

## Chapter XII

### MANPOWER PLANNING AND TRAINING REQUIREMENTS

#### Contents

- 12.1 Overall approach
- 12.2 Organisation of work
- 12.3 Organisation chart
- 12.4 Job descriptions (Questionnaires No. 1 and No. 5)
  - 12.4.1 Classification of tasks
  - 12.4.2 The “Level” classification
  - 12.4.3 Equivalent full-time staff
- 12.5 Short-term manpower needs (Questionnaire No. 4)
- 12.6 Urgent training needs (Questionnaire No. 2)
- 12.7 Long-term manpower planning
- 12.8 Simulation of manpower planning
  - 12.8.1 Objective
  - 12.8.2 Choice of “speciality”
  - 12.8.3 Annual growth of the workload indicator
  - 12.8.4 Distribution of employees on ITU-”levels” - the organisational “pyramid”
  - 12.8.5 Annual productivity improvement
  - 12.8.6 Annual cost per ITU level (category)
  - 12.8.7 Present training volume and cost
  - 12.8.8 Initial training, ”promotion” training and continuous training
  - 12.8.9 External recruitment versus internal promotion
  - 12.8.10 Outflow of personnel
  - 12.8.11 Other key figures

#### ANNEXES

- Annex 12. 1: ITU Job-Training Classification Code
- Annex 12. 2: Survey Questionnaires
- Annex 12. 3: Example of MANPLAN<sup>1</sup> output

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<sup>1</sup> MANPLAN, is a software for forecast of manpower and training needs developed by ITU



## Chapter XII

### MANPOWER PLANNING AND TRAINING REQUIREMENTS

#### **Purpose of this Chapter**

Extension of networks and introduction of new services will require human resources to plan, install, manage, operate and maintain the network as well as to manage and deliver the services offered. The cost of manpower represents a substantial part of the operating costs and development of the human resources should be considered an *investment rather than part of the operating cost*. This investment could be of the order of 10% or more of the total investment required to implement the development plan and must therefore be considered when examining the financial viability of the plan. Moreover, the organisation must endeavour to continuously improve productivity to compete in the changing environment. The manpower planning exercise therefore also involves setting targets in terms of key productivity and performance indicators.

#### **Outputs to be included in this section of the plan**

- inventory of existing human resources and their tasks;
- short-term (one to two years) forecast of manpower needs and movements;
- most urgent training needs and the means of satisfying these needs;
- long-term, strategic manpower plan and forecast of training volumes for next 10-15 years.  
(see example in Annex 3)

#### **Inputs**

- network and services development plans (see previous chapters)
- forecast of workload indicator forecast based on development plan (see previous chapters)
- ITU job-training classification code (Annex 1);
- job descriptions, with lists of tasks;
- information about manpower needs in the next one to two years based on planned activities;
- information about how employees spend their time on different tasks;
- information about urgent training needs;
- present productivity indices in the specialities or tasks for which manpower needs forecast will be made;
- target productivity indices for the specialities and tasks concerned by the forecast;
- present personnel cost and expected changes in these costs;
- information about present duration and cost of training;
- target for future duration of training for the difference specialities and tasks for which forecast of training volumes and cost will be made;
- distribution of training on different training “suppliers” (present and targets);
- turnover of staff (present and targets);
- age distribution of staff;
- recruitment and promotion policies;

#### **Content of this chapter**

To assist in the production of the outputs listed above, guidelines and tools for manpower planning and training needs surveys are given, including explanations and discussion of the parameters used in MANPLAN, a computerised tool for strategic manpower, and training needs forecast, developed by the ITU.



## Chapter XII

### MANPOWER PLANNING AND TRAINING REQUIREMENTS

#### 12.1. Overall approach

It is proposed to use three different, but complementary, methods for manpower planning and training needs forecasting. The methods proposed are as follows, the questionnaires mentioned being those given in Annex 2 to this chapter:

- a) *Short term* investigation of manpower needs based on knowledge of *known* changes, extensions and activities in the next one to two years, such as on existing activity plans, career development plans and known retirements or resignations (using questionnaire Nos. 1, 4 and 5)
- b) Survey of *most urgent* training needs, in particular areas of management training. This survey should also include information about available resources for satisfying these needs. (using questionnaire No. 2).
- c) Preparation of a *long term* (strategic) manpower plan based on long-term development strategies and plans as well as goals and policies related to the distribution of staff on different types of jobs, productivity improvement, recruitment/promotion, market share, etc. (using questionnaire No. 3)

The following sections provide guidelines and instructions on how to carry out these surveys and forecasts. On request, the BDT also organises workshops in manpower planning and training needs analysis where participants learn how to use MANPLAN, the computerised tool developed by ITU for manpower forecasts.

#### 12.2 Organisation of work

First of all, it is necessary to establish a *steering committee*, or similar body, composed of representatives of the organisational units involved in :

- strategic planning;
- forecasting and network planning;
- installations;
- maintenance;
- operations;
- management information systems development;
- Human Resources Management (HRM) and Human Resources Development (HRD) (personnel and training).

The tasks of this committee would include a review of the organisation, compiling the data collected by the various project teams (see below), for the whole organisation. They would also develop goals and policies in the area of human resources management and development, (productivity targets, distribution of staff, recruitment policies, etc.) on the basis of this information and comparisons with other organisations. Additional guidelines and questions to consider when doing this are given in section 12.8 below.

For each major "speciality" ("General", Human Resources Development, Terminals, External Plant, Switching, Transmission, etc.), *project teams* could be established with participants from both headquarters and field operations. Their task would be to collect the information required for short term manpower planning, identify urgent training needs and collect as much information as possible for the long term manpower planning *in their respective field*.

#### 12.3 Organisation chart

The first task of the above committee is to prepare an *organisation chart* (see also Chapter 11). This chart should reflect the present organisation and a code number should be given to each organisational unit shown in the chart. These codes should then be used to identify the unit in the various questionnaires. This exercise provides an opportunity to review the organisation and could generate ideas for change. If the organisation is expected to change, a chart should be drawn also for the planned organisation.

## 12.4. Job descriptions (Questionnaires No. 1 and No. 5)

### 12.4.1 Classification of tasks

The committee should then nominate members to the various project teams, each of which would deal with one of the *main specialities* (see Annex 1 and questionnaire No. 3). As a basis for the various surveys a *complete inventory of all job descriptions should be made*. To do this, present and future tasks on *Questionnaires No. 5* should be listed, and the "level", "activity" and "speciality" using the ITU Job-Training Classification Code (see Annex 1) indicated. Based on these job descriptions, a *summary list of all the jobs* (posts) of the organisation should then be prepared, using *Questionnaire No. 1*, indicating the *major tasks* of the concerned category/post.

If job-descriptions are not available or are outdated, this may involve interviews and observations of sample groups in each category in order to find out what they are doing. This exercise provides an opportunity to *review the jobs, taking into account the planned development of the organisation* (see §12.3 and Chapter 11). This means that some *new tasks* may need to be added (for which the column headed "present" will be empty) and/or some of the currently performed tasks will be abolished (i.e. the column headed "Future" will be empty).

As *both present and future tasks* should be recorded in *Questionnaire No. 5* for each job, this exercise will also indicate some urgent training needs if the employees concerned do not have the competence required for all the tasks they should perform in future. The full job description will include also other information, such as to whom the employee is responsible and objectives (see also Chapter 11). However, for the manpower planning and training needs forecast, the list of tasks given by *Questionnaire No 5* is sufficient.

It is important to realise that in today's rapidly changing world *job descriptions need to be revised frequently*.

### 12.4.2 The "Level" classification

For each task, the ITU Job-Training Code requires that the *ITU-level* is defined on the basis of the *nature of the job*, which reflects the competence required as well as the level of initiative and responsibility. The levels are defined in Annex 1 (page 4) but some further explanations are given below.

- **Level 1 tasks** are those which are simple procedural tasks not requiring any specific skill but only some ability to use simple tools, such as a spade or a broom, and some information. (Examples: clean, deliver messages, dig ducts, operate a lift).
- **Level 2 tasks** are also procedural tasks which are routinely performed according to standards, instructions, rules and procedures laid down in engineering instructions, rule books or regulations. Level 2 tasks are different from level 1 tasks in that they *require skills* (usually motor or manual skills) and knowledge which must be as a result of training. However, in contrast to level 3 tasks, they *do not* require any specific problem solving skills as, in principle, standards for each step of the task are provided. (Examples: instal telephones, splice cables, type letters from a prepared manuscript)
- **Level 3 tasks** involve **problem solving** within a limited field or speciality, for example operation or maintenance of some medium complex equipment or administrative tasks which mainly follow established routines or rules but where also situations occur which require judgement based on a thorough knowledge of the functioning of the *system* (not simply a piece of equipment). These tasks require training in fault diagnosis and problem solving in small "systems" (Examples: repair pieces of equipment, create letters, handle correspondence and filing systems, test and diagnose faults, maintain equipment or administrative systems, including information systems, records, etc.)
- **Level 4 tasks** are those which require some familiarity with tasks, either at level 2 or 3, in the speciality concerned. However, the main criterion for classifying a task at level 4 is that it involves **first line supervisory** responsibility or **solving of complex problems** requiring an **in depth specialisation** . (narrow but deep). In addition to basic training in the speciality field, tasks at this level may require some degree of management and leadership training and/or in-depth specialist training. (Examples: supervise a group of technicians, installers or administrative support staff who have no subordinates of their own, diagnose faults and repair very complex systems, development of computer software, administer accounting systems, complex information systems, manage small sections.)

- **Level 5 (and above) tasks** are **management tasks** requiring management training and broad knowledge in the speciality concerned (usually at the level of university education or equivalent), **engineering tasks** or **research and development** tasks or other **professional** tasks requiring a similar amount of training. (Examples: manage financial systems, manage maintenance or planning departments, plan and dimension networks, prepare tender specifications, evaluate tenders, analyse markets, perform feasibility studies, research new technologies, develop policies and guidelines, direct laboratory work, manage large sections or departments).

Note that "level" is *not necessarily related* to the *grade* of the post which could be based on many other criteria such as length of service, combination of tasks, supply and demand of manpower for the job concerned, government regulations, etc.. As mentioned, the level refers only to the *nature* of a *task* and thus, indirectly, to the *competence, initiative and responsibility* required.

*Most jobs include tasks at different "levels"*. It is not always obvious at what level a task should be classified and the criteria for classifying tasks in a given level are not always specific enough. There will be border-line cases when the classification has to be based on subjective judgement. Consequently, two independent persons may classify the same task at different levels. With some practice, a job analyst should nevertheless be able to classify most tasks without too much difficulty in the same way as they would be classified by another experienced analyst.

Thus, the "level" code provides additional information about the nature of the task and therefore reduces the possibility of misunderstanding which is always a problem in international co-operation and even within one organisation, as tasks described with the same words may in fact refer to two quite different tasks. For example, the task "*to maintain exchanges*" could mean *to make simple routine tests and report the result* (level 2). However it could also mean *to diagnose faulty units and replace them* (level 3) or *to diagnose faults in software and modify the programmes* (level 4 or level 5). If the language is used without precision, it could also mean working as a dispatcher of fault repairmen (level 2) or as a supervisor of maintenance staff (level 4). To assign a level to a task implies to define more clearly what the task is all about. If this turns out to be difficult it simply means that it was not well defined in the first place and therefore needs to be done anyway.

From the example given above, it is seen that only a brief *verbal* definition of a task is not always sufficient to describe unambiguously what the task actually involves in terms of competence, initiative and responsibility. Of course one could ask for a complete description but a code has the following advantages:

- it is language "neutral" (less likely to be inadequately translated into other languages);
- it allows for international comparisons with reference to standardised task descriptions;
- it is much easier to record and display (short in contrast to lengthy descriptions);
- it can more easily be stored in databases (and used for retrieval of information).

As more experience is gained in using the ITU classification code, it may be possible to provide more specific guidelines and agree internationally on the coding of the more common tasks.

As already mentioned, most posts include tasks at different levels. When counting the numbers at each level for the whole organisation or for any of the *main specialities* (see Annex 2), each employee should be considered as belonging to the *highest* level of all the tasks listed in his/her job description (**Questionnaire No. 5**) and summarised for each category of employees in **Questionnaire No. 1**. This is logical because the most complex task indicates the level of competence, initiative and responsibility required by the job, which is exactly what the "level classification" is supposed to do.

If the forecast is for a specific task (for example, maintenance of digital exchanges at level 3), it is quite possible that the employees performing this work also do many other things. In this case the number of *equivalent man-years, or full-time employees* rather than the actual number of employees performing this task on their job description must be entered. This is the reason why Questionnaire No. 5 also includes the information on percentage of time spent on each task.

### 12.4.3 Equivalent full-time staff

Knowing the *number* of employees in a given category and the *percentage of time* (estimated annual average) spent on a specific task, one can calculate the number of equivalent full-time employees for the task concerned and complete the sections of *questionnaire No 3* requesting this information. For example, if 10 technicians spent 40% of their time on installation of microwave equipment and 20 % on maintenance there are 4 equivalent full time employees for installation and 2 for maintenance. Note that different tasks listed in the job descriptions (*questionnaire No 5*) may have the same code (because the code is a rather rough classification). Thus, for example, the tasks "type letters" and "make photocopies" would both be classified as "operate office machines" (level 2 task) and coded 2/42/00.66 (see Annex 2).

In some cases records may be available of the time spent on specific tasks. For example work orders for installation or repair work sometimes include start and finish times. However, unless a sophisticated information system is available to keep records on how the employees spend their time, this has to be estimated on the basis of observations and interviews of sample groups of employees in each post (category) and confirmed by interviews with their supervisors. The proportion of time used for different tasks may vary considerably from one individual to another. A rough estimate of the average is nevertheless much better than a subjective guess made by one person.

Note also that, when completing the Questionnaire No. 5, it is necessary to allow for some time spent on *unspecified tasks* (such as self-development, coffee breaks, etc.) as it would be rather pedantic to specify each small task a person may need to carry out. The proportion on time spent idle (for example supervising an alarm or waiting for an emergency call) has been included in the questionnaire No 5. This gives an indication of the time which could be used for in-service training in the job position.

When information about all posts has been collected from the various parts of the organisation, it should all be summarised in one set of **Questionnaire No. 1** (which could consist of many pages). This constitutes a catalogue of posts with summarised job descriptions.

### 12.5 Short-term manpower needs (Questionnaire No. 4)

The short-term manpower needs should be identified by those responsible for each organisational unit on the basis of known plans and developments during the next two years, taking into account also known staff movements (transfers, promotions, retirements, absence due to training or for other reasons, etc.) For this purpose, copies of **Questionnaire No. 4** and of the list of posts already prepared on **Questionnaire No. 1** could be distributed to those who will be requested to carry out this survey in each unit. The purpose of the exercise and the questionnaire must be properly explained and those carrying out the survey must be given all available information about development plans and planned staff movements. If, at this stage, posts are identified which are not already listed in **Questionnaire No. 1**, they must be added so that the final list includes all posts in the organisation.

