CHAPTER 10   OPERATION AND MAINTENANCE IMPROVEMENT PLAN

10.1 Urgent Plan for Operation and Maintenance

10.1.1 Introduction

The provision of quality service on continuous basas is a necessary   condition for customer satisfaction. The day-to-day operational activities performed by   the service provider are focused on the effective and efficient utilisation of the telecom facilities to deliver reliable services. Best performers in telecom business guarantee the availability of their communication network and the reliability of the service they provide through the application of a well established maintenance procedure and properly defined quality standards, against which the performance of their network can be measured. In addition, the excusion of a carefully planned productivity improvement programs and the realisation of roll-out targets require the conscious engagement of a well trained, secured and motivated work force.

Outlined in this chapter are major concepts, policies, procedures, and performance targets that have to be adopted during the plan period for efficient operation of the system.

(1) Standard Procedures

To prepare standard and uniform ***Procedures*** in order to make O/M activities effective and efficient in all centers responsible for network operation. Uniform contents of the site information will lead the management to the quick decision on the ad-hoc action plan.

(2) Target Quality of Service :

To set-up **Target Quality of Servic*e(QoS)*** for the customer service considering the cost-effective operation, e.g., fault rates, fault recovery time, call completion rates.

(3) Required Maintenance Activities

Following maintenance steps are to be applied.

  a)   Preventive maintenance:

   The maintenance carried out at predetermined intervals or according to the prescribed criteria intending to reduce the probability of failure on the degradation of the function of the facilities.

  b)   Corrective maintenance:

   The Maintenance carried out after fault recognition intending to restore the fault to the sound state as soon as possible.

  c)   Controlled maintenance: (Planned work)

   A method to sustain a desired quality of service by the systematic application of the analysis techniques using centralized supervisory facilities and/or sampling to minimize the preventive maintenance. This is to be applied to Switching and Transmission systems maintenance.

  d)   Provision of maintenance tools, measurement equipment, vehicles, and spare parts related to the above maintenance.

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(4) Reinforcement of New Subscriber Connection Capacity

a) To provide tools, equipment and materials for the introduction of new service network (mobile and inter-net), and for the increased work volume.

b) To reinforce the capacity of the related organization including the out-sourcing management.

10.1.2 Strengthening of New Connections Capability

(1) Necessity to Strengthen the Customer Service Division

ETC holds long waiting lists cumulated to 155,000waiters at the end of 2001, and the applicants are still increasing.

On the other hand, achieved number of new connections in 2001 were (36,000) DEL's. Average new connections par month was (3,000) DELs. For the new connection of the cumulated (150,000) waiters, about (50) month years will be required under the current task force and management.

At present the average waiting period is about 5 years long (longest waiting period is 15 years)

Administrative work load of the new connections are too heavy for Regions/Zones to process the required work volume according to the plan envisaged in Master Plan within the limited time frame.

In this regard, the urgent reinforcement of Customer Service Division shall be made applying the simplification of the procedures as well as the aid of computer (office automation).

(2) New Connection Task Force by Out-sourcing

Concerning the master plan target of the new connection, 80,000 new connections per annum are required during the year 2003-2005.   This target will not be achieved without the assistance of the private sector (out-sourcing)

As the conclusion, ETC shall entrust a lot of new connection works to the contractors in addition to the reinforcement of the administrative work with the help of computers.

(3) Standardization of Maintenance Flow;

In order to carry out effective maintenance, the organization shall have clear and comprehensive reporting formats that are to be used to follow up site facilities and activities.

The uniform data format shall include but is not limited to;

1) Switching system

- Traffic data

- Applied traffic on each route

- Call loss details

- Switching system performance (network congestion, processor over-load,)

- Faults/recovery record

2) Transmission

- System performance (BER etc.,)

- System usage (traffic loaded stream)

- Faults/recovery record

3) Outside Plant

- DP, CCC, MDF occupancy sheet (up-dated card)

- Periodic measurement record of continuity/insulation

- Duct system status

- Faults/recovery record

The reported site data shall be analyzed by the O/M division of each region/zone in order to formulate the action plans (or ad-hoc action plan) required for the allocation of the budget and for placing the action order to the site.

For the firm implementation of the good quality installation work and corrective maintenance work of the External Plant, Standardization of practices, Engineering criteria such as **SIP** (*Standard Installation Practice*), **SOP** (*Standard Operation/Maintenance Practice*), are quite important

O/M division shall make the utmost efforts to tackle the annual target of QoS.

In this regard, the management shall place the detailed annual target for each section/team and periodically monitor/evaluate.

10.1.3 Safety Policy and Safety Measures

Following is prepared as an example of safety measures in order for ETC to set up a Standard Practice for safety measures.   It is one of the objectives of the Company management to prevent all injuries from employees, third parties and any loss or damage to plant or property during installation and maintenance works.   In order to ensure that the desired results are achieved, the following safety and loss prevention policy and working arrangement are to be laid down:

(1) Company Responsibility

Ultimate responsibility for overall safety and control of the losses rests with the management of the Company. To allow operation in a practical frame work, management delegates the responsibility for implementation of all required safety procedures, methods, designs and technical safeguards. Authority is delegated to Department Managers and to all supervisory personnel and also delegated to the same degree as their responsibility for installation and maintenance.

(2) Individual Responsibility

Each individual has responsibility to act with the safe manner. Having been taught how to act safe manner by the Company,   it is everyone's responsibility to continue to act in a safe manner using all relevant procedures and equipment.

"An incident reporting system" is set up to report any undesired event that either results in or could

result in, injury or loss and downgrades of the efficiency of ETC operation.

The report should include, but is not limited to such things as:

1) Personal injury

2) Damage to plant and equipment

3) Damage to third party's property

4) Fire

5) Theft

(3) Safety Committee and Responsible Person

Safety Committee is to be established in Headquarters, Regions and Zones.

HQ and Region will assign the responsible person in each telephone exchange office, RSU, repeater site, etc.

The work involved in laying or withdrawing of cables are mainly performed on roads. These works are indispensable prerequisite to ensure sufficient protection and safety measures for not only ETC employees performing the works but also general passers-by and vehicles. The responsible person shall be assigned in each installation team for safety works and accident prevention.

(4) Safety Provisions

1) Work on road

   Utmost care shall be take for the installation and maintenance works on road, especially the road with high road with high traffic or vehicles are running with high speed, by providing signals, warning signs, lightings, traffic control persons, etc.

   Prior to starting installation or maintenance works on roads, approval of occupying the road for the works shall be obtained from the relevant authority, owner, administrator or police station. Date, period of the works, features of the works, safety measures to be applied, traffic control methods, etc., should be informed to the authority together with the said application for approval of road occupancy.

2) Signals, Communication Equipment

   A uniform standard signal system shall be used on all operations.

   Hand signals may be used during laying of underground cables into ducts, erection of pole, laying of wires, messenger wires and overhead cables.

   Traffic Control Signals may be used where restriction of vehicles running is required during cable laying works by means of either Lighting, Signs and/or Flags with traffic control men.

Radio equipment, transceivers, telephones shall be used when a long distance between the operation.

3) Signs, MH Screens, Barricades, Warning Markers, Ropes, and Lightings Signs indicating "Under Construction" shall be placed to provide adequate warning of hazards to the public.

In addition, manhole screen shall be placed at manhole location in case of underground cable works.

Warning red flags and instruction markers shall be placed at least one set and more flags and markers where the circumstances required.

A distance of restricted traffic is longer, then the range of restricted area should be shown by stretching the rope or tape along side the work area border.

In case of the work should be done at night, it is necessary to install night markers and lighting, i.e., illumination electric lights for signs, light reflectors, flashing warning light for the pedestrians and drivers.

4) Clothing and Protective Equipment

a) External plant personnel shall be provided with, and must wear, uniform, safety hats (helmets), hand protections (glove), and safety boots issued by the Company.

Cloths shall be inspected regularly and maintained in serviceable and sanitary conditions. Persons who work on pole shall be provided with linemen's safety belts.

b) Persons who work on microwave antenna towers shall have the same provisions of external plant persons.

5) Poisonous Gases inside Manholes and Cable Vaults.

a) Instrument shall be provided to test atmospheres for poisonous gass standing inside Manholes and cable vaults. Poisonous gas detector shall be used prior to entering the manholes and cable vaults.

b) Air ventilation equipment shall be employed before entering the manholes and cable vaults.

c) In case the flame by torch lamp or other must be used inside manhole, special attention is required for confirmation of no remaining of any flammable gases inside MH so as not to cause any explosion of the gas and accordingly damages to cables inside MH.

10.2 Preventive Maintenance Procedure

10.2.1   Scheduled Maintenance to Decrease Faults

Preventive Maintenance is the maintenance carried out at predetermined intervals or according to prescribed criteria and intends to reduce the probability of failure or the degrading of the functioning of the facilities. The preventive maintenance should be applied to external plant maintenance.

10.2.2 Replacement of Out-of-standard Service-wire to Improve Customer Service

According to the Faults statistic data, 70% of the faults are being occurred at service-wire parts (Drop wires or internal wire).   Therefore, internal efforts to decrease the number of faults effectively shall be taken place on the service wire focussing the improvement of the quality of services.

In regional area, service wires are made of either steel reinforced drop wires or 2-separate insulated copper wires.   The main cause of faults on overhead facilities are feared to be loose contacts due to many joint points of copper wires between DP (Distribution point) and subscriber premises and to obsolete facilities.   If this section is replaced with a new drop wire without intermediate joints, the number of faults will be drastically decreased.

ETC's revenue loss due to faults resulting from malfunctioning drop wire is estimated to be US\$. 1 million in 1999.   A line may be faulty for a period of 5.7 days per year , and this will result a loss in the revenue amounting to Birr 250 per year.

The improvement of QoS is quite important not only for the matter of the revenue but also for the customers' satisfaction (reputation of ETC).

10.2.3 Field Trial of Outside Plant QoS Improvement Program

A rehabilitation (replacement) program of non-standard service-wire shall be applied on the selected local access network.

Step to be taken for the subject will be as follows;

1) To choose same Regional areas with high fault rates.

2) To analyses faults statistics in detail.

3) To thoroughly survey at sites and clarify technically the causes of the overhead facilities faults.

4) To establish the appropriate countermeasures and evaluate the effectiveness.

5) To prepare implantation schedule, budgeting, manpower and materials allocations.

6) To execute countermeasures.

7) From the above field trial, the Standard Installation Practices (SIP) can be established.

8) The SIP shall be applied to other Regional areas

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10.3 Decentralization Plan of Operation/Maintenance

10.3.1 Organization and Responsibility

(1) Decentralization of Management

The size of the current connected telephone network in Ethiopia is approximately 300,000 lines.

The network size is to be expanded to the order of 2 million by the year 2020 in line with the Master Plan.

In order to control and manage the expanded huge network, the management shall be coherent with the network composition and volume.

Decentralization of the O/M responsibility to the regions, which will improve the efficiency due to the reasonable extent of the network volume, is to be made timely (2005).

Prior to the decentralization, the current HQ's functions shall be stream-lined to establish the comprehensive administrative procedures so that regional offices will not have any confusion regarding their authority and responsibility, when decentralized.

HQ shall be released from the operational details and will concentrate mainly on coordination and decision making activities.

(2) Intermediate Level Management at Regional Offices

region offices are recommended to establish the management for O/M of the expanded network.

TSC shall also be reinforced to enable the daily maintenance/operation of the site network.

10.3.2 Demarcation of the Responsibility

    1)   Headquarters level shall concentrate its responsibility on the administration of;

        a)   Establishment of Operation and maintenance Policies.

        b)   Issuance of Instructions.

        c)   Standardization of Methods and Procedures.

        d)   Negotiation, liaison with other HQ divisions, other domestic, Foreign parties.

        e)   Preparation, and authorization of Budget.

        f)   Monitoring budget consumption, work progress, QoS, NP.

    2) Maintenance area office (TSC) responsibility should be such as;

        a)   Day to day operation and maintenance works.

        b)   Customer relation

        c)   Material management.

        d)   Small projects, and new connection.

        e)   Periodic measurements of traffic, QoS and performance indicators and reporting.

3) Region level responsibility should be such as;

    a) Improvement of the network.

    b) Assistance to the trouble shooting for the heavy fault cases

    c) Monitoring, analysis and instruction for improvement of traffic flow, QoS and performance indicators.

    d) Contracting of the out-sourcing for the new connections, repair works.

    e) Allocation of regional budget.

    f) Administration of budget, work progress, human resources

10.4 Reform of the O/M Structure

Details are described in Chapter 11

"Action plan for Human resources and Managemant Organization"

10.4.1 Service Oriented Organization

ETC intends to organaize the semi-autonomy departments for

    -     Fixed-phone service

    -     Mobile-phone service

    -     Internet/Data service

Considering the coming era of the open market competition.   Depending on the government policy, ETC's licence for the monopoly operation of all telecommunications services will cease in the near future, and the competition will be introduced, especially in the field of mobile-phone and internet / data services.

10.4.2 Fixed-phone Service Department

The fixed-phone service department will remain as the main body of ETC, and will be responsible for the marketing/customer services and the maintenance/operation of ;

    1) International calls.

    2) Domestic fixed-phone network including VoIP.

    3) Transmission systems (Trunk, Junction, Spur)

    4) Rural telecommmunicatons (PCO, VSAT, DRMASS)

    5) Planning / engineering / designing / implementation of the capacity expansion

    6) Gate functions to mobile-phone & internet/data services.

ETC intends to release the terminal station (telephone-set, etc) for customer's selection /procurement/ maintenance upon the type approval of ETA.

10.4.3 Mobile-phone Service Department

The mobile-phone service department (semi-autonomy) will be separated from ETC's main body, and will be responsible for the marketing/customer services and the maintenance/operation of the

mobile-phone serivce network.

1   The mobile-phone (end terminal) has been released for customer's selection / procurement / maintenance upon the type approval of ETA.

2   ETC intends to use local agents for customer services in order to follow-up the rapidly increasing mobile-phone applicants.

- Sale and registration of mobile-phone
- Sale of pre-paid card (SIM card)

3   The efforts of this department will be mainly addressed on;

a)   maintenance/operation of the specific function of mobile-phone network, i.e. MSC, BSC, BTS, MS and related software and hard-ware.

b)   Plannnig /engineering /desigining of the mobile-phone network capacity expansion and its implementation

10.4.4 Internet/ Data Service Department

The internet/data service department (semi-autonomy) will be separated from ETC's main body , and will be responsible for the marketing/customer services, and the maintenance /operation of internet/data service network.

1)   ETC intends to use local agents for the customer services of the internet subscribers.

2)   The efforts of this department will be mainly addressed on:

a)   maintenance / operation of the software and hardwares related to internet services

b)   marketing and contents development of IT services.

c)   management of the leased circuits.

- Maintenance /operation and managements of CIMISET.(Internal IT network)

d)   Plannning /engineering/ desigining and implementation of the data network expansion.

10.4.5 Point of Interface

Mobile-phone and Internet/data service departments are to borrow the transmission degital streams, local access networks, etc from the main body of ETC.

