecommunications sector (Selling some of the MTC equity to foreign investors: MTC was privatised in 1995 with 40% of Korean Telecom equity)
- After effectiveness of Telecommunication Act of Mongolia on January 3rd, 1996, PTA(Post and Telecommunication Authority) was established in December, 1996 and has been implementing telecommunications strategies, planning backbone network, and implementing programs/projects based on telecommunication development policies decided by MOI(Ministry of Infrastructure) and also leasing telecommunication facilities to MTC. (The function of the former MCAC was transferred to PTA and MTC changed the company name as MT (Mongolia Telecom Co. Ltd.)
- Revision of Mongolian Telecommunications Sector Policy Statement was approved on September 3rd, 1998.
- Revision of the Telecommunication Act of Mongolia was placed on the Parliament in March 2001 and the revision of the Telecommunication Act was passed Parliament on October 18, 2001. The corresponding Telecommunications Sector Policy Statement was promulgated on December 28, 2001 as the order of the Minister for Infrastructure of Mongolia.

(2) Telecommunications Sector Policy Statement of 2001

Mongolian Telecommunications Sector Policy Statement (as amended on December 28, 2001) is targeted to implement the liberalisation of communication sector as well as the principle of non-discrimination in the telecommunication sector by creating an efficient regulatory system. It stipulates the sector's management/governance and structural

organisation, general strategy for the telecommunications sector development, competition and regulation in the telecommunications market, privatisation and investment support of the telecommunications sector, universal service obligations, financial resource, and human resource.

(a) The objective of the general strategy for developing the telecommunications sector with the target year in 2010 is to introduce more fruitful investment along with the latest high-tech and technology in Mongolia, and it shall be implemented in;

- Keeping on the reformation and expansion of digitalisation of the telecommunications network in combination with technologies of fibre optic, microwave, space and mobile communications,
- Introducing the fibre optic technology into backbone network, connecting centres of all Aimags and towns with high speed broad bandwidth information transmission network and developing the integrated information network,
- Digitalising the Radio and TV broadcasting and receiving stations, broadening the receipt coverage of the Radio and TV broadcasting from a satellite, increasing channel numbers, improving the quality of broadcasting, step by step,
- Speeding up the penetration of optic cables into urban areas telephone network lines, and the copper, optic cables and wireless technologies into sub-lines and increasing the coverage extent,
- Introducing the space mobile communications system into the rural communications,
- Improving the telecommunications service supplies, by 2010, a telephone density in urban shall achieve 15 phones per 100 inhabitants in Ulaanbaatar, 10-12 in Aimag Centres, international and domestic calls from all Sum Centres shall be performed automatically and ensured no less than 50 percent of the population with technical opportunities to be connected into the internet.

(b) The telecommunications sector regulation is targeted at developing the free entrance into the market of providers with possibilities to enhance the fruits of the sector in the manners of broadening service coverage range by promoting competition and private investment, lowering tariffs, improving the quality.

(c) Privatisation

- In the telecommunications network privatisation, MT, which provides with the telecommunication service through the whole territory of Mongolia by implementing the universal obligations, shall be considered towards the direction in enhancing its competitive capability.
- Transferring the particular parts of the state owned network property to a company to be privatised together with the credits for its construction/renovation and the debt payment obligation, the privatisation program to seek for strategic investors shall be taken place through tendering. The revaluation of the network property has to be done for the purpose of determining price of shares to be offered.
- Under the basic direction of privatising the state property for the years 2001-2004, leaving international and domestic long distance network and international switching facilities under the state control, other assets shall be transferred to MTC and the particular parts of state controlled shares shall be sold to the strategic investors.
- After the above stated period, the privatisation program shall be intensified and percentage of the state ownership shall be decreased.
- National radio and TV broadcasting transmission stations shall not be privatised.

(d) Universal Service Obligations

In areas with high demands and supplies, there shall be supported private sectors to carry out telecommunication services under common commercial conditions. Running services in the remote and sparsely populated regions of the Mongolian territory are cost expensive, thus there shall be created a mechanism for attracting providers there. The mechanism can be established properly utilising the universal service obligations fund that is raised from providers in the telecommunications market. The telecommunications services to the remote and sparsely populated regions shall be financed on the basis of tendering. There shall be aimed at establishing telecommunications centres having services of telephone and the internet at each Sum. This objective shall be implemented by utilising terrestrial, space or mobile communications technologies.

