Sida Evaluation 96/3

Telecommunications A Swedish Contribution to Development

Evaluation of BITS' support to telecommunications development

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Infrastructure and
Economic Cooperation

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0. EXECUTIVE SUMMARY

Background

The global technological process during the last ten to fifteen years has laid the foundation for a rapid expansion and improvement of telecommunications services on a global scale. The main positive impact resulting from this development can be summarised as follows:

- access to information has come to be perceived as a *factor of production* of equal importance as land, labour and capital; the transition of the command economy into a market economy, when decisions regarding prices and marketed quantities are moved from the government to the individual producer, cannot be successfully accomplished without such information being easily accessible;

- telecommunications has come to provide a trade off with physical transportation, reducing energy consumption, pollution and, hence, the rate of environmental degradation;

- better access to and dissemination of information can serve to enrich the cultural and social life, by encouraging and facilitating person-to-person communication with impact on social and cultural diversity and broadening educational horizons;

- better access to information makes it more difficult to cut off the population from the international news agenda and from ideas and experiences challenging messages and opinions being pursued by a non-democratic government, and thus makes people better able to exercise their democratic rights.

A prerequisite for this development to be realised is that the telecommunications network is reliable and spreading over the country so that "a universal access" can be established.

Objectives of the evaluation

BITS, and since mid-1995, Sida-INEC has supported telecommunications development with concessionary credits and technical assistance[1]. The total volume to projects studied in this evaluation amounts to SEK 1 600 million counted on grant terms. If the total credit volume was to be included the figure would surpass SEK 5 000 million.

This assignment should focus on two aspects of BITS's support to telecommunications development. Firstly, the evaluation should identify the results and impact of the support in relation to the needs of telecommunications development in developing countries. Secondly, the assignment should recommend a model or a method for appraisal (ex ante)

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[1] SIDA has also supported telecommunications development throughout a long period. This support is, however, not included in this evaluation.

and evaluation (ex post) of telecommunications projects, with particular reference to possible secondary effects.

Methodology

The evaluation has used the concepts of the Logical Framework Approach (LFA) in assessing the results and impact of the support. The following definitions have bee used.

impact	short and medium term development effects (as e.g. better services to the subscribers business development , capacity building) and long term socio-economic impact related to the Swedish goals for development co-operation (such as democratic development, social development, economic growth)
results	actual output in relation to contract stipulations (extension of network, transfer of know-how etc.)
inputs	resources used for implementation
cost-effective-ness	comparison between the project budget and actual disbursements (this definition is based on the assumption that the budget was scrutinised and judged to correspond to a cost-effective resources use by BITS ex ante; this is normally included in BITS appraisal)

Results and Impact

The *results* of the co-operation financed through BITS are, at all other comparisons, very impressive. The rate of achievement of expected outputs attained 90 per cent. The few deviations that have been registered are either related to a general break-down in the project environment (Jordan) or a combination of insufficient planning and project management (local network in Mauritius).

The *impact* at sector level is also considerable, especially in the form of a more effective and efficient use of the services, measured as reduced fault rates and improved traffic. The consequential impact, expressed by the operators, on small business development, public sector efficiency and the socio-political development can only be described as high, without any precise quantifiable consequences. It can, however, be estimated that BITS support has led to improved interpersonal communication for between 10 and 20 million people. Other investigations concerning for what purposes people use telephone services show that, for instance, public pay-stations in urban areas are used by housewives (30%), small business people (30%) and students (17%). In rural areas the pay-station is used for agriculture purposes (45%), commerce and livestock (18 % each)[2].

Numerous international studies verify the close relationship between telecommunications development and economic development. A regression analysis covering the years 1955 - 65 suggests that the telephone density grows by 1.4 per cent for every per cent of GNP growth. More recent data from China (Shanghai) indicates that this coefficient could be as high 3 - 4, implying that 1 per cent of GNP growth must be combined with an increase

[2] See Telecommunications and economic development, page 241, World Bank 1994

of the telephone density of 3 to 4 per cent. The role played by telecommunications in accomplishing economic growth would thus have become increasingly important.

All this taken together leads us to the recommendation that Sida-INEC should regard telecommunications as a priority area for support. The sector is especially well suited for credit financing of network extension projects, be it through tied concessionary credits, whenever applicable, or development credits.

Grant financing of technical assistance should continue

- to ensure technological sustainability through capacity building in network operations and maintenance - this will increase the efficiency and effectiveness of investments in network extension;

- to ensure financial sustainability through advice on sector reform work and corporate development (in particular commercialisation of the services). Swedtel through Telia AB has relevant experiences in this area of great potential for other national operators needing to restructure and commercialise operations. If Swedish suppliers would not be interested for strategic business reasons, other consultants should be engaged or Sida should make sure that such reform work is on-going in other forms.

Factors to assess in future appraisals

In appraising requests for support, Sida should increasingly study the impact, not only the expected results, and look for projects that address the Swedish development goals. As the analysis in chapter 3 and chart 21 depict, Sida can target these goals by choosing telecommunications projects with higher inclination to meet the needs of certain target groups, as summarised in the box below:

objective	**target group**
economic growth	public sector, industrial sector, urban areas
democracy	residential areas
gender and social equality	residential areas, rural areas
reduced environmental degradation	transport sector, public sector

Sida should increasingly use LFA to define the contribution from the project results to the sector and development impact and use the box above as guidelines for the orientation of the support in view of the specific country strategy.

1. BACKGROUND

1.1 Terms of Reference

This assignment should focus on two aspects of BITS's support to telecommunications development[3]. Firstly, to identify the results and impact of the support in relation to the needs of telecommunications development in developing countries. Secondly, the assignment should recommend a model or a method for appraisal (ex ante) and evaluation (ex post) of telecommunications projects, with particular reference to possible secondary effects.

1.2 Structure of the telecommunications support

BITS has in various forms supported the development of telecommunications with altogether around SEK 5 billion. This figure is an estimate of the total resources disbursed through BITS, the Swedish Export Credit Scheme and the recipient government (in the form of local cost contributions recorded by BITS) in projects supported by BITS.

The direct cost reported as development assistance, which include the grant element of concessionary credits and technical assistance, amounts to little more than SEK 1.6 billion. The evaluation includes 67 completed projects to the compound grant element value of SEK 1 373 million (37 projects) and of SEK 70 million in technical assistance (30 projects) during the period 1987 - 1994. The evaluation thus covers around 90 % of the disbursed funds. The concessionary credits have almost without exception been used to finance network development and extension through supply and installation of public exchanges delivered by Ericsson (AXE-stations). Likewise, the technical assistance has financed consultancy services delivered by Swedtel or ScanSwitch, both being subsidiaries to the Swedish Telecommunications Corporation - Telia AB. This is in line with the guidelines of BITS to involve Swedish partners in the co-operation.

The regional distribution of the disbursed funds shows the dominance of China as recipient. More than half of the assistance (54%) has been disbursed to projects in China. The rate of concentration is high also for the remainder, with 87% going to four countries (in addition to China, also Algeria, Tunisia and Morocco).

As shown in chart 1 below, altogether 20 countries have received support from BITS to the telecommunications sector. This means that the 16 other countries share the remaining 13% of total disbursements. Countries whose share is registered as 0% in the chart have received less than 1% of the total disbursements from BITS.

The rate of concentration is further increased if the total credit volume is used as base for the Swedish resource flow; China's share then attains 57% and for the four biggest recipients the aggregate share rises to 89%.

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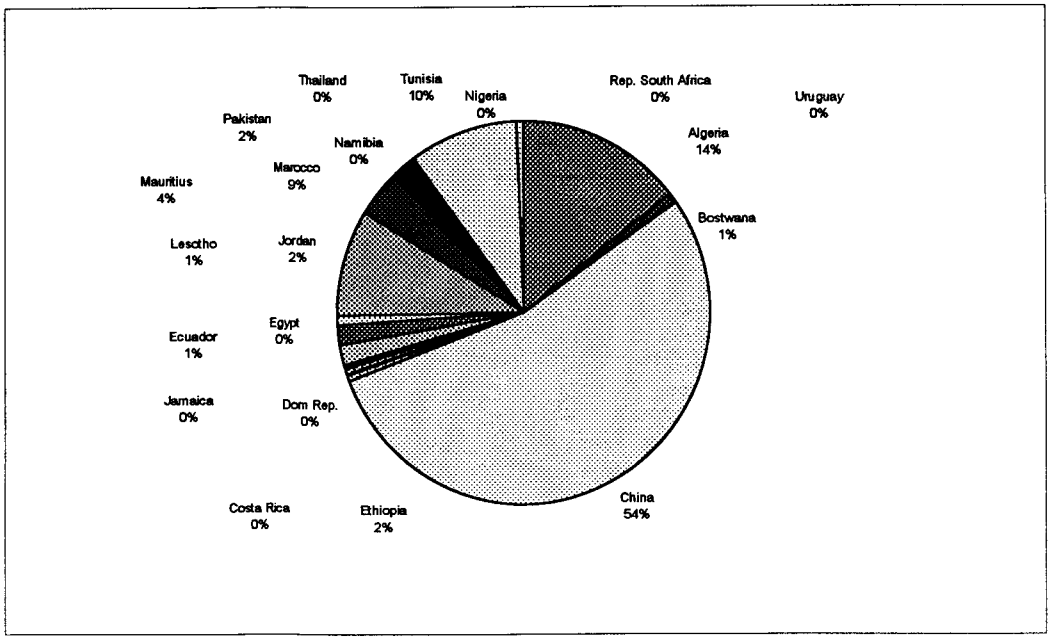
[3] See Terms of Reference, dated 1994-12-20, in Attachment 1

Chart 1: Regional distribution of BITS disbursements to telecommunications development



1.3 Evaluation methodology

The evaluation terminology is based on the Logical Framework Approach, implying the following definitions:

impact	short and medium term development effects (as e.g. better services to the subscribers business development , capacity building) and long term socio-economic impact related to the Swedish goals for development co-operation (such as democratic development, social development, economic growth)
results	actual output in relation to contract stipulations (extension of network, transfer of know-how etc.)
inputs	resources deployed for implementation
cost-effective-ness	comparison between the project budget and actual disbursements (this definition is based on the assumption that the budget was scrutinised and judged to correspond to a cost-effective resources use by BITS ex ante; this is normally included in BITS appraisal)

The evaluation has been carried out in three steps

- a review of the project documentation, mainly BITS decision memos, scope of works, independent appraisals and final reports of individual projects, in order to assess the

results of the projects in terms of actual delivery of goods and services and the *cost-effectiveness;*

- a survey of the *impact* in the form of a questionnaire (one form for credit projects, another for technical assistance) to telecommunications organisations supported by BITS (see copies of the questionnaires in appendix 2);

- field visits to China (Beijing and Jiangsu province), Egypt, Ethiopia and Tunisia (see field reports in appendices 4 - 7) to amplify the discussion of results and impact.

Both the document review and the field visits have been complemented with interviews with representatives from the two main suppliers, Ericsson and Swedtel. This was in many cases necessary since BITS' project documentation is not complete and the staff turn-over has been quite high causing a reduced institutional memory[4]. Our recommendations on the basic content of a project file is included in chapter 5, Recommendations.

The document review was summarised in a profile for the achievement of each individual project. These profiles were later aggregated to describe the total results of BITS' support to telecommunications development. Each profile contains information on the actual outputs compared to what was stipulated to be provided by the Swedish supplier in terms of training and other services, network installations etc.

The questionnaires were sent to 17 telecommunications operators which have received support from BITS[5]. The operators were requested to fill in one form per credit project and one form per TA-project. The forms were mailed in Stockholm by June 30, 1995 and the operators were requested to return the completed forms by August 30. By that time only a handful forms had been returned and much of the fall has been used to remind the operators to respond.

By February 29, 1996 all operators but two (Algeria and Tunisia) have responded. *The rate of response is thus almost 90%,* which must be considered sufficient for drawing general conclusions from the survey. The Tunisian Ministère des Communications has confirmed that they intend to respond, but a reorganisation of the telecommunications department has led to a further delay. The Tunisian response to the questionnaire is not included in the present version of the report.

On the return of the questionnaires, a flaw was observed in the definition of the projects. What BITS refers to as a project and which is recorded accordingly in its project classification - and what was used to attribute a profile in the document review - is not

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[4] This may be a reflection of the fact that BITS has recruited younger - and more mobile - professionals in development cooperation rather than senior sector specialists.

[5] Three recipients were left out in the survey: Jamaica (only a short study was financed in 1987), Nigeria (a very brief survey dated 1983) and Dominican Republic (a rather large TA-project from 1980-84 which was canceled due to change of government). South Africa was never included since no project had been fully implemented.

necessarily understood as a project by the recipient (or by the supplier). The activities that BITS assesses and approves as a credit project are in many instances a component or a phase of a national extension programme, co-financed with the World Bank and bilateral sources of finance. The recipient may then have a problem in identifying the particular results and impact of the activities financed by Sweden. This was observed in the response from i.a. Ethiopia and was corrected during the field visit. As regards the technical assistance projects, the same problem has been observed when a BITS-project in fact represents an annual contribution to a more comprehensive software programme.

This flaw signifies that the *impact* reported in the questionnaires in some cases may be based on a wider assessment of effects than what specifically refers to the activities funded by Sweden. It may subsequently also signify that what is reported as *results* in the document review is not necessarily based on exactly the same mass of information as the impact analysis. We do not, however, consider this small mis-match in the definition of "projects" to reduce the validity of the conclusions.

In the questionnaires the respondents have been requested to pass judgements of the projects' achievements in relation to the objectives, the usefulness and quality of the goods and services delivered. When these judgements have been processed to generalised data, a key for weighting has been applied. In questions involving four judgements (as e.g. "not at all, not so good, good and completely"), the alternative "no" or "not at all" has received weight 1 and the other 2, 3 and 4 respectively. Questions involving three judgements - omitting the "no"-alternative (as e.g. "low impact, medium impact, high impact") - have been weighted as 1, 2 and 3. Consequently, the first alternative with four weights makes the responses relatively rosier than the second alternative when expressed in percentages.

It should be stressed that the assessment of the impact of the projects is based on the *opinions* or *experiences* of the telecommunications operators when answering the questions in the questionnaires, not quantitative analysis involving regression analysis or similar tools to determine the relation between telecommunications development and factors which describe social and economic impact.

1.4 Execution of the assignment

The findings of the document review was presented in an interim report, dated 31st of May 1995. The interim report basically focused on the results of the supported projects as they were reported in final reports and similar. Those findings and conclusions are integrated into this final report, which consequently shall be regarded as the full and only report from the evaluation.

The assignment was planned to be finalised in August/September in 1995. However, on top of the delayed responses of the questionnaires, the field visits came to delay the assignment even further. In consultation with BITS four countries were selected to be visited for additional interviews and research: China (Jiangsu province), Egypt, Ethiopia and Tunisia. For various reason both the visits to China and to Egypt had to be postponed from early September until November and December of 1995 respectively.

The assignment has been carried out by Lars Rylander (team-leader, document review TA-projects and field visits to Egypt and Ethiopia), Bo Göransson (particularly the methodology), Camilla Hedlund (data processing), Åke Peterson (document review TA-projects), Ulf Rundin (questionnaire, document review credit projects, field visit China), Herman Ruud (field visits Egypt, Ethiopia and Tunisia) and Bertil Sunesson (questionnaire, methodology, document review credit projects, field visit China).

We would like to extend our gratitude to the telecommunications operators in general and the telecommunications staff in the Jiangsu province in China, ARENTO of Egypt, ETA of Ethiopia and DGT of Tunisia in particular as well as representatives of Ericsson, Swedtel and ScanSwitch, without the assistance of whom this assignment would not have been completed.

1.5 Report format and content - overview

Chapter two of the report contains basically our observations made from the document review, focusing at the *results* of the projects as they were reported in final reports, evaluations and through interviews. These are broken down into the two main forms of assistance: credit projects and technical assistance projects (TA-projects). We also draw some conclusions regarding the cost-effectiveness of the projects.

Chapter three looks at the impact of the projects, at the (telecommunications) sector level, at national level with references to the side-effects and the long term development objectives and, finally, in relation to the trade and commercial relations between Sweden and the recipient countries.

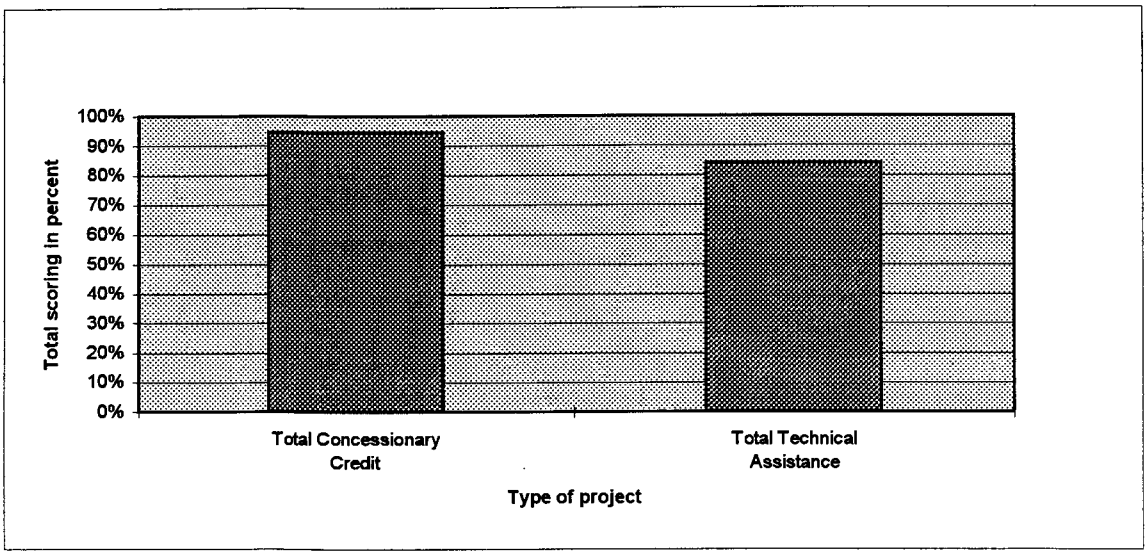
Chapter four is a summary of the main conclusions, and especially in relation to the request in the terms of reference regarding the model for ex ante (appraisal) and ex post (evaluations) assessment of development projects in the telecommunications sector.

Chapter five, finally, contains the main recommendations arising from the assignment.

2. RESULTS

The overall results are impressive. The rate of fulfillment at output level of all projects is almost 90%. This classifies without doubt the support to telecommunications development as one of the most successful areas of Swedish development co-operation in terms of actual delivery of goods and services.

Chart 2: Results compared to expected outputs



One can also note that the results are slightly higher for projects financed by concessionary credits than by grants used for technical assistance. What the chart says is that only 5% of the extension projects and 15% of the TA-projects encountered problems that affected the quantity or quality of goods and services negatively. Furthermore, there are very few cases of poor results - i.e. where the actual achievement was less than 50% of the expected results - the majority of the projects being rated as 100% performers.

2.1 Technical assistance

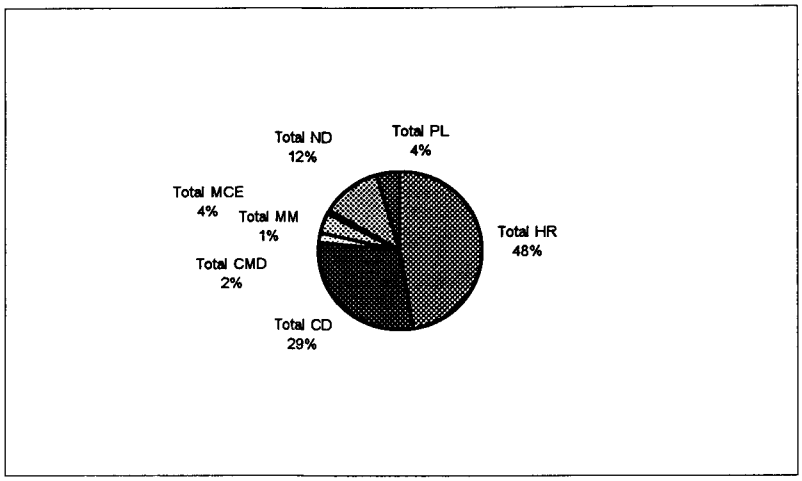
2.1.1 Types of assistance

We have distinguished seven different types of technical assistance projects. The relative disbursements distributed to these types are shown in chart 3.

The main part of the funds has gone to human resources development, which accounts for almost half of the technical assistance. If also the special BITS-programme for technical training in telecommunications were to be added, but which is not part of the evaluation, this portion would be even higher. Three-fourths of the training refer to digital switching technology (AXE) through Swedtel[6] and later, ScanSwitch[7], about 20%

[6] 100% subsidiary of Telia AB

Chart 3: Disbursements per type of technical assistance[8]



to mobile (GSM) technology and only a fraction, 4%, has financed management training (please observe that on-the-job management training often is included in any TA-project without being reflected in the formal heading of the project). The training has taken place both in the field and at the Swedtel Academy in Kalmar. It should be added that many TA-projects include training as one component, for instance to prepare for the establishment of a digital Operations and Maintenance Centre.

The support to corporate development is large in size, 29%, but relatively concentrated to a few clients. The largest project was successfully implemented in Mauritius between 1986 and 1992 and led to a restructuring of the national telecommunications operator.

The network development consultancies have been undertaken in Costa Rica, Ecuador (which encountered problems due to weak capacity of the national operator) and Namibia (national telecommunications master plan).

2.1.2 Results per type of project

Chart 4 shows that the best performance have been achieved in the two smallest areas: commercial development (Namibia) and materials management (Thailand). The other types show performance in line with the average, except for human resources development and operations and maintenance, which have got a relatively low rating. What were the problems? As regards *human resources development* many respondents felt that the training had not been sufficiently adapted to the trainees' needs and expectations. This is a little bit surprising since the Swedish partner, be it Swedtel or ScanSwitch, in several cases have received resources for making training needs

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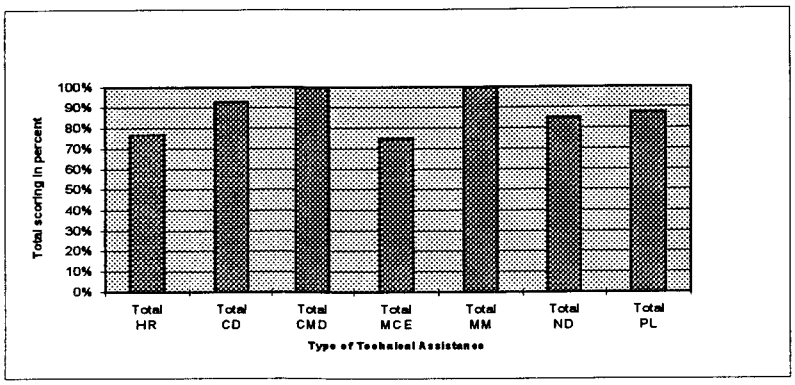
[7] Joint subsidiary of Telia AB and Ericsson.

[8] HR = Human Resources Development, CD = Corporate Development, CMD = Commercial Development, MCE = Operations and Maintenance, MM = Materials Management, ND= Network Development and PL = Policy and Law.

assessments. Yet, there are cases where the training has not been up to expectations, as in the training of Egyptian technicians in 1995 when the trainees complained that

Chart 4: Results per project type



the AXE advanced training was too superficial for their needs. The performance rate is also reduced by a training project in China, which was abandoned after the first phase due to co-operation problems.

The low rating of *operations and maintenance* relates to the problems mentioned above in Ecuador.

Some services were successfully delivered, as far as we can judge, but did not lead to a continuation of the co-operation. This refers mainly to pre-feasibility studies, sector studies, master plans etc., which often recommend further investment and capacity building. There are a few such studies delivered by Swedtel without any registered continuation, at least not with financing from BITS: a fact-finding mission to Jamaica, a study of digitalisation in Nigeria, a telecommunications sector study in Uruguay etc. As long as the study provided the client with sufficient information for decisions in the intended area, the assistance was of course successful. We have not registered any complaints in relation to these studies and they have consequently been classified as good performers. The only exception is a large TA-project in the Dominican Republic, where Swedtel was engaged in studies regarding a far-reaching restructure of the sector. The project was abandoned following the change of government. This project has been rated low, although no shadow falls upon Swedtel.

2.1.3 Cost-effectiveness

There are very few recorded cases of cost overruns. This is partly a consequence of the fact that BITS' agreements are based on a commercial contract between two parties. The deviations that have been observed are either a saving in relation to the budget from a more productive use of resources or a delay of such a magnitude that the index clause of the contract has been released (as e.g. Ecuador). In this particular case BITS helped the client out by covering half of the additional cost.