1)   Current tariff covers the various service fees to customers, but the cost shall be broken down to each service providing departments

2)   Internal lease fees of the digital streams (E-1 base) are to be reasonably defined considering the coming competitors in the near future.(Initial cost and maintenance /operation cost)

10.4.6 Training and Recruitment

Considering the establishment of the semi-autonomy departments (fixed-phone, Mobile-phone, internet/data) as well as the introduction /expansion of new technology (VoIP, GPRS, STM-4/16,

FTZ, etc.), the reinforcement of the training functon, as well as the vollume shall be alone with the priority.   In addition, the recruitment of the engineers in the specific technical field will be inecitable.

10.5 Management by Objective

10.5.1 Motivation

In order to improve the effectiveness and efficiency of the ETC business activities, the company has to take efforts to improve its productivity. Therefore, it is necessary to cultivate the capability of individual ETC staff and delegate the authorities to each level of the operation.   Each member of the staff should understand the business objection and work actively and strive towards the realization of the targets assigned to him.   The model used to demonstrate the cycle of Management by Objective is as shown below.

Manager

Target/policy	Delegation of Authority	Evaluation	Leadership
↓	↓	↓	↓
Workload Target	Realizations of Target	Evaluation of Achievement	Communication
↓	↓	↓	↓
Participation	**Set-up the Target**	**Self evaluation**	**Motivation**

Staff
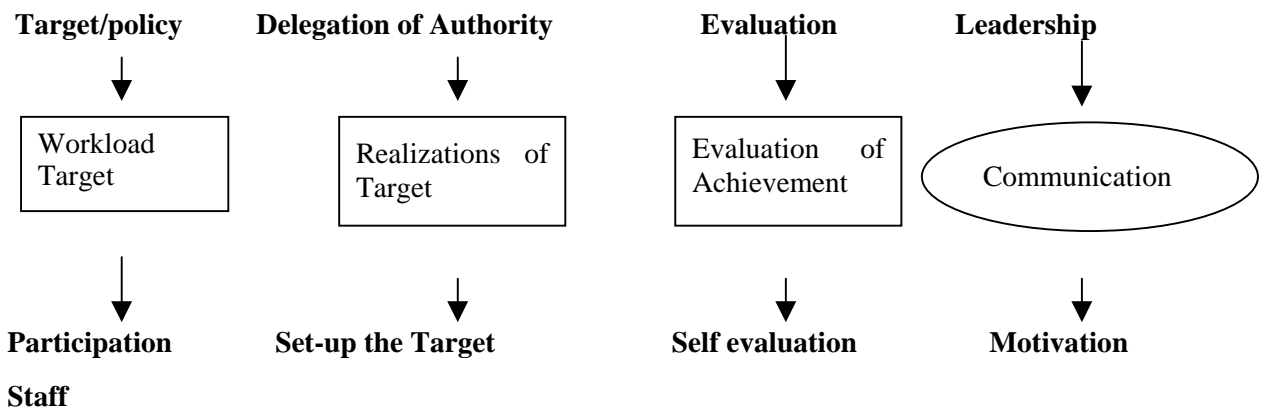
Figure 10.5-1   Motivation

10.5.2 Target Quality of Service

In order to initiate the" Management by objectives" tentative targets of Quality of Services and network perfofmances standards are given in Table 10.5.1

Tabel 10.5-1 Tentative Targets of Quality of Services and Network Perfofmances Standards

Item / Year	2003	2005	2010	2020
Call completion rate	50%	50%	65%	70%
Faults / month / 100DELs	10	2.5	1.5	1
Faults clearance rate of OSP within 24h	55%	60%	75%	90%

10.5.3 Total Quality Control System

(1) Definition of Quality Control

The terms "Quality control"," Total quality control" and "Quality" are defined as follow;

"Quality Control" is a system to economically produce goods or service that satisfy customer requirements.

QC is used as a tool to build a system of continuing interaction among all elements responsible for the conduct of a company's business so as to achieve the improved quality that satisfies the customer's demand.

"Total Quality Control " is the organized QC activities involving everyone in a company – managers and workers – in a totally integrated effort toward satisfying such cross functional goals as quality, cost, scheduling, manpower development, and new product development. It is assumed that those activities ultimately lead to increased customer satisfaction. (also referred to as CWQC – Company Quality Control)

"Quality" is anything that can be improved.   In TQC, the first and foremost concern is with the quality of people.   A company to build quality into its people is already halfway toward producing quality products. The three building blocks of business are Hardware, Software and Human-ware.

Implementing quality control effectively necessitates the co-operation of all people in the company, including top management, managers, supervisors, and workers in all area of corporate activities such as market research and development, product planning, design, preparation for production, purchasing, vendor management, manufacturing, and training and education,

Quality control carried out in this manner is called company-wide quality control or total quality control.

In order to satisfy customer requirements, essential 3 condition to QC system are QCS (Quality, Cost, Scheduling).

Quality products or quality service within a certain reasonable costs have to be delivered to customers within a certain limited period.

(2) Procedures to Solve Problems Through TQC

The procedure to solve the problem will be started from the selection of the subject releted to the problem and be preceded in accordance wi th the series of the activities of "Plan-Do-Check-Action"(PDCA cycle), details of which are given in the supplemental documents.

(3) Standardization of Result

  Any kind of the implementation is depended on 4M elements (Man, Machine, Material, and Method), which shall be under the precise standard to be maintained, or improved.

- Standardization of elements

- Simplification of job-flow

- Specialization of work field

10.5.4 Features of Management by Policy and its Effects

1 Improvement of communications (Top down and Bottom up)

2) Upgrading the educational level of personnel

Discussions are made regarding management levels, check points, pick up problems, evaluation, standardization

3 Weighting to Process

Assessment of the process is given more weighting.. If some problem is found, the weighting is given to pursuit of causes rather than pursuit of responsibility.

4 Participation of Top Management

Top Management diagnose the implementation results. Intention of the top management can be comprehensively communicated up to lowest level of the organization.

5) Administration by data

All process are made based on QC system. Therefore, the administration is proceeded in accordance with data processing system.

6) Human resources development

Cultivation of the capability of human resources and upgradation of the organizational capacity is expected through the PDCA cycles.

A NETWORK	B MATERIALS

A1.   Large
    Area size

B1. Unreliable
    Transport

A2. Network not stable

B2. Shortage or unavailability
    of materials/spares

Delay of
Clearance

A3. Obsolete overhead
    Facilities

B3. Insufficient tools
    and test equipment

C1. shortage of staff
due to too many faults

D1. Not effective utilizations
    of vehicles

C PERSONNEL	D MANAGMENT

C2. Lack of motivation

D2. No activation of
    Rehabilitation plan

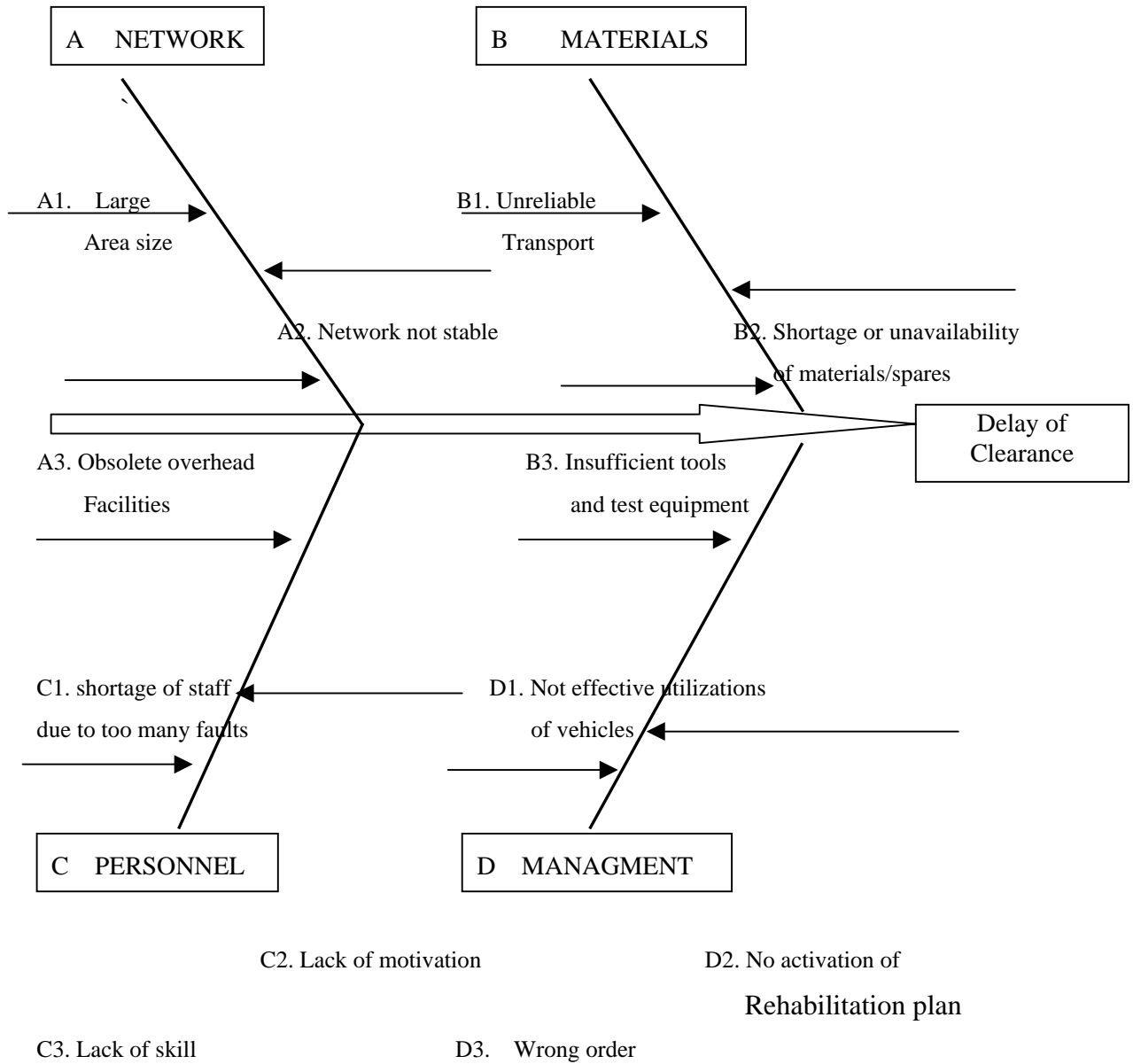C3. Lack of skill

D3.   Wrong order

Figure 10.5-2   Cause of Fault Clearance Delay (As example)

10.6 Corporate Integrated Management Information System (CIMIS)

10.6.1 CIMIS Project

CIMIS Project has been launched and put into initial implementation stage in July 2002 by ITC (Information Technology Center).

CIMIS is the **internal IT tools of ETC,** with which ETC intends to make the precise management on the resources as well as the workflow all the enterprise.

The system is also expected to help the activation of the dynamic information flow for the day-to-day work/work procedure management, and to help the statistic data processing for quick decision making.

Upon the successful implementation of the CIMIC, ETC is expecting the new business field of the "System Integration" in the very near future.

Even though the CIMIC is initiated by ITC, as the system is to be the huge and complex in terms of managerial as well as the technical know-how, the associated efforts of each department/division/zone/region will be inevitable.

Depending on ITC's explanatory paper, the project will be implemented by 3phases.

Phase I	2002 July	2002 Dec.	(6 months)
Phase II	2003 Jan	2004 Dec.	(24 months)
Phase III	2005 Jan.	2005 Dec.	(12 months)

Main infrastructure (LAN, CAN, WAN) of the CIMIC will be established within the framework of Phase I.   Financial sub-package as well as the billing system (AS 400) is to be integrated to CIMIS within Phase I. In addition, some application will be introduced and put into services in Phase I.

10.6.2 Sub-system of O/M to be Integrated in CIMIC

Although the CIMIC infrastructure will be made available, and the basic instruction on the applications will be issued by ITC, the contents of O/M sub-system shall be initiated by O/M division putting the professional know-how into the system.   Such contents may be up-graded gradually through the field trial.   The following items may be installed as the initial trial together with the detailed e-format as well as the processing procedure:

a)   Resource management

- Personal/Task force encouragement applying the management by objectives
- Giving the motivation by broken-down QoS, NP
- Tools/Measuring equipment/Vehicle
- Spare parts/Inventory management
- Budget/budget implementation status/schedule

- Out-sourceing report

b) Statistical data management

- Fault record with the reason of the fault

- - Fault recovery record to be classified by the fault duration

- Traffic data with the reason of call-loss

- Record of the repeated fault with reason

c Work flow management

- Standard work flow of the corrective maintenance

- Time schedule of the preventive maintenance

e) New subscriber connection

- Monthly/area base target

- Waiting applicant list

- Existing facility schedule (SW, OSP)

- Project implementation schedule

e) G/L, Account (prepared by ITC)

10.7 Outside Plant Maintenance and Training Center including Plant Record Management

(1) Purpose of OPMC Establishment

Ethiopia is one of the 4 worst countries in Africa in terms of the failure rate, according to the data in 1998 available from ITU, i.e.187/100 main line per year, or approximately 2 failures per subscriber per year.

With the increase in the number of subscribers and variety of telecommunications services, has become an important issue worldwide.
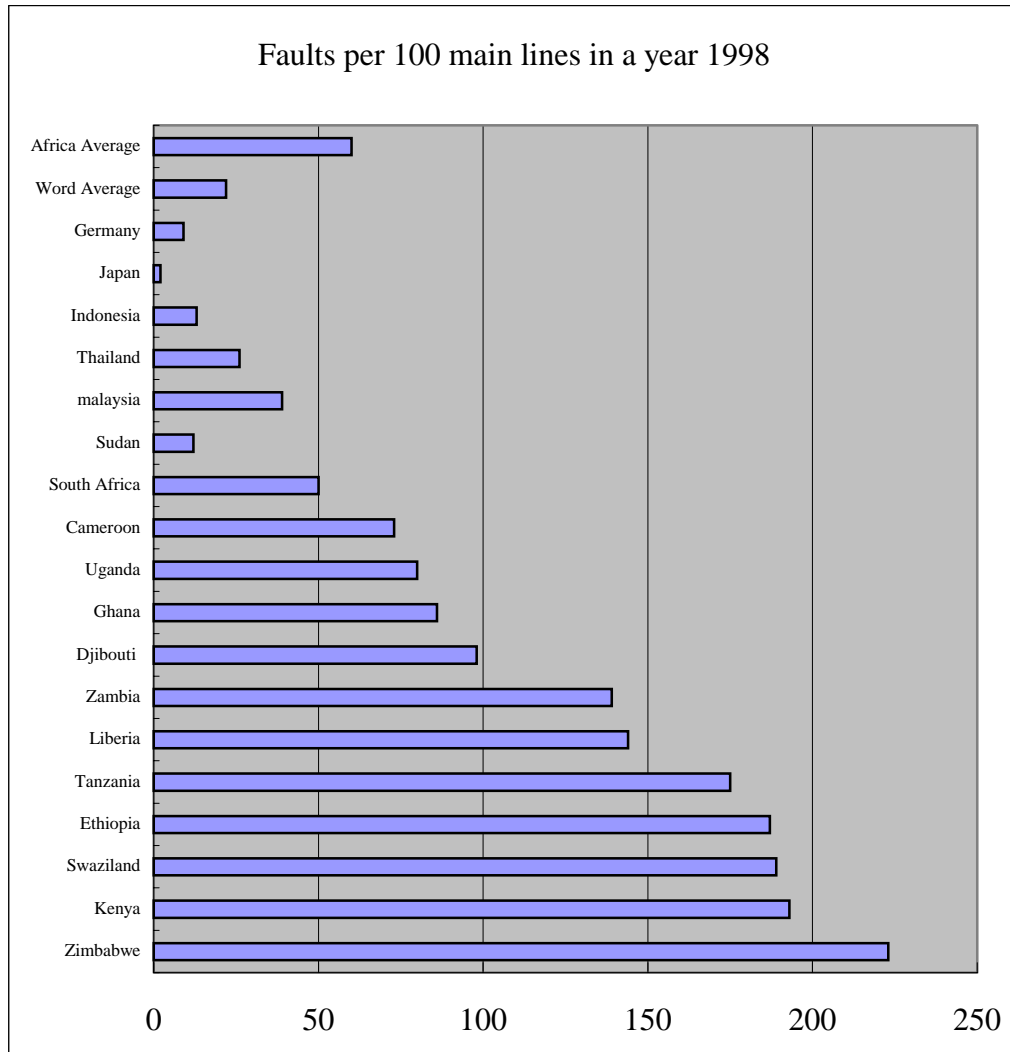
Faults per 100 main lines in a year 1998

Country	Faults per 100 main lines
Africa Average	~60
Word Average	~22
Germany	~10
Japan	~2
Indonesia	~13
Thailand	~26
malaysia	~38
Sudan	~12
South Africa	~50
Cameroon	~72
Uganda	~80
Ghana	~85
Djibouti	~98
Zambia	~140
Liberia	~145
Tanzania	~175
Ethiopia	~187
Swaziland	~190
Kenya	~193
Zimbabwe	~223

Fig. 10.7-1   Faults per 100 Main Lines in a Year 1998

OPMC aims to improve skills of ETC's personnel for efficient maintenance and better customer services.   ETC can expect an increase in income through lower fault rate and shorter failure time.