The results of the surveys carried out in the various sections using **Questionnaire 4** (with reference to the posts listed in *questionnaire No. 1*) should be compiled in one set of **Questionnaire No. 4** (which could consist of many pages) for the whole organisation.

This is essentially a *subjective estimate* of the needs which will depend on the supervisors' experience and access to information on future plans. As more information becomes available by means of the long-term forecast, this estimate can be checked against performance indicators and compared with other organisations or with other similar units within the same organisation.

### 12.6 Urgent training needs (Questionnaire No. 2)

"Urgent" training needs could also be identified by organisational units (use codes established in the chart), on the basis of known deficiencies and known development plans, transfers, promotions, etc.

**Questionnaire No. 2** which provides space for listing any topic for which training is urgently needed should be used. (For management training some topics have been suggested with a view to facilitating the compilation of aggregated information from several organisations).



As in the case of the short-term manpower needs survey, *the information from each unit should be compiled in one set of Questionnaire No. 2* (which could consist of many pages) for the whole organisation.

## 12.7 Long-term manpower and training needs forecast

*Questionnaire No. 3* asks for a lot of information, all of which may not be readily available. The various project teams should nevertheless start by *filling in the information available*. The information collected is used as inputs to the MANPLAN programme of which a more detailed description is given below. This programme consists of two parts:

- Part 1: long term *manpower planning* which forecasts needs for staff at different levels and the staff flows (recruitment, promotions and "outflow") as well as *staff costs*;
- Part 2: *forecast of training volumes* (in trainee-weeks/year) and *training costs*.

In the absence of information on training costs and duration, the programme can nevertheless be used to forecast manpower needs (part 1)

## 12.8 Simulation of manpower planning

### 12.8.1 Objective

MANPLAN<sup>2</sup> is intended to be a decision support tool for policy and strategy development in the field of human resources management (HRM) and human resources development (HRD). It allows one to simulate different scenarios, varying a number of parameters (see below).

Thus, it is possible to quickly find out the consequences of different service and network development scenarios, with different assumptions regarding personnel policies, productivity improvement, costs of manpower and training, etc., in terms of manpower needs, movements (flow), and cost as well as training volumes and costs.

For each set of simulation values entered, the programme calculates the number and distribution of personnel at the various "ITU levels" (see section 12.4. 2 and annex 1) for each of the 15 years following the current year. It calculates manpower flows (recruitment, promotions, outflow), training volume (in trainee-weeks) and cost of training and manpower for each year. EXCEL also allows you to present the results graphically and not only in tabular form.

Future *needs, flow and supply* of manpower at the various levels are obviously affected by a number of factors, such as the development of the market, the corporate strategy, the technology used and competition for qualified manpower. The *duration of training*, and hence the total training volume, depends, besides the competence requirements determined by the corporate strategy, on another set of factors, such as the development of the educational system and training technology.

The development of most of these factors is largely unknown, except possibly for the next few years. Medium and long term forecasts of manpower needs and training volumes are therefore, by nature, extremely uncertain.

Considering this uncertainty it is felt that the simple model used as a basis for this programme is adequate.

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<sup>2</sup> MANPLAN is a spreadsheet application, initially using the MULTIPLAN software (MICROSOFT) and LOTUS 1-2-3 (LOTUS Development Corp.). An enhanced version is now also available in EXCEL for Windows -(MICROSOFT). The manpower forecast and planning model used is essentially based on the approach to manpower planning described in the ITU/TDG . The following description refers to the EXCEL version of the programme. The versions for MULTIPLAN and LOTUS are similar but are less comprehensive, use 12 years, instead of 15 years planning period and do not include macros for creation of graphs.

To be able to use the MANPLAN programme, you must be a licensed user of MULTIPLAN (version 3.0 or later), LOTUS 1-2-3 (release 1A or later) , or EXCEL all of which run on a number of different brands of personal computers. The MANPLAN programme itself can be obtained from the ITU, at the cost of the diskette and handling. In return you are kindly asked to return the completed questionnaire (Annex 2) so that the ITU can develop an information bank on performance indicators for the benefit of all Members. The request should specify type of computer ( IBM compatibles only), the spreadsheet software (MULTIPLAN, LOTUS 1-2-3 or EXCEL) and diskette format. To make the programme work you must load the spreadsheet called MANPL3E.XLS (version 3 in English), as well as the file MANPLM3E.XLM which holds the macros that automate certain functions of the MANPLAN (to be hidden).

Note, however that the "standard" productivity indices proposed by the programme only provide an *indication* of what the consequences will be at a *macro* level and that the *reliability and accuracy of that information is no better than that of the information requested to be entered.*

To make a more detailed forecast of manpower and training needs for a particular task, productivity indices related to that task must be used and all the information required by the programme related to that specific task must be entered (see section 3.1 - Choice of "speciality"). Even so, such forecasts will probably be accurate only for the next 2 or 3 years, and then only if development plans for these years have been established.

The uncertainty of what is in store *is no excuse for avoiding policy decisions and strategic planning* for the future. The possibility offered by this programme of simulating and comparing different scenarios will obviously improve the decision making process. It will also give an indication of the finance required for human resources development. This should be seen as an *investment* and treated as such in the financial plan. The forecast should, of course, be regularly updated. With time, more accurate figures about cost and duration of training, trends, etc. may become available and one could expect the forecasts to become more and more reliable and accurate.

An additional advantage of using this software on an international basis is that certain key figures, such as productivity index, duration of training, distribution of staff, etc. will become available in the same format from many countries. This will allow for international comparisons, for trends analysis, goal-setting, etc.

Note that MANPLAN is intended for *quantitative* forecasts only and *not* for forecasting of *qualitative training needs.*

In other words, the programme can be used to forecast the *number* of people needed and training *volume* required (in trainee-weeks) in a given speciality or for a specific task, as well as their *cost*, but will *not* indicate anything about the *content* of the training programme.

The result of the simulation can be viewed on screen or printed (see example in Annex 3).

The output includes forecast of:

- a) **value of workload indicator unit** (DELS, cable pair-km's, terminating transmission channels, etc.)
- b) total **number of staff** and their distribution at the different ITU levels
- c) **productivity index**
- d) **staff flows** (recruitment, promotion and outflow due to turnover and termination) at each level
- e) **training volumes** in trainee-weeks (total and distributed on initial, promotion and continuous training as well as distribution on different training "suppliers")
- f) **cost of training** (total and distributed as in e) above and in % of total staff cost)
- g) total **personnel cost** (in the EXCEL version only, which also takes into account expected change in staff costs in all cost calculation).

The guidelines and instructions given below will indicate what information to enter in MANPLAN and discuss the parameters which determine manpower and training needs and cost. Note that Questionnaire 3 (see Annex 2) includes most of the information required as inputs to the forecast.

The following guidelines will *not* indicate how to operate the spreadsheet software being used (for which presumably a manual is available)<sup>3</sup>. If further assistance is required to learn how to use MANPLAN, the BDT organises manpower planning and training needs workshops on request.

### 12.8.2 Choice of "speciality"

Forecasts can be made for any or all of the *specialities* listed in Table 12.1 below (or for any other task of interest, providing the required input information is available) with the help of MANPLAN, *but only for one at a time.* "Global" = overall manpower requirements for the whole organisation can be made very easily and give a preliminary rough idea of the manpower requirements for different assumption regarding growth, productivity improvement and

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<sup>3</sup>A basic help screen is included in the programme. Press simultaneously the ctrl key and h (ctrl h) to get on-line help

personnel policies. For this only the present *total* number of staff, their distribution at the various ITU “levels” and the forecast of annual growth rate of Direct Exchange Lines (DELs) need to be known.

**Table 12.1 Proposed workload indicators and productivity indices for main specialities**

“Speciality” (see ITU job-training code- Annex 2)	Workload indicator	Productivity index (employees or equivalent man-years/workload indicator)
Global	1000DEL (Direct Exchange Lines)	Employees/1000DEL
General	1000 DEL	employees (in General)/1000 DEL
Human resources (HRD)	10 employees	(HRD) employees/10 employees
Terminals	1000 DEL	employees (terminals)/1000 DEL
External plant	1000 pair-km	employees (ext. plant)/1000 pair-km
Power	Number of generators	employees (power)/No. of generators
Transmission	1000 terminating channels	empl. (transmission)/1000 term.chs
Radiocommunication	1000 terminating channels	employees (radiocom)/1000 term.ch.
YOUR CHOICE OF SPECIALITY	YOUR CHOICE OF INDICATOR	YOUR CHOICE OF INDEX

In the absence of adequate management information systems, *global* forecasts and simulations of different scenarios of manpower requirement are easy to make and will contribute to improving strategic decision making.

However, usually different components of the network and different services grow at different rates. Therefore, forecasts will have to be made for each *speciality* or even for more specific *tasks* and then added up to get a more accurate forecast of the total needs.

Proposed *workload indicators* and *productivity indices* for some of the “*main specialities*” are indicated in Table 12.1. The productivity index is always a ratio of employees (or equivalent man-years) to some workload indicator, which, as the name suggests, is presumed to reflect the workload of the corresponding “speciality” or task. In Annex 1, each main speciality is further broken down into a number of sub-specialities, which provide further ideas for work load indicators and hence, productivity indices. *Tasks* are defined by combining any of the terms indicated under “*activities*” (*what* people do) with any of the *sub-specialities* (the object of their action).

If the manpower needs for sub-specialities or specific tasks have to be forecast, a relevant workload indicator, *for which a forecast of the growth has been made in the development plan*, has to be identified. The present code is rather technology-oriented but forecasts could also be made *by service*. Some services are included under the *main speciality* called “*General*” but these may have to be modified to match the services for which forecast have been made in the development plan.

When a forecast is made for sub-specialities or tasks which are not among those indicated in Questionnaire No. 3, only the names of the *speciality* or task and the *workload indicator* in any of the sections for the specialities proposed in this questionnaire need to be changed (see, for example, page 4 of Questionnaire No. 3). Of course the subdivision in installation and maintenance is not always relevant, but for each sub-speciality or task, information on the following is required:

- equivalent man-years spent on the relevant tasks (see section 12.4);
- the distribution of employees (or equivalent man-years) on levels;
- forecast of annual growth of the workload indicator.

and targets for annual productivity improvement have to be defined (i.e., the same information as that requested for each main speciality in Questionnaire No. 3).

If training volumes and costs have to be forecast, information about present duration and cost of training for the relevant sub-speciality or task has to be obtained (see last section on page 3 of Questionnaire No. 3).

A global forecast could be completely misleading if the *productivity improvement* could be expected to vary significantly among different *specialities* or tasks. High productivity improvement could be expected in certain *specialities* or *tasks*, for example, because new technology or tools will be introduced, whereas only moderate productivity improvement (for example, due to economy of scale) could be expected for tasks which are to be performed in the same way as they were carried out in the past.

For example, if digital exchanges (which require less maintenance than analogue exchanges) are to be installed or if switching centres and trunks already installed have a large *unused* capacity, the growth of the workload takes place mainly in external plant and in terminals in the first few years. If the number of DELs is used as the workload indicator, one would in this case expect much higher productivity gains in the *speciality* "Switching" than in "Transmission" and "External Plant".

Another reason to forecast by *speciality* rather than globally is that the duration and/or cost of training vary significantly between different specialities, which will affect the forecast of training volumes and costs.

The name of the sub-speciality or task, as well as the corresponding workload and productivity indicators are then to be entered in the row "Your choice of speciality" (see Table 12.1). Other information compiled in the Questionnaire No. 3 is entered as indicated below.

However, as indicated above, forecasting by speciality *can only be done if the present values of the corresponding workload indicators* can be determined with some accuracy and a *forecast of their growth* can be obtained (see Chapter 6 - Forecasting).

Questions to consider:

- is the growth of the network similar for all parts of it (trunks, local network, terminals, switching centres, etc.)?
- are the duration and cost of training similar for all specialities?
- what information is available about productivity in the various specialities?
- is the present value of the workload indicator readily available?
- can a forecast be made of the growth of the workload indicator?
- is information available about the number of employees and their distribution on levels in the selected speciality or equivalent man-years spent by the different categories of staff on the tasks selected?

### 12.8.3 Annual growth of the workload indicator

If forecasts of *average, annual growth* of the workload (telecommunication plant and services) have been made in % for each of the three 5-year periods covered by the forecast, these figures can be entered directly in MANPLAN. A statement is required, for each 5-year period, on whether the growth is *exponential* (compounded) or *linear* and MANPLAN will calculate the number of workload units in years 5, 10 and 15. On the other hand, if only a forecast of the *number* of workload units in these years is available, any average annual growth in percent can be entered, the result in years 5, 10 and 15 compared with the forecast and, by successive approximations, the annual growth rate (and pattern) that best match the forecast calculated.

For the purpose of long-term manpower planning, the *average, annual* growth over the planning period is adequate, even if the plant and, hence, workload indicator (number of DEL's, number of terminals, number of terminating transmission channels, etc.) is planned to increase in steps of varying size rather than by a fixed annual percentage. MANPLAN will use the forecast number of workload units (the value of the indicator) in the years 5, 10 and 15 to recalculate the number of units to be added each year, assuming linear growth (irrespective of the assumption of linear or exponential growth in the forecast). Linear growth has been used purposely, as the recruitment and training capacity should preferably be spread out as evenly as possible over the planning period in order to avoid abrupt variations in staff and in load on the training facilities.

Recruitment, layoffs and training of staff are slow processes. It is therefore in any case practically impossible for a large organisation to employ exactly the number of people it theoretically needs at each point in time if the requirements change abruptly in steps. Furthermore, experience shows that reality frequently differs significantly from the plans (sometimes because the need for skilled manpower has not been properly considered, sometimes because funding of the extensions is not available as expected, sometimes because the forecast of the demand turned out to be wrong).

Also, the lead time needed to train people must be considered. Thus, if the growth is exponential, more people must be trained in a given year than that theoretically needed that year. For all these reasons, planning for linear growth of staff (approximately the same numbers added each year) is a better strategy than using an exponential growth rate.

#### 12.8.4 Distribution of employees on ITU-"levels" - the organisational "pyramid"

Description of the ITU "levels" (or categories) of staff is given in section 12.4.2 and in Annex 1. The number of staff or equivalent man-years in each category (at each level) is entered and MANPLAN calculates the total, as well as the % of employees at each level. This is a way of describing the shape of the current organisational "pyramid". The programme will also calculate the present value of the relevant productivity index.

Targets must also be set for the *desired* distribution of staff in % for each level (category) of staff. This is equivalent to determining the desired shape of the organisational pyramid at the target year. Note that if it is desired to decrease the percentage of staff at one level, their *productivity* must *improve* more than the overall productivity improvement goal and vice versa (see below).

As technology becomes increasingly sophisticated, the need for more qualified staff (levels 4 and 5) may increase and the need for lower level staff performing routine tasks decrease, relatively speaking. Furthermore, the current trend towards more flexible organisational structures may require more versatile (less specialised) staff.