Otherwise the personnel cost and reimbursable expenditure, as well as the amount of time and expenditure involved, are reasonable and do not warrant any further comments.

2.2 Concessionary credits

2.2.1 Types of assistance

The purpose of the system for concessionary credits is to facilitate implementation of development projects of high priority. The credit scheme combines funds raised on the international capital market with grants (ODA-definitions) into credits on soft terms. BITS (now Sida) provides the grant and also a guarantee which covers the sovereign risk of the credit.

The Swedish credits have mainly financed investments in basic infrastructure and environmental protection. Energy and telecommunications dominate the present loan portfolio, being areas of high priority and also suitable for credit financing. Swedish export companies are internationally recognized to be competitive in these areas.

According to the consensus agreement between the OECD member states, the grant element ("concessionality") shall be at least 35%. This corresponds to a credit of 10 years maturity, including 1.5 years grace and at 0 % interest rate. For countries classified by UN as Least Developed Countries (LLDC) the grant element shall be at least 50%. In an agreement in 1992, concessionary credits shall be restricted to projects which are "commercially non-viable" in order to avoid trade distortions and ensure availability of concessionary credits for projects which cannot be financed on normal market terms. This agreement is, however, not applicable to LLDCs.

The broad objectives of the credits are the same as for the Swedish assistance as a whole, although in terms of procurement the concessionary credits are tied to goods and services of Swedish origin. It is the supplier, not the recipient country, that applies for a concessionary credit. The credit shall normally be channeled through a central government authority to be on-lent on terms prevailing on the local market. The subsidy shall thus be absorbed by the government in order to avoid trade distortions and prevent inefficient resource allocations.

Procurement and implementation of telecoms projects follow well established rules and procedures. As a rule, the recipient country has a master plan for telecoms expansion, often done with assistance from the World Bank. The master plan divides the network expansion in phases for timely construction. Discussions are then held between the recipient government and various suppliers on terms for bidding. If Ericsson wants to bid, and the country is eligible for concessionary credit lending, the company submits a request for a concessionary credit to finance a specified proforma contract.

Sida/BITS normally seeks the view of the coordinating Ministry on the priority of the projects and undertakes its own appraisal of the project. If all requirements are met, a decision on support is taken at the end of the appraisal phase. A commitment from Sida/BITS to provide a concessionary credit is due first after "bid closing" or after the Swedish supplier has presented a binding bid.

A network expansion with exchange stations follows a predetermined set steps. After the delivery has taken place (which could have included factory inspection), the customer issues a *preliminary acceptance test* certificate. This will release the payment to the

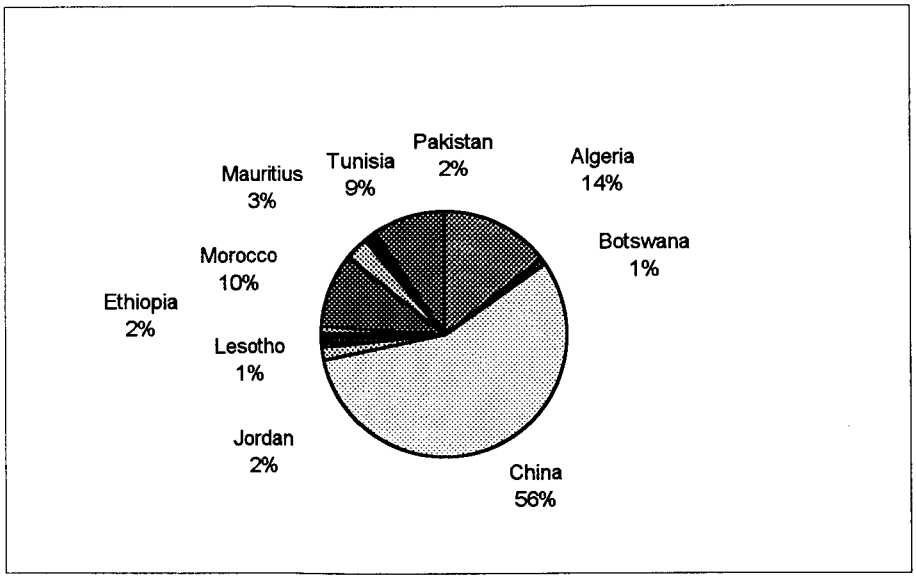
supplier, except for a guarantee down payment available after one year when the *final acceptance test* should have been completed. If installations are included in the contract, the final acceptance certificate will not be issued until the installations have been completed and tested.

Credits could be approved on a project by project basis. In China BITS chose a different approach. Because of the large demands and the needs for a carefully planned expansion the parties agreed on programmatic approach. A plan for several phases of Swedish assistance to a particular province was drawn up by the Chinese in close cooperation with Ericsson and BITS. It was not only a question of installing a number of exchanges or expanding the service with a specified number of lines. BITS ambition was to upgrade both the technical components of the network, the administration of the operations, the competence of the staff and the maintenance organisation. This programmatic was first tested in Liaoning. The experience was positive for all three parties. A similar program was then drawn up and implemented in Guangdong and Jiangsu.

This programmatic approach has been much appreciated by the Chinese and Ericsson. The system was later applied by the Ministry of Posts and Telecommunications in other provinces and for other donors.

The evaluation covers credits extended by BITS to eleven countries (chart x). All the projects except the one in Jordan has included deliveries from Ericsson. The projects in China take the lion's share of the credits (more than 50 % of the grant element went to China). A separate report on the telecoms support to China is found in appendix 4.

Chart 5: Regional distribution of the grant element in disbursed credits



The *regular* projects comprise turn key installations of AXE exchange stations, often including training and sometimes also transmission. Such projects are particularly important in Algeria, Morocco, Tunisia, Botswana, Egypt, Ethiopia, Lesotho and Pakistan.

Ericsson was granted a concessionary credit for its project on *local network development in Mauritius*. This project suffered from poor project management, and is an exception to the general rule in the other projects implemented by Ericsson. The *project in Jordan* is the only technical assistance project that has been financed by a concessionary credit. It was used to finance a large project of network development, but had to be abandoned due to a default on the debt service following the sharp drop of the Jordan currency in 1989 when PLO suddenly moved their financial assets out of the country.

2.2.2 Results

Projects of altogether 1 815 800 AXE subscriber lines and 136 400 transit lines (lines between exchanges) have attracted financial support from BITS according to the projects included in the evaluation. Provided that most of the demand from the public and business sector already had been satisfied, and provided that the average number of people using one telephone is five, then around 10 million inhabitants in developing countries would have been served with improved communications through Swedish assistance, to the benefit of their social role, access to information and public and commercial services.

The overall result of the credit projects was high, with a fulfilment of 95% of the output targets. Since both of the non mainstream projects (Mauritius, Jordan) encountered difficulties which reduced the rate of fulfilment, the result of the exchange projects only attains around 100%. One major explanation for this almost extreme result is that both the supplier, especially, and the client, at least to some extent, have long experience from their field of business and are reasonably well staffed with technically and managerially competent people.

The result from the credits in China is based on the document review and a field visit to the Jiangsu province. It was found that the Ericsson AXE telephone equipment was delivered with 2 years delay partly due to the freeze of the Swedish assistance to China after the event at the Tiananmen square. The equipment was found to be professionally installed by the Chinese and the operations and maintenance of the equipment indicated that the staff had the necessary competence to run a telephone service with quality. Industry and trade enterprises are the largest customers in terms of revenues. But a fast extension of the service to rural areas is under way.

2.2.3 Cost-effectiveness

The exchange stations are almost without exception negotiated under full international competition. There is thus little reason to believe that the exchange stations installed by Ericsson would not be cost-effective. Prices may differ a lot between different projects, although this reflects differences in local installation costs, as well as in the cost of training and spare parts, and not the equipment cost.

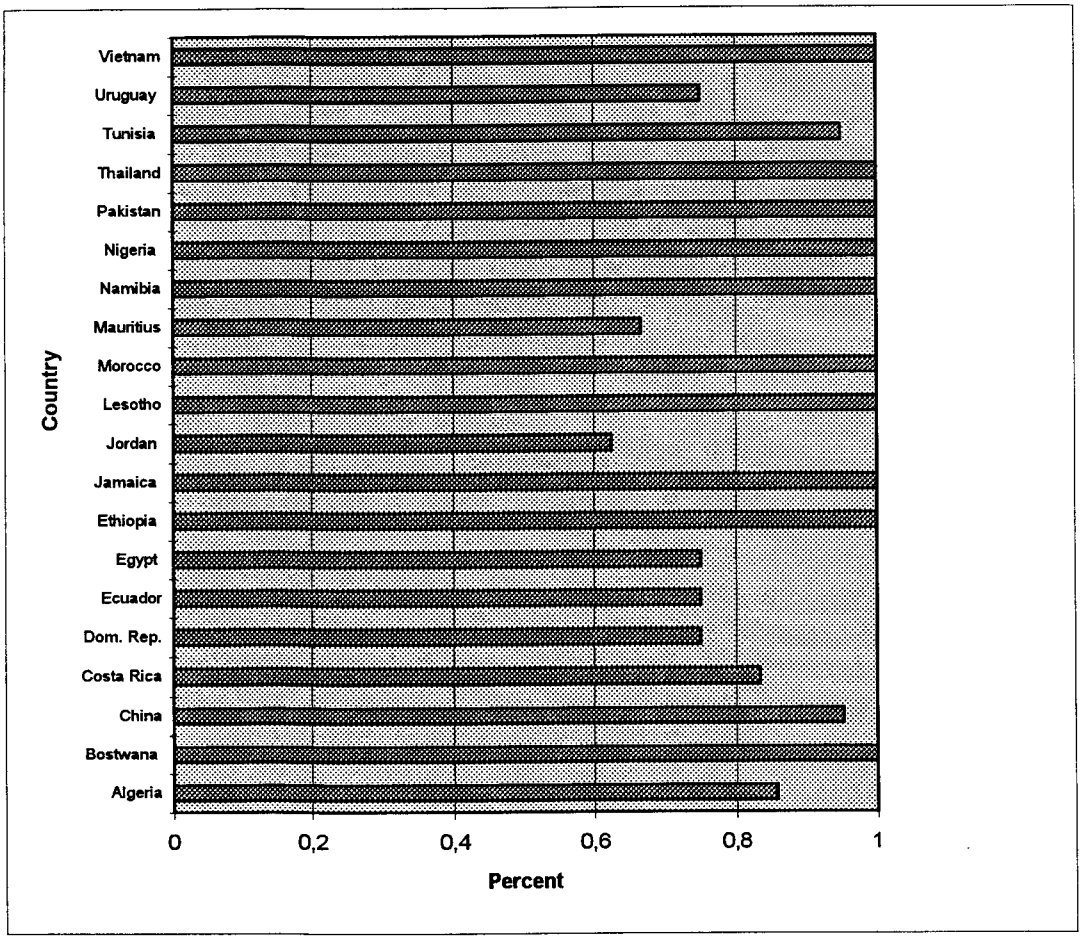
It is true, however, that the financial terms may distort the technical and price-related assessment of the different tenders. Egypt and Tunisia prove to be such cases where the markets are saturated by cheap financial packages from certain exporting countries. Under these circumstances the best combination of technology and price may not be the one selected by the client.

2.3 Results at country level

The charts below depict the results as they are scored at country level. Again it turns out that the results are the highest in countries where only one or a few projects have been implemented: Botswana, Ethiopia, Jamaica, Lesotho, Morocco, Namibia, Nigeria, Pakistan, Thailand and Vietnam.

Of the larger countries, especially the results in Algeria (86%), China (95%) , Costa Rica (also 83%) and Tunisia (90%) are impressive. The lowest score is recorded in Jordan (63%), which very much had to do with the national financial difficulties and not with the project as such. The score for Mauritius is reduced due to the poor local network project, whereas the corporate development project through Swedtel is rated as one of the best performers.

Chart 6: Results at country level



3. IMPACT

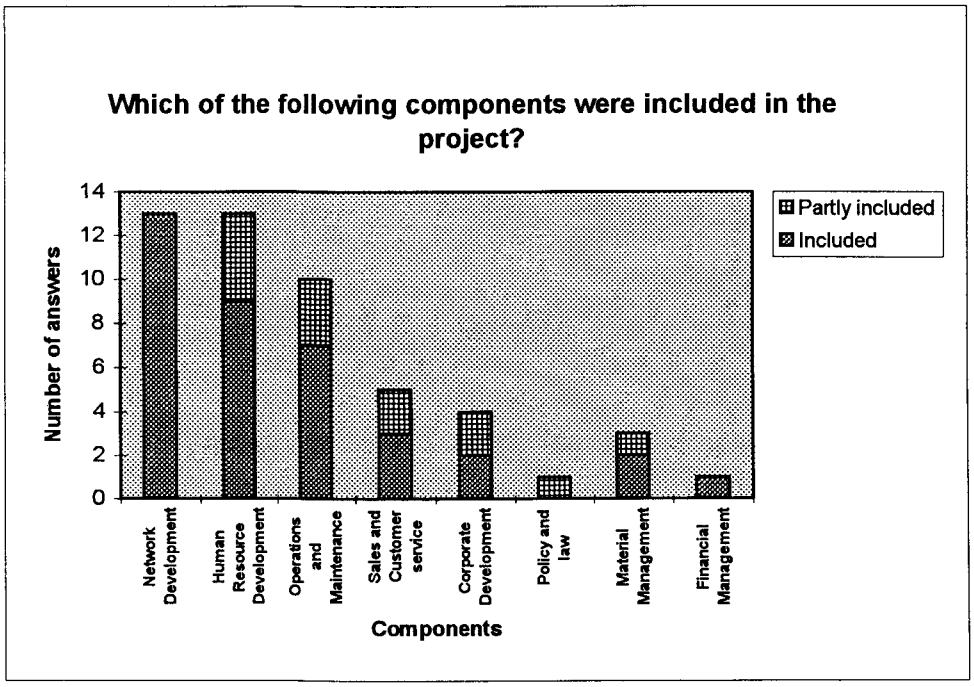
The presentation of the results in chapter 2 refers only to what extent agreed outputs actually were delivered. This is also the contractual bottom-line for the suppliers of goods and services. They can have no direct responsibility for the subsequent impact of these outputs, although it is understood that the outputs only are a stepping stone for a better performance of the telecoms operator, which eventually shall result in better and more cost-effective services to the clients, and contribute to social and economic development.

BITS and the recipient government are, however, not only concerned with results, but even more with the impact of these outputs in the area of telecommunications on the general development of relevant parts of the country. In the evaluation methodology, the questionnaires and the field visits were particularly designed to provide information in this respect.

3.1 At sector level

We mentioned earlier that BITS' project concept and the telecommunications operators' project concept not necessarily refer to exactly the same activities. This is partly reflected in the chart below, where the respondents have been asked to state which components that were included in the TA-projects in co-operation with BITS.

Chart 7: Components in TA projects



The dominance of human resources development depicted in chart 3 is not repeated here. One explanation is obviously, and which also was discussed above, that many projects include both training and a specific component. So what has been recorded above as

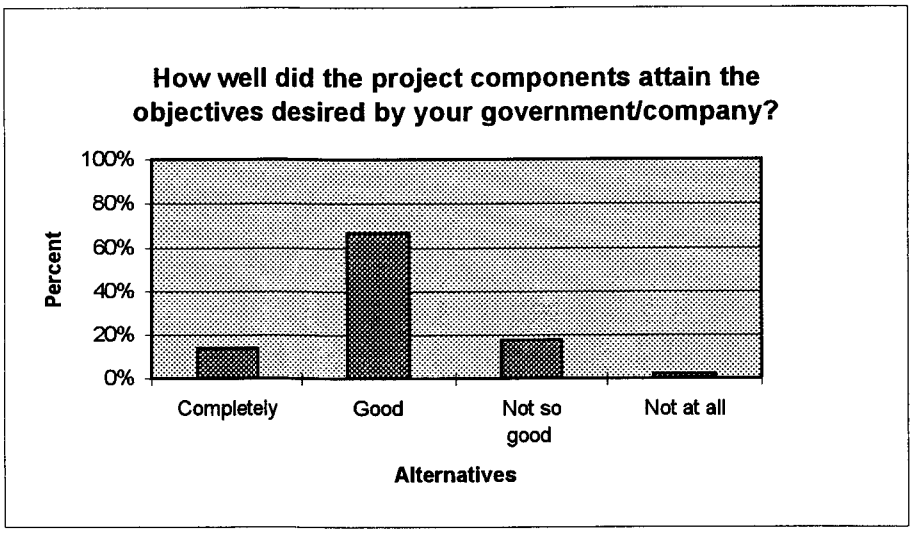
network development may well have been registered as human resources development (in network development) in the document review. The other explanation is that chart 7 is based on the number of projects, whereas chart 3 reflected the relative disbursements over the various components. Note also that the component "financial management" not at all is recorded in chart 3, which again means that the recipient has viewed a project differently (this comment refers only to one project though).

3.1.1 Achievements

It is however interesting to compare the results scored in the document review with the respondents' opinion of the rate of achievement of the objectives. Chart 8 below is a summary of the answers to this question.

With due respect for the possibility of slightly different understandings of the projects in the document review and the project components in the questionnaire we can conclude that the operators appreciate the performance of the projects slightly less than was recorded according to the documentation in the document review. Using the same key for weighting the data as in the document review proves that the overall fulfilment as judged by the operators attained 73% (compared to 85% in the document review).

Chart 8: Project achievements in TA projects



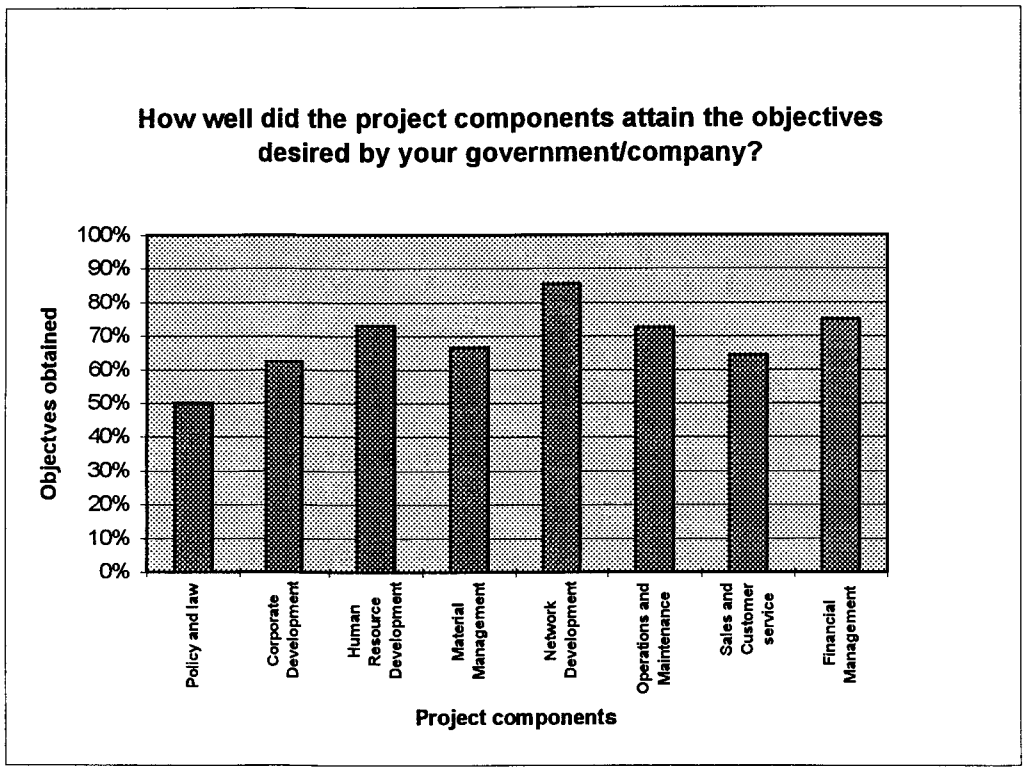
The respondents were also asked to rate the objective fulfilment per component.

In chart 9 below, one should disregard the figures for Policy and law and Financial management since they are based on one project each.

Network development stands out as the absolute best performer with half of the respondents claiming that these projects met the objectives "completely" and the other half found the achievements to be "good". The training and operations and maintenance are also strong components with all opinions but one and two respectively stating that the achievements were "good" or "completely".

Areas which could be improved, according to the clients, are corporate development and to a lesser degree, commercial development.

Chart 9: Achievements per component

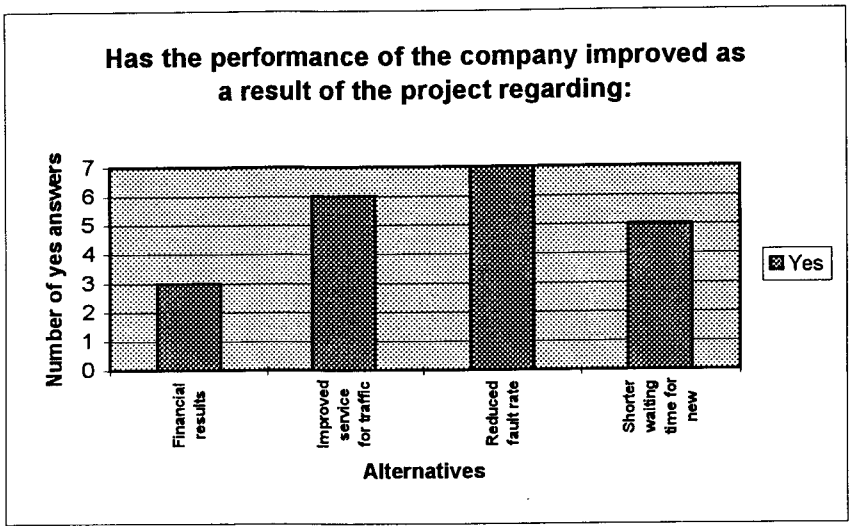


Clients were asked to state the reasons when the achievements were not satisfactory. Only three answered this question, stating as explanation that the projects had not been fully adapted to local network conditions.

Telecommunications operators, inspired by ITU, make continuous follow-up of performance indicators of their services. The impact on some of these from the TA-projects are summarised in chart 10.

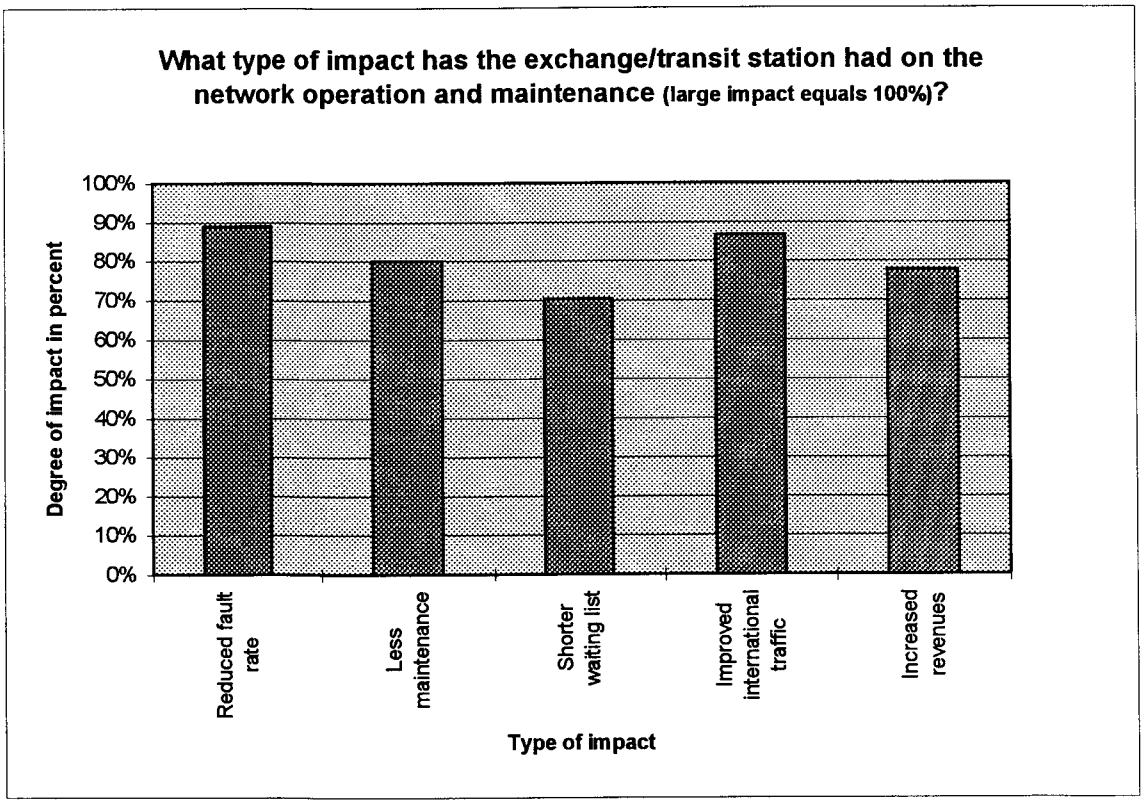
The main impact of the Swedish projects relates to reduced fault rates and improved traffic. This is a logical consequence of the focus of the TA project on network development and operations and maintenance projects. That so many has stated shorter waiting lists as impact, which rather is an effect of the extension projects, proves to be correlated with the fact that these respondents have enjoyed both TA- and extension-projects.