(e) Financial Resource

The financial resources necessary for expansion/renovation of facilities to ensure the telecommunications market demands shall be created under the sector's precise investment and finance policy.

- Investment will come from foreign, domestic and private sources. There shall be maintained directions to increase investment by keeping transparency in regulatory activities.
- Loans, aids, donations and budget funding shall be used for projects with social purposes. From the above resources, there shall be selected investment consistent with the criteria of the sector's task, financing institution and type of financing.

(f) Human resources

- It is essential that qualified personnel (technical, management, financial, marketing, accounting) be recruited, developed and retained. There shall be promoted the direction to extend domestic training system as well as to utilise foreign and international organisation's assistance efficiently.
- Establishing sufficient resources of management personnel and improve their knowledge and skill, teaching computer, Internet and foreign language, especially English, to the technical and management should receive immediate attention.
- All necessary conditions will be created in order to ensure compliance with the technological standards and to make the services provided by all the personnel especially the service related personnel and their management staff more customer oriented and efficient.

(3) Government and Regulatory Body

The current organisations, roles and obligations of MOI, CRC and PTA are as follows:

(a) MOI (Ministry of Infrastructure)

The basic role of MOI is to make policies and strategies for development of telecommunications and IT(Information Technology), and also to lead and arrange the implementation.

“Policy Coordination Department of Roads Transport, Info-Communication and Tourism”, which is one of three (3) Policy Coordination Departments in MOI, is responsible for all telecommunication policies. The number of staff for telecommunication sector in MOI is about eight (8) and PTA is one of eleven (11) execution Agencies under MOI.

The details of roles and obligations are as follows:

- To make policy of telecommunication sector development
- To promote fair competition for telecommunication sectors
- To make policy of investment and to execute
- To make a wireless frequency utilization and assignment plan
- To establish network and service standards, to define service targets and to control the execution

Organisation chart is shown in Figure 14.1-1.

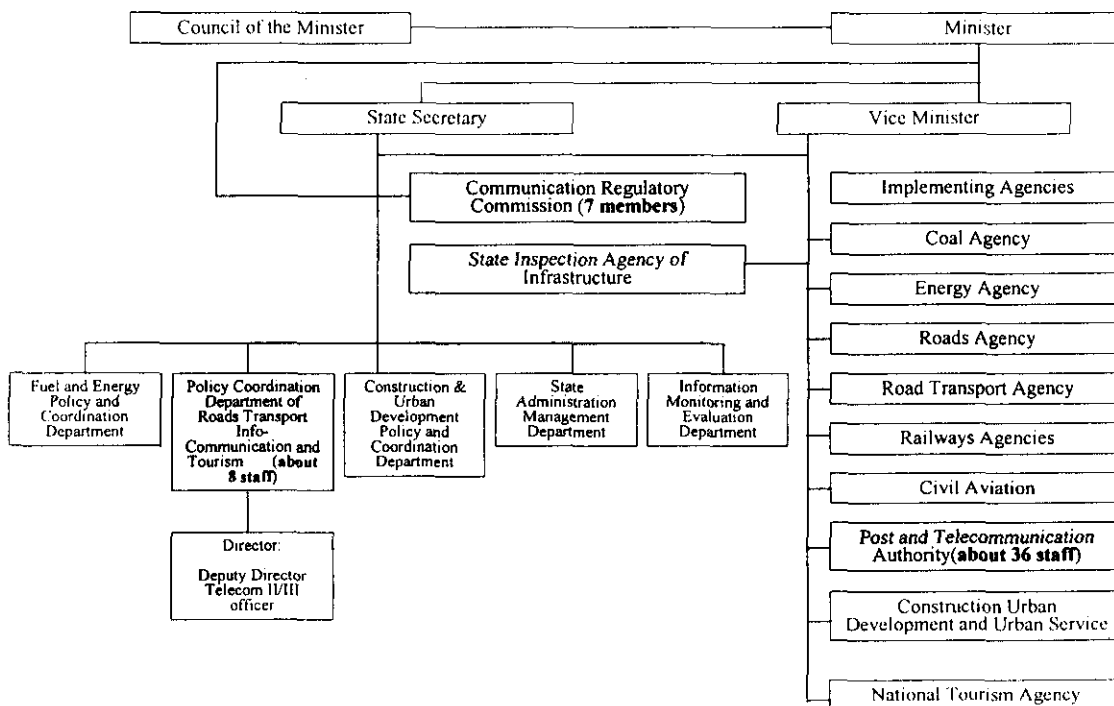


Figure 14.1-1 Organisation Structure of Ministry of Infrastructure (MOI)

(b) CRC (Communications Regulatory Commission)

The basic role of CRC is to assist and recommend the Ministry of Infrastructure on State Policy towards communications and in charge of execution of laws, issuance of operation licenses, type approval, complaints, services, tariff, etc. regarding telecommunication operation, services and manufacturing.