For the *distribution of staff* on various levels, the information already compiled in questionnaire 1 can be used. If it is not possible to estimate the equivalent man-years used on, for example, installation and maintenance of specific types of equipment, an attempt should be made to at least estimate the global figures, if possible separated into installation and maintenance when applicable. The assumptions made, or the difficulties encountered, should be explained on separate sheets

The **target distribution** can obviously be little more than a guess based on long-term strategic decisions and policy. (e.g. if it is intended to sub-contract, say cleaning and security work, proportionally less staff at level 1 will be required). If the future policy is to sub-contract installation work, less employees at level 2 (relatively speaking) will be needed. A general trend towards *proportionally* more employees at higher qualification levels (due to increasingly sophisticated equipment which requires less routine handling but more expert knowledge when something goes wrong) can be noticed. Also, comparisons with other organisations may assist in setting goals concerning the future distribution of staff at the various levels.

A change in the relative distribution of staff in the organisation pyramid may require significant changes in the training policy (more in-service training matched to the needs of each individual, for example) and in the duration of training programmes.

Changes in the distribution of staff will also affect the career possibilities and, hence, motivation and productivity of staff. This is therefore another *important policy decision* which must be considered in connection with the recruitment policy (see below).

Different scenarios can be simulated varying the parameters; *duration* and *distribution* of training, *productivity improvement* and *outflow* of staff.

##### Questions to be considered:

- How will the development of technology and organisational changes affect the distribution of staff at different competence levels?
- How will changes in the distribution of staff, training policies and programmes affect the volume and cost of training?
- How will changes in staff distribution affect staff flows (recruitment levels, career possibilities, etc.)?
- How will these changes affect productivity? (more career possibilities may improve motivation, higher competence level may result in higher productivity).

### 12.8.5 Annual productivity improvement

Another parameter that affects manpower needs is the annual productivity improvement. Productivity is usually expressed in workload per work unit (e.g. 1000 Direct Exchange Lines, or connections, per equivalent man-year). *For the purpose of manpower planning the inverted value is used as productivity index, i.e. equivalent man-years per workload unit.* This means that the value of the productivity index decreases when productivity in the usual sense increases as less personnel per work load unit are required.

Productivity *targets* can be expressed either in *average annual improvement* (in % ) or in the target *productivity index* (in terms of, for example, equivalent employees per 1000 lines).

When attempting to set targets for productivity improvement, changes have to be considered in technology and possibly in human resources management and development policies which may improve the performance. Some productivity improvement could almost always be expected in a growing business due to the economies of scale. Comparison should also be made with other organisations using similar technology as the one which is to be introduced. For specific tasks, such as installation of telephones, a sample team should be observed with a view to finding out what is possible in the given circumstances.

For information which is not readily available, efforts should be made to formulate schemes whereby it could be collected on a regular basis, i.e. *improved management information systems should be developed.* Note that this type of survey is not carried out only once but should be regularly repeated in each organisation to become meaningful.

As far as the operation of the MANPLAN is concerned, the productivity index for the target years of development is automatically calculated after entering the target productivity improvement (in %) according to whether linear or exponential growth is assumed. The effects of different improvements in productivity on the recruitment and training requirements can thus be easily assessed and targets selected which avoid wide variations in the annual manpower requirements.

### 12.8.6 Annual cost per ITU level (category)

For each level (category of staff), the average annual cost *per employee* in *thousands* of local currency, including social costs, is entered. The programme will calculate the total cost so that it can be compared with the personnel budget. The expected annual growth of salary cost *in real terms* for each 5-year period is also entered.

The salary level may affect both the productivity improvement and the turnover of staff (outflow). By improving the reward system (salaries, bonus, etc.) higher productivity growth and less resignations (outflow) of staff can be expected. This would result in lower annual staff cost (less employees needed) and training cost, which may more than off-set the additional cost caused by increasing the salaries.

The development of salaries and other benefits for the employees *is an important policy decision* which depends on many factors (financial situation of the organisation, governmental regulations, etc.).

By simulating different scenarios, varying the three parameters, rate of *salary increase*, *productivity improvement* and *outflow*, the consequences in terms of manpower needs and training costs of the different scenarios/assumptions can be examined. This may help to make a policy decision about development of employees' salaries and benefits.

#### Questions to consider:

- what should be the salary (including bonuses, etc.) improvements and how are they likely to affect productivity, revenue generation and outflow of staff?
- can productivity improvement goals be negotiated with the employees in return for better salaries and benefits?

### 12.8.7 Present training volume and cost

Information on *duration and cost of training* is only required to enable forecast of training volumes and is *not essential* for manpower planning (whereas forecast of training volumes cannot be carried out without manpower planning).

The average (last three years) annual number of trainee-weeks (multiplying each trainee with the duration of training in weeks of his/her training and summing up for a year) produced for the organisation by each of the five types of possible training "suppliers" listed below, is entered:

- In-house training facilities
- National sub-contracted training
- Regional Training Institutions
- International (overseas) Academic or Training Institutions
- Manufacturers and suppliers training facilities

For each of the above items, the allocated budget should be entered. In addition to the cost of instructors, premises, equipment, etc., the costs should include those allocated to trainees' travel and allowances - but not salaries. Although salaries obviously form part of the training costs in total, they are excluded from the MANPLAN input as quotations from suppliers of training 'packages' do not include trainees salaries.

The *volume of on-the-job training* (OJT) should also be included in training volumes. This volume should be calculated as *half* the total time spent on OJT, as it is assumed that the trainee is productive half of this time as an average for the whole period (less in the beginning - more towards the end).

The *cost* of on-the-job training (OJT) may not appear explicitly in any budget. If on-the-job training is an important part of the present training programme, the proportion of time that OJT supervisors spent on instructing the trainee should be estimated. Knowing the cost/hour of the supervisor the total cost can be estimated.

The cost of overseas training (internationally sub-contracted) and training provided by manufacturers under contract (suppliers and consultants) may not appear in the organisation's budget (fellowships, etc.). Efforts should be made to find the total cost of this training as it is needed to estimate the future training cost.

If only the in-house training cost is known, MANPLAN assumes that national sub-contracted training has the same cost, as salary levels can be assumed to be the same. Regionally sub-contracted training is assumed to be 20% more expensive than local training (travel costs and higher salary levels). MANPLAN uses \$US 1500 per trainee-week for internationally sub-contracted training and manufacturers' training if the real cost is not entered.

If the cost per trainee-week is not known at all (and not entered) the programme will nevertheless estimate the cost, assuming that the cost of per "in-house" trainee-week is equal to the average salary per week and employee (an estimate made from available statistics).

The number of instructors allocated to "in-house" training is also entered. If part-time instructors are borrowed from other departments, the number of equivalent instructors (man-years per year) is used and the cost of these in the training budget is included even if their salary is accounted for in different budgets.

The programme will calculate the cost per trainee-week for each type of training and the total budget but is not using this information in other parts of the programme.

### **12.8.8 Initial training , "promotion" training and continuous training**

#### Initial training

*Initial training* is the training given to a *new recruit* until he/she is considered qualified for his/her first job assignment. This training may be carried out as one uninterrupted programme in a training centre or as a series of shorter courses inter-spaced with job assignments ("sandwich training"). If OJT is not part of this scheme, the duration of the courses the person needs to become fully operational is added up. If OJT is planned as part of the training , the (subjectively estimated) typical time required for a person to become fully operational including the time spent training "on the job" divided by two is used. Note that the duration of initial training should be entered for all levels, even if, at present, personnel at some levels are not recruited, e.g. level 4 (first line supervisors, etc.), which is often filled by promotions from level 3.

"Promotion" training

When an employee is assigned tasks at the next higher level he/she should normally be given some training to prepare him/her for the new tasks. This training is here called "*promotion*" training. Note that such transfer does not necessarily mean that the person is promoted in grade or gets a higher salary, as this depends entirely on the organisation's career policy. Also persons may be promoted to higher grades and get a salary increase without changing level (i.e. class or type of job tasks). In this case their training (if any is required) should not be considered "promotion" training, but rather *continuous* training (see below).

Continuous training (refresher training, transfer to jobs at the same level, etc.)

Refresher training and re-training for performance improvement of tasks already performed, to enable employees to take on new tasks at the same level, or to keep abreast with development of technology or changes in the organisation is in MANPLAN called *continuous training*.

Both the present and the planned *future* (at year 5, 10 and 15) *duration* of the training for each level are entered. This duration will probably depend on the speciality, so for global forecasts the average is used. The future duration of training depends on assumptions regarding the effectiveness of short, job-oriented training versus long broad-based training, on the entry level of the recruits, etc.

For "promotions" to level 2 and to level 3, the duration of this training is likely to be almost as long as the initial training for these levels. For promotions to levels 4 and 5, it depends on the policy adopted but would normally include, specialist and/or supervisory or management training. "Promotion" from level 4 to level 5 would often involve taking an academic degree course.

In the case of *continuous* training it is preferable to specify *the number of days of training per employee and year* (average) because variations in duration are likely to be considerable. To find out the present total average number of days of continuous training per employee and year, it is necessary to calculate the total number of days of all kinds of training (usually available), deduct the days spent on initial and promotion training and then divide this figure by the total number of employees. The programme needs to know both the current amount of continuous training and the goal by the end of each 5-year period. Due to the accelerated change in technology, one would expect this training to increase considerably in future but, again, this is an *important policy decision* and the consequences in terms of training costs and expected productivity improvements under different scenarios/assumptions must be considered.

The duration of training may also be regulated by government, or in agreements with trade unions. These decisions are *important policy decisions*, which will have considerable effects on the cost of training.

Distribution of training among different training "suppliers".

For each type of training an indication of how this training is to be distributed (in %) between the possible training "suppliers" must be given, i.e. what proportion of training that should be catered for by in-house facilities, by national training facilities, by regional centres (if available), by international sub-contracts or fellowships (Telecommunication Administrations in industrialised countries) and by manufacturers/suppliers of telecommunication equipment (usually as part of equipment purchasing contracts).

The distribution should reflect the *desired future distribution* (i.e. what is desired in year 5, 10 and 15) rather than what is currently done.

This distribution could of course be different for different levels and for different types of training. For most staff and, in particular, lower level staff the *initial training* is usually catered for entirely (100%) by the in-house facility but this is not necessarily true for "promotion" training and "continuous" training.

The distribution of "*promotion*" training among training "suppliers" may be quite different from the distribution of initial training. Advanced training, including management training is often sub-contracted to a larger extent

*Continuous* training is likely to rely more on manufacturers than initial and promotion training. Usually, the contract for purchasing of new equipment should include a training contract. This contract would charge the manufacturer with the training of at least the first group of employees to operate and maintain the equipment and perhaps include provision of training material for future in-house courses.



The decision about how to distribute training between the different "suppliers" depends on available options and on their relative cost-effectiveness, as well as on political goals. This decision could also be considered to be *an important policy decision*.

Questions to consider related to duration and distribution of training.

- what is the supply of new recruits at the various levels and what is the capacity and effectiveness of the national education system?
- how broad-based (and hence how long) should the initial training be, considering the cost and the potential benefits?<sup>4</sup>
- can the trainees be expected to learn "on the job" or must the training ensure strict standards (affects duration)?
- how does the duration (and distribution) of training affect productivity?
- how much continuous training should be given, considering costs, rate of change in technology and organisation and potential benefits?
- what resources are available in-house for training?
- is the type of training you need offered elsewhere (within or outside the country)?
- how does the cost-effectiveness of the various training delivery options compare?
- cost and feasibility of in-house training development versus cost of purchasing course packages from elsewhere, e.g. the ITU Sharing System (ISS) or other sources?
- what is the desirable degree of self-reliance (or collective self-reliance within the framework of the ISS) in training?

### 12.8.9 External recruitment versus internal promotion

The desirable proportion of external recruitment (in %), for each level, should be determined. Note that the higher the proportion of external recruitment, the less possibility for internal promotions. To offer reasonable career possibilities is a powerful incentive, which may affect productivity positively. On the other hand, most organisations feel that some "new blood", particularly at management levels (level 5 and above), is needed in order to gain access to experience acquired elsewhere.

This is another *important policy decision*. The potential consequences of different policies should be carefully considered before the policy is laid down. The effects on staff flows and training costs of changes in recruitment levels and in productivity improvement rates can be seen immediately by simulating different scenarios with the help of MANPLAN.

Questions to be considered:

- cost-benefit of external recruitment, including the cost of initial training, compared with the cost-benefit of internal promotions, including the cost of promotion training?
- what is the relationship between career possibilities and productivity improvements; Can productivity improvement goals be negotiated with the employees in return for better career prospects?
- what is the present, and desired age distribution?

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<sup>4</sup> in this context government policies and regulations, as well as the opinions of trade unions, may also have to be considered.

### 12.8.10 Outflow of personnel

The outflow of personnel (retirements, resignations, deaths, termination of contracts) depends on:

- the age pyramid of the employees;
- the organisational climate;
- the competitiveness of salaries and other working conditions (in relation to the rest of the labour market);
- other job opportunities offered.

To some extent, the rate of retirements and accidents can be controlled by recruitment policies (age of recruits) and by safety measures.

Unless the organisation is attempting to reduce its staff, outflow due to *resignations* should normally be kept as low as possible. Each employee represents a considerable investment in training which would be lost to the organisation if he/she were to leave prematurely, although the nation as a whole might still benefit from this investment.

Often the rate of resignation is higher for employees at higher levels because they have more broadly marketable skills. The more general the training, the more easily people will find other jobs. From the organisations point of view, job-oriented training is therefore preferable compared to broad-based general training which also usually is longer. However, it is often wiser to adopt a compromise that to some extent meets the individuals' wishes for broader training which also makes the work more interesting.

When the targets for outflow percentages (at each level) are entered (in % of the total staff at the level concerned per year), the *policy decisions* concerning salaries, career possibilities (external recruitment levels) and other benefits must therefore be reconsidered. Again, different scenarios can be examined by simulating the consequences with different assumptions using MANPLAN.

#### Questions to be considered

- what is the current age pyramid and what will be the "natural" losses per year?
- what are the conditions offered by the "competition" in the labour market?
- what is the current rate of outflow? (note that, even if the employees stay on average *as long as 30 years* in the organisation, there will be a theoretical minimum annual average outflow of approximately 3%)
- what are the reasons for this outflow and what can be done about it?
- should resignation or early retirement be encouraged at certain levels (and in certain cases) and what pre-retirement or career counselling programmes are required?

### 12.8.11 Other key figures

The *financial*, and *traffic key figures* requested on page 1 of Questionnaire No. 3 as well as the *quality of service key figures requested on page 2* are **not directly needed** for manpower planning and are not used in MANPLAN. However, a close check has to be kept on performance and quality of service because setting unrealistic high productivity targets and reducing the duration of training may adversely affect the performance and quality of service. This could *reduce the revenue* (e.g. more faults means less traffic, poor quality of service- less customers) by more than savings.