Chart 10: Improved company performance



The impact of the extension projects in the similar respects is presented in chart 11.

Chart 11: Exchange station impact on important performance indicators



Again the most important impact is on fault rate and the traffic service, particularly the international traffic, which often is served by an AXE exchange station. That the impact is considered the lowest on the waiting list does not reflect that the number of subscribers is unchanged. On the contrary it is a very good indicator of the demand,

which increases rapidly, in some places (Egypt) even faster than the extension. This fact was furthermore confirmed by the field studies. Potential subscribers, who have been reluctant to sign the waiting lists because the delivery time had been said to be long and not defined, came forth and signed up when they became aware that some work was going on.

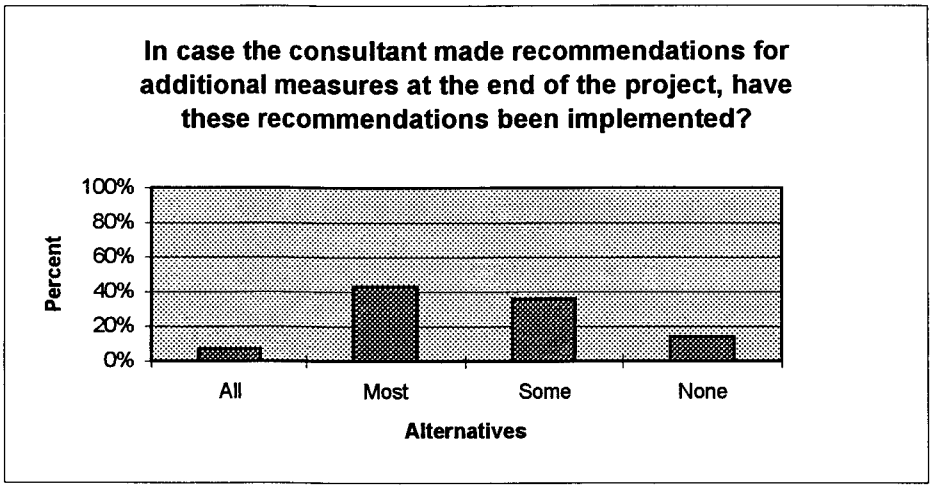
The impact was further broken down into the size of the exchange/transit station. It then proved that a large station has the greatest impact on a reduced fault rate and for shortening the waiting list, whereas a small station has a larger impact on the revenues (reflecting that it is relatively easier to fill a smaller station with subscribers than a larger). The size was neutral as to reduced need for maintenance.

3.1.2 Sustainability

One crucial effect of the projects is to what extent the services were adequate and sustainable, i.e. that recommendations were implemented and that changes in procedures or organisational changes have been maintained. The respondents were also asked to what extent the training made the staff able to handle activities introduced by the project on their own.

The rate to which recommendations were followed is not overwhelming, as is shown in chart 12.

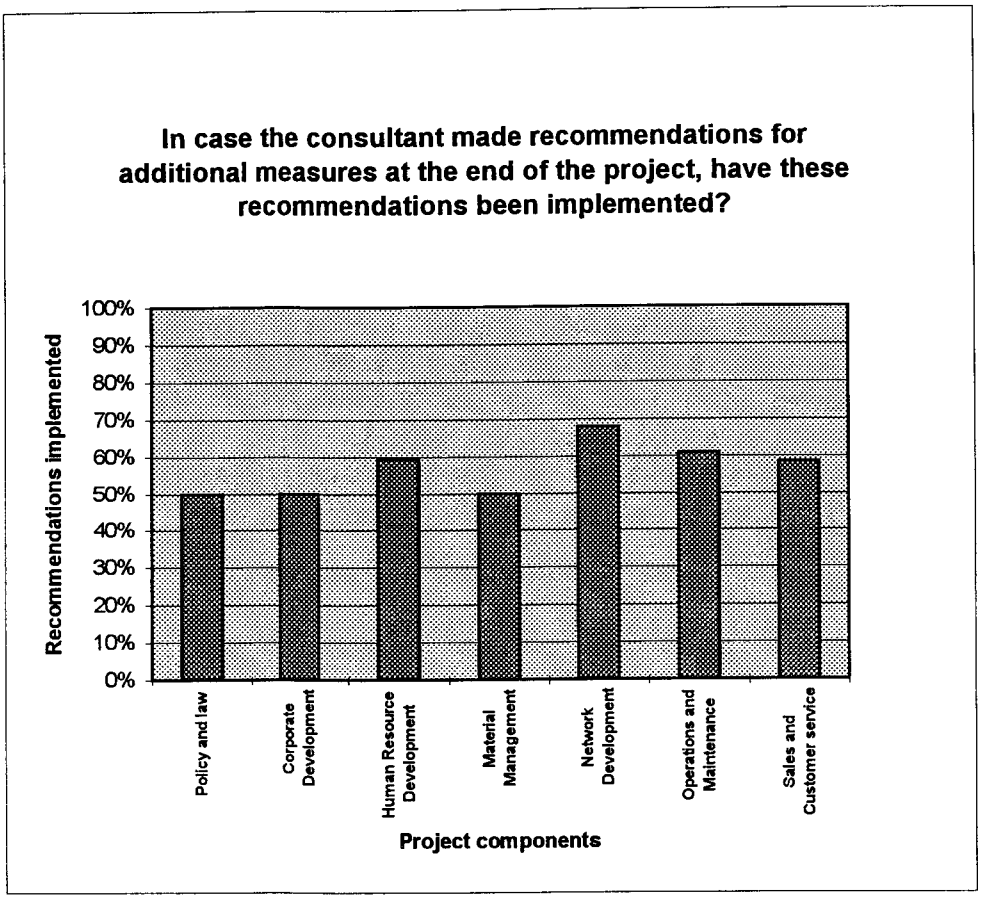
Chart 12: Rate of implementation of recommendations



It is clear from the chart that the estimation of the recommendations towards the end of a TA-project is somewhat lower than the project itself. This may also well reflect that there sometimes are difficulties in adapting the Swedish systems and methodology to the local conditions.

Again the rate differs between the different project components:

Chart 13: Rate of implementation of recommendations per component

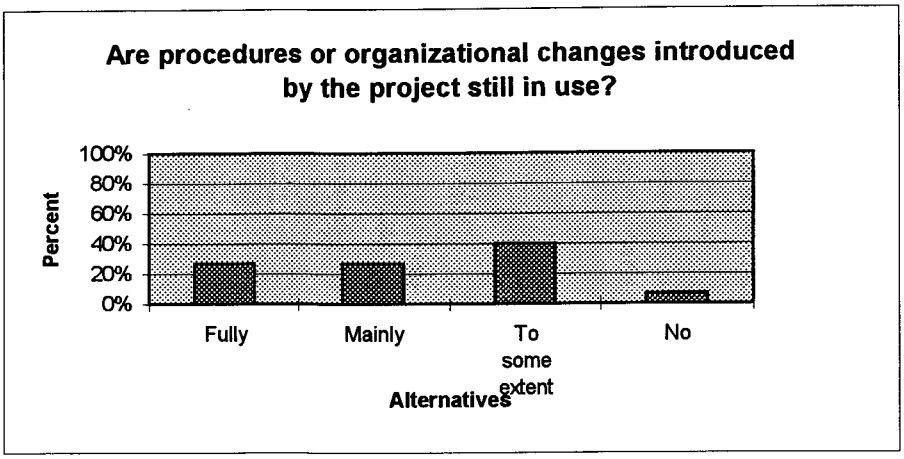


There are, according to the clients, only one area where two-thirds of the recommendations were followed - network development. In this area 70% of the respondents stated that most of the recommendations were followed. Human resources development has a broader range, with statements in all four categories, with half of the statements in the categories "all" and "most" and the other half in "some" and "none".

The best foundation for an assessment of the rate of sustainability is to what extent that recommended changes in procedures and organisations still are in place and to which degree the training has resulted in the staff being able to handle the new systems or routines put in place.

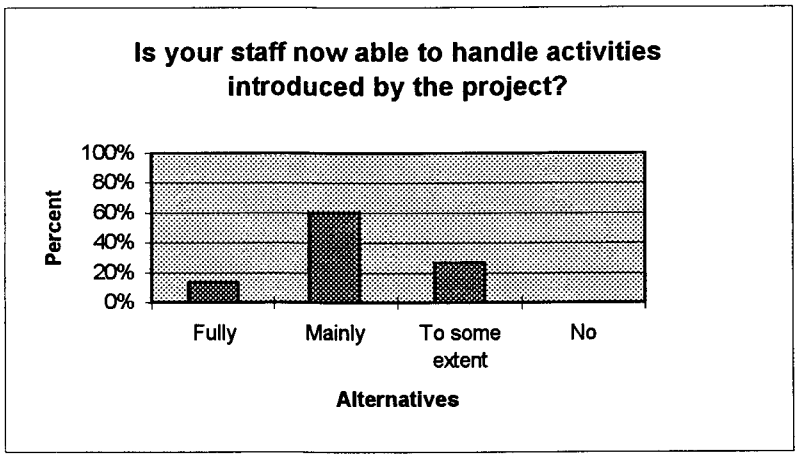
Very few of the recommended and implemented measures have later been abandoned or ceased to be applied. The rather high figure for measures that still are in use "to some extent" or "mainly" does not necessarily mean that the recommendations were not good enough, but could just as well signify that events - technological or other - have made modifications necessary.

Chart 14: Procedures in use after termination of project



The effect of the training has been more persistent with almost 75% of the clients claiming that the staff after training is fully or mainly able to handle the new systems or procedures.

Chart 15: Training effect



In summary, the findings of the impact of the TA-projects are the following:

- most recommendations are followed, especially in the larger areas such as network development, operations and maintenance and human resources development;
- the changes introduced as a result of the recommendations need modification, very likely as an effect of external or internal events - very few recommended changes have, however, become inadequate;

- the training has, compared to many other development projects, been well adapted to the technological and/or administrative changes. Yet, the training could be better tailored to the trainees' needs.

The rate of sustainability has also been assessed in the four field reviews. In this case no separation was made between credit and TA-projects. The findings from China do however exclusively refer to credit projects (network extensions). The findings can be summarised as follows:

The *technological* sustainability is very high; this despite the fact that the technology is highly sophisticated and computerised, and delivered in the form of turn key installations - which according to conventional wisdom would constitute a non-adapted form of technology transfer. Most projects include technical training in the contract, but many of the TA-projects also include management and operations and management of AXE-technology. The physical lifetime of the exchange equipment is 30 years, i.e. far more than the expected economic lifetime. There are virtually no technical break-downs, and if these occur it is simple to change a printed circuit board or other component. In Ethiopia there was a complaint that the training component had not included know-how in and facilities for card repair.

From one of the questions in the survey it can be concluded that the exchange/transit stations had a large impact on reducing the amount of maintenance.

The *financial sustainability* of the projects is high. Access to telecommunications is high in demand and the possibility of providing better, faster and more reliable services to the customers constitute a strong financial potential for the telecommunications operators. In fact, operators that are ensured a state monopoly are so profitable that they serve as cash-cows by the government (see for instance appendices 4 - 6 on China, Egypt and Ethiopia respectively). The recent development with considerable cost reductions, especially for transmission, and the possibility by foreign operators to serve the needs of the profitable international subscribes will soon threaten the state monopolies to the benefit of the subscribers. Operators that persist in working under protection will most likely fall hard if they do not start soon to commercialise their operations. Some of the TA-projects, particularly one in Namibia, has this orientation.

The *organisational and managerial sustainability* is normally high, although with a certain bias in technical aspects. Most operators are technically, rather than financially driven. However, operators enjoy an increasing policy support from Governments, not only because of the financial aspects, but also that telecommunications has proven to play a crucial role in development, not least in rural development.

It is interesting to note that the Ethiopian Telecommunications Authority (ETA) has managed to maintain and increase its capacity during the long years of dictatorship, when very little attention was paid to the human and material investments of ETA. The fact that ETA has run its own training institute - although with small resources - is probably one important explanation to this. A consequence of the need to commercialise operations will, however, constitute a challenge to many operators.

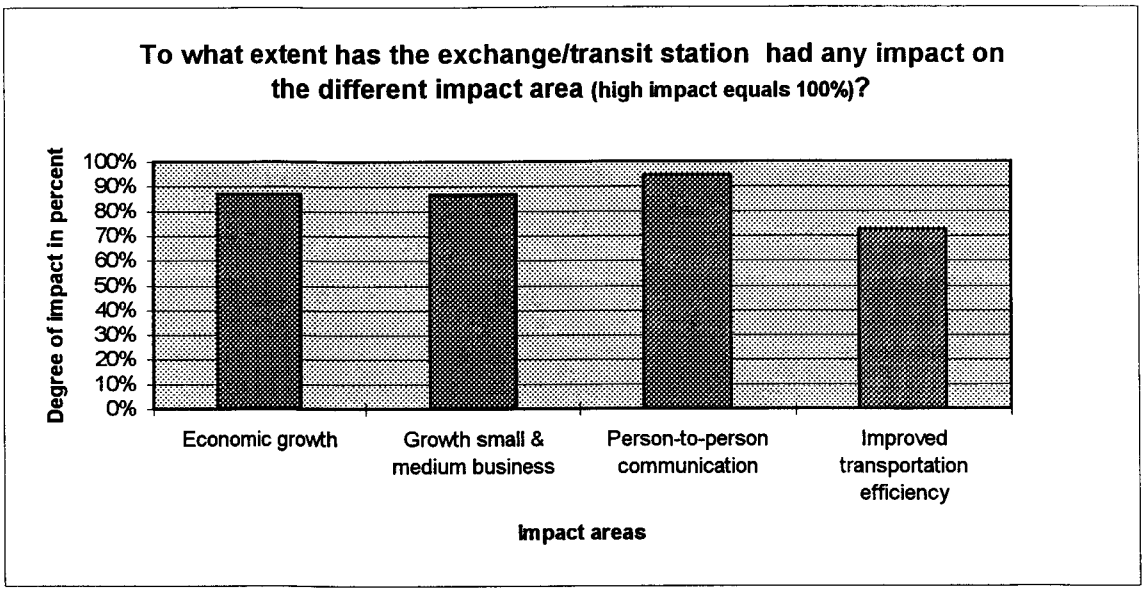
3.2 Socio-economic impact

The long term objective expressed by BITS for supporting telecommunications development is based on the standard assumption that additional and more efficient telecommunications services always will contribute to the economic growth of the recipient country[9]. In BITS' documents there is, however, seldom an attempt to distinguish the intended specific connection between the outputs of the projects and the economic growth of the country in question.

In the survey we asked the respondents to distinguish the impact from the extension projects on the socio-economic environment in four different areas: economic growth, small business development, person-to-person communication and transport efficiency.

As chart 16 below shows the extension projects had a strong impact in all areas, and particularly on person-to-person communications. The implication hereof is not necessarily related to economic growth, at least not exclusively. Better person-to-person communications provides the average inhabitant with access to information, be it interpersonal and family related, political, commercial or educational. It also increases family safety and welfare, connecting people easily to medical and security institutions. We therefore conclude that the discussion on the socio-economic impact of telecommunications development needs to be broadened (see chapter 4, Conclusions).

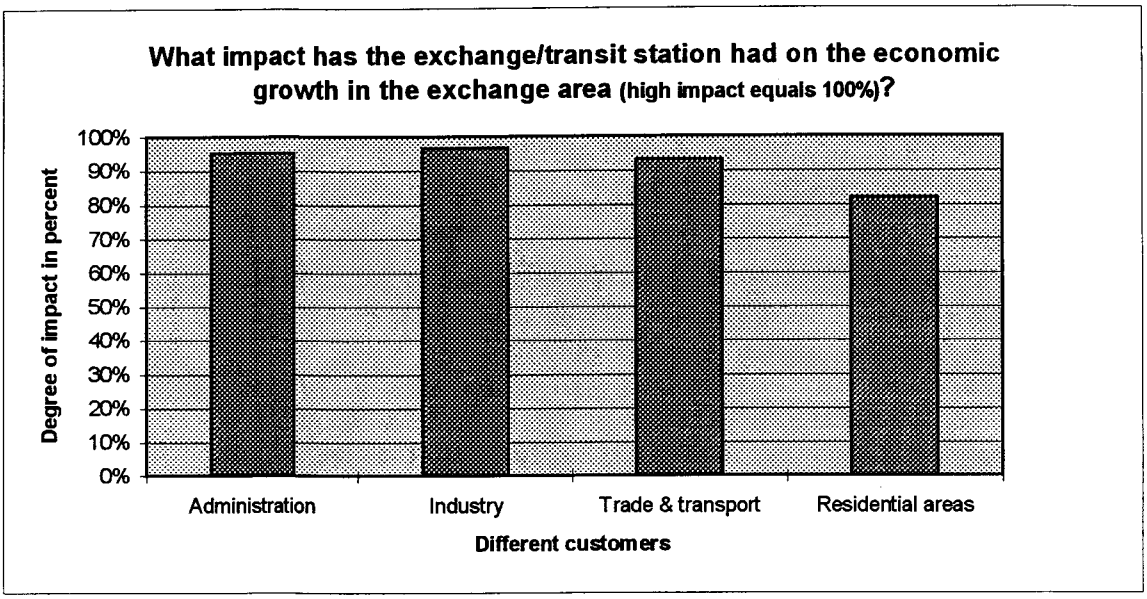
Chart 16: Socio-economic impact of telecommunications extension projects

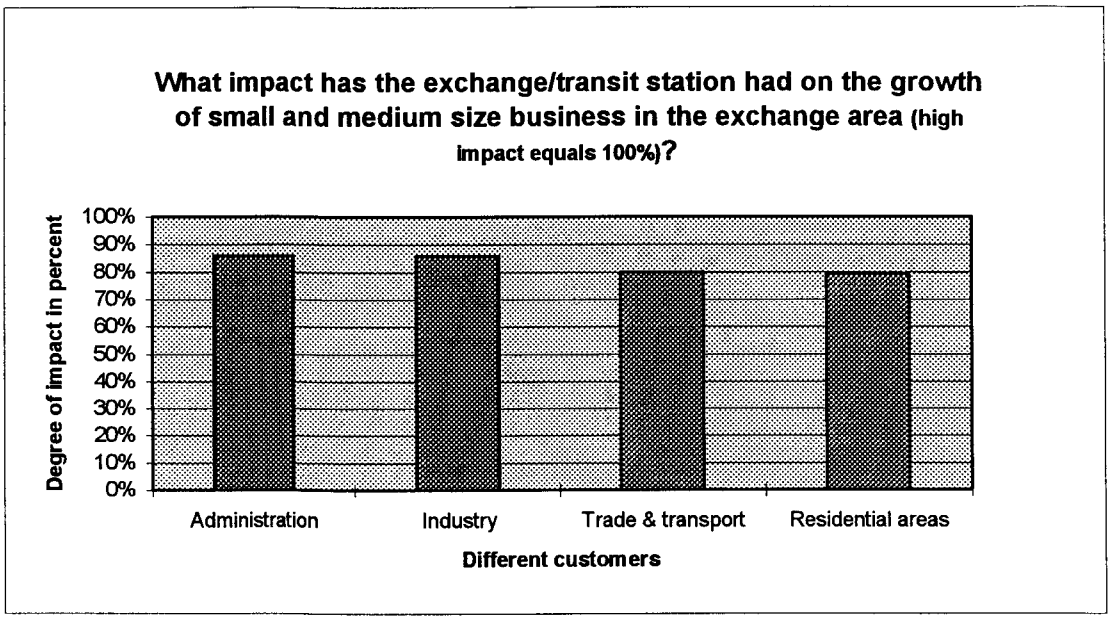


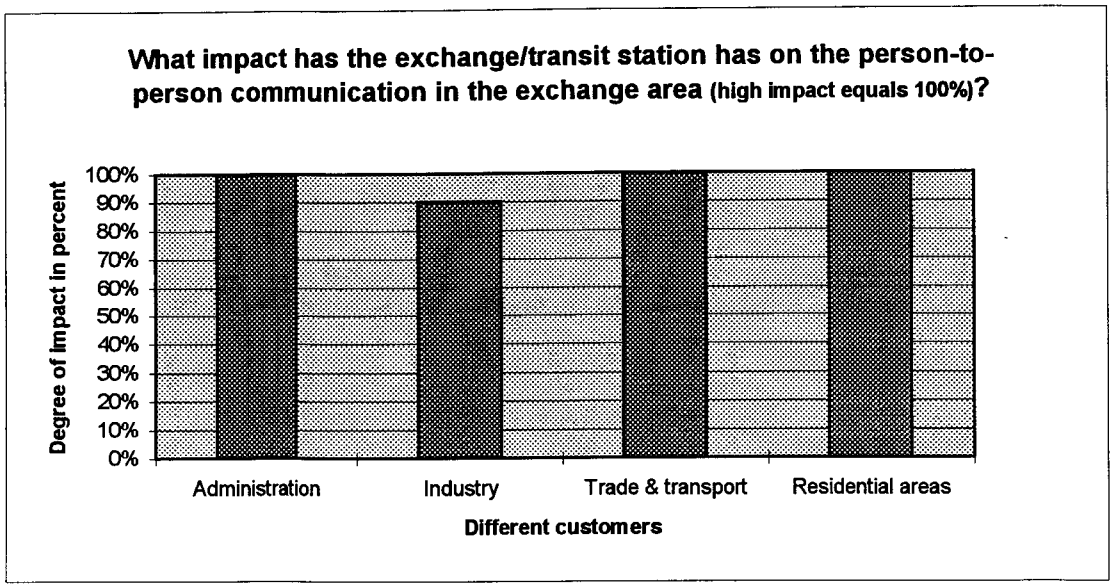
[9] The co-variance between economic growth is also well documented in the international literature (se also footnotes 10 and 11)

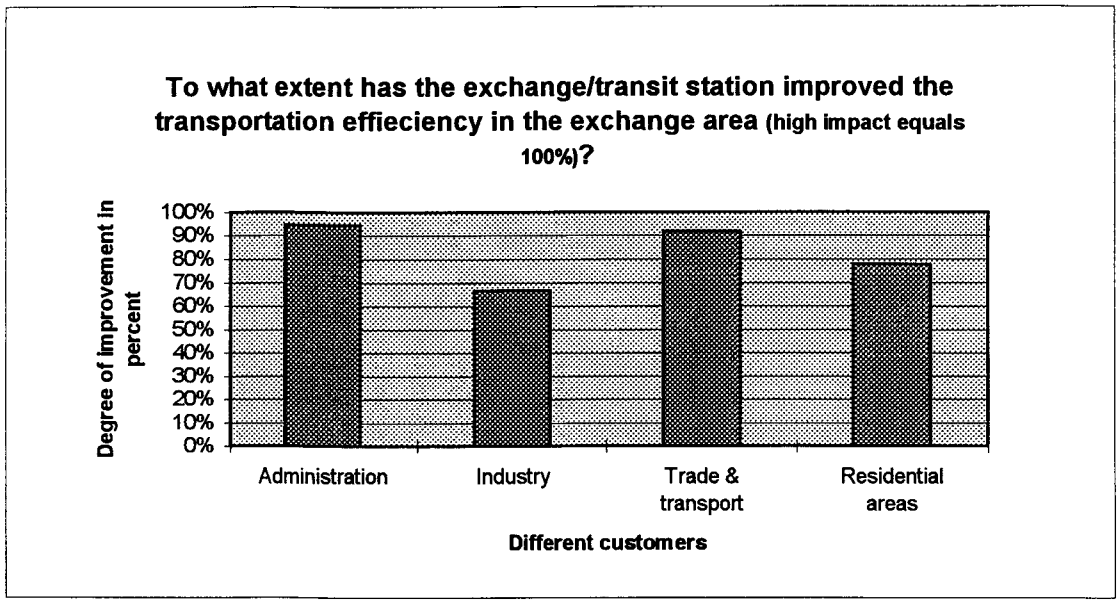
In the survey we also identified four major target groups for telecommunications: administration (public sector), industry, trade and transport and residents. We asked the respondents to asses the socio-economic impact of better telecommunications for each of the target groups of subscribers.