- Reduced failure rate
- Faster reparation
- Complete reparation with no second failure to the same subscriber

(2) Targets

- Faults per 100 main lines a year (currently 187): 90 (half the current rate) by 2005, 60 (African average) by 2010, 22 (world average) by 2020
- Faults clearance rate next day: 70% by 2005 and 80% by 2010
- Faults clearance rate within 3 days: 90% by 2005 and 95% by 2010
- Faults clearance rate within one week: 95% by 2005 and 98% by 2010
- Repair time for cable failure: within 1 month by 2005
- Repetitive failures control, repeated fault rate below 10% by 2005 and 5% by 2010
- OPMC 2month-training courses: 4times per year for maintenance staff, with approximately 20 trainees per course on the average.

(3) Scope of OPMC Works

1) Daily maintenance of outside plant int the responsible

   a) Corrective maintenance of the fault lines

     - Primaty cable, secondary cable

     - Cross-coneective cabinet, Distribution point

     - Drop-wire, internal-wire, staton protector

     - Telphone set

     - Optical fiber cable, optical cabinet

   b) Preventive maintenance of Outsaide Plant

     - Insulation / continuting test of cables.

     - Patrole check of CCC, DP, cable condition, separation from Power line, cable/ wire clearance from fround level (74.5m, 75.5m)

     - Witness to the construction work of other utilities.

   c) Inspection / maintenance of Pay-phones

2) Subscriber new connecton

   a) Urgent and small siza cable expansion design and installation

   b) Subscriber new connection

3) management of the out-sourcing contract (unit price base).

   a) Planning/Desiging of the small seze expansion of the subscriber access network (copper loop only)

   b) Contract negociaton based on the unit price

   c) Management of the ontract (S/V, Acceptance, etc.)

4) Inventry management (Outside plant related)

   a) Materials

   b) Spare Parts

5) Training of the OSP statt and local contractor

   a) Planning / Designing

   b) Installation Standards

(4) Introduction Plan

2OPMCs should be introduced in Addis Ababa by 2005 and 11 the other 9 OPMCs for each Telecom Regions nationwide by 2007: Nazareth (2), Dessie (3), Mekele (4), Dire Dawa (5), Shashemene (6), Jimma (7), Nekempte (7), Bahir Dar (8), and Harar.

(5) Content of Training

- Planning & Designing

- Maintenance Management

- Metallic Cables Maintenance

- Fiber Optical Cable Maintenance

- General Failure Maintenance

- Construction Work Supervisor Training

- Construction Work Test Execution Guideline

- Construction Company training

- Bucket Truck Usage Training

(6) Necessary Equipment

Table 10.7-1 Necessary Equipment

No.	Material Item	Unit	Numbers	U/P (US$)	Total Price ($)
1	Special car	Each	4	50,000	200,000
2	Maintenance car	Each	8	15,000	120,000
3	OF fusion splicer	Set	4	25,000	100,000
4	OF test set	Set	4	20,000	80,000
5	OF light source	Set	4	2,500	10,000
6	Pulse tester for metal cable	Set	11	5,000	55,000
7	OF power meter	Set	4	2,000	8,000
8	OF measuring instruments	Set	4	4,000	16,000
9	Buried Object Detector	Set	4	5,000	20,000
10	Cable splicing equipment	Set	14	2,000	28,000
11	Cable installation tool	Set	5	3,000	15,000
12	Civil work tool	Set	3	8,000	24,000
13	PC	Set	5	2,500	12,500
14	MH cover, key, neck	Set	10	1,000	10,000
15	PVC duct sample (6m, 100mm)	Each	20	10	200
16	Sub-duct sample	M	250	10	2,500
17	Portable generator	Each	5	1,000	5,000
18	Water pump (hose)	Set	5	1,200	6,000
19	Oxygen & explosion gas detector	Each	20	500	10,000
20	Subscriber arrester	Each	500	20	10,000
21	Digital camera	Each	5	500	2,500
22	Making text book	Each	2000	30	60,000
23	Scanner	Each	2	300	600
24	OF cable G655 (32)	M	1000	6	6,000
25	OF cable G652 (33)	M	1000	5	5,000
26	Cable jack and trailer	Set	2	2,000	4,000
27	Installation training equipment				
	MH, HH, Ducts, Tel pole, Cabinet	Set	1	5,000	5,000
28	Printer	Each	2	500	1,000
29	Xerox	Each	1	10,000	10,000
30	Stationary	Set	1	5,000	5,000
31	Measureing equipment	Set			
	(Multimeter,Megar,Others)		6	1,000	6,000
32	Line man tool set (head set, helmet, safty belt,nipper,driber,pinch,others)	Set	150	500	75,000
33	Duct lod (real 300m)	Set	2	1,000	2,000
34	Cable splicing training material	Set	500	150	75,000
35	Others				10,700
36	Grand Total				1,000,000

(7) Budget Planning

- OPMC will be installed in 2 places in Addis Ababa by 2005 and 3 places per year nationwide, to reach at the total of 11 by 2008.

- The cost per OPMC is estimated at US$ 1 million, totaling at US$ 11 million.

- Other expenditures will be necessary for OPMC building, its maintenance cost (spare parts, operation cost, etc.), salaries for instructors and trainees, business trips and daily allowance.

10.8 Customer Service

The following current problems shall be urgently solved through the improvement plan of the customer service of ETC.

- Customer couldn't have an idea for the availability of the telephone connection after an application, due to the no response from ETC for a long time.

- No information is given to the customer during the long recovery time upon the customers complaint on the fault.

- The bill of the telephone charges is delivered with several month delay.

- The detached bill giving the breakdown of the telephone charge is not issued even upon the customer's request.

In order to remove the above problems, the improvement plan and the proposal of the new service are stated below.

10.8.1   Improvement of the Contract and Billing Works

(1) Bill Production of the Digital Exchange

Billing data have been sent to the Billing center, where AS400 system is processing the bills. Currently, all the bills for the fixed-phone and the mobile-phone can be completed within 15 days.

(2) Improvement of Bill Production System of the Analog Exchanges

At present, ETC's billing work for the customers of analog exchange takes several months for delivery after calculating call data from the exchanges.   The following measures are conseidered.

1)   Making digital imaged metering data from metering figure of analog exchange by the digital camera, converting the digital imaged metering data to the metering data table corresponding to the program of the bill preparation by high-accuracy OCR processing, and increasing the number of bills to prepare per unit, so that it can shorten the time for the bill production.

2)   It is considered that the above metering data table may occur small errors due to the circumstance of the quality of the image data, etc. even if those data are made by such high-accuracy OCR processing.   So, the above metering data table should be visually compared with the digital imaged metering data by the ETC's staffs before they are input to the program of the bill production.

Majority of analog switches are to be replaced through the Eighth 5-year plan by 2004. As the present ratio of analog exchanges in Ethiopia is approx. 5%, the period to contribute to the profit improvement of ETC by introducing the above system will be very short.

The above system will take a very small investiment, but will enshort the bill production time within 15days.

(3) Bill Delivery and Collecton

Unsettled-bills may be filed in the data base, to which the operater of the special number (9XX for bill information)will access for the bill information upon the customers inquiry.   Un-settled bill in the data base shall be supported by the setted bill data base, to which the bill collection office may be allowed to access with the security ID number.

(a) Government and Key Customers

The bill will be deliverd through facsimile or by hand.
The collection will be made through the banks.

(b) Other Customers

Depending on the bill delivery management system (a data base), the bills will be deliverd through the special number for bill information, by facsimile, or by hand.
In order to increase the convenience for customers, it will be recomendable to establish the bill collection offices with the longer duty time (7:00-21:00).

(c) Internet Customers

Bills have been delilverd by e-mail.   The increase of the bill collection offices will be sufficient to support the purpose.

(d) Rapid Increase of the Mobile-phone Customers

In order to promote the rapid increase of the mobile-phone customers and to simplify the billing procedures, the pre-paid (SIM card) system is to be introduced shortly.

10.8.2 Improvement of the New Connection Works and of the Waiting Applicant Management.

In order to support the rapid increase of the new connection as well as to support the waiting applicant management , the computer-aided system shall be introduced.

- The information of the swithcing lines, primary / secondary cable pairs and DP termanals as well as the geographical locations shall be available at the customer service offices.

- The information of facilities are to be up-dated by the responsible O/M unit.

- Service orders (contract of new connections) are to be distributed to O/M unit of SW / OSP, Billing center, telephone number information and so on.

- Wating applicants shall be filed in the data base with the easy/simple indexes.

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- Waiting applicants shall be filed in each excahnge area, but prefarably broken down to each cabinet area as much as possible.

10.8.3   Integration to CIMIS

Installation of "Corporate Integrated Management Information System" has been commerced as from July, 2002, and is expected to be completed by year 2005.   The system intends to integrate the above functions of the customer offices, i.e., billing work, new subscriber connection works and waiting applicant management.

10.8.4   Proposal of New Services

(1)   Detailed Bill Service

As stated in clause 10.7.1, the introduction of the detailed bill service is proposed for the purpose of the accomplishment of the smooth bill collection and the improvement of the customer's consciousness of payment.

(2)   STM-1 Ring Network

A high-speed exclusive network is formed for the key customers such as governmental organizations, international organizations, big enterprises, providing more high-speed with a lower loss probability than normal circuits, in order to secure a stable profit for ETC.   An outline of the network, that is STM-1 Ring Network, is shown in Figure 10.8-1
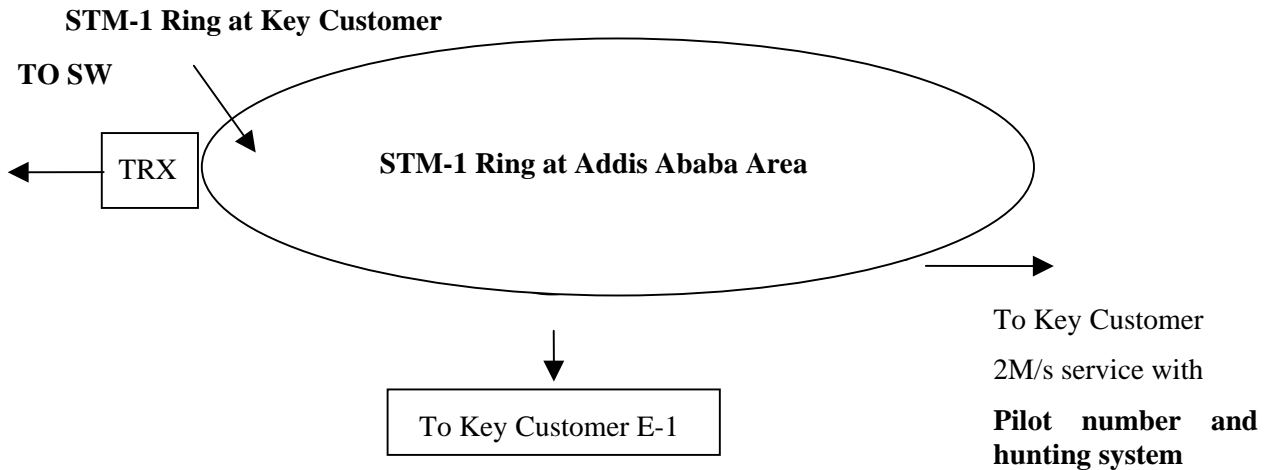
STM-1 Ring at Key Customer

TO SW

TRX

STM-1 Ring at Addis Ababa Area

To Key Customer

2M/s service with

Pilot number and hunting system

To Key Customer E-1

Fig. 10.8-1   STM-1 Ring Network

(3) Introduction of Prepaid Type Mobile-phone

Some other African countries adopt GSM system for mobile-phone service by prepaid order. Present contract work is simplified drastically by selling GSM type apparatus, SIM card and scratching card in the market.   And, the cost for billing work becomes nearly zero due to that telephone calls are available immediately after registering times by scratching card.

It is especially convenient to adopt the above system for those who don't have Ethiopian nationality and a bank account as persons belonging to the international organizations or foreign

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enterprises. The mobile apparatuses of GSM type are compatible with those in other countries and it is expected that the number of users will increase rapidly.

It is necessary for ETC to examine carefully to adopt the above system to ETC because it might change the ETC's management system of telecommunication business fundamentally.

(4) Free Dialing

Some calls to ETC (such as customer complaint on fault line) shall be made to fee calls. Free daialing service may be introduced to some enterprises to receive his customer's free call, and the bill shall be paid by the enterprise.

10.8.5   Expansion of the Existing Services

(1)   Nationwide Expansion of Card Type Public Telephone

Coin/card combination type public telephones are increased nationwide. Moreover, the sales network of the telephone card is expanded, and it is dealt in a supermarket, an airport, a hospital, a gas station, public market, kiosk, mobile apparatus store, and so on.

(2)   Expansion of Available Time for Public Telephone

Available time of public phone after business hours of telephone office is expanded in order to meet the customer's needs.

CHAPTER 11   ORGANIZATION AND HUMAN RESOURCE DEVELOPMENT PLAN

11.1 Introduction

The purpose of this chapter is to define organizational and human resource development programs concordant with the strategic plans of the telecommunication sector outlined in this master plan, with a view to ensuring that organizational and human resources management functions, together with other efforts, constitute an effective means of enabling both the regulator and the incumbent operator to achieve the short, medium and long-term objectives of the master plan.

The program should constitute a two-fold effort for both the regulator and the operator, i.e. firstly devising a dynamic organizational functional structure and human resource management style adaptable to the changing telecommunication technology and business environment, and secondly develop sufficient and competent managerial and technical personnel, through appropriate training programs, for the telecommunication and ICT sectors. This will enable the regulator to effectively regulate emerging competitive players in the sector and boost its capacity to enforce its policies and regulatory procedures. It will also enable the operator to manage its business efficiently in a competitive environment, implement, operate and maintain the proposed network, and achieve service targets set in the master plan.