These key figures also provide useful information for management for other purposes than manpower planning and are essential for comparisons with other organisations or between various units or regions within the same organisation which provide a basis for setting targets. In some cases, these indicators are available in the ITU indicator database.

The questionnaires proposed for this survey (Questionnaire No. 3) need to be thoroughly field tested before they can be adopted as standards. Anyone who is involved is therefore, in a sense, participating in a pilot exercise and is therefore invited to note and submit to the ITU all problems encountered and ideas for improvements which this exercise may generate.

## ITU JOB/TRAINING CLASSIFICATION CODE

### 1. Objective

The present classification could be used for describing jobs as well as training. Using the same codes for both purposes facilitates considerably the training needs analysis as well as the retrieval of information about existing training, once the job is known.

The three-dimensional classification proposed provides a more generic way of describing jobs and training than listing specific tasks or training objectives. It will therefore help you to identify relationships and similarities between skill/knowledge requirements for jobs which are apparently unrelated.

Specific task descriptions and training objectives may, of course, still be required for other reasons.

### 2. Structure of the classification system

The three-dimensional classification proposed in this document (see Figure 12. 1) is a further development of three classifications already used for some time within the ITU International Sharing System for training (ISS). It describes each duty/task in three dimensions, i.e.:

1. **“Activity”** = what people do, e.g. maintain, operate, install, etc.
2. **“Speciality”** = with what, e.g. switching systems, cables, etc.
3. **“Level”** = at what level, e.g. technician, engineer, etc.

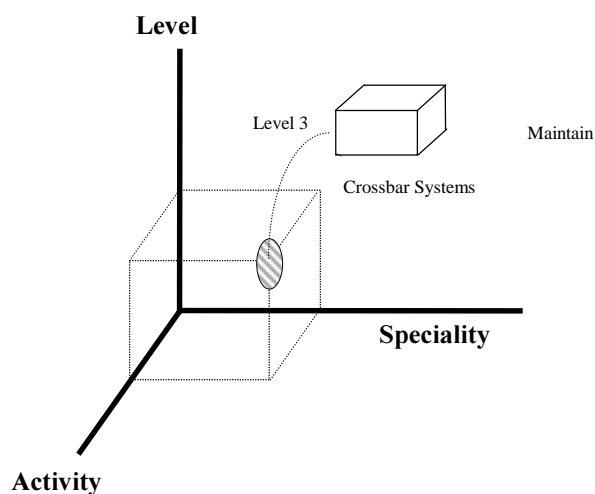


Figure 12.1 - The three dimensions of the job and training classification

The **“activity”** classification (see page 3) is a further development of the “main functions” introduced in 1984 (see page 9, TDQ No. 17).

The **“speciality”** classification (see pages 5-12) is based on the ITU “Subject-Matter Code” developed by the Training Division in 1985 (see Annex 14, ITU/TDG) and used to code courses in the TDQ. The same codes for the main sub-divisions have been used as far as possible, but the classification has been further developed and modified to better reflect today’s technology.

The **“level”** classification (see page 4), finally, is based on the Ndola classification which was extended to 7 levels in 1984 (see TDQ No. 17).

### 3. How to use the classification

Each job can be described as a set of duties, tasks, etc. Each of these can be described as **what** people do, **with what** and at which **level**. Here are some examples:

DUTY/TASK	CODE lev./act./spec.
• maintain crossbar switching systems (technician level)	3 /41/05.12
• plan transmission systems (engineer level)	5 /20/06.00
• plan analogue coaxial transmission systems (engineers)	5 /20/06.21
• develop quality control systems (management level)	6 /31/00.31
• research market or “market research” (professionals)	5 /15/00.81
• manage change (use 0 for “any level”)	0 /61/00.12
• learn transmission concept and principles (technicians) (note that “to learn” can be a task after basic training)	3 /74/06.05
• supervise installation of transmission systems (or, depending on the level, 5 /62/06.02)	4 /62/06.02
• install overhead lines (skilled workers)	2 /51/04.11
• typing = operate (or use) office machines (typist) or	2 /42/00.66 2 /04/00.66

Note that the classification system presently forces you to group specific tasks into more generic categories. In the last example above, the verb “type” must be replaced with “use or operate office machines” (which includes typewriters).

After some experience has been gained in using the code, it could be decided whether it is meaningful to develop the classification system further in the future.

When describing the duties/tasks covered by your training in question 11 in the course description form (Form 100), try to use the **most specific combination** of “activity” and “speciality” found in the present classification system that **corresponds best** to what the trainee will be doing after training.

If a duty/task cannot be adequately classified with the present system, you are free to propose new “activities” or “specialities” as long as you follow the rule that the “activity” is a verb describing an **action** and the “speciality” is the **object** of that action.

If the new combination is considered to be generic or needed for other reasons, it will later be included in the revised classification system. If not, we will suggest how it may be coded with the present system.

Remember that each job usually must be described as a **combination** or **set** of duties/tasks. Similarly, courses still usually cover several duties/tasks.

As training becomes more modularised, one may expect a development towards a more direct correspondence between duty/task and training module.

## ACTIVITIES

10	<u>ANALYSE &amp; STUDY</u>	60	<u>MANAGE &amp; SUPERVISE</u>
11	Study feasibility of	61	Manage
12	Analyse cost/benefit of	62	Supervise
13	Compare	63	Administer
14	Forecast	64	Organise
15	Research	65	Appraise
16	Investigate	66	Negotiate
17	Propose	67	Communicate
18	Identify	68	Allocate
19	Verify	69	Control/inspect
20	<u>PLAN &amp; PREPARE</u>	70	<u>TRAIN &amp; LEARN</u>
21	Plan/schedule	71	Train/teach/instruct
22	Prepare	72	Demonstrate
23	Specify	73	Monitor
24	Budget	74	Learn
30	<u>DEVELOP &amp; ADAPT</u>	75	Describe
31	Develop	76	Explain
32	Design	80	<u>SELL &amp; BUY</u>
33	Validate	81	Market
34	Evaluate	82	Advertise
35	Adapt	83	Sell
36	Interface	84	Buy/purchase
37	Change	90	<u>CREATE</u>
38	Dimension	91	Create
40	<u>MAINTAIN &amp; OPERATE</u>	92	Imagine
41	Maintain	93	Generate
42	Operate	94	Innovate
43	Perform	00	<u>OTHERS</u>
44	Repair	01	Improve
45	Test	02	Decide
46	Measure	03	Determine/define
47	Check	04	Use
48	Diagnose	05	Calculate
50	<u>INSTALL &amp; CONSTRUCT</u>	06	Estimate
51	Install	07	Motivate
52	Construct	08	Inform
53	Build		
54	Produce		
55	Accept		

## LEVELS

LEVEL	EXAMPLES	DESCRIPTION
7	Director-General of Telecoms. Director of Telecommunications Head of Department of Posts and Telecommunications General Manager	Senior responsible government or Administration officials or leaders of private industry involved in policy-making and management at the highest level.
6	Director Assistant Director Chief Engineer Heads of service	Senior Telecommunications officials empowered to take decisions and responsible for a budget, operational planning, etc. Analyses situations and takes decisions on the planning, co-ordination, control, organisation and management of the department or service for which he is responsible, with the collaboration of his immediate subordinates (in general at level 5).
5	Engineer Chief supervising technician Manager Head of centre Engineer in charge of a laboratory Specialised research worker	Is responsible for a service, project or telecommunications section. Plans, co-ordinates, manages and supervises the service/section/project for which he is responsible. Manages his service/section/project in collaboration with his immediate associates (in general at level 4). Carries out scientific or technological research in a specialised field.
4	Supervising technician Foreman Senior technician Inspector Chief of section Administrative officer Senior clerk	Staff at level 4 are mostly direct associates of senior and level 5 personnel. They have two kinds of responsibility: 1) Directing and managing local operational services, with responsibility for staff at levels 3, 2 and 1; 2) Devising creative and imaginative solutions for technical and administrative problems.
3	Maintenance technician Operating technician Skilled technician Bookkeeper Administrative assistant Secretary	They mostly specialise either in a particular type of equipment or in one of the branches of telecommunications according to the organisational system of the administration to which they belong. These are skilled technical workers, generally capable of solving all technical problems in their specialised range of activity. They are able to make technical decisions.
2	Assistant technician Technical assistant Skilled worker Fitter/installer Cable jointer Operator Typist	They generally work under the <u>technical</u> supervision of staff at level 3. They usually specialise in one of the branches of telecommunications, and sometimes in a particular type of equipment. They are generally assigned technical tasks involving simple procedures or assist staff at level 3 with more complex tasks. They generally do not make decisions in the course of their work.
1	Unskilled worker Labourer Driver Messenger	They have no knowledge of, or skill in telecommunications and can generally be recruited without previous training.

**SPECIALITIES****INDEX OF MAIN HEADINGS**

- 00. GENERAL
- 01. HUMAN RESOURCES
- 02. GENERAL SUBJECTS
- 03. TERMINALS
- 04. EXTERNAL PLANT
- 05. SWITCHING AND SIGNALLING
- 06. TRANSMISSION
- 07. RADIOCOMMUNICATIONS
- 08. BROADCASTING
- 09. POWER SUPPLY
- 10. NETWORK AND TRAFFIC
- 11. LABORATORIES & WORKSHOPS
- 12. COMPUTER TECHNOLOGY
- 13. SERVICES

<b>00.</b>	<b><u>GENERAL</u></b>	<b>00.</b>	<b><u>GENERAL (continued)</u></b>
00	<u>GENERAL</u>	80	<u>PRODUCTS AND SERVICES</u>
10	Strategic plans	81	The market
12	Change	82	Customers/subscribers
13	Manpower	83	Customer relations
14	Goals/targets/objectives	84	Products
		85	Production systems
20	<u>LEGISLATION AND LAWS</u>	86	Distribution systems
21	Regulations	87	Services
22	Copyrights/patents		
23	Industrial relations	90	<u>MEDIA</u>
24	External relations	91	Advertising
		92	Public relations
30	<u>ORGANISATION AND METHODS</u>	93	Radio/TV information
31	Quality control systems	94	Publications
32	Measurement and test systems	95	Newsletters
33	Maintenance organisation	96	Announcements/press releases
34	Evaluation systems	97	Audiovisuals
35	Efficiency		
36	Spare parts	<b>01.</b>	<b><u>HUMAN RESOURCES</u></b>
37	Public safety	00	<u>GENERAL</u>
38	Security		
		10	<u>STRATEGY &amp; POLICY</u>
40	<u>ECONOMY AND FINANCE</u>	11	Regulations
41	Budget	12	Personnel policy
42	Funding	13	Career policy/plans
43	Investments	14	Relations with trade unions
44	Taxes		
45	Accounting systems	20	<u>STAFF</u>
46	Tariffs	21	Recruitment system
47	Billing systems	22	Selection system
48	Insurance	23	Performance appraisal system
		24	Reward systems
50	<u>INFORMATION SYSTEMS</u>	25	Reward systems
51	Needs	26	Pensions and insurance
52	Reports		
53	Records and statistics	30	<u>ORGANISATION AND METHODS</u>
54	Documentation		
		31	Jobs/tasks
60	<u>INFRASTRUCTURE</u>	32	Jobs aids/instructions
61	Resources	33	Safety and hygiene
62	Buildings and land		
63	Stores and supplies	40	<u>INFORMATION SYSTEMS</u>
64	Production plant	41	Needs analysis systems
65	Transport	42	Reports
66	Office machines	43	Records and statistics
67	Furniture	44	Documentation systems
68	Hostels/accommodation		
69	Catering services	50	<u>TRAINING</u>
		51	Training centres
70	<u>PROJECTS</u>	52	Needs
71	Plans	53	Training methods
72	Extensions	54	Training material
73	Tender documents	55	Equipment
74	Call for tenders	56	Measurement and test systems
75	Contracts	57	Trainers
76	Purchasing procedures	59	Fellowships
77	Prototypes		
78	New applications		



**02.****GENERAL SUBJECTS**

- 00 GENERAL
- 01 Concepts and principles
- 02 Installation
- 03 Operation
- 04 Maintenance
- 05 Testing and measuring
  
- 10 MATHEMATICS
  
- 20 PHYSICS
  
- 30 ELECTRICITY & ELECTRONICS
- 31 Electricity
- 32 Analogue electronics
- 33 Digital electronics and microprocessors
  
- 40 ENGINEERING DRAWING
  
- 50 MECHANICS
  
- 60 TELECOMMUNICATIONS
  
- 70 COMPUTER SCIENCES
  
- 80 LANGUAGES

**03.****TERMINALS**

- 00 GENERAL
- 01 Concepts and principles
- 02 Installation
- 03 Operation
- 04 Maintenance
- 05 Testing and measuring
  
- 10 VOICE SUBSCRIBER APPARATUS
- 11 Private
- 12 Public
  
- 20 PRIVATE BRANCH EXCHANGES
- 21 Manual board
- 22 Electromechanical
- 23 Electronic
  
- 30 NON-VOICE SUBSCRIBER APPARATUS
- 31 Teleprinter
- 32 Facsimile
- 33 Computer terminals
  
- 40 OTHERS

<b>04.</b>	<b><u>EXTERNAL PLANT</u></b>	<b>05.</b>	<b><u>SWITCHING AND SIGNALLING</u></b>
00	<u>GENERAL</u>	00	<u>GENERAL</u>
01	Concepts and principles	01	Concepts and principles
02	Installation	02	Installation
03	Operation	03	Operation
04	Maintenance	04	Maintenance
05	Testing and measuring	05	Testing and measuring
10	<u>LINES &amp; CABLES</u>	10	<u>ELECTROMECHANICAL SYSTEMS</u>
11	Open wire	11	Step by step (voice)
12	Cables (pairs)	12	Crossbar
13	Coaxials	13	Analogue SPC
14	Waveguides	14	Telegraphy and telex
15	Optical fibers		
20	<u>CIVIL ENGINEERING</u>	20	<u>ELECTRONIC SYSTEMS</u>
21	Overhead	21	Time division systems
22	Underground	22	Space division systems
		23	Telex systems
30	<u>PROTECTIONS</u>	30	<u>PACKET SWITCHING</u>
40	<u>SAFETY</u>		