Chart 17 - 20: Target group impact









The result of the survey presented in charts 17 - 20 can be of use to guide Sida and the recipient government if they want to relate the network development project to a particular development goal[10]. For instance, if economic growth is to have priority, the network extension should in the first place be directed to the public administration (sic!) and to the industry sector. The fact that public administration scores so high in this perspective is likely to be related to the need of having effective and efficient public services for instance as regards clearance in various matters such as taxation, permits, registration, tender and procurement etc.

[10] Again it should be remembered that the impact is based on opinions and experiences expressed by 17 telecommunications operators.

The same orientation should be maintained if small and medium business development should be the priority, although the impact is less significant here. With the main goal being interpersonal communication, stimulating i.a. social, cultural and political pluralism, then obviously residential areas should have first priority, as well trade and transport and administration. The latter result may have to do with that the respondents consider that the households to a high extent will use the telephones to get in touch with the public sector and the private trade and transport.

Finally, if transport efficiency (with its positive impact on the environment) would be most important then, naturally, the trade and transport sector should be connected. Here again the availability of telecommunications services in the public sector scores high, this sector probably being considered a big customer of transport services.

The interpretation of these results and its implications for Sida-INEC is further elaborated in sections 4 and 5 below, especially in chart 21.

3.3 Trade and trade-related contacts with Sweden

One of the fundamental reasons for developing a concessionary credit system tied to Swedish suppliers was the understanding that the system not only would contribute to the development of the recipient country, but also that it would enable Swedish suppliers to get access to new markets. The system would help the company to win the first contract, i.e. to serve as a spearhead for exportation of Swedish goods and services.

If this would be the case one would find that the concessionary credits had generated more export business for Swedish suppliers in the same business area. However, this effect cannot be proved by the trade statistics or, for that matter, the field studies. It is true that the credit has helped to the exporter to the first contract, but this has not had the effect that the country has continued importing from the same company on less favourable financial terms. It is rather on the contrary, that the possibility to offer a concessionary credit is a minimum requirement for Swedish companies to be able to offer competitive financial terms. Some countries, with Egypt as a good example, are so flooded with cheap finance that not even a concessionary credit with a grant element of 35% always is sweet enough to be generally accepted as financial conditions. On the other hand, it is evident that Ericsson's entry on the strategic Chinese market was very much related to the financing. Also the fact that the credits were offered by the Swedish *government* had a strong symbolic value for the Chinese authorities.

In countries which are small trade partners with Sweden, there is a good correlation between the overall export and export of telecommunications equipment, financed by a concessionary credit. The implication hereof is that Swedish telecommunications equipment obviously is regarded competitive. In some cases the concessionary credits make very visible marks in the trade flow, again showing the important role of the financial terms in exporting to these countries.

There seems to be very little spill-over effects from granting of technical assistance to one country into export of equipment and hardware to the same country. No such effects are visible in for instance Namibia (there is however a joint venture involving Telia and Swedfund in Namibia), Jordan, Costa Rica and Ecuador.

4. CONCLUSIONS

4.1 General trends in third world telecommunications

Telecommunications has during many decades inspired cautiousness at government levels. It has been referred to as a capital-intensive and investment-hungry industry used mainly for the purpose of convenience of those who could afford it. Also by donors it was seen mainly as a luxury good, far from being able to meet any of the basic needs, defined by sociologists or included in the UN strategies. Moreover, the operating entities, which in most developing countries were monopolistic government departments or quasi-autonomous agencies, were poorly managed and operated as administrative entities, often even in need of financial support from the central treasury.

However, during the last ten to fifteen years, a few things have happened which have changed the situation drastically:

- By the global technological progress it has been possible to lower the cost of equipment to below one half of what it was earlier and also to make operations cheaper and more flexible and the services by far more reliable;

- In various ways (such as more international exposure and participation) governments have come to realise both that telecommunications is a cost-effective means to support development, and that the modern administration of a country cannot be achieved and made to function without rapid, reliable and country-wide telecommunications services;

- The technological development has in particular enabled a significant reduction in costs of transmission of speech and data over long distances. Distance, which effectively reduced access to information and constituted an important hurdle to development and costly to overcome, has ceased to play that role[11].

- In spite of these changes, the operating entities have not been willing (or allowed by their tutelary authorities) to reduce the tariffs accordingly. Therefore, the earnings from an increasing international telecommunication traffic have grown out of proportion, which not only has facilitated the financial break-even of the operators, but also attracted a wide spread corruption at several levels. In this situation, foreign, often multinational, enterprises are pushing more and more strongly to take over a portion of the services, a fact that constitutes a harsh and ever-increasing threat to slow-adapting national operators .

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[11] To illustrate this fact, a recent survey of the international telecommunications development in the Economist magazine of September 30 in 1995 was called "The death of distance". Similarly, in the World Bank's sector study on telecommunications one of the conclusions is that "Countries and firms that lack access to modern telecommunications systems cannot effectively participate in the global economy"

The main positive impact resulting from improved telecommunications services can be summarised as follows:

- access to information has come to be perceived as a *factor of production* of equal importance as land, labour and capital; for the local agricultural producer information on where to find the cheapest inputs and where to get the best market price for the excess farm output can make the difference between profit and loss; the change of the command economy into a market economy, when decisions regarding prices and marketed quantities are moved from the government to the individual producer, cannot be successfully accomplished without such information being easily accessible;

- telecommunications provide a trade off with physical transportation, reducing energy consumption, pollution and, hence, the rate of environmental degradation;

- better access to and dissemination of information can serve to enrich the cultural and social life, by encouraging and facilitating person-to-person communication with impact on social and cultural diversity and broadening educational horizons;

- better access to information makes it more difficult to cut off the population from the international news agenda and from ideas and experiences challenging messages and opinions being pursued by a non-democratic government, and thus makes people better able to exercise their democratic rights.

A prerequisite for this development to be realised is that the telecommunications network is reliable and spreading over the country so that "a universal access" can be established.

In the least developed countries, the vast majority of both population and the economy is outside the main cities. In Ethiopia, for example, the government has studied this matter during the last few years. About 80% of the population is in the country-side and subsists from what can be produced locally. For various reasons the agriculture is producing way below its potential. Among the conclusion drawn by the government are that

i) for a long time ahead the highest priority in the national development programme will be assigned to the development of agriculture and so called Agriculture Lead Industries; and

ii) a country-wide telecommunications service will play a crucial role in supporting this development.

The government is therefore assigning high priority to the expansion of telecommunications, particularly in towns and rural areas. The Ethiopian Telecommunications Authority has thus received instructions to increase efficiency and to implement the Seventh Telecommunications Development Programme in three years instead of five (see further appendix 6).

The indicated overall development with the national operators being used as cash-cows for various subsidies - rather than benefiting the subscribers through lower tariffs - and

constituting a basis for corruption, makes it necessary for virtually all developing countries to restructure their telecommunications sector by

i) setting up a strong regulatory body, which can handle impartially the radio frequency spectrum, issue licenses and concessions to operators, monitor compliance and take corrective actions as needed;

ii) requesting efficiency in the entity(-ies) at operational level, at best by breaking up existing monopolies, and - if basic services are to be maintained by a state monopoly - at least by giving more autonomy to the operator, to incorporate and commercialise the operations and to concede private importation of PBXs and other appliances.

4.2 Related findings and conclusions

Against the above description we can conclude that all of the countries in the survey have adopted ambitious national network extension programmes. In many cases the governments have endorsed multi-year programmes, guided by the telephone density ratio - and its expected change - as the overall performance indicator. Sometimes these programmes are worked out in co-operation with the World Bank and bilateral financiers (as e.g. Ethiopia); in other cases (as e.g. China) the Ministry of Communications (eq.) invites international suppliers to tender for parts of such programmes, including its financing. In view of the priority given to the sector, it is a little bit surprising that most of the national master plans and/or strategies are hinged upon the telephone density and that few attempts are made of relating the density figures to their social and economic implications. In China, telecommunications development was seen as one part of a three pronged strategy, which together with improved energy and roads services would ensure economic and social development.

Far from all of the countries included in the study have abandoned the state monopoly or carried through a full sector reform, clarifying the roles of the state as policy maker and regulator and the private sector as operator. In most of the countries studied this work has just started, at least in the form of studies on the future policy.

As seen from section 3 above, the projects supported by BITS have at large focused on network extension and operations issues. There is a clear dominance for network extensions, through the exchange/transit stations, and its subsequent operations, through training included in these projects or through special training efforts, implemented by Swedtel or ScanSwitch the with purpose to establish OMCs etc. It can therefore be concluded that Swedish resources have given a *strong contribution to the development of an area of high priority in the 17 studied developing countries.* The orientation of the Swedish support is far from coincidental; in fact, Sweden has a strong comparative advantage in network extension and operations through the combined know-how among Swedish public and private suppliers. If there is any business and service sector where Sweden can claim to have a lead position, it is without doubt telecommunications.

In this respect it should also be emphasised that the third form of support from BITS, the regular so called international courses in i.a. telecommunications for third world professionals, have made crucial contributions to the demand for such services. The courses have displayed the Swedish comparative advantages in this sector to third world

telecommunications decision-makers, who to a high extent have attended courses at the Swedtel Academy.

Relatively few projects have been implemented in the area of sector reform or corporate development. One explanation is that the project mass which has been studied in the evaluation dates a few years back, before the general war cry in the sector came to be sector reform. Another possible explanation is that such assignments may prohibit Swedish companies to compete for more durable international services, such as e.g. advisory functions in tender specifications, evaluations and supervision in network extension as well as training in network operations and maintenance. Also the fact the Swedtel, who would be most suited to take up sector reform consultancies, is a subsidiary to Telia AB with its recent interest to compete for operating concessions, would be a potential conflict of interest.

The *results* of the co-operation financed through BITS are, at all other comparisons, very impressive. The rate of achievement of expected outputs attained 90 per cent. The flops that have been registered are rare and either related to a general break-down in the project environment (Jordan) or a combination of insufficient planning and project management (local network in Mauritius). The *impact* at sector level is also considerable, especially in the form of a more effective and efficient use of the services, measured as reduced fault rates and improved traffic. The consequential impact, expressed by the operators, on small business development, public sector efficiency and the socio-political development can only be described as high, without any precise quantifiable consequences. It can, however, be estimated that BITS support has led to improved interpersonal communication for between 10 and 20 million people. Other investigations concerning for what purposes people use telephone services show that, for instance, public pay-stations in urban areas are used by housewives (30%), small business people (30%) and students (17%). In rural areas the pay-station is used for agriculture purposes (45%), commerce and livestock (18 % each)[12].

Numerous international studies verify the close relationship between telecommunications development and economic development. A regression analysis covering the years 1955 - 65 suggests that the telephone density grows by 1.4 per cent for every per cent of GNP growth. More recent data from China (Shanghai) indicates that this coefficient could be as high 3 - 4, implying that 1 per cent of GNP growth must be combined with an increase of the telephone density of 3 to 4 per cent. The role played by telecommunications in accomplishing economic growth would thus have become increasingly important.

The assessment of the *sustainability* of the projects is also positive. Especially the technological sustainability is high, through the introduction of a sophisticated, clean and reliable technology. All Swedish suppliers focus on training and with increasing emphasis on transfer of functional concepts, not only hardware deliveries. This also increases the managerial sustainability. One question mark could be raised for China, where an assessment by ScanSwitch found that the digital know-how was not sufficient in relation to the present technological level. An extension project in Ethiopia did also release

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[12] See Telecommunications and economic development, page 241, World Bank 1994

complaints for lack of training in computer handling and in delivery of equipment and training in card-repair. The fear that the technology embodied in the Swedish equipment would, in fact, make the customers technologically dependent on one supplier and hence being potentially subject to monopolistic pricing does not prove to be justified. The various technological systems offered by the main international suppliers are compatible at transit/exchange station level, and thus make it possible for the operator to choose freely when a further extension is being planned.

The projects financed by BITS have also provided the operators with a strong basis for financial sustainability. Telecommunications is a public service with short pay-back periods and with a huge, yet hidden, untapped demand. The pricing of the services will be crucial for the sector's development. China applies a policy of cost-recovery, which keeps waiting lists at realistic levels while it at the same time is generating funds for further investments. The other studied countries have in varying degrees let the international and commercial customers subsidise the local and resident subscribers, as well as having the revenues of the telecommunications sector to benefit other sectors.

The *cost-effectiveness* of the projects are normally guaranteed through competition. Delivery and installation of network equipment is one of most competitive global markets with steadily falling margins for suppliers. It is presumed by BITS - in the application of the Swedish system for concessionary credits - that the cost-effectiveness should be ensured through formal competition. This has not been the general rule in the countries which we have studied, where the contracts have been awarded the supplier after tender for a certain "lot" followed by negotiations. However, even in theses cases (as e.g. China, Egypt and Tunisia), it is easy for the client to reject a tender with reference to the price level, should it be inflated. In fact, the whole telecommunications environment must be regarded as cost-aware.

We can however observe that the tough competition in certain markets and the subsequent sweetened financial terms, backing the supplier, may distort the client from choosing the best combination of price and quality, especially when grants are involved to finance hardware.

A problem for Sweden as a donor is the fact that the Swedish market offers little competition among suppliers and that it is difficult for BITS to encourage competition among suppliers. The market is rather mature and well organised, and the roles and the respective business concepts are complementing each other. This could be seen as constituting a suppliers' monopoly, and there are only one or two exceptions from the rule that assignments regularly go to the main supplier in the respective market segment. But again, since the international market is competitive, there is a guarantee that the client could get good information on prices and quantities that are acceptable.

The evaluation concludes that the *criteria for project selection* has not been based on a clear policy on the expected impact on Swedish support, and that the link between overall development goals and choice of project areas and target groups has been weak. As concluded above, the largest area for support has been related to network expansion, an area in which Sweden has a well developed and broad competence. However, the project selection process generally has not involved analyses on how this focus relates to

desired socio-economic effects on different customer groups or which effects on the Swedish development goals that could be expected.

Different types of telecommunications projects can be expected to result in different socio-economic effects. Chart 21 is an illustration of how the impact on the different goals of a project could be structured. The application here is based on network expansion projects, financed through concessionary credits. In section 5 below we make suggestions on how such a model could guide Sida in appraisals of future requests with regard to the expected impact on development goals and user categories.

The likely impact of network development on the five Swedish development objectives for four categories of customers in urban and rural areas are depicted in the chart. The resulting matrix is based on the result of the questionnaire complemented by other documentation on impact of telecommunications projects. As can be seen, the goals that are likely to receive the highest impact by network development projects are economic growth (with a total score of 18), environmental protection (17) and equity (16). The impact on economic growth is well documented in both macro- and microeconomic studies[13], and is confirmed by the highly positive response in the questionnaire, as reported in section 3.2. The response also indicates an equally strong impact on growth of small and medium size business.

The high impact on environmental protection derives mainly from the substitution effect of telecommunications for travel and improved transportation efficiency, as reported in section 3.2. In addition, telecommunications projects do generally not involve any significant land use or imply any environmental damage. The overall high impact on economic and social equity is the result of the equalising effect of extending telecommunications services to rural areas and improved person-to-person communications (which received the highest impact level in the questionnaire). To these could be added the positive indirect impact on democracy and also on gender equality that a more wide-spread interpersonal communication implies.

Seen from a different perspective, the impact from the point of view of different customer groups (i.e. a vertical summation over the five goals) reveals that projects aimed at development of rural networks score higher (10) than urban project (8). On the other hand, if economic growth is the primary objective, urban projects would tend to score higher than rural ones. Finally, as the result of the survey reveals, the impact differs also between customer groups, with network expansion in residential areas generally

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[13] Ibid.

Chart 21: Likely impact of network development on Swedish development goals for selected user groups

	Administration		Industry		Trade & transport		Residential		Total score
	urban	rural	urban	rural	urban	rural	urban	rural	
Economic growth	High (3)	Med (2)	High (3)	Med (2)	High (3)	Med (2)	Med (2)	Low (1)	18
Economic and social equity	Low (1)	High (3)	Low (1)	High (3)	Low (1)	High (3)	Low (1)	High (3)	16
Democracy	Low (1)	Low (1)	Low (1)	Low (1)	Low (1)	Low (1)	Low (1)	Low (1)	8
Political and economic independence	Low (1)	Low (1)	Low (1)	Low (1)	Low (1)	Low (1)	Low (1)	Low (1)	8
Environmental protection	Med (2)	High (3)	Med (2)	High (3)	Med (2)	High (3)	Low (1)	Low (1)	17
Total score	8	10	8	10	8	10	6	7	

Note: High impact = 3
Medium impact = 2
Low impact = 1

having a lower impact on economic growth than projects targeting business oriented customers.

The *trade effect* of the projects, particularly the credit projects, is not significant. In each of the recipient countries we have analysed the total Swedish exportation and the share of and co-variance with the telecommunications projects. The intended spear-head impact of a concessionary credit can only be confirmed as regards the possibility of actually receiving the first order. However, in order to obtain a subsequent exportation of telecommunications equipment to the same country, the same soft financial conditions must be extended. There is no doubt, however, that the favourable financial terms offered by BITS constitute one of the reasons for Ericsson's strong market position in China. It is also interesting to observe that the fact that the Swedish government thereby became part of the project had a great symbolic value to the authorities in China. It is thus not only the money terms of the credit that counts, but also the extent to which it reflects a governmental co-operation.

For this reason it may also be of interest to find out who benefited from the *grant* element of the credit. The official Swedish aid policy from, for instance, counter-value payments related to import support assumes that the grant should be retained by the government, not the importer. It appears logical that the same principle should apply for concessionary credits, and that the commercial part of the deal between buyer and seller should be financed at commercial conditions whereas the government to government aid deal should benefit the general taxpayer in the recipient country. In the three of the four countries studied, the grant was generally kept by the government, on-lending the credit from BITS on more or full commercial terms. In China the credit was on-lent on the original terms to the provincial telecommunications administration, which thus kept the grant element. It seems, however, that this behaviour is part of an overall formula whereby the provincial administrations are obliged to channel parts of their annual surplus, inflated by the soft credit terms, back to the central government.

At *project level* some tangible conclusions can be drawn regarding BITS handling of the projects. The first is that almost all activities have been treated as well defined and fully contained projects, in TA-projects with a limited time horizon of about one year. The great exception here is China, where a more long term and programmatic approach has been applied by BITS.

Furthermore, there has been very little participation by BITS or the Swedish suppliers in policy dialogue on issues vital for the sector development or corporate development. The two main reasons are that

i) BITS concedes financing of the Swedish costs of a commercial contract between a buyer and a supplier; it is understood that the parties after negotiations have defined a project that will benefit the development of the sector;

ii) BITS has not had specific competence in telecommunications issues, but has relied on the opinions of external consultants on the potential development effect during appraisal. Without a clear policy on the expected impact of the Swedish support, these appraisals have been more focused on technical and financial issues of the project.

For this reason there has also been rather limited utilisation of cross-breeding between TA and credit projects. It seems as the two departments, the ones for TA and concessionary credits respectively, have been working rather independently of each other, at least during the last five years when operations expanded. There are a few exceptions to this rule, especially in North Africa - in Algeria and Tunisia in the 1980s and in Egypt in 1995 - where the network extension projects financed by a credit were supported by TA-projects for training in AXE-technology or establishment of an operations and maintenance centre for the AXE-stations.

At project level, BITS has put almost all the energy in appraisals of the requests and other preparations, and very little in monitoring and evaluation of project implementation. This, in combination with a high staff turnover has contributed to a weak institutional memory, which has precluded a possible gradual competence development in telecommunications sector issues. The project officers were furthermore engaged not only in telecommunications development in a particular country, but also in other sectors, as well as in several other countries. There was high pressure on project through-put, partly as a result of the policy of avoiding more comprehensive and longer term projects for granting quick and flexible support to concrete and shorter term activities.

5. RECOMMENDATIONS

1. The results and impact of the telecommunications projects constitute an important contribution to the development of a sector, which generally enjoys high priority by governments in developing countries. The socio-economic impact on growth, equality, democracy and environmental protection is unambiguous. The support thus gives a substantial contribution to the main Swedish development goals. Sweden has a well documented competence in the sector and a comparative advantage in relation to most other donor countries.

2. All this taken together leads us to the recommendation that Sida-INEC should regard telecommunications as a priority area for support. The sector is especially well suited for credit financing of network extension projects, be it through tied concessionary credits, whenever applicable, or development credits.

Grant financing of technical assistance should continue

- to ensure technological sustainability through capacity building in network operations and maintenance - this will increase the efficiency and effectiveness of investments in network extension;

- to ensure financial sustainability through advice on sector reform work and corporate development (in particular commercialisation of the services). Swedtel through Telia AB has relevant experiences in this area of great potential for other national operators needing to restructure and commercialise operations. If Swedish suppliers would not be interested for strategic business reasons, other consultants should be engaged or Sida should make sure that such reform work is on-going in other forms.

This point is indispensable to make sure that the subscribers benefit from the lower costs of extension and transmission through reduced tariffs, which also will make telecommunications services more accessible to the average citizen.

In fact this conclusion is so vital for the sector's potential contribution to social and economic development that we recommend a demonstrated willingness to reform the sector to be one criteria for countries being eligible for support through Sida to telecommunications development.

3. In appraising requests for support, Sida should increasingly study the impact, not only the expected results, and look for projects that address the Swedish development goals. As the analysis in chapter 3 and chart 21 depict, Sida can target these goals by choosing telecommunications projects with higher inclination to meet the needs of certain target groups, as summarised in the box below:

objective	target group
economic growth	public sector, industrial sector, urban areas
democracy	residential areas
gender and social equality	residential areas, rural areas
reduced environmental degradation	transport sector, public sector

4. It is recommended that Sida-INEC a) define a clear policy on the expected impact of Swedish support and, based on this, b) include an impact analysis in the assessment of each project. In this analysis, development goals and project-specific objectives, as well as likely impact on primary the target groups and target areas should be clearly stated. This work should be closely linked to the definition and application of performance indicators in the Logical Framework Approach (LFA), and be applied also when the support is granted as co-financing with the World Bank. As in this evaluation, the application of LFA would address:

- the project specific results (envisaged and achieved);

- the intended and actual sector impact (indicators of telecommunications sector performance);

- the intended and actual development impact (in relation to the Swedish goals for international development assistance). It will be difficult to define and monitor the direct relation between a particular project and the socio-economic impact (unless special micro-studies are undertaken). The combinations between goals and target groups in the box above will, however, serve as a guideline for the orientation of the support in view of the specific country strategy or similar decision on the overall intention of the co-operation with an individual country.

5. The construction of such an impact analysis model will depend on the specific goals defined for the project. In the model, the project areas (e.g. network development, human resource development, operations and maintenance, corporate development) and target groups (e.g. business users, administration, residential users, urban-rural users, long-distance users) could be related both to their impact on development goals as well as to their impact at sector level (e.g. reduced fault rate, maintenance and waiting list, increased revenues). In this way, a matrix tailored for the specific needs of Sida-INEC can be developed, allowing certain provisions to be relaxed and including new ones according to the defined goals.

A consequence of this approach is that it will be the goals that determine the project construction rather than the other way around. This would, furthermore, assist Sida-INEC not only in the appraisal of specific project proposals, but, more importantly, in the choice **between** project. It should be emphasized that the application of the model does

not preclude a thorough project appraisal but is aimed at providing "rules-of-thumb" or indicators on likely impact, in order to facilitate and complement the appraisal process.

6. It could also be tested to finance more long term and complete packages to support weak, yet viable national operators through a combination of plant installation, network development, operations and maintenance and corporate and commercial development. Such cases should be based on and include a sector study according to the format presented in appendix 2 to a World Bank discussion paper on telecommunications. The paper includes a systematic presentation of the "Elements of telecommunications policy, regulation and legislation". Ethiopia might be a good case for such a more long term and institutional support.

7. One selection criteria for countries to support would be to arrive at more focused density rate. A proposal for this is attached in appendix 3, where the denominator does not include the full population but a better estimation of the potential telephone target group. The adjusted density rate is referred to as "household penetration". Sida could use this figure as one indicator of which countries to support with telecommunications extension projects. With a target figure for household penetration of 15% countries such as Botswana, Mauritius, Tunisia would be excluded as well as the Guangdong province in China. Eligible countries would be Algeria, Ethiopia, Lesotho, Morocco, Pakistan and the Liaoning and Jiangsu provinces of China.