The proposed program should also attract and potential strategic partners, give them strong confidence on the sector and motivate them to participate in the bid for equity partnership of ETC The chapter mainly focuses on strengthening organizational capability, improvement of the human resource management and development utilizing effective strategies and introduction of effective training programs. The following sections discuss the program both for the regulator and the operator.

11.2 Strengthening the Regulator (ETA)

This section discusses proposed programs or actions on organizational and human resource functions for strengthening the regulator (ETA) in order to discharge its responsibility of assuring the effective and timely implementation of the master plan, i.e.

- Facilitation of a competitive business environment in the long run;
- Achieving universal access;
- Fulfilling the set service target levels;
- Tactical deployment of the proposed network plans;
- Smooth migration to emerging technologies (VoIP);
- Improvement of the operation and maintenance function to achieve reasonable QoS.

The proposed set of actions are not unique to the regulator and should be executed in relation to other players in the sector and related entities at the national level. The following table summarizes specific courses of action and subsequent paragraphs discuss details of each.

Table 11.2-1 Program/Action Proposed in Organization and Human Resource Development Plan for the Regulator

Program/Action	Short Term	Middle-Term and Long Term
1. Organization Strengthening/ Human Resource Development	* Increase of Staff (already planned) * Participate to International and Foreign Training * Establish a Library/ Internet Environment	* Information Exchange with International Organizations and Foreign Regulators
2. Strengthening Regulatory Functions for Promotion of Telecommunication Industries and Customer Protection	a. Carrying out Basic Regulatory Functions (Financial and Management Auditing, Technical Inspection) b. Establishment of Policy for Universal Access and Formulation of Rural Tele- Communication Development Plan c. Drafting Regulations/Standards/ Guidelines and Authorization/Certification System for Promotion of Private Participation to Telecommunication d. Collaboration with Universities/Colleges/ Vocational Training Schools to Establish or Expand Courses on Telecommunication e. Defining Standards and Guidelines for Interconnection (including tariff control).	* Enhancement of Regulations for Effective and Efficient Tariff Control, Universal Access, and Promotion of Private Participation and Investment in Operation (continuous upgrade of a. to e. of the left in changing environment) f. Development of Tribunal Functions

(1) Organization Strengthening through Human Resource Development

The current organization structure will function efficiently when a carefully designed staffing plan is implemented. The recommended staff assignment to the various Offices/Services/Departments is shown in the table below. Since the Planning and Research Service will discharge the key function, more staff would necessarily be allocated. For ETA as a regulatory organ, integrated and coordinated approaches are inevitable. Regular meetings, which are often neglected with scale of the growth of the organization, should preferably be held once a week to discuss and formulate sector policy or to just exchange information and opinions among Services Organs and Departments.

Table 11.2-2 Recommended Staff Allocation of ETA

(Unit: persons)

Office/Service/Department	Current	Planned	Recommended
General Manager Office	2	2	2
Audit Service	1	3	3
Planning and Research Service	1	6	10
Public Relations Service	1	4	4
Legal Service	2	3	3
Administration and Finance Service	23	35	25
Standard and Quality Control Department	7	13	15
Licensing and Frequency Management Department	6	22	23
Total	43	88	80

Currently, the regulator does not seem to have higher or same level of financial and technical know-how and information as that of the operator. After recruiting the required staff, their research capability has to be enhanced to fully discharge their responsibilities. For adequate research and policy formulation, information collection and distribution is inevitable. Various types of reference materials are to be available for the staff in the forms of research papers, text books, journals, newsletters or magazines, as well as electronic documents accessible though the internet and are posted by international agencies, such as ITU, World Bank, UNICEF, etc. At present, since a huge volume of information is available through the internet from various sources, the ETA staff especially those in the Research Service should have sufficient access to the internet.

Participation in trainings, seminars, workshops offered by international agencies and foreign organizations is also very important to acquire knowledge for proper regulation. Although this may incur substantial cost, and since there is no other regulator in Ethiopia that is capable of organizing such forums, ETA has no option but to make use of available opportunities. The participation will help the staff to develop personal contacts and connections to the staff of the regulators in other countries who may share same or similar problems/issues regarding equitable regulation. These connections will be invaluable for information exchange or mutual consultancy among the regulators.

(2) Strengthening Regulatory Functions

(a) Carrying Out Basic Regulatory Functions

First of all, it is necessary to start checking the adequacy of service pricing and conformance to service quality or technical standards stipulated in the regulations by inspecting performance of the operator and analyzing its reports.

There are many directives or standards/guidelines yet to be provided by responsible government authorities. Proclamations and Council of Ministers Regulations generally use such adjectives, like: "proper", "adequate", "modern", "compatible" or "normal" in many phrases to describe targets, objectives or preferable conditions, as laws and regulations may often and properly do. However, more concrete procedures and measurable performance standards that are defined according to conditions, time and zones are necessary to be prescribed as directives/ standards/guidelines in order to serve as bench marks for the law enforcement. These directives/standards/guidelines should be revised when conditions change and necessities arise, while laws/regulations are often difficult to change. The directives/standards/guidelines to be stipulated include the followings:

* type of documents to be submitted to the regulator from operators
* criteria for license granting or refusal
* accounting rules and criteria for tariff setting

* mean failure rate, mean time between failure, means time to repair of the systems or parts

* detailed technical standards for customer premises equipment

* environmental conditions within where telecommunication equipment can be operated

* signal lighting or reflective paints to be affixed to the top of antenna and antenna supporting structures

* safety guards and warning devices to be provided in underground cable installation

* Interconnection obligations and standards.

The only way for ETA to prepare the drafts of the directives/standards/guidelines might be:

1) to collect information from international organizations and foreign regulators (as recommended above) regarding texts of directives/standards/guidelines and results of their application,

2) to analyze implication of these information for the application to Ethiopia,

3) to discuss with MOI and related organizations, such as EPA and ESTC.

Frequent meeting and discussion with related organizations will be required.

(b) Establishment of Policy for Universal Access and Formulation of Rural Telecommunication Development Plan

Another urgent task for ETA is to formulate a policy for universal access to telecommunication services. In license conditions, unrealistic large number of rural public call offices (PCO) is given as a duty for licensee. Although to achieve universal access is very important and one of key policies of the Government, it will require at the same time, huge amount of investment to attain universal access throughout the country.

Installation of a rural PCO may incur substantial costs since usually there is no telecommunication facility extending closer to the site. Subsequently, operation and maintenance will also incur much cost because the operator who will take care of the PCO cannot stay near by so that transportation cost will increase, and the O&M costs will exceed the revenue from PCO. Since the government has no intention of subsidizing the telecommunication sector, all funds for rural access have to be paid by the operator. Consequently rural PCO will pose considerable financial burdens on the operator.

Moreover, the goals, long-term objectives or establishment standards for universal access are not properly defined. The educational ministry, for example, aims that all children should have access to a primary school within 5 km by 2015. The ministry recognizes that at present only 57% children have a school within the distance with around 11,000 primary schools, and has a plan to raise the percentage to 65% by 2005 through adding 1,350 primary schools. On the contrary, ETA put a target of 22,000 *lines* in a draft condition to licensee as of January 2002, instead of the number of offices, as a target of PCOs in remote area by 2001/02 and 48,800 lines

by 2005/06. ETA is required to analyze the rural conditions regarding development of other social and economic infrastructures such as schools, primary health care facilities as well as roads or electricity distribution. The development of universal access to telecommunication services should be consistent with development of other infrastructures as well as agricultural development.

To realize universal access may be a difficult task and the balance between urban and rural telecommunication development is a critical issue under the circumstance of decreasing profitability even in the urban services. It is necessary for ETA, as the regulator of the sector, to find an equitable balance by analyzing financial conditions of the operator, available technology and management methods for the rural development, and conditions and requirements of rural communities, through discussion with other sector of the government, local governments and rural communities as well as with the operator. The consensus obtained through the discussions can be a good base to formulate universal access policy.

Since there are no sufficient PCOs in rural or remote areas at present, pilot projects in some model areas will be necessary with participation of rural communities or agricultural cooperatives, local governments and the operator. Community-based management, rather than management by large operating corporation, may be suitable or sustainable for rural PCOs. Learning from pilot projects will be essential for the policy formulation.

In the middle or long term, the telecommunication sector may evolve into multi-operator environment to invite investment to meet growing demands as well as to offer customers more options and more efficient services under competitive circumstances. At that time, operators will hesitate to invest in less profitable rural areas to survive in the competitive market. A certain mechanism has to be devised to coordinate the collateral objectives, i.e., i) economic and commercial objective; to expand urban telecommunication in terms of quantity, quality and variety to drive economic development for Ethiopia to survive in competitive growing markets, ii) social objective; to attain universal access to achieve social equity.

To attain the two different objectives or to seek a balance among the two, universal access funds (UAF) are often adopted in many countries. UAF are raised with funds from urban services, 1% of the sales in Uganda for example. To operate the service in rural or remote areas incumbent government-owned operators may take charge.

(c) Drafting Regulations, Standards/Guidelines, and Authorization/Certification System for Promotion of Private Sector Participation to Telecommunication Services

National Communication Policy prepared by the MOI encourages private participation to non-core telecommunication activities, such as external plant construction, and import and maintenance of terminal equipment. The policy also allows and promotes resale of telecommunication services by the private sector, communities and cooperatives. When

interviewed, some private companies also keenly hoped participation to the above-mentioned business, especially, import and maintenance of terminal equipment including PABXs for companies and buildings.

When allowing private sector to participate in telecommunication services, even in non-core services, some regulation are required. In the era of monopoly, including non-core service, standards of the national operator have been those of Ethiopia. In the circumstances of multiple role players, regulation is necessary to attain system compatibility and customer protection.

At the beginning of the Phase-2 Study, ETA and MOI attained amendment to the principle law according to the National Policy. This is, however, not the end but the beginning and a must for ETA to prepare i) criteria for licensing to and ii) mechanism of control over private companies or local communities for the participation to non-core services. It might be necessary for ETA to prepare the two for a) telecenter and resale service, b) outside cabling and WLL installation and maintenance, c) in-house or building cabling and telecommunication exchange installation and maintenance, d) import approval of telecommunication equipment.

Telecenter and Resale Service

As for telecenter and resale services, there may be various types of service. Capacity requirements for the services depend on the type and scale of the services. The responsibility of the reselling persons or companies to the customers may also vary. Persons or communities for resale in rural PCO, for example, cannot take technical responsibility for equipment restore. They will only make some part of the business of the core operator. Criteria for licensing for telecenter or resale services have to correspond to what part of business of the sole operator the reselling persons, whether physical or juridical, will do or to what extent of responsibility to the customer the persons should take. Actually the demarcation depends of the contract with the core operators, or the sole operator, which have or has capability for reliable service. ETC may get contracts for resale for cheaper or efficient services. It is necessary for ETA not to hinder efficient service provision when it sets up criteria for licensing and control mechanism to resale service providers.

Outside Cabling and WLL Installation and Maintenance

As for outside cabling and WLL installation and maintenance, the persons who will engage in these activities also provide services to the sole service provider. ETC may also get contracts with this type of service providers to supplement its manpower or to attain cheaper cost. ETC has or should have capability to control the quality of works and maintenance by outsourced persons through preparing contracts, including design and specification documents and through supervision. Although these services constitute a part of public switched network construction and maintenance, the criteria and control mechanism should not be too high or too strict for the private sector to seriously hesitate the participation.

Rather than setting up high criteria or establishing strict control mechanism ETA should establish scheme for certification of engineers who can engage in the construction and maintenance of telecommunication networks, as recommended below. The scheme will help proper and transparent selection of outsourced companies. The scheme will also contribute to human resource development of the sector.

Telecommunication Exchange Installation and Maintenance/In-house or Building Cabling

Participation of the private sector to telecommunication exchange installation and maintenance, as well as in-house or building cabling offer more options and more scrupulous services to the customers. Regarding these services, however, on the contrary to the above two latter types of services, the service users are companies or persons who may not have enough knowledge for selection of the service provider. When contracting, the customers often cannot assess the capability or reliability of service provider. Further, when some troubles or disorder happen, the sole operator will not be responsible for the part installed or maintained by the provider.

The criteria for licensing have to be set on capabilities in terms of human, material and financial resources of candidate service providers. Human resource capabilities can be judged by the certification scheme as described below. Regarding material resources, minimum equipment for construction and equipment, including testing equipment, and spare parts should be listed according to the type of the services. Minimum capital should also be determined according to the type of the services. Reports on scale of the provided service and conditions of human, material and financial resources, including financial statements, of each licensed service provider should be submitted every year to ETA.

Required capacity of the service provider in terms of human, material and financial resources depends on the scale of the services provided by the licensees. Service quality may also vary depending on the requirements and affordability of the customers, although minimum level of the quality should be set not to harm public network operation. Rather than setting quality targets, ETA should prepare standard form of the service contract for the reference of the customer.

ETA has to issue guidelines to determine the responsibility demarcation points between the sole operator and the customers. Each demarcation point should be clearly marked for the third party, including ETA, to easily identify at the presence of the customer/service provider and the sole operator when connected to public network.

Certification to Engineers

Certification to engineers, or to chief engineers of contractors who will engage in installation and maintenance of customers premises equipment, in-house or building cabling after the demarcation points, should be prepared to let customers or the operator know whether the engineers or the contractors are qualified for the services or not. The certifications can be

issued by MOI or ETA after the candidates pass the examination prepared by ETA in consultation with the sole operator. The examination should composed of tests on, i) basic knowledge on electrics, electronics, electro-magnetism, and telecommunication, ii) practical knowledge on construction and installation works and maintenance, as well as on iii) legal knowledge on telecommunication. ETA should also establish regulations regarding the powers and norms of the certified engineers. To meet various levels of the customer requirements, the certification might have two or three grades. In case of frictions to the laws or norms for the certified engineers, the certification should be cancelled.

Equipment Import

ETA has improved much on equipment approval and established a base for regulation on import of equipment. For further improvement, it might be necessary for ETA should notify the following to the importers, dealers and the public to avoid troubles caused by connection of unapproved equipment and to protect customers.

i)   List of approved equipment

ii)   Required procedure for import of equipment, including personal carriage

iii)   Punishment for connection of unapproved equipment

Local Manufacturing or Assembling of Equipment

Local manufacturing or assembling of equipment or the parts has preferably to be promoted. Quality control/assurance is essential and to be encouraged. It is necessary for ETA to check of the design of the product, inspection procedure and testing machines. Factory inspection is also necessary to examine the production process and products inspection procedure.

(d) Collaboration with Universities/Colleges/Vocational Training Schools to Establish or Expand Courses on Telecommunication

Human resource development of telecommunication sector has been solely dependent on the national monopolizing operator, ETC, so far. To encourage participation of others than ETC to telecommunication sector and under the circumstances of multiple operators, the role of the regulator have to increase in terms of human resource development. After the employment to the operators or other companies, each employer is and will be responsible for the human resource development of respective employees. However, for sound and prosperous development of the sector, human resource development at the academic level should also be encouraged to correspond to changing technology involved in the sector.