<b>06.</b>	<b><u>TRANSMISSION</u></b>	<b>07.</b>	<b><u>RADIOCOMMUNICATIONS</u></b>
00	<u>GENERAL</u>	00	<u>GENERAL</u>
01	Concepts and principles	01	Concepts and principles
02	Installation	02	Installation
03	Operation	03	Operation
04	Maintenance	04	Maintenance
05	Testing and measuring	05	Testing and measuring
10	<u>CARRIER SYSTEMS</u>	10	<u>RADIOCOMMUNICATION SYSTEMS</u>
20	<u>COAXIAL SYSTEMS</u>	11	Analogue HF systems
21	Analogue	12	Digital HF systems
22	Digital	13	Analogue VHF/UHF systems
30	<u>WAVEGUIDE SYSTEMS</u>	14	Digital VHF/UHF systems
31	Analogue	15	Analogue microwave systems
32	Digital	16	Digital microwave systems
40	<u>OPTICAL FIBRE SYSTEMS</u>	17	Analogue troposcatter systems
50	<u>PCM SYSTEMS</u>	18	Digital troposcatter systems
60	<u>SUBMARINE SYSTEMS</u>	20	<u>PROPAGATION</u>
61	Analogue	21	Ionospheric
62	Digital	22	Non- ionospheric
70	<u>MULTIPLEX SYSTEMS</u>	30	<u>RADIO FREQUENCIES</u>
71	Analogue	31	Interference
72	Digital	40	<u>ANTENNAS AND TOWERS</u>
73	T.D.M.A.	50	<u>SATELLITE SERVICES</u>
74	F.D.M.A.	51	Earth stations
80	<u>OTHER DATA TRANSMISSION SYSTEMS</u>	52	Mobile terrestrial
81	Modems and interfaces	53	Mobile maritime
90	<u>TELEX/TELEGRAPHY TRANSMISSION SYSTEMS</u>	54	Mobile aeronautical
		55	Radionavigation
		56	Space stations
		60	<u>MULTIPLEX SYSTEMS</u>
		61	Analogue
		62	Digital
		63	T.D.M.A.
		64	F.D.M.A.
		70	<u>MOBILE RADIO SYSTEMS</u>
		71	Cellular systems

<b>08.</b>	<b><u>BROADCASTING</u></b>	<b>09.</b>	<b><u>POWER SUPPLY</u></b>
00	<u>GENERAL</u>	00	<u>GENERAL</u>
01	Concepts and principles	01	Concepts and principles
02	Installation	02	Installation
03	Operation	03	Operation
04	Maintenance	04	Maintenance
05	Testing and measuring	05	Testing and measuring
10	<u>PRODUCTION FACILITIES</u>	10	<u>POWER PLANT</u>
11	Sound studios	11	Diesel
12	Television studios	12	Turbogenerators
13	Sound recording	13	Solar cells
14	Television recording	20	<u>POWER DISTRIBUTION SYSTEMS</u>
15	Sound mixing control desk	30	<u>AIR CONDITIONING SYSTEMS</u>
16	TV mixing control desk	40	<u>HEATING SYSTEMS</u>
17	Camera equipment	50	<u>LIGHTING SYSTEMS</u>
18	Lighting		
20	<u>COMMON EQUIPMENT</u>		
21	Outside broadcast equipment		
22	Special effects		
23	Test equipment		
30	<u>TRANSMITTING SYSTEMS</u>		
31	Sound transmitters		
32	Television transmitters		
33	Rebroadcasting systems		
34	Antennas and towers		
40	<u>NETWORK</u>		
41	Radio		
42	Television		
43	Frequencies		
44	C.A.T.V.		
50	<u>SATELLITE SYSTEMS</u>		
51	Receiving earth station		
52	Feeder links		
53	Space stations		
60	<u>RECEIVING SYSTEMS</u>		
61	Sound receivers		
62	Television receivers		

**10.            NETWORK AND TRAFFIC**

- 00    GENERAL
- 01    Concepts and principles
- 02    Installation
- 03    Operation
- 04    Maintenance
- 05    Testing and measuring
  
- 10    ANALOGUE NETWORK
- 11    Urban
- 12    Rural
- 13    Long distance
  
- 20    MIXED NETWORK
- 21    Urban
- 22    Rural
- 23    Long distance
  
- 30    DIGITAL NETWORK
- 31    Urban
- 32    Rural
- 33    Long distance
- 34    Integrated
- 35    I.S.D.N.
  
- 40    TRAFFIC
- 41    Local voice traffic
- 42    National voice traffic
- 43    International voice traffic
- 44    Local telex/telegraph
- 45    National telex/telegraph
- 46    International telex/telegraph
- 47    Local data
- 48    National data
- 49    International data
  
- 50    C.A.T.V
  
- 60    SUBSCRIBERS' DEMANDS
- 61    Voice
- 62    Telex/telegraph
- 63    Data
  
- 70    TELEX NETWORKS
  
- 80    DATA NETWORKS

**11.            LABORATORIES & WORKSHOPS**

- 00    GENERAL
- 01    Concepts and principles
- 02    Installation
- 03    Operation
- 04    Maintenance
- 05    Testing and measuring
  
- 10    REPAIR & MAINTENANCE
- 11    EQUIPMENT
- 12    Switching
- 13    Radiocommunications
- 14    Transmission
- 15    Sound broadcasting
- 16    Television broadcasting
- 17    Earth stations
- 17    Cables
  
- 20    TEST & RESEARCH LAB. EQUIPMENT
  
- 30    WORKSHOPS

<b>12.</b>	<b><u>COMPUTER TECHNOLOGY</u></b>	<b>13.</b>	<b><u>SERVICES</u></b> (continued)
00	<u>GENERAL</u>	30	<u>ENHANCED VOICE SERVICES</u>
01	Concepts and principles	31	PABX in-dialling
02	Installation	32	Centrex
03	Operation	33	Advice of call charge
04	Maintenance	34	Indication of call charge
05	Testing and measuring	35	Logging of incoming calls
10	<u>HARDWARE</u>	36	Display of calling subscribers
11	Main frame computers	37	Free phone
12	Minicomputers	40	<u>NON-VOICE SERVICES</u>
13	Microcomputers	41	Analogue leased line
13	Peripherals	42	Broadband analogue leased line
20	<u>SOFTWARE</u>	43	Facsimile group 2 / 3 / 4
21	Telecom. software	44	Teletex
22	Operating systems	45	Alarm
23	Programming languages	46	Remote appliance control
24	Tools	47	Telemetry
25	Application software	48	Telex
30	<u>NETWORK</u>	49	Telegraph/telegram
31	Local area network hardware	50	<u>NON-VOICE SERVICES</u>
32	Local area network software	51	Digital leased line
<b>13.</b>	<b><u>SERVICES</u></b>	52	Broadband digital leased line
00	<u>GENERAL</u>	53	Dial-up services at 1200 bps
01	Concepts and principles	54	Facsimile at 64 Kbps
02	Management	55	High-speed data transfer
03	Development	56	Electronic fund transfer
10	<u>BASIC VOICE SERVICES</u>	57	Packet-switched data transfer
11	Analogue	58	Integrated service via 2B+D, 30B+D
12	Digital	59	Visual phone
13	Mobile	60	<u>NON-VOICE SERVICES</u>
20	<u>SUPPLEMENTARY VOICE SERVICES</u>	61	Videotex
21	Abbreviated dialling	62	Database access
22	Conference	63	Voice mail
23	Call waiting	64	Text mail
		65	Fax mail
		66	Message handling system (paging)
		70	<u>NON-VOICE SERVICES</u>
		71	Amateur radio
		72	Disaster communications
		73	Video conferencing

List of posts with summary job descriptions

page No \_\_\_\_\_ of \_\_\_\_\_ pages

**Questionnaire 1**

For each post or category, use ITU Job/training code (see Annex 1) to describe "level", "activity" and "speciality", for example, 3/41/05.12 = level 3 - maintain (activity 41), crossbar exchanges (speciality 05.12)

Use several lines per category if they perform more than 6 major tasks (and several pages if required)

Write the name of the post or category in your own language with your own translation into English below

<b>Organisation</b> : _____													
<b>Unit code-No</b> : _____		(refer to organisation chart to be provided for your organisation).											
<b>Location</b> :													
Name of post or category (Your own English translation)	total staff	Principal tasks -list most common tasks for the category concerned											
		level	activ.	spec.	%*	level	activ.	spec.	%*	level	activ.	spec.	%*
		/	/	.	%	/	/	.	%	/	/	.	%
		/	/	.	%	/	/	.	%	/	/	.	%
		/	/	.	%	/	/	.	%	/	/	.	%
		/	/	.	%	/	/	.	%	/	/	.	%
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		/	/	.	%	/	/	.	%	/	/	.	%
		/	/	.	%	/	/	.	%	/	/	.	%
		/	/	.	%	/	/	.	%	/	/	.	%

\* by interviewing and observing some job holders, estimate the % of working time they devote to each task per year (rough estimated average for all job holders in the category concerned)





**Questionnaire No. 2 - Urgent training needs**

Country : \_\_\_\_\_  
 Organisation : \_\_\_\_\_ Location: \_\_\_\_\_  
 Organisation unit code : \_\_\_\_\_ (refer to organisation chart provided for your organisation)

**Management training needs**  
 (suggested topics/themes)

**Needs (priorities)** In second row (Pr.) Indicate priority for each level concerned (3=High, 2=medium, 1=low) and in third row approximate number of staff who needs this now

**Availability of resources** for development/delivery/organisation of training/conferences, etc. in this field (Specialists, support material, facilities, etc.)

**1. Telecom organisations' role in the information society**

**ITU levels** (see Annex 1)

7	6	5	4	3	2	1
Pr.						
No						

many	some	none

Need for information and how it is used in sectors such as business, government municipalities and education. Role of telecom organisation in satisfying these needs.

**2. Financing Policies**

7	6	5	4	3	2	1
Pr.						
No						

many	some	none

Different source of financing, General rules used by international institutions when granting loans. Performance indicators used when assessing the competence of an administration. Bilateral and multilateral financing.

**3. International standardisation**

7	6	5	4	3	2	1
Pr.						
No						

many	some	none

Standardisation organisations - how they work, current trends. Influence of local user groups. Effects of standardisation on telecom operations

**4. Telecommunication development strategies**

7	6	5	4	3	2	1
Pr.						
No						

many	some	none

Strategies applied in the interplay between government, market forces and the telecommunication administration when developing the infrastructure of the new information society

**5. Forecast of demand and network planning**

7	6	5	4	3	2	1
Pr.						
No						

many	some	none

Subscribers and traffic forecast, network planning dimensioning, network optimisation, etc.

**6. Economic and financial aspects**

7	6	5	4	3	2	1
Pr.						
No						

many	some	none

Financial systems, investment appraisal, budgeting and accounting, billing and invoicing, etc.

**7. Purchasing**

7	6	5	4	3	2	1
Pr.						
No						

many	some	none

Tender specifications, invitation to tenders, evaluation of tenders, contract drafting, negotiations and supervision, acceptance testing, etc.

**Management training needs (continuation)**

(suggested topics/themes)

**Needs (priorities)**

In second row (Pr.) Indicate priority for each level concerned (3=High, 2=medium, 1=low) and in third row approximate number of staff who needs this now

**Availability of resources**

for development/delivery/organisation of training/conferences, etc. in this field (Specialists, support material, facilities, etc.)

**8. Organisation development**

		<b>ITU levels</b> (see Annex 1)						
		7	6	5	4	3	2	1
Pr.								
No								

many	some	none

Readiness for, and management of, change, adaptation of organisation structure, working procedures, methods and tools to goals and strategies

**9. Marketing and sales**

		7	6	5	4	3	2	1
Pr.								
No								

many	some	none

Marketing plans, customers relations, sales organisation, etc.

**10. Business communication**

		7	6	5	4	3	2	1
Pr.								
No								

many	some	none

Development of communication within business enterprises - network solutions, maintenance and operation procedures.

**11. Management models and information systems**

		7	6	5	4	3	2	1
Pr.								
No								

many	some	none

Management control systems, management by objectives, management information systems.

**12. Project management**

		7	6	5	4	3	2	1
Pr.								
No								

many	some	none

Project planning, control, follow-up and evaluation.

**13. Human resources management  
Human resources development**

		7	6	5	4	3	2	1
Pr.								
No								

many	some	none

Working procedures and performance standards (job design), manpower planning, recruitment/selection, career and succession planning, performance appraisal, rewards and incentives, discipline, industrial relations, training needs analysis, training development and delivery.

**14. Leadership**

		7	6	5	4	3	2	1
Pr.								
No								

many	some	none

Directing and controlling work, motivation and on-the-job training of staff, etc.

**15. Teamwork**

		7	6	5	4	3	2	1
Pr.								
No								

many	some	none

Building of consensus, goal-setting, communication, inter-personal skills, etc.

**16. Computerised management tools**

		7	6	5	4	3	2	1
Pr.								
No								

many	some	none

Word processing, spreadsheets, databases, etc.





## Questionnaire No. 3

INDICATORS AND KEY FIGURES FOR MANPOWER PLANNING, TRAINING NEEDS FORECAST  
AND APPRAISAL OF ORGANISATIONAL PERFORMANCE

The information collected by means of this questionnaire will allow you to construct a number of indices of productivity (staffing ratios) and quality of service. These will help you to evaluate the performance of your organisation by comparisons with similar organisations or between units of your own organisation. Such comparisons provides a basis for estimating potential scope for improvement. The information can also be used to forecast manpower needs and training volumes and costs using, for example, the MANPLAN software, developed by the ITU/CODEVTEL project. If employees are involved in several "specialities", estimate the proportion of time they spent on each and indicate the number of equivalent man-years as the number of staff in each "speciality". Please indicate if you wish to receive a manpower needs forecast based on the information you will return by this questionnaire.

The questionnaire should be returned to: ITU, (attention Training Division), Place des Nations, CH-1211 Geneva 20, Switzerland.

Information identifying the originator (organisation or country) **will not be disseminated without your approval.**

Country..... Year.....

Organisation:.....

**"Global"**

(The whole organisation)

Overall productivity index : employees/1000 DELs

**Main workload indicator for total organisation**

(other indicators must be considered in comparisons)	present number	forecast (average) annual growth
Direct Exchange Lines (DELs) (x1000)		%

**Staffing indicators for total organisation**

	Total staff 1)	Technical staff 2)	Operating staff 3)	Nature of job (see "ITU levels" - Annex 11.1)					Remarks
				7 - 5	4	3	2	1	
Present numbers of staff									
Total yearly staff cost 4)		Average. yearly cost/employee. 4)							
Target distribution of staff 5 years from now (in percent at each level)				%	%	%	%	%	
Target distribution of staff 10 years from now				%	%	%	%	%	
Target distribution of staff 15 years from now				%	%	%	%	%	
Year 1-5: Annual turn-over (outflow) of staff (retirements., resign., deaths)				%	%	%	%	%	
Year 6-10: Annual turn-over (outflow) of staff				%	%	%	%	%	
Year 11-15: Annual turn-over (outflow) of staff				%	%	%	%	%	
Year 1-5: Percent external recruitment vs. internal promotion to level ->				%	%	%	%	%	
Year 6-10: Percent external recruitment vs. internal promotion to level ->				%	%	%	%	%	
Year 11-15: Percent external recruitment vs. internal promotion to level ->				%	%	%	%	%	

**Yearly productivity improvement - target****Target productivity index 5)**

Year 1-5: Percent yearly increase in workload indicator per employee -->	%	employees/1000DEL's -->	
Year 6-10: Percent yearly increase in workload indicator per employee -->	%	employees/1000DEL's -->	
Year 11-15: Percent yearly increase in workload indicator per employee -->	%	employees/1000DEL's -->	

**Other Key figures\* indicating workload and performance of total organisation**

	Present figure	Annual growth	Remarks
Yearly operating income 6)	US\$	%	
Operating expenditures 7)	US\$	%	
Yearly investment in property and plant 8)	US\$	%	
Total No of charge units for telephone calls (thousands)		%	
Total No of national telephone calls		%	
Total No of outgoing international telephone calls		%	
Total minutes (thousands) - national telephone calls		%	
Total minutes (thousands) - international telephone calls		%	
Total No of telex calls (thousands)		%	
Total minutes of telex traffic (thousands)		%	
Number of telegrams (thousands)		%	
Total training budget in US\$	Salaries of staff trainers & admin. support	Investments in buildings, equipment etc.	Maintenance of buildings, equipment etc.
			Purchase of external training material
			external courses, seminars, etc.
			Consultants

\* Most of these figures are included in the ITU indicator database



## Questionnaire No. 3

**01 Human resources - HRM/HRD**

Main productivity index: HR-staff/100 total staff

- HRM/HRD strategies and policies, personnel administration, salaries and benefits, social welfare, training, etc.