8. With a more active Sida-policy for support to telecommunications, the monitoring and follow-up would need to be upgraded. Standard formats for reporting on network extension projects would need to be developed, and the role of the recipient country as to reporting on the impact of the projects in terms of actual connection to subscribers ("filling-rates"), development of fault rates, waiting lists etc. would need to clarified.

9. To summarise, the following criteria should be applied by Sida-INEC in the appraisals of requests for support to telecommunications development:

At country level:

- is there an on-going or planned sector reform? Does the work or the plans seem appropriate in terms of regulator-operator roles and commercialisation policies?

- is the adjusted density rate for household penetration lower than 15%? With a rate above this target it is likely that the telecommunications development could equally well be financed on wholly commercial terms.

At project level:

- does the requested project support the implementation of the country's strategy (equiv.) and sector reform for telecommunications development?

- give priority to network extension and development projects;

- give priority to capacity building for sector reform work and establishment of Operations and Maintenance Centres.

To develop:

Following the impact analysis model and the above criteria Sida-INEC needs to develop both the planning format and the reporting format for these projects.

BITS
1994-12-20

UTVÄRDERING AV BITS FINANSIERING INOM TELESEKTORN

1 Bakgrund

Till grund för BITS utvecklingssamarbete ligger dels samarbetsländernas egna prioriteringar och, dels, kompetensen och konkurrenskraften hos svenskt näringsliv. Som en följd härav har en stor del av BITS finansiering destinerats till telesektorn.

BITS har, sedan början av 1980-talet, finansierat 49 teleprojekt i 12 länder med u-krediter till ett sammanlagt belopp av 4,5 mdr kr, detta motsvarar ca 35% av BITS totala u-kreditengagemang. Den sammanlagda biståndskostnaden för subvention av dessa krediter uppgår till totalt 1,5 mdr kr.

Inom det tekniska samarbetet har BITS sedan 1978 genomfört 52 insatser inom telesektorn till en sammanlagd kostnad om 114 milj kr.

Den Internationella Kursverksamheten har t o m 1993/94 innefattat sammanlagt 1 382 deltagare i sex olika kurser vid sammanlagt 49 kurstillfällen. Den totala biståndskostnaden för telekurser uppgår till c a 73 milj kr. Deltagarna kommer från ett 90 tal länder, med det högsta deltagarantalet från Thailand (80 deltagare), Mexico (75 deltagare), Malaysia (75 deltagare), Kina (58 deltagare), Jordanien och Tanzania (vardera 54 deltagare), Tunisien (49 deltagare) samt Mocambique (46 deltagare).

En sammanställning av BITS totala finansiering inom telesektorn för olika verksamhetsområden, presenteras i bilaga.

C. Projektgenomförande

Kvalitén på de levererade varorna och tjänsterna, hur har kontraktsparterna uppfyllt sina åtaganden, samarbetet mellan uppdragsgivare och uppdragstagare (köpare och säljare) och andra relevanta institutioner. Följande aspekter av projektgenomförandet ska beaktas:

- kostnadseffektivitet - i jämförelse med uppställda budgets och planer, i internationell jämförelse och i jämförelse över åren i mottagarlandet;

- tidplaner - har ursprungsplanerna för projektgenomförande kunnat hållas - om inte: vad har varit de främsta orsakerna;

D. "Lessons learned" (operationellt och strategiskt)

E. Effekter på svenska relationer med mottagarländerna, inkluderande även handelsrelaterade relationer, samt uthålligheten i dessa.

F. Möjliga korsrelationer mellan BITS tre olika 'insatsinstrument' (Internationella kurser, Tekniskt samarbete och U-krediter).

3. Metodik

Studien genomförs i fyra steg:

a) det första avser en genomgång, sammanställning och analys av dokumentation befintlig på BITS och hos svenska leverantörer/uppdragstagare;

b) datanisamling - i första hand ankommer det på beställaren/köparen i mottagarlandet att samla in relevant information, ev kan behov finnas för konsultstöd som då lämpligtvis bör vara lokalt rekryterade;

c) fältstudie - under den första fasen görs ett selektivt urval av projekt som ska bli föremål för djupstudium;

d) analys och rapportering.

Efter det första steget lämnas en rapport med plan och metodik för det fortsatta arbetet. Rapporten ska diskuteras med och godkännas av BITS innan nästa steg i studien initieras.

Studien ska genomföras i samarbete med beställarmyndigheterna. BITS kommer att tillskriva varje beställare med information om utvärderingen, dess syfte och metodik efter det att första steget i studien har avrapporterats av konsulten.

Rapport ska avlämnas skriftligen. Konsulten förväntas också presentera studien och resultaten/slutsatserna av densamma vid ett seminarium med medverkan av inbjudna representanter från några beställarmyndigheter, leverantörer och representanter från BITS.

Internationella kurser:

Kurs	Antal	Deltagare	Biståndskostnad mkr
Telecommunication Management	15	351	21,2
Digital Network Management	13	370	15,6
Operational Management	11	280	23,3
Telecommunications in Society	4	100	2,4
Telecoms Outside Plants	5	123	8,9
Telecoms Quality Management	1	27	1,3
Summa	49	1 382	72,7

Form A

BITS QUESTIONNAIRE ON TELECOMMUNICATIONS

Form A. Technical assistance/consulting services

Please answer the questions below and return to BITS, P.O. Box 7837, S-103 98 Stockholm, Sweden.

Use only one qustionnaire per project. Use additional sheets if your comments require more space.

Project

Name of BITS supported project:
Responsible government body/telecommunications company:
Address:
Name of contact person for this questionnaire:

Form A

1. Project data

Which of the following components were included in the project?

Component	Included	Partly included	Not included
Policy and law	☐	☐	☐
Corporate Development	☐	☐	☐
Human Resource Development	☐	☐	☐
Financial Management	☐	☐	☐
Material Management	☐	☐	☐
Network Development	☐	☐	☐
Operations and Maintenance	☐	☐	☐
Sales and customer service	☐	☐	☐

2. Which year was the project completed? 19.....

3. How well did the project components attain the objectives desired by your government/company?

Component	Completely	Good	Not so good	Not at all
Policy and law	☐	☐	☐	☐
Corporate Development	☐	☐	☐	☐
Human Resource Development	☐	☐	☐	☐
Financial Management	☐	☐	☐	☐
Material Management	☐	☐	☐	☐
Network Development	☐	☐	☐	☐
Operations and Maintenance	☐	☐	☐	☐
Commercial Development	☐	☐	☐	☐

4. If the project did not meet your expectations, please mark type of problem:

Problem related to:	Yes	No
Time allocated to know how transfer too short	☐	☐
Training period too short	☐	☐
Consultants training ability too limited	☐	☐
Lack of training facilities	☐	☐
Procedures and systems proposed not adapted to local conditions	☐	☐

Please elaborate reasons for the problems marked with "yes":

Form B

5. Are the procedures or organizational changes introduced by the project still in use?

Fully	Mainly	To some extent	No
☐	☐	☐	☐

6. In case the consultant made recommendations for additional measures at the end of the project, have these recommendations been implemented?

Component	All	Most	Some	None
Policy and law	☐	☐	☐	☐
Corporate Development	☐	☐	☐	☐
Human Resource Development	☐	☐	☐	☐
Financial Management	☐	☐	☐	☐
Materials Management	☐	☐	☐	☐
Network Development	☐	☐	☐	☐
Operations and Maintenance	☐	☐	☐	☐
Sales and customer service	☐	☐	☐	☐

7. Is your own staff now able to handle activities introduced by the project?

Fully	Mainly	To some extent	No
☐	☐	☐	☐

8. Has the performance of the company improved as a result of the project regarding

	Yes	No
Financial results	☐	☐
Improved service for traffic	☐	☐
Reduced fault rate	☐	☐
Shorter waiting time for new connections	☐	☐

9. Has your government/company continued the co-operation with the Swedish consultant after the project came to an end?

BITS QUESTIONNAIRE ON TELECOMMUNICATIONS

Form B. Concessionary credit projects

Please answer the questions below and return to BITS, P.O. Box 7837, S-103 98 Stockholm, Sweden.

Use additional sheets if your comments require more space.

Project data

Name of BITS credit:
Responsible government body/telecommunications company:
Address:
Name of contact person for this questionnaire:

Important!
If this Credit covers several exchanges/ transit stations, please select *only three* of them. If possible one large, one medium size and one small exchange/transit station. Use one form for each exchange/transit station.

Form B

3. Impact

3.1. What type of impact has this exchange/transit station had on the network operation and maintenance ?

	Large	Medium	Small
Reduced fault rates	☐	☐	☐
Less maintenance	☐	☐	☐
Shorter waiting list	☐	☐	☐
Improved international traffic	☐	☐	☐
Increased revenues	☐	☐	☐
Others, please specify	☐	☐	☐

3.2 What type of impact has this exchange/transit station had on the economic and social development in the exchange area? Please rank according to your opinion:

Impact area	High impact	Moderate impact	Low impact
Economic growth	☐	☐	☐
Growth of small and medium size business	☐	☐	☐
Person-to-person communication	☐	☐	☐
Improved transportation effiency	☐	☐	☐

4. Trade relations

4.1 Did the project have a positive impact on the trade relations between your country and Sweden?

☐ Yes Please specify.....

☐ No

4.2 Did the project result in any additional BITS financed projects or any other project with deliveries from Sweden?

☐ Yes Please specify.....

☐ No

QUESTIONNAIRE DU "BITS" SUR LES TELECOMMUNICATIONS

Formulaire A : Projets de l'assistance technique ou des services d'experts-conseils

Veuillez répondre aux questions ci-dessous et retourner le formulaire dûment rempli à :

Monsieur Herman A. RUUD
pour l'Autorité suédoise du développement international (Sida-"BITS")
Rés. la Feuillée No. 7
CH-1138 VILLARS-sous-Yens
Suisse

Utilisez, s.v.p., des feuilles supplémentaires, si l'espace prévue est insuffisante pour vos commentaires.

Détails du projet

Nom du projet "BITS" :
Entité gouvernementale/Compagnie de télécommunications responsable :
Adresse :
Responsable à contacter pour cette questionnaire (Nom et numéro de téléphone et/ou de télécopie) :

1. *Caractère et impact du projet*

Lesquels des domaines suivants étaient couverts par le projet?

Domaine	Couvert	Partiellement couvert	Pas couvert
Politique sectorielle et législation	☐	☐	☐
Développement institutionnel	☐	☐	☐
Développement des réssources humaines	☐	☐	☐
Gestion financière	☐	☐	☐
Gestion des stocks	☐	☐	☐
Développement des réseaux	☐	☐	☐
Exploitation et maintenance	☐	☐	☐
Ventes et service aux clients	☐	☐	☐

2. *En quelle année, le projet, fut-il complété?* 19.....

3. *Dans quelle mésure, les objectifs fixés par votre Gouvernement/la Direction de votre entreprise, ont-ils été atteints par le projet dans ses diverses domaines?*

Domaine	Totalement	Bien	Partielle-ment	Pas du tout
Politique sectorielle et législation	☐	☐	☐	☐
Développement institutionel	☐	☐	☐	☐
Développement des réssources humaines	☐	☐	☐	☐
Gestion financière	☐	☐	☐	☐
Gestion des stocks	☐	☐	☐	☐
Développement des réseaux	☐	☐	☐	☐
Exploitation et maintenance	☐	☐	☐	☐
Ventes et service aux clients	☐	☐	☐	☐

4. *Dans le cas où le projet n'a pas atteint ses objectifs, veuillez indiquer le type du ou des problème(s).*

Problème ayant rapport avec :	Oui	Non
Temps attribué	☐	☐
Durée de la formation par le projet, trop courte	☐	☐
La capacité des consultants en formation trop limitée	☐	☐
Manque de materiel et de l'équipement pour la formation	☐	☐
Les procédures et les systèmes appliqués dans le projet n'ont pas été adaptés aux conditions locales	☐	☐

Veuillez développer les arguments, s. v. p., pour les cas où vous avez marqué :"Oui".

5. *Organisation, systèmes, et procédures*

	Totale-ment	La plupart	Quelques-uns	Aucun
Les changements de l'organization, des systèmes, et des procédures introduits par le projet, est-ce qu'ils sont encore appliqués?	☐	☐	☐	☐

6. *Dans le cas où le consultant a présenté, à la fin du projet, des recommandations pour les mésures additionnelles, est-ce qu'elles ont été mis en application?*

Domaine	Totale-ment	La plupart	Quelques-uns	Aucun
Politique sectorielle et législation	☐	☐	☐	☐
Développement institutionel	☐	☐	☐	☐
Développement des réssources humaines	☐	☐	☐	☐
Gestion financière	☐	☐	☐	☐
Gestion des stocks	☐	☐	☐	☐
Développement des réseaux	☐	☐	☐	☐
Exploitation et maintenance	☐	☐	☐	☐
Ventes et service aux clients	☐	☐	☐	☐

7. *Votre personnel propre, est-il maintenant capable de prendre en main indépendamment les activités couvertes par le projet?*

Pleinement	En large mesure	Jusqu'à un certain point	Non
☐	☐	☐	☐

8. *Le rendement et le fonctionnement de votre entreprise, se sont-ils vus améliorés comme un résultat des activités du projet dans les domaines suivantes?*

Impact dans le domaine de :	Important	Moyen	Peu d'impact
Nombre d'interruptions de service, réduit	☐	☐	☐
Interventions pour la maintenance, réduites	☐	☐	☐
Liste d'attente, raccourcie	☐	☐	☐
Fluidité du traffic international, améliorée	☐	☐	☐
Résultat financier	☐	☐	☐
Autre, veuillez spécifier	☐	☐	☐

9. *Relations avec la Suède*

Est-ce que votre Administration/Entreprise a continué la collaboration avec le consultant du projet après l'achèvement de ce dernier? ☐ Oui ☐ Non

(Date et signature: ...)

QUESTIONNAIRE DU "BITS" SUR LES TELECOMMUNICATIONS

Formulaire B : Projets financés par des crédits concessionaires

Veuillez répondre aux questions ci-dessous et retourner le formulaire dûment rempli, à:

Monsieur Herman A. RUUD
pour l'Autorité suédoise du développement international (Sida-"BITS")
Rés. la Feuillée No. 7
CH-1138 VILLARS-sous-Yens
Suisse

Utilisez, s.v.p., des feuilles supplémentaires, si l'espace prévue est insuffisante pour vos commentaires.

Détails du projet

Nom du crédit "BITS" :

Entité gouvernementale/Compagnie de télécommunications responsable :

Adresse :

Responsable à contacter pour cette questionnaire (Nom et numéro de téléphone et/ou de télécopie) :

Important :

Dans le cas où ce Crédit couvre plusieurs centres de commutation locale ou transit, veuillez ne sélectionner que trois d'entre eux; si possible, un grand centre, un centre moyen et un petit.

Veuillez remplir un formulaire séparé pour chaque centre.

Ce formulaire se rapporte à :

☐ un grand centre de commutation locale ou de transit

☐ un centre de commutation locale ou de transit de capacité moyenne

☐ un petit centre de commutation locale ou de transit

Nom du centre :

1. *Détails du projet*

Capacité du centre en nombre de lignes *avant* l'achèvement du projet	.....			
Capacité du centre en nombre de lignes *après* l'achèvement du projet	.....			
L'année de la fin de garantie	19.....			
Capacité *actuelle* en nombre de lignes	.....			
Nombre actuel de lignes principales raccordées aux abonnés ou utilisées pour transit, exprimé en pourcentage de la capacité totale installée	>90% ☐	80%-90% ☐	60%-80% ☐	<60% ☐
Année projetée pour une nouvelle augmentation de la capacité (si applicable)	19.....			
Nombre de lignes prévues dans cette aumentation (si applicable)	.....			

2. *Clients*

Les clients les plus importants, servis par ce centre (selon le nombre d'impulsions comptées), sont à présent :

L'administration centrale, régionale, et/ou locale	☐
L'industrie	☐
Le commerce et le transport	☐
Les agglomérations ou quartiers résidentielles	☐
Autre groupe de consommateurs. Veuillez spécifier.....	☐

3. *Impact*

3.1 Quel est l'impact de ce centre sur l'opération et la maintenance du réseau?

	Important	Moyen	Peu d'impact
Nombre d'interruptions de service, réduit	☐	☐	☐
Interventions pour la maintenance réduites	☐	☐	☐
Liste d'attente raccourcie	☐	☐	☐
Fluidité du traffic international amélioré	☐	☐	☐
Augmentation des revenues	☐	☐	☐
Autre, veuillez spécifier	☐	☐	☐

3.2 Quel est le type d'impact de ce centre sur le développement économique et social de la région de service de ce centre? Veuillez classer selon votre opinion:

Zone d'impact	Impact important	Impact modéré	Peu d'impact
Croissance économique	☐	☐	☐
Croissance des petites et moyennes entreprises	☐	☐	☐
Communication à l'échelle individuelle	☐	☐	☐
Amélioration de l'efficacité de la gestion des transports	☐	☐	☐

4. *Relations commerciales*

4.1 Le projet avait-il un impact positif sur les relations commerciales entre votre pays et la Suède?

☐ Oui Veuillez spécifier.....

☐ Non

4.2 Le projet a-t-il eu comme conséquence des projets supplémentaires financés par le "BITS", ou quelque autre projet avec fourniture de la Suède?

☐ Oui Veuillez spécifier.....

☐ Non

(Date et signature : .....)

PROPOSAL FOR IMPROVED ASSESSMENT OF TELEPHONE PENETRATION IN DIFFERENT COUNTRIES

The telephone penetration or telephone density have been used as a single number describing the telephone achievements or "telephone standard" of a country. The telephone density is the number of telephones as percentage of the total population.

However, the conditions vary considerably between countries, which makes this single number misleading of the following reasons:

- a telephone subscriber may have more than one telephone set connected to the telephone main line. The telephone density will for many "telephone advanced countries" be a measure of the number of telephone sets.

- the telephone density is often so small in many developing countries - a few percent - that further information is needed to properly describe the usage of the telephone facilities.

The factors involved in measuring of a countries telephone "standard" are:

- most telephone administrations apply different tariffs for business and residence customers and, thus, keep records of these two kinds of customers.

- the number of "main lines" (or subscriber connected DELs (DEL = Direct Exchange Line)) are for technical reasons kept under close observations by the administrations.

- the population in developing countries has often a high growth resulting in a large percentage of children and teenagers.

The BITS study has called for a better way of describing the "telephone standard" of the countries. Information about the countries has been collected from different sources and used in a computer program to achieve "key figures". The method used has been sufficient for the BITS study but would require refinements in order to be a reliable tool for future studies by Sida staff.

The method is based on following sources:

1. **The New Grolier Multimedia Encyclopaedia**

This encyclopaedia is CD-ROM-based, and contains updated general information (1993) about population, annual growth, GDP etc.

2. Yearbook of Common Carrier Telecommunication Statistics from ITU in Geneva

This annual statistical yearbook contains staff, demographic, economic and financial information, which has been submitted by the telecommunications administrations. The development, specifically in technical terms, during the last ten years can be followed.

3. National Telephone Tariffs by SIEMENS AG

This annual document is based on measurement of the tariffs used in 50 counties for a set or basket of services - installation fee, subscription rate, local call rate and long-distance call rate (day-time). All measurements are made in German currency (Deutsche Mark). Comparisons are made in relation to the purchasing power in each country.

These sources are used to establish the table in annex 1 showing the "telephone standard" of Morocco. The table consists of the following parts.

The **General Data** are:

GNP per capita (GDP/capita)	= 1 060 $
Population	= 26 709 thousands
Annual population growth	= 2,1 %
Infant mortality	= 56 per 1000 live birth
Life expectancy/man	= 63
Labour distribution: agriculture	= 50 %

Telecom Development:

Direct Dialling (AUTOshare)	= 98 %
.....	
.....	
Tariff for basket services	= 398 DM
Tariff above as % of GNP per capita	= 23,4 %

Comment: The cost of a using a telephone is very high. The GDP/capita is low.

Calculation of Telephone Demand:

Adult percentage: 66 %

Comment: This figure is calculated from the population growth assuming that only adults above 20 years of age demand telephone service. Exponential function is applied.

"Customer in demand" = 4 406 985

Comment: This number is calculated from the adult percentage, from the labour distribution assuming that the people involved in agriculture use the telephone of the local shop, and assuming that only one of two adults in a family (the husband or the wife)

is a potential customer. Since the children and teenagers are excluded the "customer in demand" will be almost identical to the number of households.

"Customer in demand" as percentage of population = 16,5 %

Comment: The "customer in demand" are 16,5 per cent of the population i.a. that the (basic telephone) demand will be fully met if the telephone density is 16,5 %, providing that the assumptions stated above are valid.

Percentage of DEL of "customer in demand" = 11,3 %

Comment: With the number of DEL in operation only 11,3 % of the "customer in demand" (or households) have at present access to telephone services. Another expression for this figure is household penetration.

Development of country's investments :

Investments in telecom/GDP	= 1 %
Investments in telecom/GFCF	= 2,8 %
Telephone density	= 1,92 %
Percentage of main lines which are residential	= 89 %

Comment: The high percentage of 89 % might indicate that the business customers are relatively few - probably due to governmental priority matters.

The key figure for Morocco is 11,3 %, i.a. the "Percentage of DEL of customer in demand". This key figure indicates that roughly every ninth household has direct "access" to the telephone network. (This figure is somewhat too high since the business main lines have been overlooked.) A short study of the OECD decisions for soft loan seems to indicate that countries with a key figure lower than 15 % are eligible for this type of loans.

The Evaluation report gives the following key figures for "Percentage of DEL of "customer in demand" or "Household penetration" and for the commonly used "Telephone density":

Country	Household penetration	Telephone density
Algeria	12,6 %	3,4 %
Botswana	43,5 %	2,3 %
Ethiopia	9,2 %	0,3 %
Lesotho	5,3 %	0,6 %
Mauritius	16,9 %	6,1 %
Morocco	11,3 %	1,9 %
Tunisia	15,3 %	4,0 %
Pakistan	6,7 %	1,0 %

Lioaning - China	11,7 %	2,3 %
Jiangsu - China	13,7 %	2,2 %
Guangdong - China	23,2 %	5,8 %

STUDY OF THE IMPACT OF BITS SUPPORT TO THE TELECOMMUNICATIONS SECTOR IN CHINA

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4.1 Telecoms projects in China according to our data list
4.2 Map of AXE installations
4.3 Interview forms
4.4 List of persons met
4.5 Data on telecommmunications in China

1. Swedish assistance to the telecommunications sector in China

China has received Swedish assistance to the telecommunications sector since the middle of 1980s. The first concessionary credit supported teleprinter equipment in Shanghai. Liaoning was the first province to receive loans for network expansion. Later two other provinces were included, Guangdong and Jiangsu.

An overview of all telecom projects in China financed by BITS is shown in annex 4.1. A summary of the projects according to areas is shown below[1]:

Telecommunication projects in China, financed by BITS

Province or area	Year of decision	Number of local lines	Contract amount, MSEK	BITS costs, MSEK	Year of final acceptance
Shanghai	1984	Teleprinter	13.4	4.2	1989
Changquing	1987	51 200	69.0	20.0	1992
Liaoning	1985-92	407 800	544.3	176.8	1992-93
Guangdong	1988-92	668 000	706.6	244.6	1989-93
Jiangsu	1990-92	310 200	340.2	108.3	1993-95
Total		1 437 200	1637.5	553.9	
Non-completed projects			890.5		
Grand Total			2564.0		

The main feature of the support to China has been an upgrading of the existing telecom network by financing deliveries from the Swedish contractor, Ericsson Telecom AB. The financing has been arranged under the Swedish concessionary credit scheme. The terms and conditions of the concessionary credits have varied somewhat over the years. The credits are normally provided on terms that correspond to a concessionality level (grant element) of 35 per cent. The broad objectives of the credits are the same as for the Swedish assistance as a whole although in terms of procurement the concessionary credits are tied to goods and services of Swedish origin.

Two of the telecom projects are of a technical assistance nature and include human resource development undertaken by Swedtel. They were completed by the end of the 1980s. They are exceptions from the general rule followed by BITS to require technical assistance to be included under the delivery contracts.

2. The telecom assistance to the Jiangsu province

2.1 Jiangsu selected for visit

Jiangsu province was selected as the most suitable area for a field visit during the evaluation.

[1] The table only includes completed projects. Most projects consist of several contracts which refer to an installation plan, divided in phases. BITS decision could cover several subsequent credit agreements. The division of phases used by the Chinese authorities and Ericsson does not always coincide with the BITS phase numbering.