The CRC is an independent organisation and comprised of a Chairman and six(6) executive members who are nominated by the Prime Minister on the basis of a proposal by the cabinet member with portfolio for communications. The Commission shall be financed by payment revenues derived from its regulatory services to licensees and radio frequency exploitations.

The details and obligations are as follows:

- To furnish authorized organisations with information and develop proposals on the State Policy on communications;
- To grant, suspend and revoke licenses, monitor applications of license conditions and requirements, establish contracts within the framework of policies on communications;
- To determine technical conditions and requirements for equipment of communications network and customers, and certify them;
- To approve general terms of interconnection agreements between networks and procedures of revenue distribution;
- To approve accounting methodologies for service tariffs, monitor service tariffs dominating a market;
- To create conditions for fair competition in communications sector;
- To ensure implementation of universal service obligations;
- To work out communications standards, have them duly approved by relevant authorities, and monitor their applications;
- To elaborate an integral numbering plan of networks and implement it;
- To make radio frequency allocations and conduct monitoring;
- To determine regulatory service fees to licensees;
- To settle various disputes between licensees and customers within its specified powers:

Organisation chart is shown in Figure 14.1-2

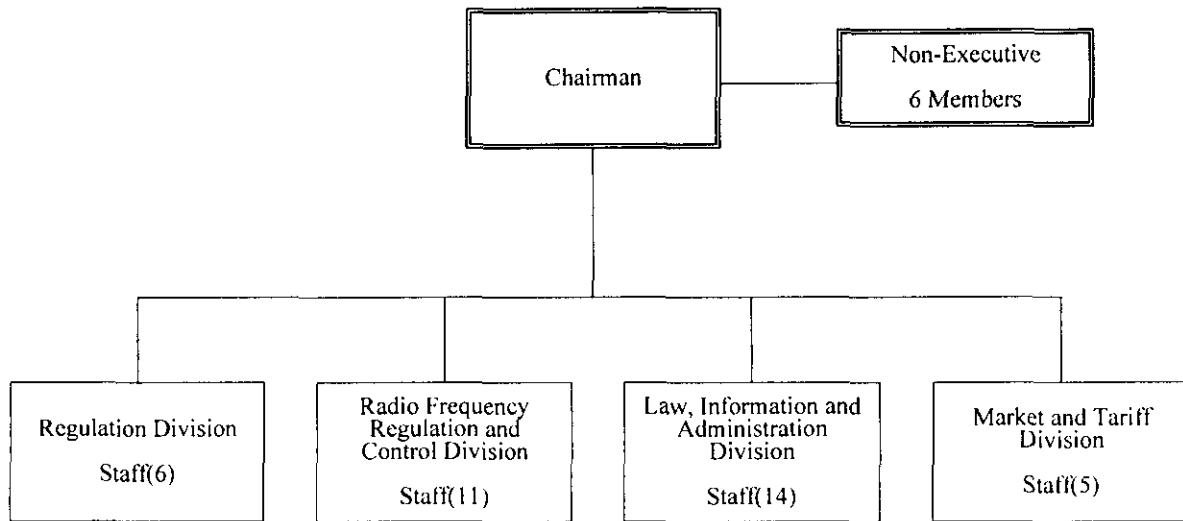


Figure 14.1-2 Organisation Structure of Communication Regulatory Commission (CRC)

The detailed rights and duties of each division of CRC are as follows:

a. Regulatory division exercises the following rights and duties;

- (i) On the state policy to develop the communications sector, work out proposals towards the followings and submit them to the Regulatory Commission’s meetings;
 - ❖ Increase communications service coverage areas, communicate rural areas,
 - ❖ Develop a fair competition environment in the communications sector market,
 - ❖ Create a favourable legal atmosphere to develop communications,
 - ❖ Issue a license, amend it or revoke and abolish,
 - ❖ Ensure implementation of the universal service obligations,
 - ❖ Submit general conditions of interconnection contracts of networks and a methodology for tariff establishment as well as a procedure for revenue sharing for approval.
- (ii) Establish technical performances and requirements of the communications networks and customers equipment and verify.