ETA should start to analyze technological change of the sector as well as required present and future human resources in quantity and quality, in consultation the operator and others who wish to or will to participate to the sector. Although there are courses in universities and colleges for electrics and electronics, curriculums for telecommunication may appear quite insufficient in terms of quality and quantity. ETA should feedback the demands of the sector to academic institutes, such as universities, colleges, and vocational training schools. ETA should,

through the educational ministry or directly, collaborate with these institutes to establish or to expand the courses or subjects on telecommunication for the development of the sector. ETA should also to help the institutes to improve curriculum by feeding back the requirements of the sector.

Currently, specialists for information and communication technology seem seriously missing. Despite there are many vocational training schools with computer training courses emerging in many cities, their education and trainings are limited to simple PC operation. Tremendous number of system analysts, programmers and other experts of higher level will be required for the development of telecommunication and ICT sector. ETA, as a representative of the largest demanding sector for this type of human resource, should promote academic education of this field. For this field, however, ESTC, as the regulator or promoter of national ICT policy, is also in charge for the human resource development. Coordination with ESTC is inevitable.

(e) Defining Standards and Guidelines for Interconnection

Under the circumstances of multiple operators for telecommunication services, interconnection among the networks of carriers is a must for normal functioning of the services. Without an agreement for interconnection a new carrier cannot start operation unless they fully develop their own backbone networks which will incur huge cost, resulting in tremendous waste of investment or in hesitation to participate in telecommunication services. Having this as background, Council of Ministers Regulation No. 47/1999 provides on interconnection and agreements for the interconnection among the operators as compulsory.

Generally, the demands for telecommunication are growing and government-owned monopolizing operators cannot afford investment for network development to meet the demands. To increase the investment to the sector, it is necessary to invite private sectors, either foreign or domestic, to invest to the government-owned operator as shareholder or to allow the private sectors to invest as new operators. The former way has a certain limit in case that the government wants to continue control its incumbent operator as the majority holder. When the latter option is taken, competition starts. Competition normally causes more efficient services with more variety options to the customers.

Technical issues of inter-operability are not critical in general. Issues are often derived on conditions of agreements, including connection charges, among competing operators. ETA should prepare transparent guidelines for the agreements to invite new operators with proper analysis on financial and economic conditions of the sector. The guidelines often should not allow advantage for the incumbent operator but some times it should be conducive for new operators to make the sector fairly competitive.

(f) Development of Tribunal Functions

Since issues in telecommunication sector is often highly specialized and changing, normal juridical or court system cannot follow. Arbitration with involvement of the regulator may

work, as Council of Ministers Regulation No. 47/1999 provides in Article 56. Although the provision is limited to interconnection, it could be expand to other types of disputes or issues. Speedy arbitration, which normal juridical system cannot often make is fatal not to miss timely implementation of solutions. When legal issues are clarified during the arbitral process involved by ETA, appeal to the Supreme Court may work for more prudent judge.

11.3   Strengthening the Operator

In order for the ETC to work as a corporation with commercial objectives, not as a government authority to grant public services, its corporate culture has to be changed. The ultimate aim of the following plans and programs is to change the culture of ETC, where everyone of employees is willing to work for the benefits of themselves, recognizing that their benefits come from the profits of ETC, and profits are gained only when ETC provides good services efficiently.

In order to correspond to the changes in the market and business environment, following plans and programs were designed as shown below.
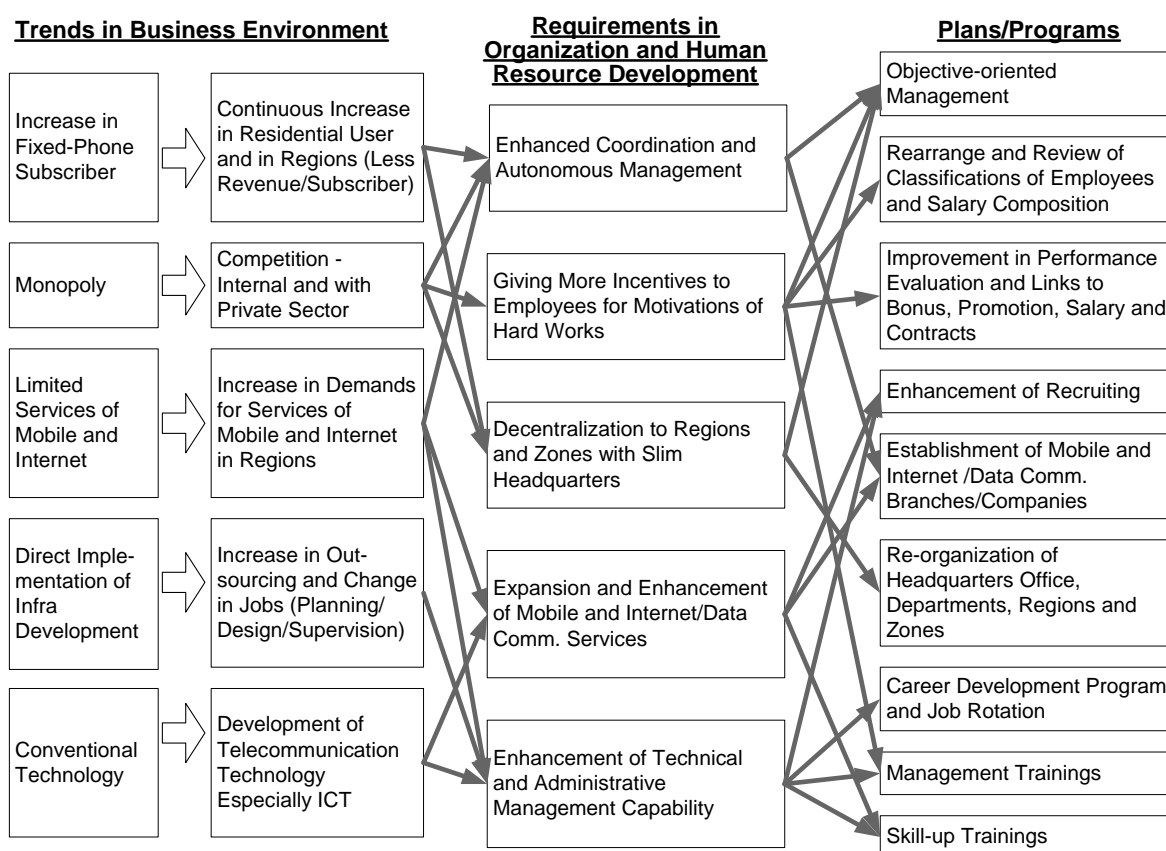

**Figure 11.3-1   Change in Business Environment, Requirement in Organization
and Human Resource Development, and Proposed Plans/Programs**

The following table summarizes specific courses of actions to be taken to strengthen the operator and subsequent paragraphs discuss details of each.

Table 11.3-2 Organization and Human Resource Development Plan of ETC

Plan/Program	Short Term	Middle-Term	Long Term
1. Objective Oriented Management	* Introduction to Department, Region and Zone Level	* Spread to Division, Section/ Unit and Team Level and Enhancement	
2. Personnel Management	a. Enhancement of Recruiting		
	b. Rearrange Classification of Employees and Salary Composition	b. Continuous Review of the Classification	
	c. Improvements in Performance Evaluation and Links to Bonus and Promotion	c. Links of Performance Evaluation to Objective-Oriented Management and to Salary or Employment Contracts	
3. Organization Strengthening	a. Establishment of Mobile and Internet/Data Com. Branches	a. Establishment of Mobile and Internet/Data Com. Companies and Competition with Private Operators	
	b. Re-organization of Corporate Planning and Business Development Dept.		
	c. Re-organization of Telecom Infra-structure Development Dept.	---	
	d. Re-organization of Telecom Services Dept.		
	e. Re-organization of Regions and Zones		
4. Human Resource Development	a. Career Development Program and Job Rotation		
	b. Management Trainings (Organization and Project Management)		
	c. Continuous Upgrade of Skill-up Trainings, especially for ICT		

(1) Improvement of Objective-Oriented Management

Although the management technique recommended below has partially been carried out in ETC, the full introduction of objective-oriented management will contribute to clarified responsibility allocation, consistent resource allocation as well as giving incentives to achieve respective objectives of the employees. Documentation with definite forms, as given below as examples, is essential for the objective-oriented management, especially in case offices of departments and divisions are scattered far away.

ETC appears to have a breakdown system from a five-year plan to annual plans and also from corporate annual plan to annual plans of divisions. However, according to the evaluation of implementation of the 7th five-year plan made for formulation of the 8th five-year development plan, the breakdown system has not been conducted with definite purpose of consistency or efficiency. In the 8th five-year plan of the corporation responsible departments or divisions are not defined, while annual development is often clearly described.

Annual plans should be formulated after evaluation on the implementation of the previous annual plan. In case some of the objectives in the previous year are not accomplished, some countermeasures should be added to the original one broken down from the five-year plan. The implementation should be monitored briefly every month, and in the mid-year thorough monitoring should be conducted and countermeasures should be planned and taken according to the implementation conditions of the first half of the year. The monitoring within a lower organ should be carried out at beginning, and then managers of the lower organs should meet together under the manager of the higher for monitoring of higher organs.
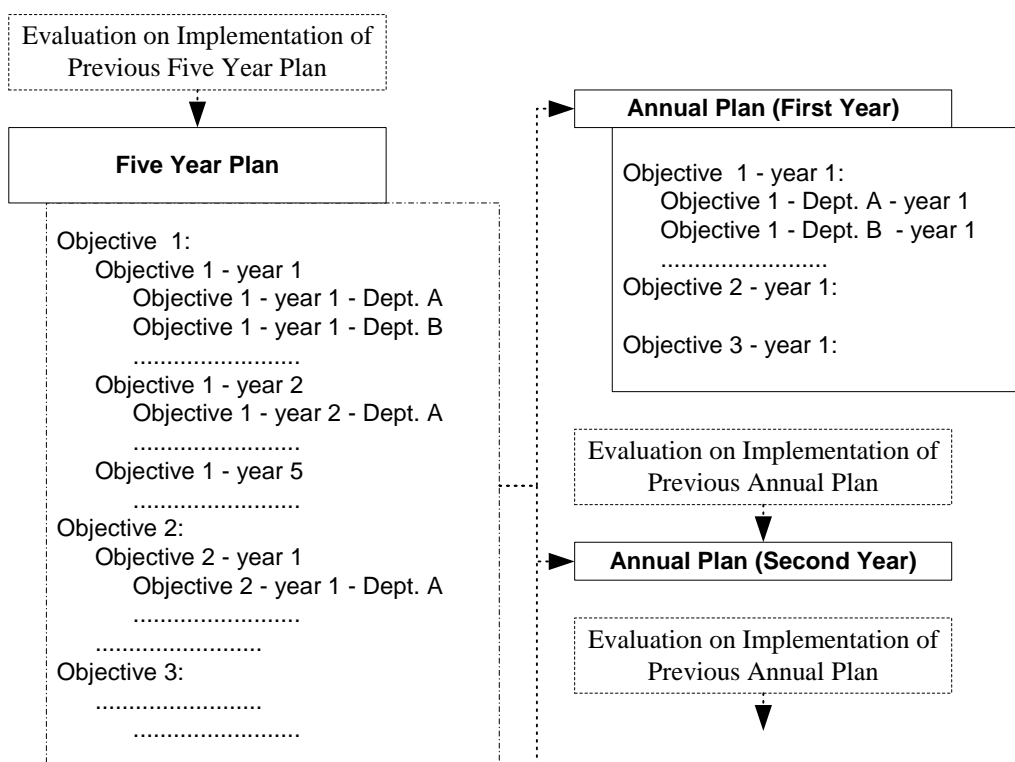
Figure 11.3-2 Breakdown of 5-Year Plan to Annual Plans

To attain consistency of objectives among the departments or divisions in a department is often a tough job. Objectives of an upper organ should be attained when all objectives of the lower organs are accomplished, in principle. In case lower objectives are not sufficient to achieve the upper objective, some new lower objectives should be added at the time of planning. In case some lower objective is not necessary to achieve the objectives of the upper organ, that lower objective can be omitted for the efficient attainment of the upper, or, in some cases, the upper can be modified.
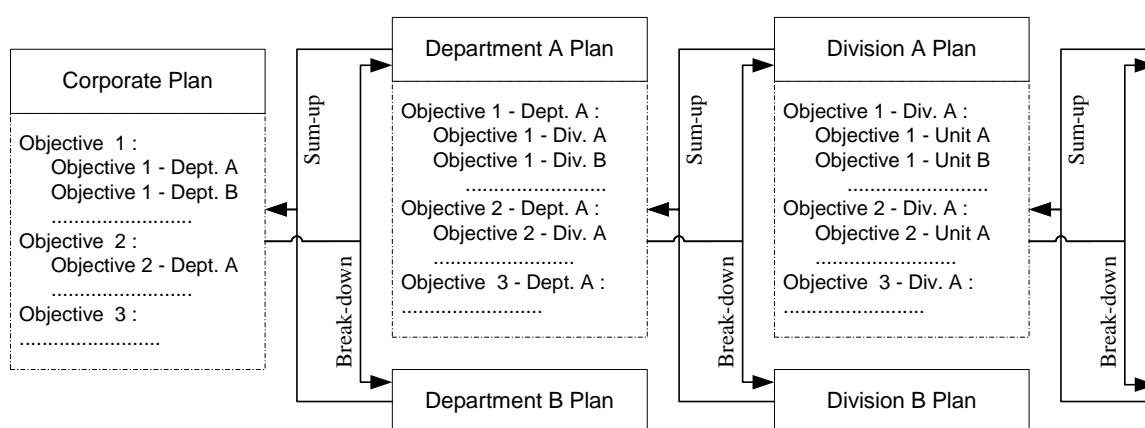
Figure 11.3-3 Breakdown of Corporate Plan to Department and Division Plans

In order to assure consistency, interactive processes between the upper and lower organs are required. The process illustrated below is a typical one. It can be a case that when all implementation plans of lower organs related to an upper objective are adequately planned with efficient use of human, financial and material resources and the upper organ or related organs

cannot provide these resources, the objective of the upper as well as related objectives of the lower should be modified.

Upper Organ

Prepare Plan with Broken-down Objectives of Lower Organs (Department, Division, Section/Units or Team)	Sum-up and Examine Consistency of Objectives and of Resource Allocation Efficiency	Revise Objectives and Resource Allocation and Present Comments	Approve the Implemen-tation Plan

Discussion

Prepare Implementation Plan	Revise the Implementation Plan

Lower Organ

Figure 11.3-4 Process of Planning

The table below shows essential elements of a plan of an organ. Each objective should be assigned to a responsible person. Without responsibility assignment, no one feel responsible, and when the objective is not attained no one cannot point out right reason why the objective is not attained. The responsible person should require necessary supports to attain the objective, since only one person or one organ cannot complete most of the jobs.

The supports from other departments or divisions should be, after assessment of relevancy and efficiency, objectives of the departments or division and corresponding implementation plans should be added, if missing.