We chose to visit Jiangsu as this is one of the most expansive areas of China. It is also the centre for the present activities by Ericsson and the Chinese telecom authorities have fresh experience from the implementation. Due to the size of the province and the wide extension of the telecommunications network, only a part of the installations were covered by the visit. Detailed documentation of all installations in the province were provided the Chinese provincial telecom administration and Ericsson. See annex 4.2 for AXE exchange stations in Jiangsu.

2.2 BITS preparations

BITS´ preparations for the Jiangsu assistance started in 1988 at the request of the Chinese authorities. Consultants visited the province and gave recommendations on the design of the assistance. Ericsson had shortly before concluded a frame agreement with the Chinese authorities on their role in the expansion of the network.

BITS did not select Jiangsu, the province was chosen by the Chinese authorities, presumably inspired by Ericsson. The assistance took the form of a program for development of the telecommunications in the whole province, financed by concessionary credits. It was not only a question of installing a number of exchanges or expanding the service with a specified number of lines. BITS ambition was to upgrade both the technical components of the network, the administration of the operations, the competence of the staff and the maintenance. Such *program approach* had before been tested in Liaoning and Guangdong with good results and with genuine support from the Chinese ministries.

The first decision on support to Jiangsu was approved by BITS in April 1989. Sweden did, however, impose a freeze on the assistance to China after the events at the Tiananmen square. This delayed the implementation. It was not until November 1990 that the first contracts for Jiangsu were released for commitment.

The 1989 concessionary credit related to exchange stations equipment for the expansion of the telecommunications network in Jiangsu. The contract amount was 68 700 000 USD and the credit 58 395 000 USD corresponding to 373.7 million SEK. The grant element was estimated at 130 million SEK[2]. Later, in 1992 a second credit was approved (phase IV) for 83 960 lines.

2.2 Objectives and expected results in Jiangsu

The feasibility study from 1988 describes the project technically and gives broad judgements on expected results and economic and financial rate of return. A summary project description is contained in the BITS board documents where the general objectives are briefly stated. The following means-end relation could be compiled:

[2] Board decision 21 April 1989

LFA matrix for the Jiangsu credits

	The Jiangsu credits, phase I	*Assumptions*
Overall objectives	Contribution to economic growth and social development	
Project objective	Improved means of communication within the province.	All installations very cost-effective (internal rate of return 20-30 %)
Output	218 000 local lines and 5 750 trunk lines installed after 2 years at 32 sites in Jiangsu	Building and installations to be completed by China
Activities	1. Delivery of equipment for exchange stations from Ericsson 2. Training of 80 technicians 3. A training exchange at the P&T college in Nanjing	Training costs approx 3 MSEK

3. Organisation and acknowledgements

The visit was undertaken in November-December 1995 by Mr.Ulf Rundin and Mr.Bertil Sunesson. Our preparations included the circulation of a questionnaire to the Ministry of Post and Telecommunications (MPT) in Beijing, who collected answers from the provinces Liaoning, Jiangsu and Guangdong. The outcome of the replies received is recorded in the main report (all questionnaires to China were properly completed and returned).

Secondly, we carried out interviews following a predetermined format structured to suit the LFA-presentation (annex 4.3). We interviewed around 40 people, mainly officials in Jiangsu employed by the Jiangsu Posts and Telecommunications. We also met with senior management staff at the Ericsson (China) Company in Beijing and the Ericsson Communication Co in Nanjing. All interviews with Chinese officials were made with the assistance of an interpreter.

Site visits were made to the Nanjing Telecommunications Bureau and to Dan Yang PTB and Zhang Jia Gang PTB in the Jiangsu province. See map.

We were greatly assisted by the Nanjing Telecom Bureau and the Ericsson representatives in Nanjing. We extend our thanks in particular to Mr Hu An Rong, Senior Economist at the Jiangsu PTA and to Ms Gunnel Björkert, General Manager at the Nanjing Ericsson Co. We are grateful for the generous attention given to our request for information as well as the openness of our discussion with them. A list of persons met is enclosed in annex 4.4.

4. Validity and reliability

Our visit has given us a good picture of the results achieved in Jiangsu. We consider the technical information relevant and reliable. We have been able to compare information on delivered equipment with data supplied by the Chinese authorities. Necessary cost data to calculate internal rate of return of the investment has, however, not been available.

Our observations of the effects are less precise but supported by figures on demand for telecoms service from the industry and the household at current prices. The traffic intensity in the network indicates that there is a reasonable balance between service offered and service accepted.

Statistics on telecommunications *traffic volume* has not been made available to us as such data are restricted in China. In addition, most of the non-technical information is written in Chinese, a fact which has limited our access to information about investment planning and priorities. Our interviews have, however, provided us with most of the information we asked for. We do not think that the lack of traffic statistic makes our conclusions less reliable.

5. General context

5.1 The telecommunications sector in China

China's economic performance during the last, few year has been impressive, in particular in terms of growth. The economy has had an average annual growth of more than 8 per cent (1980-93, World Bank estimate) and investments have been booming in particular in the construction sector. The economic growth has been uneven over the country. The coastal provinces to which Guandong, Jiangsu and Liaoning belong, have achieved much higher growth due to inflow of foreign investment capital and rapid expansion of the labour force.

China has now a population of 1,2 billion inhabitants. The telecommunications network had 288 million subscribers at the end of 1994 out of which 77 per cent are found in urban centres and 23 per cent in rural areas. Mobil telephones were introduced at the end of the 1980s and have become increasingly popular. There are now 1,6 million subscribers and the sales curves for new equipment are rising steeply.

Telecommunications is a priority area for the Government. The network is therefore being expanded to follow the increasing investments in new industries, housing and transport infrastructure. During 1994 the increase was 12 million new subscribers, 14 million DEL and 300 000 toll lines. Paging service is available and has become very popular due to low costs.

Two separate networks for telecommunications are in use today: The regular government network under the Ministry and Posts- and Telecommunications (MTP) and, since 1994, the new telecoms operator, United Telecommunications Co (Unicom). Unicom´s network was set up by three ministries (electronics, electric power and railways), China International Trust and Investment Corporation (CITIC)and twelve other organisations. Using the the railway ministry´s routes as a backbone, Unicom is constructing a fibre-optic network in each of the four large cities. The plans are new and we did not find any trace of Unicom in the areas we visited.

As noted, Swedish assistance has been extended mainly to three provinces in China. The table in annex 4.5 gives some salient telecoms data for those provincies, including Beijing. The figures tell us that

- the GDP/capita in Beijing is twice as high as that of the three provinces. Guangdong is the richest province, followed by Liaoning and Jiangsu.

- Household telephone penetration is highest in Guangdong (16%), closely followed by Beijing (13%), Jiangsu (7%) and Liaoning (5%).
- Telephone business customers are 2,6 per 1000 inhabitants in Guangdong, 2.1 in Beijing and 0.9 in both Jiangsu and Liaoning.

Jiangsu has a ranking in the middle, a fact which should be kept in mind when discussing the findings we made during our visit to this province.

5.2 Policy

The Chinese government has set down the following policy guidelines for the future development of the telecommunications sector[3]:

1. The government will continue to list posts and telecommunications as a fundamental industry with higher development priority. Local government at different levels will also provide necessary conditions and formulate favourable policies to support the development of posts and telecommunications.
2. The policy of "centralised planning, coordination of efforts from both the central and local authorities, shared responsibilities among different levels and joint construction" will continue to be adhered to. China will develop its posts and telecommunications by bringing the initiative of all the sectors of the society into full play. New channels for funding the P&T construction will be actively sought, making use of domestic and foreign loans and lease financing. New ways of making use of domestic and foreign funds will be studied.
3. In order to realise the modernisation of communications networks, China will take advantage of technological advances by adopting new technologies and starting projects at a high technological level. For foreign advanced technologies, import, digestion and absorption should be combined.
4. The policy of combining an open window to the outside world with self-reliance in building communications networks, will continue. The telecommunications equipment market will be further opened to the outside world. The network access licensing system will continue to be practised and open invitations for bids on major network equipment to both domestic and foreign bidding parties will be made. The transfer of technology, and the imports of advanced and applicable technologies and equipment will be promoted on the basis of mutual benefit and equal footing. Meanwhile, exchanges of technical and managerial personnel will be facilitated.
5. The control over the domestic markets of communications services will be strengthened. The responsibility entrusted by the state to manage the communications industry must be fulfilled earnestly. Under the relevant state regulations, competitions will be introduced as appropriate; the operation of some value-added services will be decentralised and the operation of licensing system will be put into effect.

6. Telecommunications in Jiangsu

6.1 General

The Jiangsu province is situated in the east of China. It has an area of 102,600 km2 with 68 million inhabitants, among which 54 million live in the rural villages, i. a. 80 % of the population in the rural areas. The Yangtze river divides the Jiangsu province into a northern and a southern part. There are 75 cities or counties and 35 701 villages in Jiangsu.

The main industries in Jiangsu are textile, clothing, electronics, machinery and chemicals. Its main farming products are rice, wheat, cotton, corn, sweet potatoes, flax, fish, cocoon, fruit,

[3] Quotation from China Posts and Telecommunications, 1994 Annual Report from the Ministry of Posts and Telecommunications

etc. The average annual per capital income for the rural population in 1993 was 890 Y (= 102 $). When the market reforms started in 1980 the annual per capita income was only 210 Y. A general survey of the province shows that incomes vary a lot, with low income areas particularly in the northern and part of the southern Jiangsu province (see map).

Reliable telecommunications with broad penetration and an efficient transportation system is regarded as a most important precondition for economic development of the province. At a provincial telecom meeting held in 1993, the provincial government asked for a quick construction of rural telephone network to create a solid foundation for the economic development of the rural areas.

6.2 Organisation

China has four basic levels in its administrative structure, namely
1. central government
2. provinces (30 + Taiwan)
3. prefectures (335 incl. 196 cities) and
4. counties (2166).

The structure of the telecommunications organisation is similar. Thus, the central Ministry of Posts and Telecommunications (MPT) in Beijing is the functional department under the State Council. The task of the MPT includes the governing the P&T communications, making overall plans, coordinating projects and supervising operations. The MPT holds both Directorate-General of Posts and Directorate-General of Telecommunications, which are departments of a corporate nature and they follow independent accounting procedures. They are responsible for the operation and management of the P&T services, the construction and operation of the networks and the provision of international service.

Jiangsu is one of the 30 provinces and the Jiangsu Posts and Telecommunications Administration (Jiangsu PTA) in Nanjing is the responsible parastatal. PTA has a staff of 300 and manages the whole telecom system in the province. There are around 30 000 people employed in subordinate PTBs.

At the third level, there are 11 Provincial Telecommunications Bureaux (PTB) of the primary class in the Jiangsu province, each PTB for a city of prefecture level (i.a. provincial capital and other major cities). All of these PTBs report to the Jiangsu PTA, including the Nanjing PTB. At the fourth level, there are 64 PTBs of the secondary class in the province. These PTBs report to PTBs of the primary class. The PTBs present their plans to the Jiangsu PTA, who decides the way the network extensions shall be done and how the extensions shall be financed.

We discovered no conflicts between the different levels of administration. The standard answer to our question was "we all belong to the same family".

6.3 Procurement and the credit grant element

In the telecommunications sector, China encourages competition between foreign companies when buying equipment and services. The procurement is decentralised. Each major province makes the procurement after directives from the Ministry for Posts and Telecommunications in Beijing and MOFTEC (Ministry of Foreign Trade and Economic Cooperation). The Jiangsu telecoms administration (PTA), which includes an imports division, invites selected companies to quote for the delivery of equipment to specified exchange areas (lots). Competitive bidding in line with World Bank procedures is not applied. Instead each company is encouraged to present their products and solutions. Price comparison is possible as most of the technology is standardised.

All contracts with Ericsson were subject to negotiations with the borrower. Price comparison with systems from Japan (Fujitsu) and France (Alcatel) were made. In the end the unit price per line turned out to be fixed at a lower level than the estimates in the appraisal study. The Chinese authorities negotiated the contracts and signed them after getting the credit approvals from BITS.

In the Chinese government, MOFTEC is the coordinating ministry for concessionary credits. The priority of the project and terms of the credit are endorsed by MOFTEC and the Ministry for Posts and Telecommunications before the decision in taken by BITS. The grant element of the credit is, as a matter of policy, not retained by the central government but transferred to the PTA in each province. Our discussion with PTA in Nanjing revealed that the grant element does not appear as a separate item in the PTA accounts. The concept of a "market rate for investment financing" is not part of their present calculations.

7. Result and efficiency of the Jiangsu I-IV credits

7.1 Volume and timing

The evaluation has studied the result from the installations finalised before 1994. Jiangsu has received six credits later (1994-95) but these result were not yet ready for evaluation.

Jiangsu credits, phase I-IV

Jiangsu, phase no	Year of decision	Number of local lines	Final acceptance test
Phase I	1990	54240	1993
Phase II	1990	76000	1993
Phase III	1991	96000	1994
Phase IV	1992	83960	1994
Summa		310 200	

Around 310 000 local lines have been installed in Jiangsu under the four credits financed contracts. The rapid expansion of the network continues and the new BITS credits will add more lines. The AXE-system is now in use in 24 PTBs out of a total of 75 PTBs in the

province. The installations have been made according to specifications and have gone through the final acceptance test. The technology is advanced but well know and not very different from the system used in Sweden.

The delivery of the AXE equipment was delayed due to the freeze of the assistance to China imposed by the Swedish government. Installations started at the beginning of 1991 were completed (phase I-III) in 1993. Phase IV was on schedule, decided 1992, completed 1994.

All installations have been done by Chinese staff. We found the engineering and installations to hold an acceptable, and in many cases, very good standard. The buildings, in particular the main structure, are often bulky and oversized for their purposes, although well maintained. They are a typical product of a building industry which operates on budget allocations without demands for efficiency and cost-saving.

7.2 Observations from a travel to three local telecom administrations (PTB)

The three PTBs visited were Nanjing PTB, Dan Yang PTB and Zhangjiagang PTB. Essential data for the three PTBs is given in the table below.

Capacity and household penetration for three local telecommunications areas (PTB)

Tele-administration	Population		Telephone exchange capacity (DEL)			Household penetration			
	millions	urban/ rural (%)	installed	subscriber presently connected	planned annual increase	urban (%)	rural (%)	Traffic intensity (erlang)	Faults per sub-scriber and year %
Nanjing PTB	5.90	49/51	930,000	510,000	160,000	40	5-10	0.12	0.5
Dan Yang PTB	0.8	15/85	75,000	50,000	25,000	35	ca 10		
Zhang-jiagang	0.83	12/88	100,000	70,000	20,000-30,000	30	8	0.12	0.3

Nanjing PTB covers the capital of the province and has a large proportion (49 %) of its population in urban areas. Zhangjiagang PTB is influenced by its closeness to Shanghai by fast-growing industries. The urban population is still small, 12 per cent, but the rural areas are densly inhabited, people live in "rural villages".

The traffic intensity was quoted to be about 0,12 erlang. This figure indicates that the usage of the traffic capacity of the telephone network is adequate.

The AXE exchanges, the MDF (Main Distribution Frame) and multiplexor (for the optical fiber cables) were all placed in exchange buildings with sufficient space for future installations. The ground floor was often occupied by a post and telecommunications office with arrangements for receiving payments of bills, using public call boxes, sending letters, etc.

Some of the exchanges had an Operation & Maintenance Center- one for each of the exchange system used - with many consoles and wall-displays. The installations we saw were of good quality.

7.3 Maintenance

The maintenance of the equipment is carried out by trained staff and the network monitoring is done in well-equipped Operation & Maintenance Centres. We found the equipment to be of high technical standard and the technicians showed good knowledge in operation and maintenance of the AXE equipment. The AXE-equipment has built-in diagnostic features. It will tell the operator about faults in the system and pin-point faulty printed circuits (PC). The operator replace the faulty PC, send it to headoffice, which will send the PC and other faulty components to the manufacturers.

One of the exchanges we visited had suffered from a severe fault some two years ago. The cutoff lasted for 30 minutes. But this was evidently an exception, cutoffs due to fault in the AXE-equipment were on the whole rare. According to information given by the PTB officials, the common complaints from the customers have to do with the telephone bills and cutoffs caused by construction teams damaging telephone cables.

Repair teams consist of four technicians on bicycle, or they use a vehicle if the volume of repairs justified the expense.

Some of the AXE maintenance technicians had been trained in Ericsson Training Centre in Malaysia. The exchange chief engineer in Nanjing PTB had been on management training course at Kalmar. The technicians in the three studied PTBs stated that they were capable of maintaining the AXE system without assistance from the supplier. But Ericsson technical staff claimed that the demand for support to the PTBs has increased and reached such a volume that their so far free support service may be priced in the future.

7.4 Tariff structure

There are 13 tariff levels for national calls ranging from 0,3 Y/3 min to 2 Y/min (0.24 - 1.60 öre/min). The tariffs are decided by MPT in Beijing. The entry fee for subscriptions varies depending of type of customer. There are also slight variations between different PTA and PTB. These tariff were used in Nanjing PTA :

Entry fee, Jiangsu province

Customer	Fee, yuen
Business	4500
Government service	3500
Private	3500
Schools	1500
Health care	0
Institutions for orphans and handicapped	0

Monthly charge for private customers 50 Y and slightly different for other types of customers. International calls are expensive, a call to Sweden costs 30 Y/min (24 kr/min). Calls to or from a mobile telephone are charged as ordinary telephone calls but with an extra charge of 0,5 Y/min.

The high entry fees has resulted in keeping the demand from the private customers at a low level. The Jiangsu province has no waiting lists which indicates that there is a balance between demand and supply of basic services at the present entry fee level.

A second, and certainly welcome effect of the high private entry fees, is that there is enough room for the business community to expand their telephone use. In all three visited PTBs, the ten largest customers were the industries, banks and hotels.

The largest customers in terms of traffic revenue

Rank	Customers in Nanjing	Customers in Dan Yang	Customers in Zhangjia Gang
1	Nanjing Ericsson Co	Kai Sa Hotel	Quing Yuan Holiday Villa
2	Jiangsu Mechanics Imports and Exports	Dan Yang Hotel	Iron and Steel Factory
3	Nanjing Zhuang Yuan Lou, hotel ·	Fu Mai Tea Co	China Bank
4	Nanjing Steel Co	Dan Yag Fertilizer Factory	Guo Mao National Trade Hotel
5	Jiangsu Construction Bank	Economy and Trade Comittee	Tax Free Zone Donghai Food & Oil Industry Ltd
6	Nanjing Construction Bank	Dan Yang Asian Gymn Equipment Co	Sha Zhou Textile Printing Co
7	Jiangsu Chemical Industry	Dan Yang Foreign Trade Committe	China Foreign Transportation, Jiangsu Ltd
8	Nanjing Chemical Industry		Hu Fang Textile Co
9	Nanjing Press		Glass Factory
10	Jiangsu Decoration Material		Harbor Administration

The Chinese tariffs for calls are strongly dependent on distance. Technological changes are now making distance a less important factor in determining tariffs. The capacity of the network will be vastly increased by the use of fibre-optic cables in combination with modern switches like the AXE. This calls for tariff reforms which give the customers the benefit of using telephones for long-distance and international calls at a cheaper price. We noted that the provincial telecoms authorities were not able to discuss tariff changes or modify them locally as all tariffs are decided by the central authorities.

Revenues from telephone traffic are an important source of income for the central government. Tariffs are therefore decided in Beijing. All revenues *from long-distance and international calls* have to be sent to the Ministry of Post and Telecommunications in Beijing. The provincial PTA for Jiangsu only retains a small administrative fee. Revenues from *local, intra-province calls* are retained in full by the Jiangsu administration. In practice about half of the total PTB revenue is sent to MPT in Beijing.

7.5 Management

The management appears to be very knowledgeable in technical matters with high ambitions and a fair understanding of what the new technology will offer and require. The staff we met in the PTBs were well trained and able to handle the installed equipment.

On the other hand, our discussions on investment financing, rate of return from capital and tariff/usage relationship did not produce much. Knowledge in business economics is not yet widely spread, investments decisions are taken more in physical terms than in economic. The fact that the present entry fee would be sufficient to pay for all costs related to a new customer, was not a point considered as important.

The knowledge of English is poor even at the top level. This could isolate the management from the international development of telecommunications.

8. Impact

8.1 Economic growth and the market economy

The Chinese society is going through a rapid transformation through economic reforms and the introduction of a market economy system. The building and investment boom is a most visible effect of these changes. New industrial areas, a reformed marketing system for agricultural produce are putting pressure of on the construction sector to provide the necessary infrastructure. "Electricity, telephones and roads is the key to development", said Mr Ma Ao Cheng, the chief engineer who we met in the Danyang PTB. "And these investments must go hand in hand".

The driving forces are several. Firstly, the telephone network is being extended to new areas as a result of opening up of new industrial villages, new housing schemes and new transport system. Secondly, the existing network is being modernised and its capacity upgraded to allow for more intense traffic (Nanjing has had telephones since 1901). Thirdly, the economic reforms have created a strong demand for better information to make entrepreneurs more able to take economic decisions. The pricing of melons is an example which appeared in a Nanjing newspaper.

> The year of 1993 was a good harvest year for melon growers in the Zhyi and Jiuxian area. Under the new market conditions the growers had themselves decided to go in for melons. Earlier the farmers were told what to grow and how much. Government provided seed and fertiliser and bought all products at fixed prices. Now the growers decided for themselves and could set their own prices. As the big market was in Nanjing all melons were taken there. But the week before growers in other areas had got the same idea. Nanjing was flooded with melons, which could not be kept fresh in +35 degrees, the price went down to 0.1 yuen per kilo, which was the lowest price in 40 years. But in nearby Shanghai, Sushan and Hangzhou traders willingly paid 0.8 yuen per kilo as the supply was very low.

> The melon growers in Zhyi and Jiuzian lost both money and their trust in the market system. When journalists visited the villages the farmers complained: "In the past we were worried about nothing, at least we did not lose. The government bought what we grew. Now we are on our own and we have worries and fears. How can we sell something when we do not know the price? We have no telephone and Nanjing is far away".
>
> Price information is vital for a market. Telephones are the fastest and most reliable means to get information from distant markets. The message is, wrote the newspaper, that the market economy will not operate without telephones.

8.2 Impact within service area

As noted above, the Jiangsu is one of most develop provinces in China and this especially true for the area we visited south of the Yangtze river. In Nanjing, the former capital of China, a considerable network expansion has taken place. Most industries have been connected as have the small vendors who could afford to pay the entrance fee. Public phone installations have been followed by the introduction of a paging network, data communication facilities and an extended mobile telephone service. Available statistics and our observations during the visit confirm the reports on the substantial increase in installations and traffic, not only for Nanjing but also for the whole southern area.

The northern part of Jiangsu is much more rural and backward. So far the main part of the installations has been done in the south whereas the expansion in the north has gone much slower. Rural areas have been affected in both parts although the word "rural" in the south denotes an agglomeration of densely populated centres, so called rural villages.

The appraisal documents from 1989 recorded the *telephone density in the rural areas* of Jiangsu at 0.7 per cent. This figure presumably refers to the middle of the 1980s. The rural density is now (1995) estimated at 3 per cent, with an increase of 400 000 lines a year[4]. If these figures are comparable, and we have no indication to the contrary, a significant improvement of the telecom network in rural areas has been accomplished, partly financed by the Swedish credits.

It should be noted that *old telecom equipment is recycled* in China as a matter of good resource management. Small local exchanges, which have been found outmoded after connections to the new AXE station, are frequently moved or sold and used in remote areas, where the network still holds a lower standard. This is a secondary effect of the project, leading to improved, although not up-to-date connections in the less developed rural areas.

8.3 Tele availability to the public

Public phones are built in the cities as a part of the expansion programme. The old installations made for the political units of the building block are retained. In addition, modern *public phone booths* and magnetic card phones are being introduced. The service has been greatly

[4] Jiangsu Posts and Telecommunications 1994. Annual report

promoted during the last, few years. Nanjing has, according to PTB, 2 200 new newly installed public phones. Similar policy is promoted in other densely populated areas.

An *emergency service* is in place with standard numbers for police, fire brigade and ambulance.

International telecom links are available and *direct dialling* is possible. Obviously this service is mainly used by the commercial customers because of the high fees for international calls. The customer must also get an approval from the authority to use direct dialling. Only the ability to pay is considered when such applications are exmined, ensured our Chinese hosts.

While *satellite antennas* or parabolas are forbidden, international hotels and commercial customers are allowed to install such facilities. Clandestine antenna installations are common and no longer actively prevented.