- (iii) Work out a license conditions and requirements and monitor/enforce its implementation.
 - (iv) Establish interconnection contact conditions, requirements and demarcation points, monitor/enforce and regulate the contract implementation.
 - (v) Monitor and regulate payment backgrounds in accordance with the methodology on establishing interconnection charges and the revenue sharing principle.
 - (vi) Attend seminars or meetings hosted by international or national telecommunications unions.
 - (vii) Study new international standards or recommendations in telecommunications sector, work out national standards and recommendations, submit them to authorized organisations for approval as well as monitor their implementations.
 - (viii) Study international and national numbering trends, regulate national integrated numbering plans.
 - (ix) Control and regulate compliances with the numbering by licensees.
 - (x) Deposit and enrich information or documents on licensees activities along with applications for licenses, evaluate their activities.
 - (xi) Work out rules and procedures on dispute settlements between licensees and customers, elaborate proposals to settle disputes by studying the arguments.
- b. Radio frequency regulation, enforcement divisions have rights laid down in the radio spectrum law and the following rights and duties;**
- (i) Determine requirements for licensee to utilize radio frequency and monitor its implementation.

- (ii) Establish technical performances for verification for radio equipment and test.
- (iii) Record lists of national integrated registration of radio frequency allocation.
- (iv) Study and determine radio frequency bandwidth demands and requirements for the special purpose utilization in collaboration with relevant organisations.
- (v) Study tariff, demands and supplies of radio equipment or radio frequency utilization, radio frequency propagation, electric magnitude compatibility, assessment methodology, organize investigation works.
- (vi) Deploy its specialists in working groups of standard formulation of the ITU, set up working or study groups as well;
- (vii) Allocate radio frequency bandwidth according to the National radio frequency allocation table.
- (viii) Conduct the following inspections with the purposes to implement provisions stipulated in Article 20 of the Radio spectrum law and 9.1.10 of the Communication law;
 - ◇ Determine and test radio equipment's frequency propagation, radiation and location, monitor and establish compatibilities of technical and utilization standard and norm requirements,
 - ◇ Participate international radio frequency control,
 - ◇ For the purpose to protect radio spectrum users, detect illegal customers, terminate their activities, test and measure compatibilities of imported radio devices to international and national standards,
 - ◇ For the purpose of studying radio spectrum radiation and confirmation of violations of applicable legislations and decisions, signals of the controlled noise sources may be recorded in the course of the radio

control. These records may be used only as evidence for investigation and evaluation and upon their completion they are to be destroyed,

- ✧ For the purpose of settling customers complaints, proposals and disputes(except court cases), conduct measurements and regulate.

c. Finance and administrative division has the following rights and duties;

- (i) Work out communications service tariff establishment methodology and interconnection revenue sharing procedure, submit them to the Commission's meetings for approval, control and regulate service tariffs dominating a market,
- (ii) Control and regulate licensees' compliance with the service tariff establishment methodologies and tariffs information to public,
- (iii) Work out drafts of relevant legislations, rules, procedures and instructions within the Commission's powers and control compliances,
- (iv) Investigate licensees' financial or economic status as well as activities expenses. establish a methodology to determine an expenditure structure,
- (v) Control the licensees' financial resources and capability changes, impacts of the changes to activities stipulated in the license;
- (vi) For the purpose of using in the tariff accounting methodology, create or compile information system on the licensee's financial, economical and activities expenditure performances, renew information regularly;
- (vii) Work out proposals on regulatory service fee from the licensee and submit them for approval;
- (viii) Work in collaboration with associations of customers interest protection as well as non governmental organisations;
- (ix) Create information data base on the licensee's activities and services;

- (x) Compile archive and documents within the Commission in accordance with applicable rule and procedures;
- (xi) Work out drafts on the Commission's annual budget and investment plan and control the budget compilation;
- (xii) Conduct account registration, financial balancing accounts shall be audited and publish;
- (xiii) Train the staff employed by the Commission, elaborate proposals on their social welfares as well as decide;
- (xiv) Work in cooperation with international organisations, study experiences, introduce them in its activities;
- (xv) Publish reports and information on the communications sector activities, service qualities and development;
- (xvi) Study competition development tendencies in communications market, investigate;
- (xvii) Study companies' service tariffs and interconnection charges engaged in providing communication's public service, evaluate and draw conclusions;
- (xviii) Determine market demands and supplies, create an united base by searching new technologies;
- (xix) Furnish the public with related information on the Regulatory Commission's decisions.

d. Enforcement division has the following rights and duties:

- (i) Work and enjoy administrative control in accordance with the applicable legislations such as the Communications state control rule.
- (ii) Control and inspect implementations of the Communications and radio spectrum laws.