Main workload indicator for "HRM/HRD" = total staff in organisation (see "Global")

(the yearly growth of total staff can be calculated by MANPLAN)

**Staffing indicators for "HRM/HRD"**

Staff in HRM/HRD functions (including training)	Total staff	HR-Professionals	Admin support	Nature of job (see "ITU levels" - Annex 11.1)					Remarks
				7 - 5	4	3	2	1	
Present numbers of staff									
Total annual staff cost 4)		Average annual cost/employee. 4)							
Target distribution of staff 5 years from now (in percent at each level)				%	%	%	%	%	
Target distribution of staff at 10 years from now				%	%	%	%	%	
Target distribution of staff 15 years from now				%	%	%	%	%	
Year 1-5: Annual turn-over (outflow) of staff (retirements., resign., deaths)				%	%	%	%	%	
Year 6-10: Annual turn-over (outflow) of staff				%	%	%	%	%	
Year 11-15: Annual turn-over (outflow) of staff				%	%	%	%	%	
Year 1-5: Percent external recruitment vs. internal promotion to level ->				%	%	%	%	%	
Year 6-10: Percent external recruitment vs. internal promotion to level ->				%	%	%	%	%	
Year 11-15: Percent external recruitment vs. internal promotion to level ->				%	%	%	%	%	

**Annual productivity improvement - target****Target productivity index 5)**

Year 1-5: Percent yearly increase in workload indicator per employee -->	%	employees/Total No. of staff year 5 ->
Year 6-10: Percent yearly increase in workload indicator per employee -->	%	employees/Tot. No. of staff year 10 ->
Year 11-15: Percent yearly increase in workload indicator per employee -->	%	employees/Tot. No. of staff year 15 ->

**Training delivery**

Main productivity index : trainers/ 1000 trainee-weeks delivered per year

In this section, consider only "formal" <sup>12)</sup> training delivered in your own facilities

Workload and staff indicators	Initial training (of new recruits)	"Promotion" training (see note 16)	"Continuous" training (see note 17)	Total all types of training	Remarks
Trainee-weeks per year <sup>12)</sup>					
Number of trainees per year <sup>13)</sup>					
No of trainers (instructors, etc.) <sup>14)</sup>					
Productivity improvement - target <sup>15)</sup> 1st/2nd/3rd 5-year period	/ / / %	/ / / %	/ / / %	/ / / %	
Target productivity index 5)					
Trainers/1000 trainee-weeks delivered year 5/10/15	/ / /	/ / /	/ / /	/ / /	

**Training development**

Main productivity index : course developers / 10 course hours developed per year

In this section, consider only training developed, adapted and maintained by your staff

Workload and staff indicators	development of new courses	adaptation of acquired courses	up-dating and revision	Total hours developed, adapted and revised	Remarks
No of course hours/year					
Number of course developers <sup>18)</sup>					
Productivity improvement - target <sup>15)</sup> 1st/2nd/3rd 5-year period	/ / / %	/ / / %	/ / / %	/ / / %	
Target productivity index 5)					
Course developers/10 course hours year 5/10/15	/ / /	/ / /	/ / /	/ / /	

**Other key figures and targets in training**

(for forecast of training volumes)

In this section, consider all training irrespective of where and by whom it is delivered

Average for staff in all specialities	Nature of job(see "ITU levels" - Annex 11.1)					Average all levels
	7 - 5	4	3	2	1	
Please indicate duration in weeks when not otherwise stated						
Average duration of "formal" <sup>11)</sup> training when recruited to level:						
Average duration of on-the-job (OJT) training <sup>19)</sup> , when recruited to:						
Planned <sup>20)</sup> average duration "formal" training, when recruited to:						
Planned <sup>20)</sup> average duration of OJT when recruited to level:						
Average duration of "formal", training when "promoted" <sup>16)</sup> to:						
Average duration of OJT when "promoted" to level:						
Planned <sup>20)</sup> average duration of "formal" training when "promoted" to:						
Planned <sup>20)</sup> average duration of OJT when "promoted" to level:						
No of days of "continuous" <sup>17)</sup> training per employee & year						
Planned <sup>20)</sup> No of days of "continuous" training per employee & year						

**Questionnaire No. 3**

**03 Terminals**

- installation and maintenance of telephones, PBX's, telex, telefax, data terminals, etc. executed by your own organisation

Main productivity index: employees (in "terminals")/1000 subscribers (all types)

<b>Main workload indicator for "Terminals"</b>										
(other indicators must be considered in comparisons)					present number			forecast average annual growth		
Number of subscribers (all types of equipment)								%		
<b>Staffing indicators for "Terminals"</b> (only "technical" 2) staff including test desk operators and dispatchers)										
Staff for installation & maintenance of terminals	Total staff	installation only	repair & mtce only	both inst/mtce	Nature of job(see "ITU levels" - Annex 11.1)					Remarks
					7 - 5	4	3	2	1	
Present numbers of staff										
Total annual staff cost 4)		Average annual cost/employee. 4)								
Target distribution of staff 5 years from now (in percent at each level)					%	%	%	%	%	
Target distribution of staff at 10 years from now					%	%	%	%	%	
Target distribution of staff 15 years from now					%	%	%	%	%	
Year 1-5: Annual turn-over (outflow) of staff (retirements., resign., deaths)					%	%	%	%	%	
Year 6-10: Annual turn-over (outflow) of staff					%	%	%	%	%	
Year 11-15: Annual turn-over (outflow) of staff					%	%	%	%	%	
Year 1-5: Percent external recruitment vs. internal promotion to level ->					%	%	%	%	%	
Year 6-10: Percent external recruitment vs. internal promotion to level ->					%	%	%	%	%	
Year 11-15: Percent external recruitment vs. internal promotion to level ->					%	%	%	%	%	
<b>Annual productivity improvement - target</b>					<b>Target productivity index 5)</b>					
Year 1-5: Percent yearly increase in workload indicator per employee -->					%	employees/1000 subscribers year 5->				
Year 6-10: Percent yearly increase in workload indicator per employee -->					%	employees/1000 subscribers year 10->				
Year 11-15: Percent yearly increase in workload indicator per employee -->					%	employees/1000 subscribers year 15->				

**Installation of terminal equipment**

Productivity index : Equivalent full-time installers /100 terminals installed per year

Workload and staff indicators	Telephones	PBX	Telex	Telefax	mobile phones	Data terminals	Total all types of terminal equipment		Remarks
No of term. installed per year now									
No of terminals to be installed annually 21)									
Year 1-5									
Year 6-10									
Year 11-15									
Equivalent full-time installers now									
% install. done by own staff 22)									
Productivity improvement target 15)									
Year 1-5									
Year 6-10									
Year 11-15									
Target productivity index 5)									
Installers/100 term. installed per year									
Year 5									
Year 10									
Year 15									





## Questionnaire No. 3

**04 External plant**

- planning, construction and maintenance of over-head lines, cables, ducts, etc. executed by your own organisation

Main productivity index: employees or man-years in external plant/ 1000 pair-km's

<b>Main workload indicator for external plant</b>										
(other indicators must be considered in comparisons)					present number		forecast average yearly growth			
Number of cable pair-km's (pairs x km x 1000)							%			
<b>Staffing indicators for External plant (E.P.)</b>										
Staff for planning, constr. & maintenance (of E.P.)	Total staff	Installation only	mtce only	both inst/mtce	Nature of job(see "ITU levels" - Annex 11.1)					Remarks
					7 - 5	4	3	2	1	
Present numbers of staff										
Target distribution of staff 5 years from now (in percent at each level)					%	%	%	%	%	
Target distribution of staff at 10 years from now					%	%	%	%	%	
Target distribution of staff 15 years from now					%	%	%	%	%	
Year 1-5: Annual turn-over (outflow) of staff (retirements., resign., deaths)					%	%	%	%	%	
Year 6-10: Annual turn-over (outflow) of staff					%	%	%	%	%	
Year 11-15: Annual turn-over (outflow) of staff					%	%	%	%	%	
Year 1-5: Percent external recruitment vs. internal promotion to level ->					%	%	%	%	%	
Year 6-10: Percent external recruitment vs. internal promotion to level ->					%	%	%	%	%	
Year 11-15: Percent external recruitment vs. internal promotion to level ->					%	%	%	%	%	
<b>Annual productivity improvement - target</b>					<b>Target productivity index 5)</b>					
Year 1-5: Percent yearly increase in workload indicator per employee -->					%	employees/1000 pair-km year 5->				
Year 6-10: Percent yearly increase in workload indicator per employee -->					%	employees/1000 pair-km year 10->				
Year 11-15: Percent yearly increase in workload indicator per employee -->					%	employees/1000 pair-km year 15->				

**Construction work - External Plant (E.P.)**Productivity index: Equivalent full-time staff for construction of E.P./100 cable-km's constructed per year  
or equiv. full-time construction workers/1000pair-km installed

Workload and staff indicators	U-G cables	O/H cables	Open wire (OH)	coaxial cable	fibre-optic	All types of conductors	Remarks
Kilometres constructed/year now							
Planned 21) annual extensions (Km)							
Year 1-5							
Year 6-10							
Year 11-15							
Planned annual extensions (pair-Km)							
Year 1-5							
Year 6-10							
Year 11-15							
Equiv. full-time E.P. constr. workers							
% of constr. done by own staff 22)	%	%	%	%	%	%	
Productivity improvement target 15)	%	%	%	%	%	%	
Year 1-5							
Year 6-10							
Year 11-15							
Target productivity index 5)							
Installers/100km constr. per year 25)							
Year 5							
Year 10							
Year 15							
Installers per 1000 pair-km/ year 25)							
Year 5							
Year 10							
Year 15							

**04 External plant**

**Maintenance of External Plant (E.P.)** (consider only work done by your own staff)

Productivity index: Equivalent full-time E.P. maintenance maintenance staff /1000 pair-km's  
or equivalent full-time E.P. maintenance staff/ 100cable-km

	U-G cables	O/H cables	Open wire (OH)	coax cable	fibre- optic	All types of conductors	Remarks
Present number of pair-km's 21)							
Annual growth in pair-km's 21) Year 1-5 Year 6-10 Year 11-15	%	%	%	%	%	%	
Number of maintenance staff now 23)							
Productivity improvement target 15) Year 1-5 Year 6-10 Year 11-15	%	%	%	%	%	%	
<b>Target productivity index 5)</b>							
maintenance staff 26)/1000pair-km Year 5 Year 10 Year 15							
Maintenance staff per 100 cable-km Year 5 Year 10 Year 15							

<b>Other performance indicators for External Plant</b>							
Number of faults / year							
Average duration of faults 10)							
" of repeated faults	%	%	%	%	%	%	

## Questionnaire No. 3

**05 Switching**

- planning, installation, operation and maintenance of switching systems executed by your own organisation

Main productivity index: equivalent full-time employees for switching / 1000 DELs

Main workload indicator for switching = 1000 DELs (see "General") (other indicators must be considered in comparisons)										
Staffing indicators for Switching (including telephone operators)										
Staff for plan. inst. oper. & mtce of switch. systems	Total staff	Technical staff	Operating staff	Admin. support	Nature of job (see "ITU levels" - Annex 11.1)					Remarks
					7 - 5	4	3	2	1	
Present numbers of staff										
Target distribution of staff 5 years from now (in percent at each level)					%	%	%	%	%	
Target distribution of staff at 10 years from now					%	%	%	%	%	
Target distribution of staff 15 years from now					%	%	%	%	%	
Year 1-5: Annual turn-over (outflow) of staff (retirements., resign., deaths)					%	%	%	%	%	
Year 6-10: Annual turn-over (outflow) of staff					%	%	%	%	%	
Year 11-15: Annual turn-over (outflow) of staff					%	%	%	%	%	
Year 1-5: Percent external recruitment vs. internal promotion to level ->					%	%	%	%	%	
Year 6-10: Percent external recruitment vs. internal promotion to level ->					%	%	%	%	%	
Year 11-15: Percent external recruitment vs. internal promotion to level ->					%	%	%	%	%	
Annual productivity improvement - target					Target productivity index 5)					
Year 1-5: Percent yearly increase in workload indicator per employee -->						%	employees/1000DEL's year 5 ->			
Year 6-10: Percent yearly increase in workload indicator per employee -->						%	employees/1000DEL's year 10 ->			
Year 11-15: Percent yearly increase in workload indicator per employee -->						%	employees/1000DEL's year 15 ->			

**Installation of switching systems**

Productivity index = employees or man-years for installation of switching systems /1000 DELs installed per year

or number of installers/ number of exchanges (switching systems) installed per year

Workload and staff indicators	Step x step & rotary	Cross-bar systems	Electronic systems		Manual systems	Total all systems	Remarks
			analogue	digital			
DELs installed/year now (thousands)							
Planned annual installations in 1000 DELs 18)							
Year 1-5							
Year 6-10							
Year 11-15							
No of exchanges installed yearly now							
Planned No of exchanges inst./yr 18)							
Year 1-5							
Year 6-10							
Year 11-15							
Equip. full-time installers now							
% install. work done by own staff 22)	%	%	%	%	%	%	
Productivity improvement target 15)	%	%	%	%	%	%	
Year 1-5							
Year 5-10							
Year 11-15							
Target productivity index 5)							
Installers/ 1000DEL's inst'd per year							
Year 5							
Year 10							
Year 15							
Installers/exchange installed per year							
Year 5							
Year 10							
Year 15							

**05 Switching (continued)****Maintenance of switching systems** (consider only work done by your own staff)

Productivity index = No of staff or equivalent man-years for maintenance of switching systems/1000 DELs  
or No of staff or equivalent man-years for maintenance/exchange