8.4 The Ericsson factory in Jiangsu

Ericsson has entered into a joint venture with the Chinese telecom authorities by opening a factory outside Nanjing to produce exchange equipment. The factory will produce 1.6 million lines per year and printed circuits to cover the needs for expansion of the installations made by Ericsson. Around 400 workers are employed in the factory.

9. Sustainability

9.1 Policy support

As we have seen, Chinese policy underlines strongly that reliable telecommunications are vital for any program to improve infrastructure and hence to achieve economic growth. During the next plan period, the Ninth, starting 1996, the extension of the basic telecom services will continue. Resources are provided also to upgrade the network to modern standard with digitalized high capacity links. The installations provided by Ericsson under the Swedish credits will fit well into the future Chinese telecom system.

Chinese planners show concern for the rural areas and the difficulties get a balanced expansion of the network between cities and rural areas. We have got the impression that rural areas are lagging behind but that efforts are made, at least in terms of policy, to give the countryside a fair share of the telecom investments.

Although commercial customers dominate by far among the subscribers, the service to the general public is not forgotten. Our visit gave many examples of different measures taken to develop public phones (public phone booths, paging service, card payment system).

9.2 Financial sustainability

As shown in section 5.3 the revenues from the traffic should be sufficient to cover new investments in the network, at least in the densely populated areas. Some sort of regional redistribution of income is practised to safeguard new investments in provinces and areas that

cannot bear their own cost for network expansion. In Liaoning, Jiangsu and Guangdong which belong to the most developed provinces in China, the revenues will be more than sufficient to bear the costs for maintenance and expansion, provided that the present tariff structure and regional distribution system is not changed drastically.

9.3 Technology

The technology used is the most up-to-date one and similar to the technique used in Sweden. Is it appropriate for China? Yes, the technology for telecom equipment is today more or less similar from one country to another. The Chinese approach with international competition for telecoms investments has resulted in a modern telecom network. The authorities are pressing ahead to further upgrade the system to international standard.

The new equipment has a lifetime of at least 30 years. The system is expandable and easy to maintain as most of the equipment consists of standardised modules that could be exchanged.

9.4 Training

The choice of modern technology means that training must form an important part of the telecom investments. China is building up their own competence through the establishment of a vocational training system for the telecom service. In Jiangsu there is both a special training center and a technical school within the Jiangsu Post and Telecommunications organisation.

BITS supported a training school in Liaoning at the end of the 1980s and later a telecommunications centre in Beijing. No further support to training has, however, been extended although this issue has been raised several times by BITS with the Chinese authorities. One reason seems to be that China wants to organise training separate from the suppliers and on their own. Ericsson, as a supplier, is involved in equipment specific training, closely related to their deliveries. Specific, additional training could, and has been, included in some contracts on request of the telecom operator. They are then costed and paid for within the contract. BITS efforts to provide supplementary training together with the credits have, however, not been successful. A few Chinese technicians have participated in the Kalmar courses. Swedish proposals for cooperation on broader training, for instance related to organisational management and advanced network operations, have so far met little interest. Telecom experts think that the Chinese are underestimating the need for better competence in telecoms operations in face of the fast advancing technological changes.

Ericsson has own training facilities in Sweden, in Malaysia and in Beijing which are used for customers in need training at different levels.

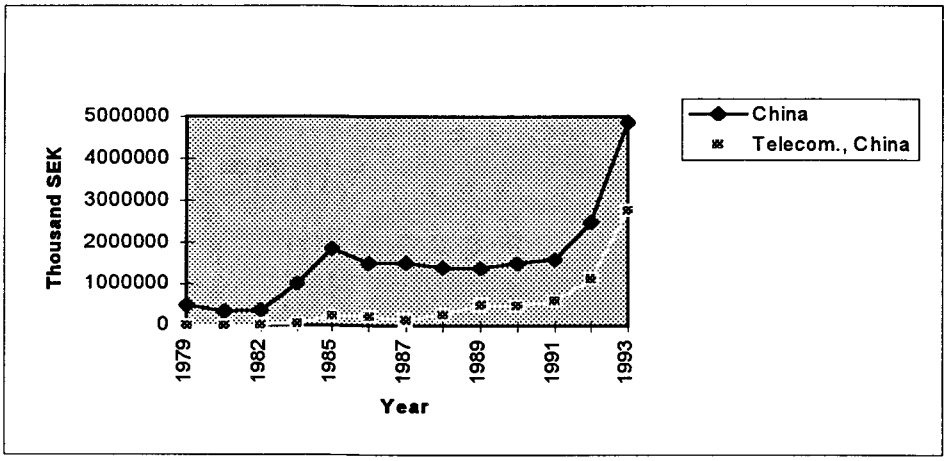
We were not been able to follow how the training is organised and what needs there may be for expansion of the training facilities. We have noted that the training under the contracts for Jiangsu took another form than originally visualised. Ericsson has given in service training and has had staff trained in Malaysia and in Stockholm. A few staff members participated in the management course in Kalmar. Otherwise the Jiangsu PTA organised the training through their own facilities, in particular through the telecom training school in Nanjing.

10. Trade relations

Swedish trade statistics indicate that Chinese imports of telecommunication equipment from Sweden has had a significant impact on trade at least during the 1990-93 period. See diagram. This was also the view in China. The credits were thought to "promote Sino-Swedish trade" and to give "increased purchase from Ericsson"(see response to our questionnaire in the main report). But few thought that the credits promoted other projects or deliveries from Sweden.

This coincides with our observation that the telecom credits tend to consolidate a position already achieved by a company, rather than open up new areas for cooperation or trade.

Chinese imports of Swedish goods and telecom products



Ericsson has benefited a lot from the concessionary credits. Such credits give the benefiting company a better competitive position when pricing their products. Secondly, the entry to the market is promoted by government to government contacts, which is important for the image of the contractor. Thirdly, and particularly important in telecoms business, the choice of a AXE system for a central exchange will make it necessary for the customer to use the same technical system in the substations (RSS). The widespread use of AXE-system in Jiangsu, as in Liaoning and Guangdong, will ensure future sales for Ericsson, provided that its products are reasonably competitive. But Ericsson has no monopoly. The Jiangsu PTA use two other companies (Fujitsu and Alcatel) for several central exchange stations. There is stiff competition in China and today's prices are low. Local production in the new factory outside Nanjing may improve Ericsson´s competitive edge in particular in view of the tariff imposed on the imports of telecommunications equipment.

11. Concluding remarks

BITS support through concessionary credits to the telecom expansion in China has been successful both as development aid and as a promotion of Swedish exports. These two, sometimes conflicting objectives, have in the telecom sector been mutually supportive. One explanation is the determined and, as we understood, uncorrupted efforts by the Chinese

authorities to secure international competition at each level. Secondly, the technology is advanced but also appropriate for the expanding Chinese society and the Swedish supplier is competitive on the world market. Thirdly, the BITS concept to finance a program, rather than a project by project approach (section 2.2), has been very rewarding. The long-term financing secured continuity in planning and a cooperation between the donor, the recipient and the supplier which turned out to be very fruitful. The freeze of Swedish assistance 1989-91 caused delays and momentarily disrupted the financial flows, otherwise the implementation has gone according to plans.

While most BITS board decisions have been preceded by consultancy studies of the technical aspects of the projects, studies of the economic setting and/or the intended penetration of the telecoms expansion have not been done. In the case of China this is understandable but leaves to the evaluators to reconstruct the possible objectives of the assistance. Beyond any doubt, the promotion of economic growth has been the over-riding goal of the BITS´ credits, besides the wish to promote Swedish trade at the same time. The distribution of the benefits of telecom expansion could, however, have been better analysed.

Today soft loan financing of telecom projects is presumably a closed chapter in China after the donor government agreement not to finance commercially viable telecom investments. The remote and poor parts of China may, however, still qualify for concessionary credits. A lesson for the future is that the contractor, in this case Ericsson, should be asked to produce more informative reports than those required by BITS. A format for a standard report should be produced by Sida which sets out the expected type of information to be issued by the contractor after each project phase has come to and end.

Annex 11

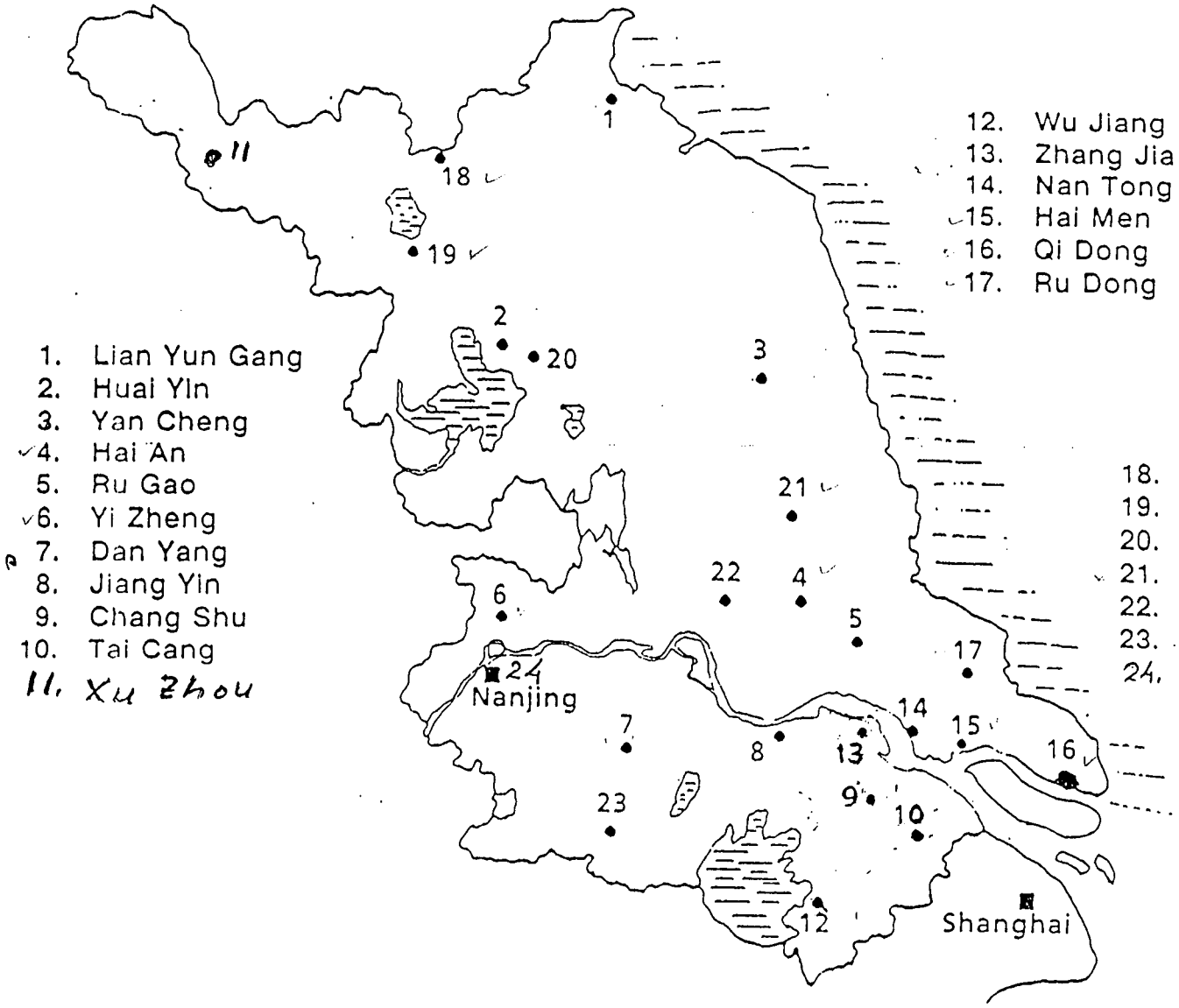
Database: BITS financed telecom projects in China

BITS Number	Name of project	Country	Date of Decision	Foreign partner	Swedish partner	Type of project	Costs, contract amount	Grant element	Amount disburs-ed, SEK
240	Tele-printer-proj. Shanghai / CHN	China-Shang-hai	840918	Ch Nat Mach Im & Ex Co	LME	CC: ovr mtrllev	13.4	4.2	13.4
022/85	Telecom. / Dalian	China-Liaoning	850520	Ch Nat Tech Imp Cop Dahlian	LME	CC: DEL 21760, OVR transm	54.3	13.2	54.3
45/85	Fushun 1 Telecom Liaoning	China-Liaoning	851218	Ch For Trade Corp	LME	CC: DEL 16000, TR 200	24.8	6.2	24.8
145/85	Benxi 1 Telecom Liaoning	China-Liaoning	851218	Ch For Trade Corp	LME	CC: DEL 12000, TR 200	17.9	4.5	17.9
345/85	Shen-yang 1, Tele Liaoning	China-Liaoning	860204	Ch For Trade Corp	LME	CC: DEL 20224	32.7	8.2	32.7
545/85	Fushun 2 Tele Liaoning	China-Liaoning	870601	Ch For Trade Corp	LME	CC: DEL 8000, OVR transm	10.5	6.3	10.5
645/85	Tele / Benxi Steel	China-Liaoning	870601	Ch Liaoning For Trade Corp	LME	CC: DEL 10000	18.3	6.1	18.3
445/85	Benxi 2 Tele Liaoning	China-Liaoning	870601	Ch For Trade Corp	LME	CC: DEL 10000, TR 100, OVR transm	13.6	8	13.6
CHN0511 0512	Tele Liaoning I,II	China	870630, 870428	Liaoning PTT	LME	HR: AXE OMS	4.26		3.89
225/87	Guang-dong, tele Phase 2	China-Guang-dong	880413	Ch Nat Mach Im & Ex Co	LME	CC: DEL 134000, TR 1300, OVR transm	246.2	86.7	246.2
125/87	Guang-dong, Tele Phase 1	China-Guang-dong	880413	Ch Nat Mach Im & Ex Co	LME	CC: DEL 265000, TR 4900	202.2	67.5	202.2
745/85	Liaoning, Tele	China-Liaoning	890208	Liaoning P&T Ltd	LME	CC	63.5	16.5	63.5
CHN1051	Telecom-center Peking Stage A	China	890404	SCOMPT	LME	HR: AXE	3.7		3.7

Database: BITS financed telecom projects in China

123/88	Telecom muni-cation, Liaoning II	China-Liaoning	890421	Liaoning For Trade Corp	LME	CC: DEL 24456, TR 900	34	12.2	34
223/88	Telecom muni-cation, Liaoning II	China-Liaoning	890421	Liaoning For Trade Corp	LME	CC: DEL 21569, TR 816	25.5	9.3	25.5
109/89	Telecom Jiangsu Phase I, CHN	China-Jiangsu	900522	Jiangsu Provincial For Trade Corp	LME	CC: DEL 54240, TR 2300	76.2	28.1	76.2
323/88	Telecom muni-cation Liaoning II	China-Liaoning	901019	Liaoning For Trade Corp	LME	CC: DEL 101000, TR 6370	134.1	46	134.1
209/89	Telecom Jiangsu Phase II	China-Jiangsu	901203	Jiangsu Prov For Trade Corp	LME	CC: DEL 76000, TR 2350	95.9	34	95.9
309/89	Telecom Jiangsu Phase III	China-Jiangsu	910424	Jiangsu PTA	LME	CC: DEL 96000, TR 1260	91.7	21	91.7
423/88	Telecom muni-cation Liaoning II	China-Liaoning	920128	Liaoning For Trade Corp	LME	CC: DEL 83000	115.1	40.3	115.1
118/91	Telecom muni-cation Guang-dong II	China-Guang-dong	920130	Guangdon g P&T	LME	CC: DEL 269000, TR 23400	258.2	90.4	258.2
409/89	Telecom Jiangsu Phase IV, CHN	China-Jiangsu	920218	Ch Nat Instrumen t IM & Ex Corp	LME	CC: DEL 83960, TR 10580	76.4	25.2	76.4
218/91	Tele Guang-dong II Phase 2	China-Guang-dong	921029	Ch Nat Mach Im & Ex Corp	LME	CC: DEL 353000, TR 11000	707.6	235	707.6

AXE in Jiangsu



ERICSSON

Annex 4.2

INTERVIEW GUIDELINES FOR THE TELECOMMUNICATION EVALUATION

Approach

The methods to be used for collecting data will be interviews with key people. Written records are probably in local language except for technical documentation about the exchange which form part of the Ericsson specifications. Selection of interviewees is important.

We will presumably have plenty of opportunities to talk to management and the people most involved with the expansion of the tele network. We will have to make special effort to get hold of other the consumers of the services - industrialists, local administrators and private subscribers.

The structure of the interviews will follow the LFA. Answers from officials and management representatives should preferable be supported by some indicators. For instance, has the tele service given better access to markets, service centres, employment opportunities? Seek indicators for the answer, economic statistics, number of shops and merchant representatives. Note all indicators even if they are translated to us from local documents. Try also the establish the source, get hold of quantitative data and other documents which could give base-line statistics.

Structure of questions:

A. Context, relevance and impact. Sector level and overall development effects

1. How has the introduction of tele services affected the development of commercial and industrial activities within the area. Have new companies and markets been established through the expanded tele services?
2. What has been the effect of the new tele links on communication/logistics in general and trade activities in particular? Note examples.
3. Which sectors of the economy have benefited most from the expanded tele service?
4. What is the profile of the non-commercial subscribers? Local government administration, emergency transport, social service, defence forces, etc.?

B. Effects of the project (effectiveness)

1. Using statistics from the area, describe the growth and development structure of the exchange area (people's income, increased investment, etc.). To which extent has the new tele service contributed to the development?

2. What is the penetration rate of tele service in urban and rural areas?
3. Has the tele service contributed to economic and social equality? In terms of better access to market, service centres, employment opportunities?
4. Are the customers able to communicated on the international network? Prohibitive tariffs, technical constraints?
5. Has the tele expansion made it possible to provide rural areas with new services and jobs? Access to information which have up to now been available only by moving to urban areas? Give examples.
6. How has the local trade been affected by telephones? How did they communicate before and how has the pattern changed?
7. Have people in the urban areas access to a telephone box or some service centres where they could make private calls? How much does the customer have to pay?

C. Project result/output (efficiency)

1. Technical specification of the exchange? How many numbers, how many commercial users (=users who pay), how many non-commercial users (local government?) How many numbers are available for new customers?
2. Describe delivery of equipment and installation of exchange (Find out who financed and constructed exchange building, local network and long distance network)
3. Is a mobile telephone network connected to the exchange system?
4. The management of the exchange unit. Composition of staff, competence corporate culture, training and other human resource development.
5. Are plans in hand to train new personnel for maintenance?
6. Tariff structure, billing system. How much does a household have to pay for telephone? Tariffs related to income level?
7. Find out the structure of the subscribers within the exchange area (population, type of economic activity, etc.)
8. Try to get a list with the name of the 10 most important customers in terms of revenue. Does the revenue from the subscribers cover capital and running costs?
9. Fault rate, maintenance and repair functions

D. Sustainability

1. Has the management and the staff sufficient capacity to maintain service at present level?
2. Has cost recovery methods been introduced to make the service profit-generating?
3. Is the level of technology appropriate for the telephone companies?
4. Are the local authorities planning investments to better utilise new maintenance technology?
5. Discuss other prospects for further expansion of the telecommunication network (mobile telephone service, in particular).

E. Environment

1. Has the project had any direct environmental effects? Could secondary environmental effects be identified?

F. Trade

1. Has the project had a positive impact on the trade relations between the telephone administration and Swedish companies in terms new contracts?
2. Did the project result in any additional BITS financed project or any other project with deliveries from Sweden.
3. Try to identify secondary effects of the cooperation with the Swedish contractor. Joint ventures?

Questions to MOFTEC in Beijing

1. The organisation of MOFTEC and its role in planning and supporting the telecommunication expansion in the provinces?
2. Explain priorities for expansion between various provinces and in particular the strategy as regards Jiangsu, Liaoning and Guandong
3. Is there an established development plan for the expansion of the nationwide telecommunication services (datacommunication, mobile telephone service, etc.)?
4. Tariff structure. Explain policy and application in the various provinces. Interprovincial and international connections?
5. Has the cooperation with Ericsson resulted in other commercial relations with Sweden?

LIST OF PERSONS MET

Björkert, Gunnel, General Manager, Marketing Departm, Nanjing Ericsson
Calander, Sven, Market Support Manager, Ericsson (China), Beijing
Cassisa, Carlo, Area Manager, Africa, Swedtel
Deng Chong Lin, Director, Jiangsu PTA
Feng Xiong, Senior Engineer, PTA, Jiangsu
Gu Ding Xuan, Commission of Foreign Economic Relations and Trade, Jiangsu
Harborn, Mats, Resident Vice President, Svenska Handelsbanken, Beijing
Horm, Peeter, Chief , Policy and Planning, Sida - East
Hu An Rong, Senior Economist, PTA , Nanjing
Jansson, Lars, Senior Project Manager, Nanjing Ericsson
Johnsen, Robert M., Area Manager, Middle East, Swedtel
Lager, Mats, Network Operations Manager, Scanswitch
Liljeson, Lars, Director of Credits, Sida
Lin Jingtao, Imports Division, Jiangsu PTA
Linag Bing, Interpreter
Liu Tingzhi, vice chief, Engineer, IPTB
Lu Ming Qing, Vice-Director, Nanjing Telecommunication Bureau
Ma Ao Cheng, Senior Engineer, Dan Yang, PTB
Sun Cheng Ming, Director of Finance Division
Thanger, Hans, Deputy director, Ericsson
Xiong Jiajun, Intepreter, Maintenance Center
Xu Xi Chao, Director, Zhangjiagang PTB
Yu Benlin, Section Chief, MOFTEC, Beijing
Zeng Gao Feng, Commission of Foreign Economic Relations and Trade, Jiangsu
Zhao Yanmei, Vice Chief, Engineer

Data on telecommunications in China

	Unit	Province			Guangdong	China, total
		Beijing	Liaoning	Jiangsu		
GDP 1993	Millions Y	86353	180815	275449	322530	3206999
Total population 1993	Millions	11.12	40.42	69.67	66.07	1185.17
GDP/Capita	Yuen	7766	4473	3954	4882	2706
Urban business subscribers	1000	230.3	326.6	545.7	1316.8	6743.9
Urban resident subscribers	1000	300.8	471.4	663.5	1411	8003.8
Rural telephone subscribers	1000	2.2	135.5	288.5	1129.5	3257.9
Mobile telephones subscribers	1000	31.3	17.5	23.8	244.5	638.3
Number of households	Millions	2.3	11.5	11.5	13.3	330.7
Persons per household	Number	5	3.5	6	5	3.6
Urban and rural business subscr	1000	231	371.8	641.9	1693.3	7828.9
Urban and rural residence subscr	1000	302.3	561.7	855.8	2164	19175.7
Industrial enterprises	1000	39.6	315.7	616.8	483.1	9911.6
Business subscribers per enterprise	Number	5.9	1.2	1	3.5	0.8
Household penetration	%	13.1	4.9	7.4	16.3	3.1
Ranking of household penetration		2	4	3	1	

Source: China Statistical Yearbook 1994, Table T 2.14, T 3.3, T 12.40, T 3.14 and T 10.4

Business subscribers= Urban business subscribers + 1/3 x rural telephone subscribers

Residence subscribers= Urban residence subscribers + 2/3 rural telephone subscribers

Household penetration= Residence subscribers/number of households

Study of Impact of BITS-support to the Telecommunications Sector in Egypt

1. Swedish Assistance to the Telecommunications Sector

BITS has provided funds for four projects in the telecoms sector in Egypt.

The first one was **training** of technicians and engineers in testing and maintenance of manual and automatic public telephone exchanges and telex equipment, including transmission equipment. This project was negotiated by the Swedish Ministry of Education already in 1978, i.e. before the formal start of BITS. Altogether 2 419 training weeks were delivered by Ericsson, with a small portion subcontracted to Swedtel. The total Swedish government contribution amounted to SEK million 1.73 to which local costs of EGP 0.170 borne by ARENTO and Ericsson should be added.

The second project is an on-going **network extension** project of in total 117 000 digital lines in Western and Southern Cairo. The project is part of the third five year plan with a total planned network expansion of 1.6 million lines, corresponding to an increase from 2.6 million lines in 1992 to 4.2 million in 1997. The project is partly financed by a Swedish government concessionary credit, proposed by BITS, following the re-establishment of Egypt as a credit-worthy country and thus being eligible for Swedish official concessionary credits.