Table 11.3-2 Example of Annual Division Implementation Plan

(Initial. Revised in Mid-year)															
Objective 1 – Dept. A: (related objective of the upper organ)															
Division A															
Objective 1:															
Verifiable Indicator: (numerical indicator)				Responsible Person: (division manager normally)											
Actions to achieve the Objective	Verifiable Indicator	Responsible Leader	Required Input	Schedule											
				1	2	3	4	5	6	7	8	9	10	11	12
			Manpower: (profession)- M/M Money: Material: (Type), (Quantity) (Delivery)												
Necessary Support of Other Divisions to Achieve the Objective															
Name of Division		Type of Support		Delivery/Deadline											
Important Risks to Monitor:															

It is often cases that all plans are implemented as planned and still the objective is not achieved. There are many factors which affect the achievement and the factors are uncontrollable for the department/division or ETC. These factors often referred as "*excuse*" after failure to achieve the objective. These factors should be clearly recognized as *risks* when planned and should be monitored during the implementation. In case the conditions of the risk have changed out of the limit, the approach or actions should be changed. In case the approach or actions cannot be changed, the implementation should be stopped. Thus, the risks should be assessed carefully when planned.

After planning, all related members should know the contents of the plan. Copies of the implementation plan should be delivered to all members and related organs.

Once implementation plans of a lower organs approved, after checking adequacy to achieve a part of objectives of the upper organ as well as optimal resources allocation to the lower organ, the approval can also mean the delegation of the powers and the resources allocation (human, financial and material resources). When the resources are actually required for the implementation of the plan, the resources can be automatically allocated or after simple check with the comparison of the application with the initial plan by the upper organ, the Financial and Material Divisions (Department) and Human Resource Development Divisions.

(2) Improvement of Personnel Management

(a) Enhancement of Recruiting

Recruiting an employee is a kind of bulk investment. It is nothing to say that good employees are source of profits of ETC and the achievement of ETC's objectives will be heavily dependent on human resource.

Recruiting necessity can be roughly estimated as follows. Due to insufficient number of graduates from university as well as college level courses of related faculties and departments, and small portions of employed persons to ETC out of bachelor or diploma graduates in Ethiopia on relevant courses, such as electrics and electronics, it may not be able to recruit enough engineers or higher level technicians to meet future demands corresponding to the development of telecommunication technology. To full fill the gap, it is necessary to train or retrain graduates from diploma courses and technical schools to higher level as recommended later.

Table 11.3-3 Estimated Number of Employees to be Recruited for a Year

Type/Grade	- 2005		2006 - 2010		2011 - 2020	
Total	290		350		380	
Engineer/Technician	155		200		230	
- Bachelor or Higher	40	(70)	60	(90)	80	(110)
- Diploma	60	(80)	75	(85)	90	(90)
- Technical School	55		65		60	
Administrative Workers	55		70		90	
- Bachelor or Higher	20		30		40	
- Diploma	35		40		50	
Secondary Education	80		80		60	

(Note) Figures in ( ) show required number

The most important factor for human resource development is to hire qualified employees. For recruiting qualified staff, 1) large number of applicants and 2) proper selection procedure is essential.

Advertisement for recruiting should be enhanced, in universities/colleges and schools for junior staff and in newspapers, magazines or other mass media for senior staff. Developing brochures or pamphlets for students and other possible applicants may contribute to have larger number of applicants.

Selections may consist of a) that with application documents submitted by candidates, b) paper examinations and c) interview tests. Application forms specific to ETC for documentary selection should be prepared.

Paper examinations are to be composed of i) those to examine basic knowledge and ii) those to examine willingness to work and personality. Introduction of paper examination may help to avoid excessive nepotism.

Three successive types or times of interview tests are to be conducted, i.e., i) individual interview to check basic information and attitudes (with junior personnel staff), ii) group interviews, where personality in group dynamics can be tested (observed with senior personnel managers), and iii) individual interview to finally check for employment (with high-ranked managers).

(b) Rearrange Classification of Employees

There are many position classification names in ETC. Ad-hoc arrangements in position are found. The positions are classified into too detail and is not suitable for flexible staff allocation. Current ETC position coding looks a mixture of 2), and 3) listed below. Normally, the following four types or dimensions of codes are to be considered in large corporations like ETC. It would be better to set the four types of the codes to each employee.

> 1) Basic Salary Schedule
>
> 2) Occupation/Profession Type and Level

3) Management Level (Line Management and Expertise Management)

4) Career Type

After separation of 2) and 3), current position code should grouped into groups of less number. At present, levels of occupation, such as "Clerk I to III", are attached to employees mainly according to years of experience. The difference is to be level of skills or capability. Each level of occupation/profession should be defined as skills to have and capability to do some kind and level of jobs. The definition should be written in a document and the document should be available for all employees to refer. Promotion to upper level, including that in Career Type, for example from Counter Cashier to Cashier Head, or to change another occupation, such as from Cashier to Accountant, is to be encouraged and should be made after some evaluation, either evaluation by the superior, paper tests and/or practical tests. The position classification should be reviewed, probably at least once in five years, according to change in business and technological circumstances.

Salary can consist of basic salary and allowances determined according to management level and occupation/profession level. The allowances for management level and occupation/ profession level can be determined according to the value to ETC. To prevent brain drain, more allowances are to be paid for higher management level or more valuable professions.

"Career type" is a newly recommended classification for human resource development. Since human resources development for new managers is fatal to performances of ETC and there is only one telecommunication operator in Ethiopia and ETC cannot hire enough managers from outside, especially managers of middle level, ETC should have its own program for carrier development of future managers. The following three career types might be recommendable. Career development programs have to be prepared for each career type, as described below. With the development of policy for outsourcing, employees of Career III will decrease or disappear.

Career I: Managers and Professionals (Managerial Staff)

Career II: Technicians and Administrative Clerks (Operational Staff)

Career III: Workers (Only Simple Operation)

(c) Performance Evaluation for Giving Incentives to Employees

Current performance evaluation in ETC appears to focus for checking and picking up inefficient workers. Performance evaluation has to be programmed to enhance incentives (to achieve to objectives) and motivation (to improve jobs or business in changing circumstances). The evaluation should be positively reflected to position promotion and bonus in short term, and to basic salary in medium to long term.

The following elements should be included for items of evaluation. Items should be prepared for each type of occupations/professions and their level. Weight for each element should also be determined by level of occupations/professions.

1) Performance

   * Junior Level

     - customer attention or consciousness

     - volume of works

     - quality of work

     - preciseness

     - cost reduction

     - proposals

     - knowledge and skills obtained

   * Senior Level

     - customer attention or consciousness

     - increase in sales and profit

     - response to changing environments

     - improvement in jobs

     - leadership

2) Willingness and Attitude

   - sense of responsibility

   - willingness to improve (personal, organization)

   - teamwork spirit

   - punctuality

As for scores of evaluation, ETC is planning as, 1) very low, 2) low, 3) medium, 4) high, and 5) very high. The scores should be concrete and numerical, such as '5 points: 20 times/day'. If numerical scoring is difficult, it should be graded into levels of even number, preferably four or six, without having "medium", since some evaluators tends to select "medium" without enough care.

In medium to long term, or after objective-oriented management has established, performance evaluation of managers should be made based on the objective-oriented management. An example of evaluation forms is given below.

Table 11.3-4 Example of Evaluation of a Division/Division Manager

Objective 1 – Dept. A:															
Division A															
Objective 1:															
Attained Level:			Responsible Person:					Evaluation: (Rank)							
Actions to achieve the Objective	Attained Level	Responsible Leader	Actual Input	Actual Schedule											
				1	2	3	4	5	6	7	8	9	10	11	12
			Manpower: (Member) - M/M Money: Material: (type), (Quantity) (Delivery)												
Actual Support given from Other Divisions															
Name of Division		Actual Support					Actual Delivery/Deadline								
Actions taken to avoid Risks:															

(Note: Grey columns are to be defined at times of planning.)

(3) Development of Organization Structure

(a) Overall Organization Development

In the following organization charts, staff offices are placed at left, while operational departments are placed at right. As a commercial entity, headquarter offices or staff divisions have to support operational departments and divisions or to improve them, instead of inspecting or controlling.

One of the important principles for organization planning here is to introduce outsourcing. Outsourcing or releasing non-core service to private sectors is recommended in "National Communication Policy" formulated recently by MOI. Release is to be introduced in, i) import, installation and maintenance of customer premises equipment, including PABXs, while outsourcing is to be, ii) construction and maintenance of external plants, iii) resale of parts of telecommunication services, such as management of telecenters, iv) general services, such as guards, cleaning, management of canteens, repairs of ordinary vehicles, etc. The outsourcing or contracting-out as well as the release may contribute to attainment of efficiency in monopolizing environment through competition.

The release of i) of the above to private sector may also provide various options for customers. Customers may select their premises for their convenience, as far as ETA approves them. Also, customers can contract-out maintenance services to some companies at the responsibility of

themselves. The release of these services to private sector will also promote development of telecommunication industries. ETC, of course, can be best provider if they win the competition.

Regarding ii) of the above, outsourcing is necessary to implement extension of external plants proposed in the master plan. With current manpower of ETC, it may not be able to construct the proposed number in the master plan. However, local telecommunication industries cannot be contractors for major projects in terms of financial and human resource capacities at present. Contracts with foreign telecommunication companies will be required. To achieve efficient outsourcing as well as to promote the local industries, joint venture of foreign and local companies should be encouraged.

For rural PCOs, management contracts with local associations or private sector will be recommendable for efficient management of them. For mobile phone, subscribing services are supposed to be outsourced to mobile phone dealers or other shops. Pre-paid system is also supposed for mobile services. It is necessary to prepare these systems immediately.

As for iv) of the above, ETC is trying to change contracts with these workers form permanent to temporally. This change may not substantially reduce the administrative workloads of ETC. In case multiple candidate contractors for competition can be found, contracting-out will help efficiency. For the encouragement of the outsourcing in these fields, Financial and Material Resources Department of the Headquarters as well as Financial and Material Divisions of Regions and Zones should search the potential contractors by checking level of the services which the candidates offer at present, numbers and qualities of the personnel, as well as financial status of the candidates. Periodical evaluation of the performance of the contractor is also important. There are more than 200 employees engaged in these services. It is essential for the departments and divisions, with coordination with Human Resource Development Office, to fix up jobs of these workers in the candidate contractors or in other companies, when these services are determined to be outsourced.

Proposed organization structure of ETC in 2005 and the staff allocation are given in the figure and table below. Important feature of the new organization is to raise Regions to Department Level with more power delegated to Regional Managers, although many supports from Financial and Material Department as well as Telecom Service Department are still necessary.

For Mobile and Internet & Data Communication, duties for financial/material services, marketing/sales promotion, as well as for infrastructure development will start to be discharged in their own branches however supports by headquarters and fixed telephone branch may be necessary especially at initial period after establishment of the new branches. Separate accounting for each branch should start for operational expenditure, including personnel costs for the operation, while administrative costs can be shared according to a certain rule, such as allotment by respective operational expenditure.
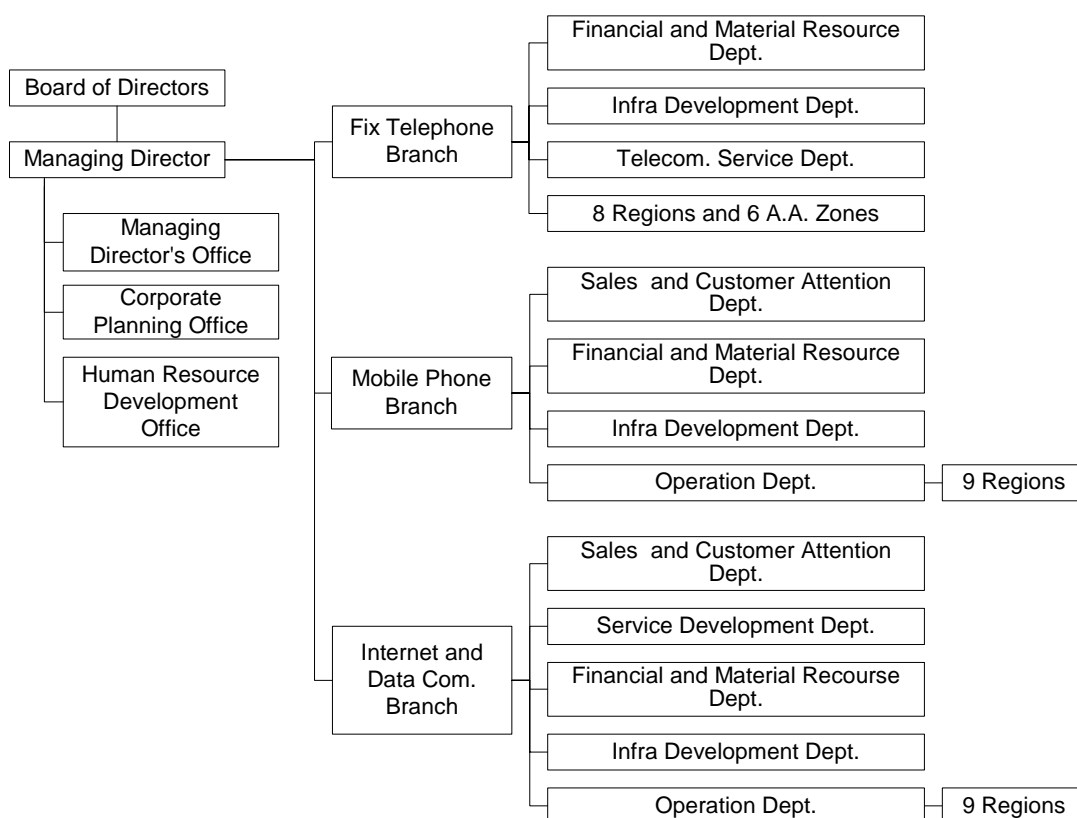
Figure 11.3-5 Proposed Organization of ETC in 2005

Staff allocation for 2005 is estimated as follows. Mobiles phone services and internet/data communication services are staffed with more than 1.5 times and three times of persons, respectively, compared to the present manpower. Number of employees in South Addis Ababa Zone, and Northern, North Western and Eastern Regions will largely increase. In these regions recruiting substantial employment or shift to from headquarters to the zone and these regions will be required.