Workload and staff indicators	Step x step & rotary	Cross-bar systems	Electronic systems		Manual systems	Total all systems	Remarks
			analogue	digital			
Present number of DELs (x1000) 23)							
Present number of exchanges 23)							
Equiv. full-time mtce staff now							
Productivity improvement target 15) Year 1-5 Year 6-10 Year 11-15	%	%	%	%	%	%	
Target productivity index 5)							
Equiv. f-t. mtce staff/1000DEL's Year 5 Year 10 Year 15							
Equiv. full-time mtce staff/exchange Year 5 Year 10 Year 15							
<b>Other performance indicators</b>							
Number of faults per year							
Average duration of faults 10)							
Number of repeated faults	%	%	%	%	%	%	
Operator answering delay = % calls answered by operator within 10 sec's:					%		



**06 & 07 Transmission & radiocommunication (continued)****Maintenance of transmission & radiocommunication systems**

Productivity index: Equivalent full-time staff for maintenance of transmission systems/100 terminating channels  
or equivalent full-time staff for maintenance of transm. systems/transm. system

Workload and staff indicators	Small FDM radio links		Large FDM radio-links		Digital systems		optical	Total all transmission systems
	terminals	repeaters	terminals	repeaters	cable	radio	fibre sys.	
Present number transm. syst. 21)								
Number of maintenance staff 23)								
Productivity improvement target 15)		%		%	%	%	%	%
Year 1-5								
Year 6-10								
Year 11-15								
Target productivity index 5)								
Mtce staff/ 100 term. channels 26)								
Year 5								
Year 10								
Year 15								
Mtce staff/ transm. system 26)								
Year 5								
Year 10								
Year 15								

Performance indicators for transmission	Small FDM radio links	Large FDM systems	Digital systems	optical	Total all systems
Total number of faults per year					
Percent repeated faults	%	%	%	%	%
Average duration of faults 10)					

## Questionnaire No. 3

**09 Power**

Main productivity index: Equivalent full-time employees in power/power supply unit

- planning, installation, operation and maintenance of powers supply, rectifiers, power distribution, aircon, etc., executed by your own organisation

Main workload indicator for power								
(other indicators must be considered in comparisons)				existing number		forecast average yearly growth		
Total number of power supply units						%		
Staffing indicators for power								
Staff for planning, installation, operation & maintenance of power supply, etc.	Total staff		Nature of job (see "ITU levels" - Annex 11.1)					Remarks
			7 - 5	4	3	2	1	
Present numbers of staff								
Target distribution of staff 5 years from now (in percent at each level)			%	%	%	%	%	
Target distribution of staff at 10 years from now			%	%	%	%	%	
Target distribution of staff 15 years from now			%	%	%	%	%	
Year 1-5: Annual turn-over (outflow) of staff (retirements., resign., deaths)			%	%	%	%	%	
Year 6-10: Annual turn-over (outflow) of staff			%	%	%	%	%	
Year 11-15: Annual turn-over (outflow) of staff			%	%	%	%	%	
Year 1-5: Percent external recruitment vs. internal promotion to level ->			%	%	%	%	%	
Year 6-10: Percent external recruitment vs. internal promotion to level ->			%	%	%	%	%	
Year 11-15: Percent external recruitment vs. internal promotion to level ->			%	%	%	%	%	
Annual productivity improvement - target			Target productivity index 5)					
Year 1-5: Percent yearly increase in workload indicator per employee -->			%	power empl./power supply year 5 ->				
Year 6-10: Percent yearly increase in workload indicator per employee -->			%	power empl./power supply year 10>				
Year 11-15: Percent yearly increase in workload indicator per employee -->			%	power empl./power supply year 15>				

**Installation of power supply and air-conditioning equipment**

Productivity index : Equivalent full-time employees for installation of power plant/ unit installed per year

Workload and staff indicators	Diesel Generators	Gas turbines	Air-conditioning equipment	solar power plant	Remarks
No of systems installed/year now					
Planned yearly installation 18) units					
Year 1-5					
Year 6-10					
Year 11-15					
Equiv. full-time installers now					
Productivity improvement target 15)	%	%	%	%	
Year 1-5					
Year 6-10					
Year 11-15					
Target productivity index 5)					
Installers/unit installed per year 19)					
Year 5					
Year 10					
Year 15					
% of units installed by own staff 24)	%	%	%	%	



**09 Power (continued)**

**Maintenance of power installations** (consider only work done by your own staff)

Productivity index = No of equivalent employees for maintenance of power plant

Workload and staff indicators	Diesel Generators	Gas turbines	Air-conditioning equipment	solar power plant	Remarks
Present number of units 21)					
Number of maintenance staff 23)					
Productivity improvement target 15) Year 1-5 Year 6-10 Year 11-15	%	%	%	%	%
Target productivity index 5)					
Equiv. full-time mtce staff/ unit Year 5 Year 10 Year 15					

Performance indicators for power	Diesel generators	Gas turbines	Air-conditioning equipment	solar power plant	Total all
Total number of faults per year					
Percent repeated faults	%	%	%	%	%
Average duration of faults 9)					

**Questionnaire No. 3**

**Key figures and targets in training of staff in "terminals" volumes.**

information required for forecast of training

Similar forms can be filled for any speciality or

task)

In this section, consider all training of installers, irrespective of where and by whom it is delivered Please indicate duration in weeks when not otherwise stated	ITU nature of job "levels" (see Annex 11.1 )					Average all levels
	7 - 5	4	3	2	1	
Average duration of "formal" 11) training when recruited to level:						
Average duration of on-the-job (OJT) training <sup>19)</sup> , when recruited to:						
Planned 13) average duration "formal" training, when recruited to:						
Planned 13) average duration of OJT when recruited to level:						
Average duration of "formal", training when "promoted" 14) to:						
Average duration of OJT when "promoted" to level:						
Planned 13) average duration of "formal" training when "promoted"						
Planned 13) average duration of OJT when "promoted" to level:						
No of days of "continuous" 15) training per employee & year						
Planned No of days of "continuous" training per empl. & year						

In this section, consider all training of maintenance staff, irrespective of where and by whom it is delivered Please indicate duration in weeks when not otherwise stated	ITU nature of job "levels" (see Annex 1)					Average all levels
	7 - 5	4	3	2	1	
Average duration of "formal" 11) training when recruited to level:						
Average duration of on-the-job (OJT) training <sup>19)</sup> , when recruited to:						
Planned 13) average duration "formal" training, when recruited to:						
Planned 13) average duration of OJT when recruited to level:						
Average duration of "formal", training when "promoted" 14) to:						
Average duration of OJT when "promoted" to level:						
Planned 13) average duration of "formal" training when "promoted"						
Planned 13) average duration of OJT when "promoted" to level:						
No of days of "continuous" 15) training per employee & year						
Planned No of days of "continuous" training per empl. & year						

(for forecast of training volumes)

**Key figures and targets in training of staff in External Plant**

In this section, consider all training of installers, irrespective of where and by whom it is delivered Please indicate duration in weeks when not otherwise stated	ITU nature of job "levels" (see Annex 1)					Average all levels
	7 - 5	4	3	2	1	
Average duration of "formal" 11) training when recruited to level:						
Average duration of on-the-job (OJT) training <sup>19)</sup> , when recruited to:						
Planned 13) average duration "formal" training, when recruited to:						
Planned 13) average duration of OJT when recruited to level:						
Average duration of "formal", training when "promoted" 14) to:						
Average duration of OJT when "promoted" to level:						
Planned 13) average duration of "formal" training when "promoted"						
Planned 13) average duration of OJT when "promoted" to level:						
No of days of "continuous" 15) training per employee & year						
Planned No of days of "continuous" training per empl. & year						

In this section, consider all training of maintenance staff, irrespective of where and by whom it is delivered Please indicate duration in weeks when not otherwise stated	ITU nature of job "levels" (see Annex 1)					Average all levels
	7 - 5	4	3	2	1	
Average duration of "formal" 11) training when recruited to level:						
Average duration of on-the-job (OJT) training <sup>19)</sup> , when recruited to:						
Planned 13) average duration "formal" training, when recruited to:						
Planned 13) average duration of OJT when recruited to level:						
Average duration of "formal", training when "promoted" 14) to:						
Average duration of OJT when "promoted" to level:						
Planned 13) average duration of "formal" training when "promoted"						
Planned 13) average duration of OJT when "promoted" to level:						
No of days of "continuous" 15) training per employee & year						
Planned No of days of "continuous" training per empl. & year						

## Questionnaire No. 3

## NOTES

- 1) Equivalent full-time staff employed for common carrier telecommunication services (excluding broadcasting)
- 2) Equivalent full-time staff employed for installation, maintenance and repair of telecommunication plant (including supervision of such tasks).
- 3) Equivalent full-time staff employed for setting up telephone and telex calls, for handling of telegrams, for answering requests for information (e.g. directory assistance) and for auxiliary work related to these tasks (including supervision of these)
- 4) **Annual staff cost** (expressed in US\$) should include social costs, benefits etc.
- 5) Target = employees (or equivalent man-years) per workload indicator
- 6) **Income** consists of all telecommunication revenue earned during the financial year under review (from subscribers, other national or foreign telecom organisations, governments, etc., **after deduction of** the share of this income to be paid to other Administrations or organisations for outgoing traffic. It does **not** include revenue earned during previous years, nor moneys received in loans or from repayable subscribers' contributions or deposits.
- 7) **Expenditures** means current expenditures **other than investments**. It refers to running of the telecom services on an annual bases, e.g., **operational expenditures**(cost of staff, cost of material , etc.), **depreciation, interests on loans associated with fixed or current assets, taxes on income, expenditures, profit or capital. It does not include pay-related (e.g. social) taxes which are included in staff costs**
- 8) **Investments** = expenditures associated with acquiring the ownership of property and plant before depreciation
- 9) Staff employed for management and administration, excluding personnel administration and training (see 01) but including policy and strategy development, forecast, network planning, etc. and staff employed for research & development, accounting, public relations and marketing, budgeting and accounting , transport and buildings and other support functions not directly related to "technical" or "operational" tasks
- 10) Please indicate hours (H), days (D), weeks (W) or months (M).
- 11) "Formal" training = vocational (job oriented) training carried out schools or training centres.
- 12) One trainee-week = one trainee (student) for one week = 5 trainee-days = 30 trainee-hours.
- 13) If a person attends several courses in one year he/she should be counted as one trainee only.
- 14) or number of equivalent man-years/year spent on instruction (if part time instructors )
- 15) average yearly % increase workload indicator per equivalent full-time employee in the speciality concerned
- 16) "Promotion" = changing NATURE of tasks from one "ITU level" to the next (not necessarily promotion in grade)
- 17) "Continuous" training = refresher training, upgrading of skills, training for new tasks of the SAME NATURE (at the same "ITU level"), i.e. all training except "initial" and "promotion" training
- 18) or equivalent man-years/year spent on course development, adaptation or revision/updating
- 19) OJT = training carried out on the job (state average duration of apprenticeship until fully qualified for job)
- 20) Planned = estimated (target) duration 5 years from now
- 21) **Average number of units** to be installed or removed (negative) **per year** in the period according to plans
- 22) If the installation of equipment as well as the planning and supervision of this is entirely done by the supplier or sub-contracted, you should indicate 0%. If your staff is responsible only for the supervision, put an "S" .
- 23) maintained by your organisation (this could be different than numbers installed by your organisation)
- 24) expected growth of terminals maintained by your organisation (may include terminals installed by others)
- 25) or number of equivalent man-years/year spent on installation (by you own staff)
- 26) or number of equivalent man-years/year spent on maintenance (by you own staff)
- 27) in % increase in number of course hours developed per equivalent full-time course developer and year













## Forecast of Manpower and Training Needs : Sample of MANPLAN Output

3      **MANPOWER PLANNING**  
 Speciality:      Global      Scenario No      1  
 Forecast of growth of workload indicator and personnel (all levels)

1st period: productivity improvement: exponential      2nd period: productivity impr. expon.      3rd period: productivity impr. expon.  
 workload growth: exponential      workload growth exponential      workload growth exponential

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
x1000DEL	171	183	196	209	224	238	252	267	283	300	318	337	357	379	401
Equiv. employees	2025	2064	2103	2143	2184	2184	2184	2184	2184	2184	2205	2226	2247	2268	2290
Empl/1000DEL	11.8	11.3	10.7	10.2	9.7	9.2	8.7	8.2	7.7	7.3	6.9	6.6	6.3	6.0	5.7

(Productivity)      0.08      0.089      0.093      0.098      0.103      0.109      0.115      0.122      0.130      0.137      0.144      0.15      0.16      0.17      0.18

1st period: productivity improvement: exponential      2nd period: productivity impr. expon.      3rd period: productivity impr. expon.  
 workload growth: linear      workload growth linear      workload growth linear

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
x1000DEL	171	184	198	211	224	239	254	270	285	300	320	341	361	381	401
Equiv. employees	2025	2078	2122	2157	2184	2199	2206	2206	2198	2184	2220	2249	2269	2283	2290
Empl/1000DEL	11.8	11.3	10.7	10.2	9.7	9.2	8.7	8.2	7.7	7.3	6.9	6.6	6.3	6.0	5.7

1st period: productivity improvement: linear      2nd period: productivity impr. linear      3rd period: productivity impr. linear  
 workload growth: linear      workload growth linear      workload growth linear

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
x1000DEL	171	184	198	211	224	239	254	270	285	300	320	341	361	381	401
Equiv. employees	2025	2071	2112	2150	2184	2184	2184	2184	2184	2184	2209	2232	2253	2272	2290
Empl/1000DEL	11.8	11.2	10.7	10.2	9.7	9.1	8.6	8.1	7.7	7.3	6.9	6.6	6.2	6.0	5.7

(Productivity)      0.08      0.089      0.094      0.098      0.103      0.110      0.117      0.123      0.130      0.137      0.145      0.153      0.160      0.168      0.175

1st period: productivity improvement: linear      2nd period: productivity impr. linear      3rd period: productivity impr. linear  
 workload growth: exponential      workload growth exponential      workload growth exponential

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
x1000DEL	171	183	196	209	224	238	252	267	283	300	318	337	357	379	401
Equiv. employees	2025	2056	2093	2136	2184	2168	2161	2162	2170	2184	2194	2209	2231	2258	2290
Empl/1000DEL	11.8	11.2	10.7	10.2	9.7	9.1	8.6	8.1	7.7	7.3	6.9	6.6	6.2	6.0	5.7

Forecast of manpower needs and staff flows      Speciality:      Global      Scenario:      1

1st period: productivity improvement: exponential      2nd period: productivity impr. linear      3rd period: productivity impr. expon.  
 workload growth: exponential      workload growth linear      workload growth exponential