- (iii) Control the licensees' compliance with operation and service's technical and technological regimes along with international and national standards.
- (iv) Inspect and measure the licensees' service quality in proper level, undertake applicable measures.
- (v) Control and inspect according to requests and requirements made by the Regulatory Commission or its divisions, undertake proper measures.
- (vi) Submit inspection results, imposed measures to the Commission's meetings and consult with.
- (vii) Evaluate and draw conclusions on implementations of legislations, standards, norms and normatives.

(c) PTA (Post and Telecommunication Authority)

The basic role of PTA is to implement telecommunication strategies, network plan, and projects, based on telecommunication development policies decided by MOI(Ministry of Infrastructure). And PTA owns all telecommunication facilities on behalf of the State and leases it to MT for provision of basic telephone services, and does not have any stakes of MT.

The budget is made by the income of a part of rental fees of State-owned telecommunication assets.

The details of roles and obligations are as follows:

- To be a possessor of State-owned telecommunications backbone network which consists of international and domestic long distance transmission and international long distance switching facilities;
- To plan and implement technical, technological and organisational actions, and conduct research and study works in order to implement the government policy towards stable operations and development of the State owned backbone network;

- To implement projects, conduct related accounting, evaluation, analysis works and appraisal in accordance with the strategy plan for expansion of the State owned backbone network;
- To organize investment into the State owned backbone network and conclude network operation contracts with providers;
- To accumulate assets at Universal Service Obligations Fund and disburse in consistence with its purpose, report to the Cabinet Member on the status of performance;
- To render professional and methodological assistance to local authorities and relevant bodies pursuant to implementation of the State policy;
- To develop the State owned backbone network and to furnish the State administrative central body with relevant information.

The number of PTA staff is about 55 and 16 staff of them are engaged to planning, investment and projects.

Organisation chart is shown in Figure 14.1-3. The roles and obligations among Government and regulatory bodies are illustrated in Figure 14.1-4.

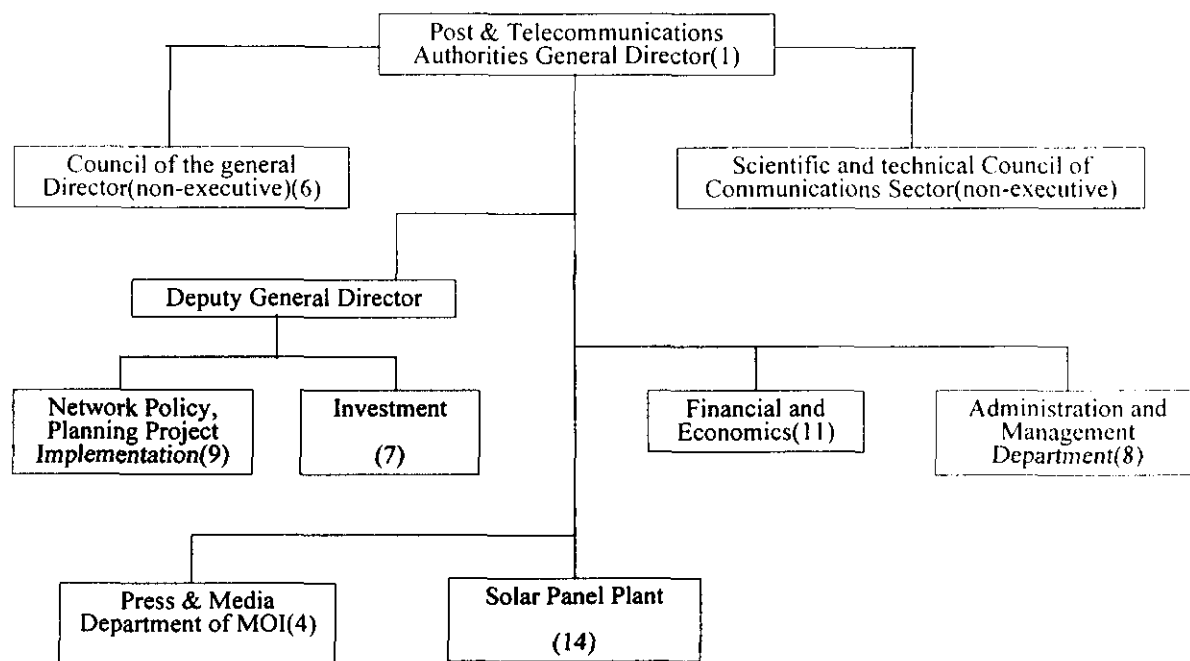


Figure 14.1-3 Organisation Structure of Post and Telecommunication Authority (PTA)