Table 11.3-5 Proposed Staff Allocation in 2005

Branch/Department	2005	Branch/Department	2005
Head Quarter Offices	310	Regions	3,945
Managing Directors Office	55	Northern	590
Corporate Planning Office	125	North Eastern	400
Human Resource Development Office	130	North Western	580
Fixed Telephone Branch	7,150	Eastern	650
Financial and Material Resource Dept.	490	Western	245
Infrastructure Development Dept.	205	South Eastern	500
Telecom Service Dept.	430	South Western	390
Addis Ababa Zones	2,080	Southern	590
Central	300	Mobile Phone Branch	140
Northern	380	Sales and Customer Attention Dept.	55
Eastern	380	Financial and Material Resource Dept.	20
Western	350	Infrastructure Development Dept.	15
South Western	260	Operation Dept.	50
Southern	410	Internet and Data Communication Branch	140
		Sales and Customer Attention Dept.	50
		Service Development Dept.	10
		Financial and Material Resource Dept.	20
		Infrastructure Development Dept.	10
		Operation Dept.	50
		Grand Total	7,740

Organization structure of ETC after 2007 is proposed as illustrated in the figure below. At this stage, administrative works will also be discharged by each branch/company, while headquarter offices under the General Manager will concentrate on policy formulation and manage financial and human resource allocation. As companies, each of them should have separate account, while the headquarter offices can be managed with profits of the branch/companies. For the efficient operation and administration, management contracts with explicit agreement among the branch/companies should be encouraged, such as those for maintenance of local facilities or for training services.
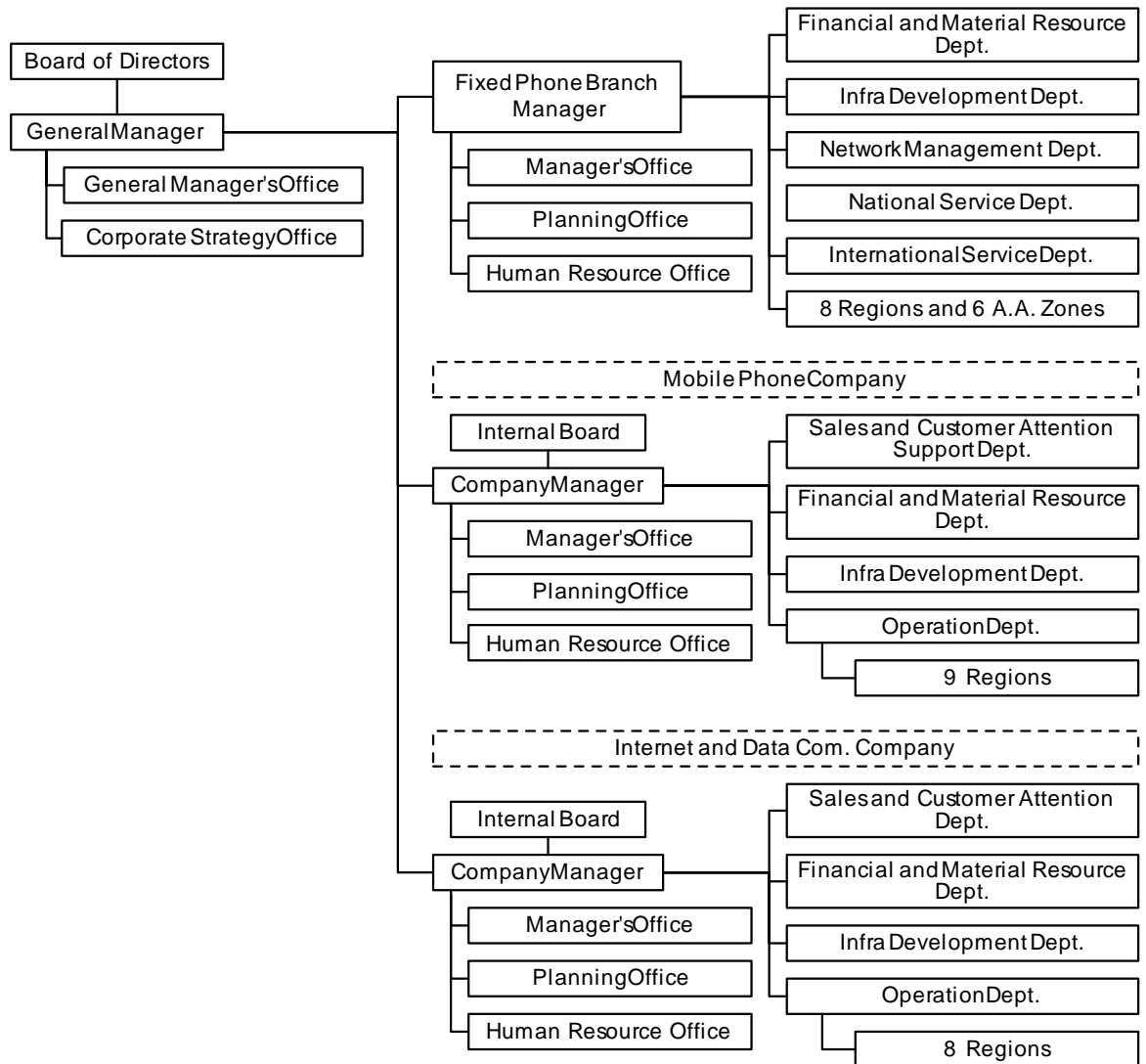
Figure 11.3-6   Proposed Organization of ETC after 2007

After 2007, private operators may participate to the *core* telecommunication services. The organization of telecommunication services would be as shown in the following figure. After 2007, ETC should be managed under circumstances of competition to induce more investment to the sector from the private sector, whether they are foreign, domestic or joint venture of them, to meet the service demands. Networks of operators, including those of the companies within the corporation, should be fairly interconnected under the control of ETA.
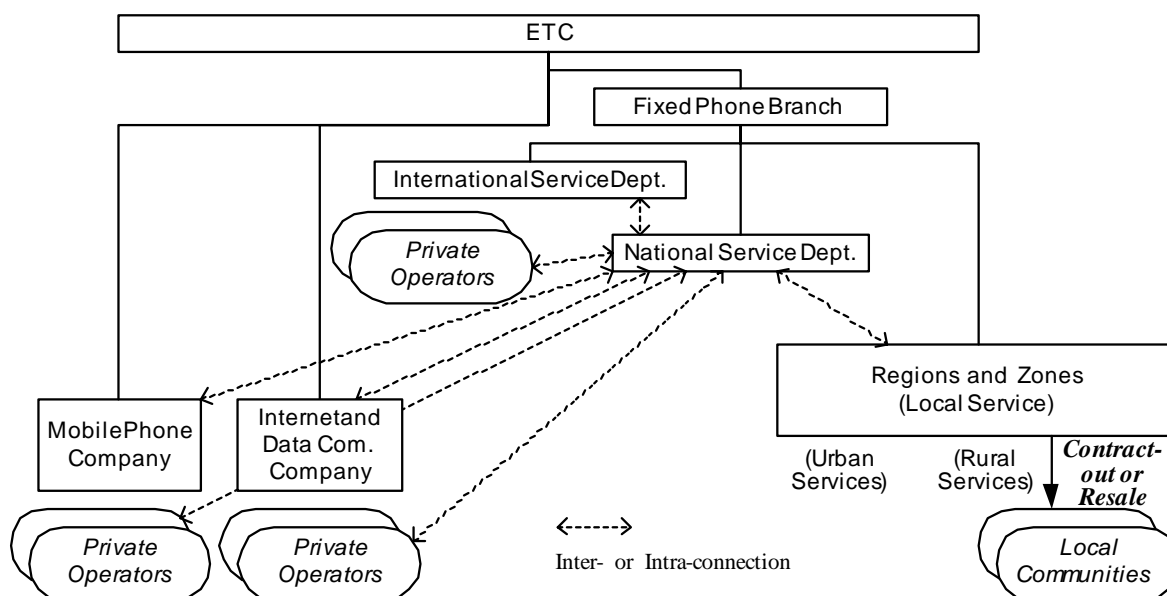
Figure 11.3-7 Telecommunication Service Organization after 2007

Staff allocation in 2010 is roughly estimated as follows. Number of employees as well as its allotment to each branch/company may vary according to conditions and results of the competition with private operators, especially for Mobile Phone and Internet/Data Com. Companies. Since almost of all operation is carried out by branch/companies, staff allocation to headquarter offices can be quite limited.

Currently the number of employees in Region and Addis Ababa Zones share 46%, 26%, respectively, to the total of employees for fixed phone service.   The shares of Regions and Addis Ababa Zones in 2010 will be 52% and 31%. The share of headquarters offices in the brand will decrease to 27% to 18%.

Table 11.3-6   Proposed Staff Allocation in 2010

Company	2010
Corporate Headquarters	20
Fixed Telephone Branch	8,140
(Addis Ababa Zones)	(2,490)
(Regions)	(4,225)
Mobile Phone Company	160
Internet and Data Com. Company	155
Total	8,475

(b)   Re-organization of Corporate Planning and Business Development Department

Proposed organization of the Corporate Planning Office in 2005 is given in the below chart. Major functions of each division are as follows.

Marketing and New Service Development Division: i) to conduct marketing survey and other researches to promote new service development and to expand conventional services, in consultation with Sales and Customer Attention Departments of Mobile Phone and Internet/Data Com. Branches as well as with Customer Services Divisions of Regions and

Zones; ii) to conduct feasibility study for new service development; iii) to forecast demands of telecommunication services, iv) to make research for tariff setting.

Organization and Management Division: to formulate policies for organization development which enable new service development, other corporate policy and efficient operation of telecommunication services.   The staff of the division will be shifted from the present Teleconsult Division of Managing Directors Office.

Business Development Division: to coordinate objective oriented management over the corporation.