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
x1000DEL	171	180	189	198	208	219	231	242	254	265	286	309	334	361	390
Equiv. employees	2025	1987	1950	1914	1878	1789	1716	1654	1602	1558	1529	1501	1474	1447	1421
Empl/1000DEL	11.8	11.1	10.3	9.7	9.0	8.2	7.4	6.8	6.3	5.9	5.3	4.9	4.4	4.0	3.6
(Productivity)	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2
Level/year	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
7 - 5	3%	3%	3%	4%	4%	4%	4%	5%	5%	5%	5%	5%	6%	6%	6%
4	14%	15%	16%	18%	19%	19%	20%	20%	21%	21%	22%	22%	23%	23%	24%
3	47%	46%	45%	44%	43%	42%	41%	40%	39%	38%	37%	37%	36%	36%	35%
2	14%	15%	15%	16%	17%	18%	19%	19%	20%	21%	22%	23%	23%	24%	25%
1	23%	22%	20%	19%	17%	17%	16%	16%	15%	15%	14%	13%	12%	11%	10%



## FORECAST OF DISTRIBUTION OF STAFF ON LEVELS (in numbers)

Global Scenario No 1

Level/year	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
7 - 5	58	63	67	71	75	75	75	76	77	78	80	81	83	84	85
4	278	299	319	338	357	347	340	334	330	327	330	333	336	339	341
3	945	909	874	840	807	751	703	662	625	592	572	553	534	515	497
2	278	289	300	310	319	318	319	321	324	327	333	339	345	350	355
1	466	427	390	354	319	297	278	261	247	234	214	195	177	159	142
<b>Total</b>	<b>2025</b>	<b>1987</b>	<b>1950</b>	<b>1914</b>	<b>1878</b>	<b>1789</b>	<b>1716</b>	<b>1654</b>	<b>1602</b>	<b>1558</b>	<b>1529</b>	<b>1501</b>	<b>1474</b>	<b>1447</b>	<b>1421</b>

## STAFF FLOWS

Speciality: Global Scenario: 1

LEVEL 5-7	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
New posts	4.6	4.4	4.2	4.0	0.0	0.4	0.6	0.8	1.0	1.6	1.6	1.5	1.4	1.3	1.2
Out-flow:	2.3	2.5	2.7	2.8	3.0	3.8	3.8	3.8	3.8	3.9	2.4	2.4	2.5	2.5	2.6
Net flow	6.9	6.9	6.9	6.8	3.0	4.1	4.4	4.6	4.8	5.5	3.9	3.9	3.9	3.8	4
Vacancies	7	7	7	7	3	4	4	5	5	6	4	4	4	4	4
Promot 4→5	2	2	2	2	0	0	0	0	0	1	0	0	0	0	0
Recruitment	5	5	5	5	2	3	4	4	4	4	3	3	3	3	3
Term/transf.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

LEVEL 4	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
New posts	21.0	20.1	19.3	18.4	-9.7	-7.3	-5.5	-4.1	-3.0	3.2	3.0	2.8	2.6	2.4	2
Out-flow:	8.3	9.0	9.6	10.2	10.7	17.4	17.0	16.7	16.5	16.4	9.9	10.0	10.1	10.2	10.2
Net flow	31.1	30.8	30.5	30.3	1.7	10.8	12.4	13.5	14.5	20.7	13.7	13.6	13.4	13.3	13
Vacancies	31	31	31	30	2	11	12	14	14	21	14	14	13	13	13
Promot 3→4	29	29	29	29	2	10	11	12	13	19	12	12	12	12	12
Recruitment	2	2	2	2	0	1	1	1	1	2	1	1	1	1	1
Term/transf.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

LEVEL 3	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
New posts	-35.9	-34.9	-33.9	-32.9	-56.1	-47.9	-41.7	-36.8	-33.0	-19.9	-19.4	-18.9	-18.4	-17.9	-17
Out-flow:	28.4	27.3	26.2	25.2	24.2	30.1	28.1	26.5	25.0	23.7	17.2	16.6	16.0	15.5	14.9
Net flow	22.0	21.7	21.4	21.1	-30.3	-8.1	-2.4	1.8	5.0	22.4	10.1	9.9	9.7	9.5	9
Vacancies	22	22	21	21	0	0	0	2	5	22	10	10	10	10	9
Promot 2→3	4	4	4	4	0	0	0	0	0	4	2	2	2	2	2
Recruitment	18	17	17	17	0	0	0	1	4	18	8	8	8	8	7
Term/transf.	0	0	0	0	30	8	2	0	0	0	0	0	0	0	0

LEVEL 2	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
New posts	11.1	10.5	10.1	9.6	-0.8	0.7	1.8	2.7	3.4	6.3	6.0	5.6	5.3	5.0	5
Out-flow:	8.3	8.7	9.0	9.3	9.6	12.7	12.8	12.8	12.9	13.1	10.0	10.2	10.3	10.5	10.7
Net flow	23.8	23.5	23.3	23.1	8.8	13.4	14.6	15.9	17.4	23.8	18.0	17.8	17.6	17.4	17
Vacancies	24	24	23	23	9	13	15	16	17	24	18	18	18	17	17
Promot 1→2	5	5	5	5	2	1	1	2	2	2	2	2	2	2	2
Recruitment	19	19	19	18	7	12	13	14	16	21	16	16	16	16	16
Term/transf.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

LEVEL 1	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
New posts	-38.6	-37.3	-36.1	-34.8	-22.3	-19.0	-16.5	-14.6	-13.1	-19.5	-18.9	-18.3	-17.7	-17.1	-17
Out-flow:	14.0	12.8	11.7	10.6	9.6	11.9	11.1	10.5	9.9	9.3	6.4	5.9	5.3	4.8	4.3
Net flow	-19.8	-19.8	-19.7	-19.6	-10.9	-5.8	-4.0	-2.6	-1.5	-7.8	-10.7	-10.7	-10.6	-10.6	-11
Vacancies	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Recruitment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Term/transf.	20	20	20	20	11	6	4	3	2	8	11	11	11	11	11

**TOTALS**

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
<b>Recruitment</b>	43	43	42	42	9	16	18	21	25	46	29	28	28	28	27
<b>Promotions</b>	40	40	40	39	4	12	13	15	17	27	17	17	17	16	16
<b>Terminations</b>	20	20	20	20	41	14	6	3	2	8	11	11	11	11	11

(or transfers)

**FORECAST OF TRAINING VOLUMES AND COST****Training volume - initial training**

	Speciality:					Global					Scenario: 1				
	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
<b>Level 7-5</b>	21	21	21	21	9	13	14	15	15	18	13	13	12	12	12
<b>Level 4</b>	0	1	2	4	0	4	5	5	6	8	5				
<b>Level 3</b>	264	485	701	910	0	0	0	116	320	1431	645	633	621	610	599
<b>Level 2</b>	266	256	246	236	87	145	158	172	188	258	194	192	190	188	186
<b>Level 1</b>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Total</b>	551	763	970	1170	96	163	177	308	529	1715	857	838	824	810	797

**Training volume - "promotion" training**

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
<b>To level 7-5</b>	0	48	96	144	85	115	123	129	135	155	110	109	108	107	106
<b>To level 4</b>	29	47	64	81	6	39	44	49	52	74	49	49	48	48	47
<b>To level 3</b>	110	156	201	244	0	0	0	29	80	358	161	158	155	152	150
<b>To level 2</b>	57	53	48	44	15	11	12	13	14	19	14	14	14	14	14
<b>Total</b>	196	304	409	513	106	165	179	220	281	606	335	331	326	322	317

**Training volume - "continuous" training**

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
<b>Level 7-5</b>	81	88	94	100	105	105	106	107	108	109	111	114	116	118	119
<b>Level 4</b>	78	91	105	119	134	139	136	134	132	131	132	133	134	135	136
<b>Level 3</b>	510	502	493	484	475	451	422	397	375	355	343	332	320	309	298
<b>Level 2</b>	43	59	76	94	112	127	128	128	129	131	133	136	138	140	142
<b>Level 1</b>	0	17	16	14	13	59	56	52	49	47	43	39	35	32	28
<b>Total</b>	713	757	783	811	839	882	847	818	793	773	763	753	744	734	725

**Summary of training**

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
<b>"Initial"</b>	551	763	970	1170	96	163	177	308	529	1715	857	838	824	810	797
<b>"Promotion"</b>	196	304	409	513	106	165	179	220	281	606	335	331	326	322	317
<b>"Continuous"</b>	713	757	783	811	839	882	847	818	793	773	763	753	744	734	725
<b>Total</b>	1460	1823	2162	2494	1041	1209	1203	1346	1603	3093	1956	1922	1894	1866	1839

**DISTRIBUTION OF TRAINING ON 'SUPPLIERS' OF TRAINING IN YEAR: 1996**  
**Speciality: Global**  
**Scenario: 1**

**INITIAL TRAINING**

Level	(trainee weeks)					Total
	7 - 5	4	3	2	1	
'IN-HOUSE' TRAINING	12	4	0	145	0	161
NATIONAL SUB-CONTRACT	1	0	0	0	0	2
REGIONAL SUB-CONTRACT	0	0	0	0	0	0
INTERNAT. SUB-CONTRACT	0	0	0	0	0	0
SUPPLIERS & CONSULTANTS	0	0	0	0	0	0
<b>TOTAL trainee-weeks</b>	<b>13</b>	<b>4</b>	<b>0</b>	<b>145</b>	<b>0</b>	<b>163</b>

**"PROMOTION" TRAINING**

To Level	(trainee-weeks)				Total
	7 - 5	4	3	2	
'IN-HOUSE' TRAINING	12	27	0	11	50
NATIONAL SUB-CONTRACT	69	2	0	0	71
REGIONAL SUB-CONTRACT	23	2	0	0	25
INTERNAT. SUB-CONTRACT	12	4	0	0	15
SUPPLIERS & CONSULTANTS	0	4	0	0	4
<b>TOTAL trainee-weeks</b>	<b>115</b>	<b>39</b>	<b>0</b>	<b>11</b>	<b>165</b>

**"CONTINUOUS" TRAINING (= all IN-SERVICE training, except "promotion" training)**

Level	7 - 5	4	3	2	1	Total
'IN-HOUSE' TRAINING	47	62	361	115	59	644
NATIONAL SUB-CONTRACT	5	7	23	6	0	41
REGIONAL SUB-CONTRACT	5	7	0	0	0	12
INTERNAT. SUB-CONTRACT	21	28	23	0	0	71
SUPPLIERS & CONSULTANTS	26	35	45	6	0	112
<b>TOTAL trainee-weeks</b>	<b>105</b>	<b>139</b>	<b>451</b>	<b>127</b>	<b>59</b>	<b>882</b>

**SUMMARY DISTRIBUTION OF TRAINING VOLUME (in trainee-weeks) ON "SUPPLIERS" OF TRAINING**

Year : 1996

Level	7 - 5	4	3	2	1	Total	%
'IN-HOUSE' TRAINING	71	94	361	270	59	855	71%
NATIONAL SUB-CONTRACT	76	9	23	6	0	114	9%
REGIONAL SUB-CONTRACT	28	9	0	0	0	37	3%
INTERNAT. SUB-CONTRACT	33	32	23	0	0	87	7%
SUPPLIERS & CONSULTANTS	26	39	45	6	0	116	10%
<b>TOTAL trainee-weeks</b>	<b>234</b>	<b>182</b>	<b>451</b>	<b>283</b>	<b>59</b>	<b>1209</b>	<b>100%</b>
%	<b>19%</b>	<b>15%</b>	<b>37%</b>	<b>23%</b>	<b>5%</b>	<b>100%</b>	

## TRAINING BUDGET

Name of local currency:

TELS

TOTAL PERSONNEL COST YEAR: 1996

Level	7 - 5	4	3	2	1	Total
Number of employees	75	347	751	318	297	1789
Annual personnel cost	6	26	48	18	16	113

Mega- TELS

## DISTRIBUTION OF TRAINING VOLUME (in %) &amp; COSTS ON "SUPPLIERS" OF TRAINING

1996

	Volume	Actual cost		Estimated cost	
	in %	Mega- TELS	in %	Mega- TELS	in %
'IN-HOUSE' TRAINING	70.7%	0.89	24%	1.04	24%
NATIONAL SUB-CONTRACT	9.4%	0.19	5%	0.14	3%
REGIONAL SUB-CONTRACT	3.1%	0.05	1%	0.05	1%
INTERNAT. SUB-CONTRACT	7.2%	1.17	31%	1.30	30%
SUPPLIERS & CONSULTANTS	9.6%	1.47	39%	1.75	41%
TOTAL	100.0%	3.77	100%	4.27	100%

The estimated training cost = training)	4 % of the total salary cost	(including cost of international and suppliers
The estimated training cost = training)	1 % of the total salary cost	(excluding cost of international and suppliers
The actual training cost = suppliers training)	3 % of the total salary cost	(including cost of international and
The actual training cost = suppliers training)	1 % of the total salary cost	(excluding cost of international and

## CONFIGURATION OF COST FOR INTERNAL TRAINING UNIT ('IN-HOUSE' TRAINING)

1996

(Typical distribution of cost)

Cost categories:	%	Actual	Estimated
		Mega-	TELS
Personnel	50%	0.445	0.52
Oper & mtce	15%	0.133	0.16
<b>Depreciations</b>			
Buildings	5%	0.044	0.05
Equipment	30%	0.267	0.31
Total	100%	0.89	1.04

Mega- TELS

Number of EQUIVALENT FULL TIME TRAINERS needed = 3 in 1996

( for in-house training, assuming that a trainer works 40 effective weeks/year, that they spend an average of 20 hours/week in class and that the average class size is 10 trainees per trainer)

**FORECAST OF YEARLY PERSONNEL, AND TRAINING COSTS**

(using the "estimated training costs, i.e. assuming that local training costs = 1 weeks average salary per trainee-week and a yearly change of training costs = to the average yearly change in personnel costs)

**Yearly cost per employee in thousands of TELS**

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Level 7-5	73	74	74	75	76	77	77	78	79	80	81	81	82	83	84
Level 4	71	72	72	73	74	75	75	76	77	78	78	79	80	81	82
Level 3	61	62	62	63	63	64	65	65	66	67	67	68	69	69	70
Level 2	55	56	56	57	57	58	58	59	60	60	61	61	62	63	63
Level 1	51	52	52	53	53	54	54	55	55	56	56	57	57	58	59

1

**Total yearly personnel and training cost in Millions of****TELS**

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Tot. "loc." cost	122	122	122	122	120	115	112	109	107	107	105	105	104	103	103
Salaries, etc.	121	120	120	119	119	114	111	108	106	104	103	103	102	101	101
"In house" trg	1.2	1.5	1.8	2.1	0.9	1.0	1.0	1.2	1.4	2.7	1.8	1.7	1.7	1.7	1.7
nat. sub-contr.	0.2	0.2	0.2	0.3	0.1	0.1	0.1	0.2	0.2	0.4	0.2	0.2	0.2	0.2	0.2
reg. sub-contr.	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
int. sub-contr.	1.6	2.0	2.3	2.7	1.1	1.3	1.3	1.4	1.7	3.3	2.1	2.1	2.0	2.0	2.0
suppl. & cons.	2.1	2.6	3.1	3.6	1.5	1.7	1.7	1.9	2.3	4.5	2.8	2.8	2.7	2.7	2.7
<b>Total costs</b>	126	127	127	128	122	118	115	113	111	115	110	109	109	108	107