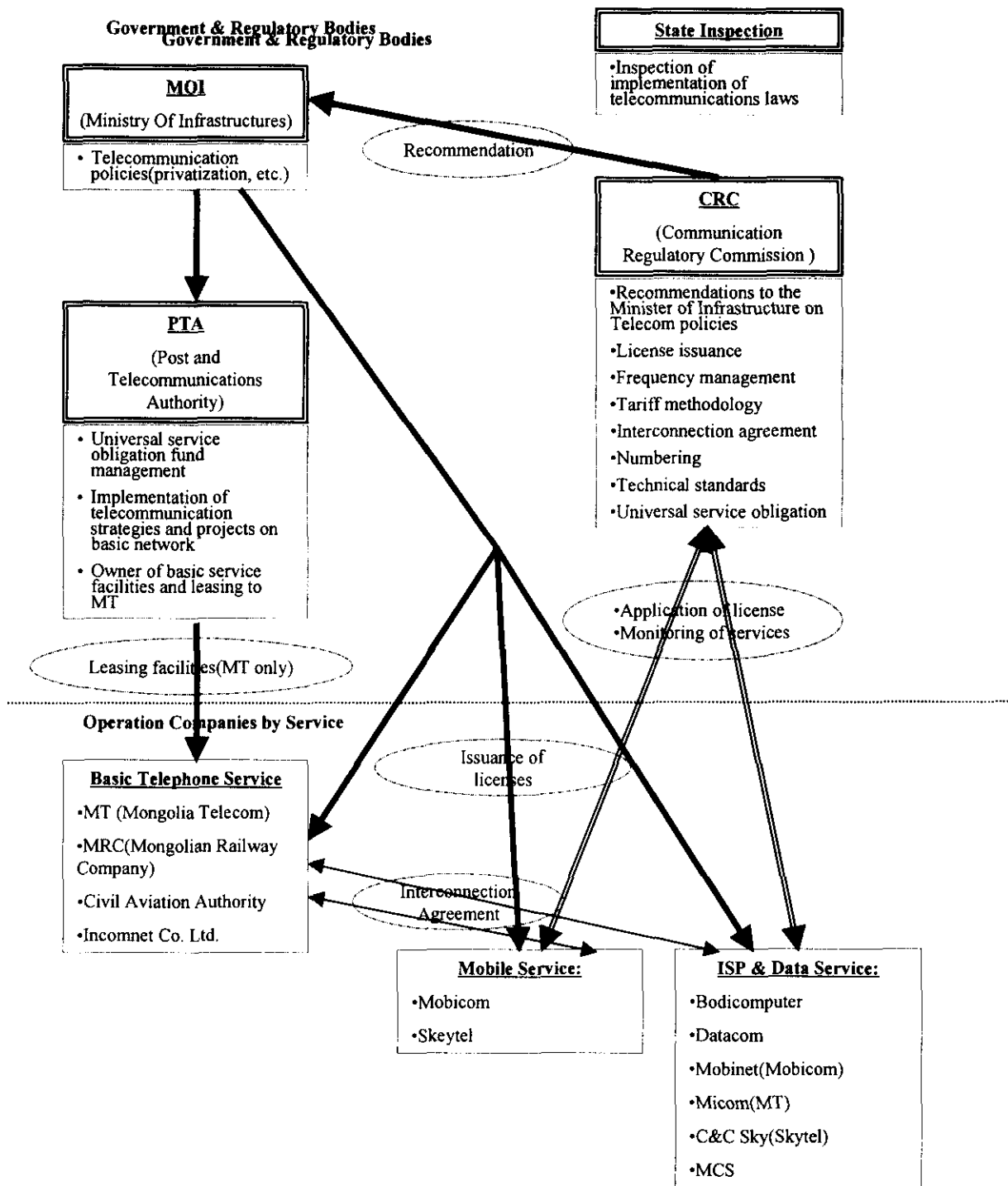


Figure 14.1-4 Roles and Obligations of Telecommunications Sectors in Mongolia