Management Information System Development: to develop, including facilitating information network within the corporation, and to manage management information, including billing and customer care system.   Some of whose staff are to be allocated from the present Information Technology Center Division.
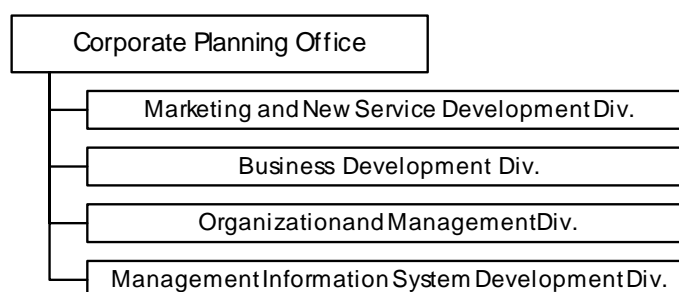
```
┌─────────────────────────────────┐
│     Corporate Planning Office    │
└─────────────────────────────────┘
    ├──┌───────────────────────────────────────────────┐
    │  │ Marketing and New Service Development Div.     │
    │  └───────────────────────────────────────────────┘
    ├──┌───────────────────────────────────────────────┐
    │  │ Business Development Div.                      │
    │  └───────────────────────────────────────────────┘
    ├──┌───────────────────────────────────────────────┐
    │  │ Organization and Management Div.               │
    │  └───────────────────────────────────────────────┘
    └──┌───────────────────────────────────────────────┐
       │ Management Information System Development Div.  │
       └───────────────────────────────────────────────┘
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Figure 11.3-8   Proposed Organization of Corporate Planning Office in 2005

(c)   Re-organization of Telecom Infrastructure Development Departments

Currently major parts of construction works as well as manufacturing of metal, concrete and wooden structures are directly implemented by ETC. This system assures quality standards of the works and products under the circumstances without capable private local industries. This system, at the same time, has deficiency in terms of costs as well as flexibility of implementation in the monopolized environment. The balance between direct management and outsourcing or procurement from outside have to be carefully made taking into consideration of factors of i) required amount/volume of works/products to be completed or delivered by certain time, ii) existing capacities of the relevant divisions of ETC, iii) capability and capacity of the local industries, and iv) cost efficiency.

In case i) supercedes ii) and iii), ETC should invite foreign industries through tendering, as mentioned earlier for external plant construction, expecting joint venture with local industries for cheaper tenders. In case ii) is enough to satisfy i), ETC or the department should consider factor iv), and gradually reduce ii) or continue to implement by itself. In the long term according to development of local industries related to the sector, the Telecom Infrastructure Development Departments, as well as Financial and Material Resource Department, should encourage outsourcing and to change organization and staff allocation accordingly. Duties of

divisions in the two departments should shift from construction or manufacturing to designing and supervision of contractors or outside manufacturers.

Proposed organization of the Infrastructure Development Department of Fixed Telephone Branch in 2005 is given below. Project Planning and Coordination Division is to be established or shifted to this department to achieve consistent project implementation. The present Building Design and Supervision Division in Corporate Planning and Business Development Department should also be transferred to this department.

To meet the increasing and varying demands, required infrastructure will be identified by the Project Planning and Coordination Division in consultation with Technical Research and Application Division which is in charge of technical research for efficient networks development and operation/maintenance as well as for enabling new services. After the identification, Project Planning and Coordination Division will start to organize project teams whose members consist of the staff in line divisions, such as Outside Plant, Switching, Transmission, Power Engineering and Tele Civil/ Building Divisions, which will conduct preliminary designs, feasibility studies, detail designs and will prepare technical specifications for tendering or implement by itself. Establishing Tendering and Contracting Division is recommended to correspond to the increasing contracting-out. When outsourcing, Tendering and Contracting Division will prepare tender documents and conduct tendering and negotiations with tenderers in consultation with the project teams. After contracting, the project teams supervise the construction by the contractors. The Project Planning and Coordination Division also have to immediately prepare common project management tools for planning, monitoring, reporting and evaluation to be used within ETC. Tendering and Contracting Division should keep records of performances of project implementation for improvement of selection of contractors.

The characters o works of staff in the line divisions of the department will change from those for direct construction to those for design and supervision. Many low level technical workers will turn to be unnecessary, especially those for Outside Plant and Telecivil /Building Divisions, while more employees for design and supervision will be required for rapid infrastructure development applying outsourcing. As a public corporation, it is difficult to compulsorily streamline these divisions. Employment of numbers technicians and engineers for design and supervision is also a hard task, since there is no telecommunication operator and no specialized course for telecommunications in vocational training institutes or universities. Retraining of these technicians to upgrade for design and supervision work as recommended below, or to change to occupations should be promoted.

In addition to the retraining, job change to maintenance sections or shifts to outsourced companies have to be encouraged. There will be increasing requirements for operational staff since its demands will grow due to rapid infrastructure development. Outsourced companies also need technicians who have skills of telecommunication infrastructure development.

Fixing up jobs in those companies for the surplus workers should be promoted, if necessary, assisted by Human Resource Development Office.

As for building design, construction and supervision, there are less requirements of building specific to telecommunication sector, corresponding to downsizing of telecommunication equipment. General contractors can construct most of buildings used for tele- communication service. Necessity for in-house building construction units will be substantially decreased. Fixing those employees up with jobs in general contractors or construction companies is especially encouraged with assistance with Human Resource Development Office.

Composition of line divisions, subdivisions and teams of Infrastructure Development Department for Mobile Phone and Internet and Data Communication Branches will vary according to the type of infrastructure.

Currently ETC has Project and Technical Planning Division in Corporate Planning and Business Development Department, putting project follow-up functions in Strategic Planning Division of the same department, and a policy to gradually reduce the number of employees in Telecom Infrastructure Development Department, using outsourcing as major instrument of infrastructure development. The recommended organization plan, on the contrary, proposes shift of the division to Infrastructure Development Department with the following reasons.

1) Infrastructure development is a key of operational tasks rather than administrative or strategic planning. Even for technical research, major part of new technology to Ethiopia will be introduced when it is applied in some infrastructure development project.

2) Line divisions of the department will gradually shift its function from direct implementation to planning, designing, preparation of technical specifications and supervision for outsourcing.

3) Project planning and coordination among and within project teams and project implementation are better to be done in the same department, wither direct construction or outsourcing. Otherwise, they may criticize each other when the project is not implemented or coordinated as planned, especially the project includes parts of direct construction and those of contracting-out.
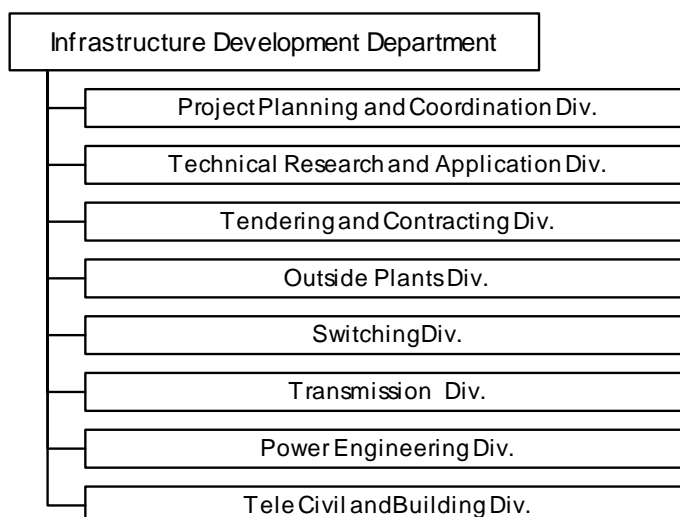
```
┌─────────────────────────────────────────────┐
│    Infrastructure Development Department      │
└─────────────────────────────────────────────┘
    ├──┤ Project Planning and Coordination Div. │
    ├──┤ Technical Research and Application Div. │
    ├──┤ Tendering and Contracting Div.          │
    ├──┤ Outside Plants Div.                     │
    ├──┤ Switching Div.                          │
    ├──┤ Transmission Div.                       │
    ├──┤ Power Engineering Div.                  │
    └──┤ Tele Civil and Building Div.            │
```

Figure 11.3-9   Proposed Organization of Infrastructure Development Department of Fixed Telephone Branch in 2005

(d)   Re-organization of Telecom Services Department

Proposed organization of Telecom Services Departments in 2005 is shown below. Network Performance and Quality Standards Division should also be moved to Telecom Service Department with change of the mane to Network Management Center Division.

Currently standards setting and performance control are done by the headquarter division and actual management are implemented by the operational department. The principle lying in the recommendation is setting targets or standards by themselves and performing by themselves. They are responsible to themselves. The benefits and disadvantages as well, can be or should be taken by themselves.

Setting minimum performance standards is a matter of the regulator, which was separately established as ETA. Internal standards, of course, can be set by the operator or operational department itself to meet the service target efficiently or to offer quality services to the customers.
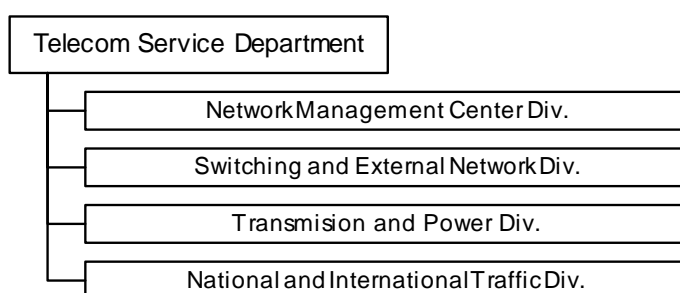
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┌─────────────────────────────────────────────┐
│         Telecom Service Department            │
└─────────────────────────────────────────────┘
    ├──┤ Network Management Center Div.          │
    ├──┤ Switching and External Network Div.     │
    ├──┤ Transmision and Power Div.              │
    └──┤ National and International Traffic Div.  │
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Figure 11.3-10   Proposed Organization of Telecom Service Departments in 2005

(e)   Re-organization of Regions and Zones

Regions and Zones are the frontlines of ETC, and their service quality and efficiency are vital for the management of ETC. Regions and zones should be placed at department level with

delegated power for prompt and flexible management although enough supports from central offices and departments will be continuously necessary.

Regions and zones should be enhanced in terms of sales and customer attentions as the frontlines to the customers. Units for customer attention should be established to receive customer complaints 24 hours a day and to hand over to relevant units or persons promptly and properly. The receptionists or operator should be trained for proper attitudes as well as for understanding processes to be taken for trouble solutions. Key customer units should also be established, since troubles for key customers may substantially reduce the revenue as well as may cause social and economic inconveniences.

Regions and zones are recommended to start infrastructure development functions, especially in the field of external plants. The functions are to be gradually strengthened starting from minor projects or rehabilitation project. Supervision function would also be a starting point in projects whose other parts are implemented by Infrastructure Development Department of the headquarters. When the staff from regions/zones takes the supervising functions, it is preferable for the staff to participate meetings for planning, designing as on the job training.
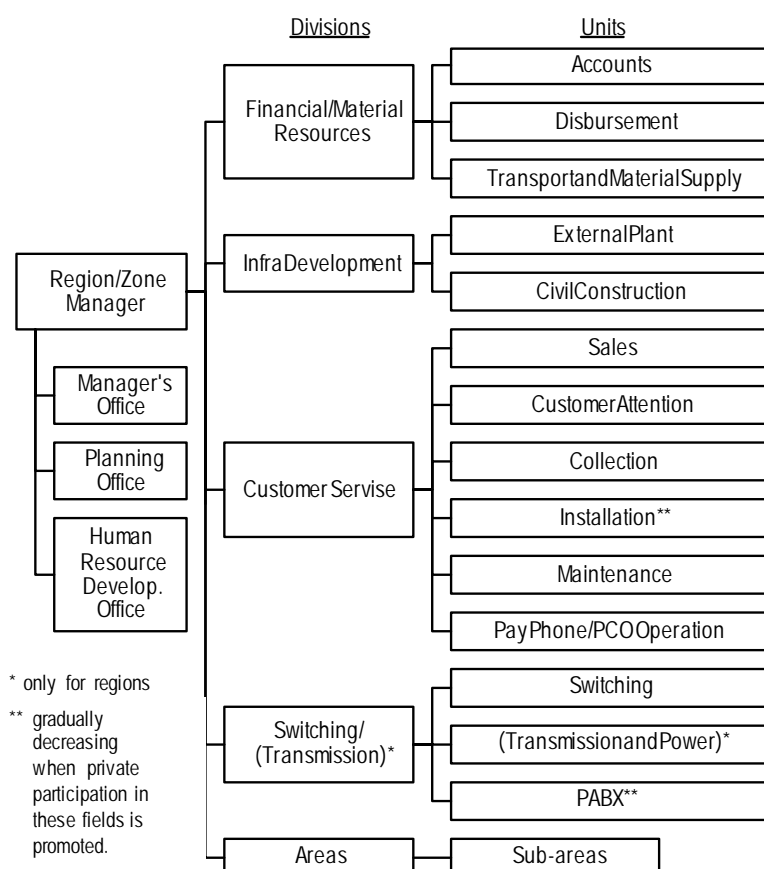

Figure 11.3-11 Proposed Organization of Regions and Zones in 2005

(4) Human Resource Development

Since there is no other telecommunication operator in Ethiopia at present, human resource development for employees of telecommunication operation, except education and training

provided at academic level, is solely implemented by ETC. ETC should establish a system of its own career development from employees who has just finished academic education up to those for top management or up to those who ends the career by age of retirements.

The aims of human resource development consist of two parts, concretely, 1) to enhance willingness to work of employees, and 2) to give capability and skills of employees. The former can be achieved by giving incentives and motivation mainly by introduction of objective-oriented management, and proper performance evaluation followed by promotion and rewarding, accompanied by follow-ups of leaders or managers.

The latter can be attained by on-the-job-trainings (OJT) and off-the-job-training (OFF-JT). Compared to the efforts for OFF-JT, elaboration for OJT seems inefficient, although both are essential for human resource development as two wheels for drive.

(a) Career Development Program (CDP) and Job Rotation

Career Development Program (CDP) should be the base of human resources development of each employee. Standards CDP should be prepared by career type and by type of occupation/profession, defining types of knowledge and skills with duration to be obtained. Then, career development sheet for each employee should be prepared. The format would preferably prepared, filled or recorded as well as approved, circulated and kept electronically. However, before the establishment electronic system, card system may work.

Table 11.3-7   Example of Career Development Sheet

(Name of Employees)	(Employee No.)		(Career Type)		(Occupation/Profession)
(Date of Birth)	(Date of Employment)		(Educational Career)(School, Course, Date of Graduate)		
Plan and Records of OJT					
Items to be Trained	Corresponding Level	Place of Assignment	Period	Records and Evaluation (by Superiors)	
*	Xxxxx III		(Planned)		
*			(Actual)		
*	Xxxxx II				
*					
Records of OFF-JT					
Name of the Course		Held by	Duration	Evaluation by Trainer	
Self-Leaning Plan					
Items to Learn	Duration	Required Supports	Self Evaluation	Evaluation by Superiors	
*					
*					

Each employee, the superior and Personnel Administration Division of Human Resource Development Office should keep one latest copy. The division should analyze all of the sheets and carry out necessary follow-up. The sheet can be an essential tool to control OJT of each employee.

To encourage and support self-learning is the most important base of human resource development. At the beginning of each year, each employee should evaluate the activities for self-learning of the previous year and plan or revise plan of the year, followed by evaluation and comments by the superior. During the process, interview by the superior with each of the employee should be conducted.

Recommendable job rotation system includes job rotation of the following three stages.

Stage I: Just after the employment after ending academic career, each employee rotates a few divisions to find most suitable job and to understand jobs of related departments (including a Region and Zone for Career I) and divisions (in a department for Career II). For Career I, it should take two or three years and for Career II one year.

Stage II: Medium level managers should rotate according to the business development of the corporation.

Stage III: High-level managers should rotate once in four or five years to activate the organizations as well as to avoid logrolling or connivance.

In addition, rotations should be made at times according to the wills of employee. Interviews for rotation should be made once in one or two years. The interview should be recorded in a format, whose example is given below. Each employee, the superior and the Personnel Administration Division should also keep the records. The division should also analyze and carry out necessary follow-ups.

Table 11.3-8   Example of Records of Interview for Rotation

(Name of Employees)	(Employee No.)	(Career Type)		(Occupation/Profession)
(Date of Birth)	(Date of Employment)	(Educational Career)(School, Course, Date of Graduate)		
Will to Move (by employee)	Degree of Will	Reason		Opinion (by the Superiors)

For the implementation of job rotation system, hosing (allowance) for employees should be enhanced.

(b) Management Trainings (Off-JT)

Management training seems another weak point in human resource development of ETC. Recommended management training consists of those for a) management of groups or organizations and b) project management. For the implementation management training invitation of instructors from outside is necessary, who are to teach general management theories and knowledge in the training courses. Those management training should be composed of the sessions not only of those by outside instructors but also of those by the managers of headquarter offices for explanations of ETC policies, how to implement those policies and how to apply standard forms prepared by the headquarter offices.

New team leaders as well as new section/unit, subdivision, and division managers are necessary to be trained for i) general knowledge for group/organization management, ii) general knowledge for promotion of incentives and motivation of employees, iii) case studies and

group discussions and iv) explanation for using organization management tools prepared by headquarter offices. Emphasis for junior level should be placed on how to attain teamwork to achieve a certain objective effectively or efficiently, while that for the senior level should be on how to manage the organization in a changing business environment, i.e., how to set adequate objectives for the organization for the development of the business of the corporation. An example of the organization management course is given below.

Table 11.3-9 An Example of Organization Management Course (for New Team Leaders)

Main Course				
Day	A.M.		P.M.	
Mon.	Orientation	ETC's Policy on Organization and Human Resource Development	Basic Theory on Organization Management and Human Resources Development	
Tue.	Theory on Incentive and Motivation		Case Study and Exercises on Incentive and Motivation	
Wed.	Presentation on Case Study and Exercise and Discussions on Incentive and Motivation		Explanation of Forms of ETC related to Human Resources Development	
Thu.	Theory on Skill Management		Exercises on Skills Inventory	
Fri.	Theory on Performance Evaluation		Explanation of Forms of ETC related to Performance Evaluation	Formulation of Action Plans (by each Trainee)
Follow-up Course (half a year later after the Main Course)				
Mon.	Presentation of Success and Failures of Organization Management (Presentation on the Implementation of the Action Plans)			
Tue.	Discussions and Additional Lectures on Organization Management			Review of Action Plans (by each Trainee)

Trainings for project management should be conducted regarding general knowledge on i) work breakdown stricture (WBS), ii) schedule/delivery control and critical path method (CPM), iii) cost control, and iv) case studies as well as v) explanation for using project management tools prepared by headquarter offices.

Table 11.3-10 An Example of Project Management Course
(for Engineers or Assistant Engineer)

Main Course			
Day	A.M.		P.M.
Mon.	Orientation	ETC's policy on Project Management	Basic Theory on Project Planning
Tue.	Theory on Work Breakdown		Case Study and Exercises on Work Breakdown
Wed.	Theory on Scheduling and Delivery Control		Case Study and Exercises on Scheduling and Delivery Control
Thu.	Theory on Cost Control		Case Study and Exercises on Cost Control
Fri.	Theory on Monitoring and Countermeasures against Problems/Risks		Explanation of Project Management Forms
Follow-up Course (half a year later after the Main Course)			
Mon.	Presentation of Success and Failures of Project Management (Presentation by Trainees)		
Tue.	Discussions and Additional Lectures on Project Management		

(c) Skill-up Trainings (OFF-JT)

Although much efforts are dedicated for skill-up trainings at present, more efforts should continuously made to correspond to technical change and development of the sector as well as change in business environment of ETC. It is necessary for ETC to put further effort i) to establish Mobile Branch and Internet/Data Communication Branch, ii) to obtain more information and communication technology (ICT) specialist, iii) to upgrade technicians to assistant engineers. For the first, immediate reference of experiences of foreign operators will be required, while establishing permanent courses by the training institute (ETTI) will be necessary for the latter two.

For the establishment of Mobile Phone and Internet/Data Communication Branches, training and observation trips in foreign countries should immediately be implemented. Observation trips are recommendable for candidate managers, while foreign training, including secondment to foreign operators for months, is necessary for candidate of junior managers or staff. Invitation of managers from the strategic partner will also help smooth expansion of the services.

Future requirement of ICT specialists could be roughly estimated as shown Table 11.3-10.

Table 11.3-11 Estimated Requirement of ICT Specialist

Profession	2002 (Present)	2005	2010	2020
System Analyst	2	20	60	100
Programmer	21	40	120	180
System Operator	unknown	80	240	400
Internet Attendant	2	30	80	320

For these training, immediate invitation of instructors from outside, including foreigners, is essential for planning the courses, and curriculum as well as for implementation of training to fulfill the needs of the short to middle term.

For continuous efforts, ETTI should dispatch staffs to post-graduate courses of foreign universities. After finishing the post-graduate courses, those staff can contribute to expand and enhance the training not only for ETC but also nation-wide requirement of human resource development in the field. Concentration in internal training, however, will be required in the short term.

In addition more than one hundred of staff should be trained for basic operation of computer each year. ETTI may also have to concentrate its efforts and resources for internal training.

As for conventional techniques, ETC will need more senior technicians and assistant engineers who will engage planning, designing and supervisory works under the instructions of engineers in the circumstances of more outsourcing and rapid technology development. ETTI has currently courses for Junior Technicians (60 persons for a year, five months) and Basic Technicians (60 persons for a year, four months), for general up-grading. These courses should

be expanded and extended to meet the future requirement for human resource. Recommendable courses for general up-grading are as follows. In the middle or long term, participation to the courses from outside can be encouraged.

    I)   Junior Technicians;   3 to 4months, 100 – 120 persons for a year

    II)   Basic Technicians;   6 months, 80 – 100 persons for a year

    III) Senior Technicians;   3 to 4months, 60 - 80 persons for a year

    IV) Assistant Engineer;3 to 4 months, 50 – 60 persons for a year

With the merit of ETC as the actual operator of the sector, ETC can and should reflect current technological change, including development of information and communication technology. For the expansion and improvement of curriculum, dispatching the training staff to foreign telecommunication post-grade courses has to be encouraged.