The credit amounted SEK 108.4 million and was initially intended to finance 110 000 lines, to be delivered and installed by Ericsson. The total contract is worth SEK 127 million. During the commercial negotiations the sites allocated to Ericsson were slightly changed with a subsequent reduction to 105 000 lines. However, following a later decision by BITS, ARENTO was permitted to use the additional funds intended for the export credit insurance fee to be transformed into new lines, and the total number of lines to be installed does now amount to 117 000 with a total contract value of SEK 141.5 million.

As per December 1995 the following installations have been undertaken:

Southern Cairo:
- Helwan area 25 000

Lines to be installed until May 1996:

Southern Cairo:
- 15th of May: 15 000

Western Cairo:
- Bolak el Dakour: 40 000
- Helwan Garden: 25 000

The remaining 12 000 lines will be installed towards the end of 1996.

The third project is **training** in digital switching (AXE), consisting of four components, with funding from BITS of SEK million 4.98:

- a pre-study of the training needs within ARENTO;

- basic AXE training for 10 junior engineers;
- advanced AXE training for 10 senior engineers;
- management training for 5 senior staff members.
- consultancy services to establish an Operations and Maintenance Centre (OMC)

The training programme was implemented by ScanSwitch in Sweden during 1995. Only six junior engineers took part (only six were sent to Sweden due to capacity problems) in the basic AXE training, whereas nine completed the advanced training. Despite the pre-study of the training needs the advanced course did not fully correspond the participants' expectations as it underestimated the participants' existing knowledge of AXE . The one week management course was found to be too short.

The consultancy services in operations of AXE public exchanges from an OMC was planned to implemented during the fall of 1995. Implementation has been rescheduled to the spring of 1996 due to late deliveries of the OMC equipment from Ericsson.

The fourth project is the **establishment of the OMC**. The project includes delivery and installation of the necessary equipment from Ericsson. The equipment is financed through a concessionary credit of the value of SEK 5.5 million. The project is planned to be implemented during early 1996.

Altogether BITS has decided to support the development of the telecommunications sector in Egypt with around 45 million in current Swedish Kronor on grant terms.

2. The Present Evaluation

The results and expected impact of the above projects have been assessed through a combination of

- desk studies of reports available at BITS (mainly BITS decision memos, and Scope of Works for the projects);
- questionnaires sent to and filled in by ARENTO;
- interviews with officials (see the attached list).

In fact only part of the training project - no 3 above - has been evaluated in full. As regards the first training project in the late 1970s there is no information available, except for what is stated in the contract for the services. The general impression from the interviews is that the project was very useful, both for the telecommunications sector and for the relations between Ericsson and the Egyptian telecommunications authorities. The impact of this rather huge investment in training in terms of good will for Swedish technology and supplies has however at large been erased over time by other means of competition (see section 8 below). The impact of the extension project is largely based on the expected results and impact from the project after a successful implementation.

3. Objectives and Expected Results of the Assistance to Egypt

The objectives expressed by BITS for the support are based on the standard assumption that additional and more efficient telecommunications services always will contribute to the economic growth of the host country. All projects described above

mention economic growth as the overall objective for the support. There is, however, no attempt to distinguish the specific intended connection between the outputs of the projects and the economic growth of Egypt. In the network extension project a particular distributional angle is added to the overall objective, based on the fact that the extension covers the poorer parts of Cairo. It is quite clear, however, that the services will primarily be provided to the public and commercial customers, which of course very well may benefit also poor segments of the population, although indirectly from better access to public and private services and goods rather than directly by becoming subscribers. The installation of a big number of public telephones in the areas will also help:

a) those who cannot afford having a separate line installed to their home or office, and
b) people who need an installation but not belonging to the priority groups or being able to pay the special rate for urgent installation services.

It should, however be clear, that the choice of these areas was not based on a policy directive aiming at poverty reduction or redistribution of public services, but a sheer consequence of the third telecommunications development plan.

The TA-projects for training and establishment of an efficient O&M Centre suppose that there is a link between improved quality and increased availability of telephone lines, which is the purpose of the O&M Centre, and economic growth. Again, this may be correct but it would have had to involve an analysis of the client and waiting list structure to be understood and verified. The formulation of the objectives is thus not particularly related to the specific conditions in Egypt, but expresses rather vague and general statements on the expected impact of telecommunications projects. One explanation for this may be that the telecommunications development in Egypt also lacks reference to the socio-economic context, being based as it is entirely on density figures and waiting lists (see below).

4. General context

ARENTO and the Ministry of Communications are now into the third five year plan. The plan was initiated in mid 1992 and comprises the period up to mid 1997. The main goals of the plan are to increase the telephone density from 4 % to 5 % by July 1997, and to maintain the official waiting list at the 1994 level (1.4 million subscribers)[1]. The corresponding density rates at regional level are as follows:

Teledensity	*1992*	*1997*
Cairo	9	11
Alexandria	8.5	9.5
Upper Egypt (south)	1.5 - 2.0	2 - 3
Lower Egypt (north)	1.5 - 2.0	4 - 5

[1] It should be acknowledged that there most probably is a vast "hidden" waiting list of people who would request a subscription if they were offered the service, especially at the present charges of installation and annual subscription (400 and 45 EGP respectively equiv to SEK 750 and 80 respectively)

By the end of 1994 the density rate at national level had risen to 4.2 %, which is a little slower than expected. Part of the achievement was that all villages had been connected to the network, including rural areas.

The plan requires an annual installation target of 300 000 (digital) lines per year on average. The installation capacity is said to be 500 000 lines per year, provided that financing is granted. The present rate of self-financing amounts to about 25% of the investment, which in fact is an underestimation due to the obligation by ARENTO to contribute to the financing of the extension of the Cairo subway network of 300 million EGP per year and the contribution to the state budget of 100 million EGP per year (a sum that roughly corresponds to 200 000 lines, calculated at USD 650 per installed line[2]). The telephone subscribers are thus not only paying for the telecoms services, but also subsidising the commuters of Cairo.

The financial gap, excluding ARENTO's transfers to the metropolitan and central government, is covered by grants (mainly USAID) and concessionary credits (France, Austria, Switzerland and Sweden).

The main real problem in reaching the capacity level for network extension is not primarily lack of finance. In fact, technical and organisational problems, as e.g. delays in transmission installations, co-ordination with outdoor plant and difficulty in obtaining permits from metropolitan authorities to dig cable trenches appear as bottle-necks already in connecting the installed switching lines to the subscribers. It could be mentioned as an example that in Cairo West a total of 919 492 exchange lines were installed, of which only 671 079 were connected (72%).

As regards operations and maintenance (OMC) there is already a system in operation for Siemens (EWSD) switching installation of almost 1 million lines, distributed in around 50 exchanges, of which 30 in Cairo. The OMC for AXE is not planned to be integrated with the existing EWSD centre. This may, in turn, cause longer fault investigation times, and therefore worse services to the clients.

5. Efficiency

In BITS own appraisal of the extension project, the cost per installed line offered by Ericsson is compared to similar projects in other countries. The equipment cost per line is competitive (USD 143)[3], whereas the estimated installation cost is double that of, for instance, China, but equal to that of Indonesia and Nigeria (USD 504). The financial rate of return is calculated at 13 % at given prices, and the economic rate of return is roughly estimated to be between 13 and 25%. There has been no opportunity to make an post-investment evaluation of the efficiency, mainly because the project is yet under implementation.

The contract with Ericsson was not subject to a full tender competition, but to direct negotiations. In any case, the world market prices for digitalization are well known, and there is no reason to believe that ARENTO had to pay more than under full competition.

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[2] Cost per line in Ericsson's contract

[3] The quoted price per line was probably competitive at the time of decision, but later development in the market has lowered the price to less than USD 100 per line.

The training component of the TA-project implemented by ScanSwitch did suffer from deficiencies, both in quantitative and qualitative terms. The cost-effectiveness of the training component thus became lower than expected.

6. Expected Impact

The network extension takes place in residential areas with high demand. In some parts (Bolak) the waiting lists date from the end of the 1980s. It is therefore beyond doubt that the project will ease a badly felt bottle-neck (however, please note again that the discrepancy between capacity of switching lines and actual connections). Subscribers who can pay the urgency rate of EGP 1 500 instead of the regular EGP 50 are given priority, which implies that medium and large businesses, public institutions, international organisations, embassies come first in line to be served. Priority is also given to military and security personnel and medical doctors. It is estimated that 30 - 35% of the subscribers in Cairo were "business clients", and the remaining residential clients. If this a correct estimation, the project will serve around 35 000 new business clients and 75 000 residential clients. However, due to the residential character of the areas served by the AXE switches, it is probable that the number of residential clients is higher than the average for Cairo.

It is also safe to conclude that many of the residential clients in fact are informal small-businessmen and -women. These small business persons may also act as a go between to the real residential clients by letting the telephone services on a cost-recovery basis, increasing the penetration to residential clients yet further.

The benefits of this exposure of telephone services to new clients is difficult to assess, but includes a combination of a positive *income effect* from reduced transport costs, better and more diversified output of goods and services and *access to public services* and political and other *information*, which contribute both to the personal safety and level of social participation.

The impact of the training component is very much dependent on the establishment of the OMC. The intention of the OMC is to increase the availability of telephone services, which should be reflected in a reduction of the fault rate. As mentioned above, it would probably have a higher impact if co-ordinated with the other digital networks into a joint OMC.

7. Sustainability

Financial sustainablity

ARENTO's financial position is strong with an annual net profit of EGP 647 million (1995). In fact it is under present circumstances of monopoly so strong that ARENTO is used as a cash-cow by the central Government (EGP 100 million is transferred to the budget) and the Cairo metropolitan government (EGP 300 million is transferred as an annual cash contribution to the Cairo Underground). Despite these transfers the debt-equity ratio is low (est. at 20%, see Balance Sheet 1995).

The loan terms on credtis obtained are not automatically transfered to ARENTO. The government on-lends the loans on slightly more commercial conditions thn what is offered, implying that the grant element (to a large extent) stays with the government.

The interviews with ARENTO staff suggest, however, that the profit is inflated due to inadequate depreciation. The rates of the provisions follow standard recommendations, but the capital base is far too low with assets being registered at historical rather than re-purchase values. This affects especially the buildings property accounts, which is substantial, and where the replacement cost most probably is way above the book value. It is beyond the purpose of this evaluation to assess the full effect of this flaw, but it will certainly reduce the declared net profit. On the other hand, a revaluation of the property and other assets would also improve the debt-equity ratio, and probably rather big values could become available for investments if ARENTO would rely on sale-lease back deals or similar arrangement to commercialise its property.

The reliance on cross subsidies is high: whereas the domestic services generate a loss of EGP 200 million, the surplus from the international traffic, not only easily offsets that loss but provides for the net company surplus of EGP 647 million. Especially the traffic with the Arab countries is very profitable. The increasing world wide competition for international clients will rather soon reduce the scope for heavy cross-subsidies.

In the medium run a more commercial orientation will be necessary to ensure ARENTO's financial sustainability. Such a reorientation would have to be based on a policy on obtaining more subscribers (faster extensions and a higher filling ratio), less cross-subsidies, current revaluation of assets, a depreciation policy based on replacement values and sector reform.

Technological sustainability

The project is based on turnkey installations of 117 000 lines. Can the reliance on turnkey deals pose a problem from a maintenance point of view? Not really, because firstly the installation is done mainly by local Ericsson staff with participation of ARENTO staff, and secondly, the knowledge of AXE is already good (see above) and the current training and establishment of an OMC staff will hopefully ensure that this knowledge is at least maintained. The combination of a credit for network extension and a grant to finance the transfer of know-how to updating and maintaining the technology involved appears to be an effective and efficient way of using BITS resources for telecoms development and to ensure technological sustainability.

Organisational sustainability

There is at present too much focus on technical aspects in the organisation. The training in management was a step in the direction of seeing the organisation from a management perspective, as an undertaking that mainly is there to deliver good telecoms services to the customers. More of such courses would most probably be beneficial in transforming ARENTO to a commercially oriented organisation, and hence in contributing to financial sustainability.

For this to become reality the board of directors must also have more autonomy - today tariffs are set by Parliament and the base salaries are set by Government, although the chairman of the board can decide on staff bonus.

There is yet no clear division of responsibility between the political, regulatory and operational level. A study of all these matters is being commissioned by ARENTO to an American consultant (Booz-Allen).

8. Trade relations

As mentioned above, Ericsson's share of the market during the five year plan so far amounts to less than 10 %. The main other suppliers are AT&T, Siemens (which also operates a joint venture telephone company together with ARENTO), Alcatel and NEC. As per 1993/94 the market shares of already made digital installations were distributed as follows:

supplier	*share(%)*
Siemens	30
Ericsson	22
AT&T	19
Alcatel	18
NEC	11

Compared to the distribution in the third five year plan, Ericsson's market share is obviously decreasing. This development is not a reflection of a change in ARENTO's appreciation of the AXE-technology. It is rather an implication of the fact that the Egyptian market is characterised by stiff competition as to the financing of telecoms investment. Especially suppliers from USA (AT&T, Bell) seem to benefit from the huge USAID funds, the size of which (USD 800 million) seems partly to be determined by the American political need to match the support to Israel and Gaza/West Bank. Siemens is obviously benefiting from its investment in a local joint venture telephone company, as is Alcatel from the annual French protocol for development co-operation/export subsidies. The modification of the initial Ericsson extension project is said to be the result of pressure from various competitors/financial sources. Under present market circumstances no orders are received unless you can offer a financial package that is enough sweetened to match the competitors. Old merits or existing technology will not be sufficient to win repeat orders.

In spite of the financial conditions Ericsson will try to maintain their position in Egypt, although their share of the market has fallen. The extension programs still offer good business opportunities, and with the introduction of stronger criteria in using soft loans for telecommunications development, there may be chances for a levelling of the playing field for Ericsson in Egypt.

9. Concluding Remarks

1. The telecommunications sector in Egypt has been saturated with cheap external finance. The bottle-neck in development is thus not lack of financial resources, but administrative capacity to execute the extension plans. The financial conditions rather than the technological considerations determine to a high extent the choice of supplier.

2. With this in mind and in view of the fact that Egypt is not a long term partner in official Swedish development co-operation, Ericsson can only occasionally benefit from the necessary government support to be selected as supplier. It is therefore realistic to assume that Ericsson's market share will continue to decrease under present circumstances. Following this, also TA-projects with Swedtel or ScanSwitch will be less demanded. On the other hand, a more restricted use of concessionary credit for telecommunications development would probably increase Ericsson's relative competitiveness, why there still may be a good case for Ericsson in Egypt.

3. The telecommunications operator, ARENTO, enjoys a state monopoly, which has enabled it to lay golden eggs for the benefit of the state budget in general and the metropolitan commuters in particular. The increasingly stiffer competition for international telecoms customers will inevitably force the Egyptian government to abolish the monopoly and the cross-subsidies in the near future. Sweden has experience in the transformation of a generally technically driven telecoms operator into a commercially driven operator, a change that could be of interest for ARENTO. But also other state companies in the sector have similar experiences and there is no obvious reason to highlight the Swedish change as role-model.

4. The Swedish assistance has at large been well oriented and used by ARENTO. The network development of Southern and Western Cairo will meet a badly felt demand for telecoms services, although the waiting list will most probably not be shortened. The isolated impact is difficult to assess although evidence suggests that the residential and small business component is relatively high in the designated areas. It is somewhat surprising that the advanced AXE-training did not fully match expectations as the training need was assessed in a special pre-study. The combination of supply and installation of AXE-exchange equipment and training and establishment of an operations and maintenance centre for this equipment is intended to ensure long term technical sustainability of the investment.

5. With the benefit of hindsight, the preparation of the AXE-training and co-ordination between Ericsson and ScanSwitch in delivery of the OMC equipment and the establishment of the OMC could have been better. As it now is, it will take at least half a year between the training was performed and the opening of the OMC. Also the management training could have been planned to be more comprehensive, either in a direct sequence to the first training input or as a follow up to the OMC.

Appendix 1: List of people met

ARENTO

Prof Osman Lotfy, chairman
Madame Belkais, vice chairman, Planning and Execution
M. Abu Schady, Sector Chief Planning Exchange
Ms. M. Salva, General Manager Switching
Ms. Marcell, General Manager Traffic
M. Mohammed Montasser, Chief Execution Exchange
M. Abdullah Abbas, Chief Operations & Maintenance
Ms. S. Suleiman, General Manager Operations & Maintenance
M. Mohamed Abu Khresh, OMC Siemens
M. Feisal, Chief Finance and Administration
M. Gamil Ibrahim, Chief CDC Cairo West
M. Hassan, Liaison with Ministry of International Co-operation

Other

M. Robert Andersson, General Manager Ericsson, Egypt Branch
M. Gamal Mohamed, Public Telecommunications Manager, Ericsson, Egypt Branch
Hans Ohlsson, Counsellor, Swedish Embassy, Cairo

Study of Impact of BITS-support to the Telecommunications Sector in Ethiopia

1. Swedish Assistance to the Telecommunications Sector in Ethiopia

A. BITS CREDIT

Ethiopia has only had one concessionary, BITS-administered credit for its telecommunications sector. This credit was approved in March 1984; it covered a co-financed element (in this case so called "parallel financing") in the Sixth Telecommunications Development Programme. The total programme financing was co-ordinated by the World Bank.

Implementing Agency was the Ethiopian Telecommunications Authority (ETA). The overall financing schedule was the following.

FINANCING OF THE SIXTH DEVELOPMENT PROGRAMME OF ETA

Source	USD million (equivalent)	% of total cost of programme
World Bank - IDA credit (SDR38.7 M)	40.0	26.3
Italy - bilateral protocol	25.0	16.5
Sweden - BITS credit	12.0	7.9
African Development Bank	26.4	17.4
ETA's own cash generation	48.4	31.9
TOTAL	151.8	100.0

B. EARLIER SWEDISH ASSISTANCE

The first World Bank loan for the telecommunications sector in Ethiopia was signed already in 1951. Conditions for this one was, among others:

- *that* the telecommunications services, which up to then had been handled by a department of the Ministry of Posts, Telegraph and Telephone, were separated from the Ministry and corporatized into a public share company. It was given a very large autonomy and placed under the responsibility of a Board of Directors (the corporation became known as the Imperial Board of Telecommunications of Ethiopia, IBTE. The name was changed to Ethiopian Telecommunications Authority, ETA, after the revolution in 1974);
- *that* top management and in particular the posts of General Manager, Financial Controller, and Chief Engineer, should during the period of validity of the loan agreement be filled by persons approved in advance by the World Bank;
- *that* technical assistance should be obtained for various other technical and administrative key posts; and

- *that* a training institute should be established to train staff for posts of, in principle, all categories and all levels.

After a brief trial with two other arrangements, the Ethiopian government turned to the *Swedish Televerket* (Telia's predecessor) to obtain the persons of category (ii) and (iii) and to the *UN* for help with the setting up and running of the training institute.

All costs, including salaries, re-imbursables, etc., for the Swedish personnel serving in the new organisation were covered by its income. The costs of the Training Institute were covered partly by UN, foreign exchange costs; partly by IBTE, local exchange costs.

Thus, a total of above 90 Swedish personnel served in the IBTE between 1952 and 1968, with a maximum presence of 15 to 17 in the early 1960s. Ethiopians were trained both at the Institute and -- equally important -- on the job, and the posts held initially by Swedes were gradually taken over by Ethiopians. An Ethiopian General Manager was appointed to serve as from January 1967; this was the last managerial post to be Ethiopianized; the then remaining two to three Swedes served in an advisory capacity for one to two years. The Training Institute had already been fully Ethiopianized at that time.

In the beginning, all exchanges and most of the outside plant material was supplied from Sweden by *Ericsson*. The company had a switching engineer permanently stationed in Ethiopia for about six years around 1960 and, in addition to helping out with his normal tasks, this person, supported by his company, contributed very actively to the training of Ethiopians in planning, installation, and operation of exchanges.

The result and sustainability of these Swedish activities and of the UN-supported Institute were so successful that they were highlighted, as *a good example*, with a box included in the World Bank Annual Report in 1983.

During the period between 1967 and the coming into operation of the BITS-credit in the mid-1970s, Ericsson continued to supply most of the exchange equipment and played a significant part in related staff training.

2. The Present Evaluation

The evaluation is based on the questionnaire sent to ETA in July 1995 and a field visit in December 1995.

The team arrived in Addis Ababa in the morning of 12 December and in the afternoon it was invited to a meeting, lead by the Acting General Manager, ETA, and with the presence of seven out of ten other members of ETA's top management. The team informed the meeting of the precise purpose of its visit to Ethiopia and of what type of subjects it wished to discuss during its stay.

The Acting General Manager introduced the people present and encouraged them to collaborate fully with the team. He discussed the implementation of the Sixth Development Programme, which in fact had just been completed. He also informed the team that the planning, design, and financing of the Seventh Programme was rather advanced. ETA was negotiating a further

concessionary credit from Sweden for Ericsson equipment to this Programme.

He stated also that the demand for additional and new services was very big -- the number of potential subscribers having signed formal waiting lists was about the same as the current number of connected subscribers. In view of this situation, ETA did not see any point in waiting with desirable investments, even if they were outside the Seventh Programme: as soon as financing could be obtained, ETA would go ahead with the investment. *It would thus wish another Swedish Credit of about the same amount and contents as the one currently under negotiation.*

After the meeting with the Acting General Manager, who was to leave for abroad the following day, the team had a session with the Chief, Public Relations and Information Branch, who was very helpful in managing and making all necessary arrangements for the visit of the team. In his office we made a programme for our stay in Addis Ababa. He checked the appointment hours with his colleagues, and our programme proved to function almost to perfection. (**ANNEX 1**)

We received the printed Annual Report (including audited accounts and auditors' report) for the fiscal year from mid-1993 to mid-1994 and various other material. Some restriction was that not all available information is printed in both Amharic (the national language) and English, some detailed material was only available in Amharic.

As far as we could judge, the documentation and verbal information we received, were in general accurate and reliable.

3. Objectives and Expected Results of the Assistance to Ethiopia

The contract financed by the BITS-credit was initially to cover local switching equipment of the AXE-type -- hard-ware and soft-ware -- for 41,000 lines, 2,100 national and 600 international inter-exchange lines, various pertaining facilities, a certain quantity of electro-magnetic lines for the extension of existing stations, and training activities. Some of this material was delivered by FATME, the Ericsson affiliate in Italy, together with other supplies from this company, within the bilateral Ethiopian/Italian protocol. The corresponding reduction of the number of local and inter-exchange lines delivered from Sweden was made up for by an Operation & Maintenance centre, with remote testing facilities, for all digital switching and transmission equipment in the country. The contract covered significant amounts of training for various categories of personnel, a comprehensive AXE/digital seminar for all managerial staff, and one year local availability of a highly qualified engineer for assistance with testing, fault clearance, and such minor soft-ware problems as called for his attention.

The installation work started in mid-1986; the first station in Addis Ababa was opened in September 1988 and the first station outside Addis Ababa in March 1989. Ericsson received the preliminary acceptance certificate for all stations in July 1989 and all aspects were completed in November 1989.

Among the general objectives of the assistance to the telecommunications sector the following may be mentioned:

a) to enable overhaul and upgrading of existing plant as needed for adequate service level and optimum usefulness;

b) to expand the national network with particular emphasis on traffic handling capacity and on support of rural development;

c) to improve access to long-distance links;

d) to automatize the service at, and between, the regional capitals and about ten of the economically most important other cities;

e) to introduce modern technology in the new installations; and

f) to further the development and training of staff.

It deserves pointing out, though, that these objectives are more general than for just the BITS-credit; as mentioned above, this latter amounted to just 7.9% of the total cost of the Development Programme. Furthermore, some of the supply from Italy included the same type of material, more or less, as that delivered from Sweden by Ericsson. The objectives mentioned must therefore be understood in a restricted fashion, so as to relate in the first hand to the areas where the Swedish equipment was used. The supply also enabled some of the new equipment to replace existing equipment, which latter could be dismantled, overhauled, and installed at smaller or otherwise less important stations; this work was done by Ethiopian technicians at modest costs.

4. General Context

The establishment and operation of telecommunications services in Ethiopia have so far been a State monopoly. The public services are provided by ETA, which is a share company, fully owned by the State and established by proclamation. The government nominates the members of ETA's Board of Directors; the Minister of Transport and Communications is *ex-officio* the chairman. Authorised share capital is Birr 130 million. In June 1995 the retained earnings were Birr 299 million and the long-term debt Birr 563 million (equivalent)[1]. The debt ratio is thus acceptable. The net value of ETA's installations was Birr 278 million.

The ETA handles all aspects of the provision of and charging for public telecommunications services to all categories of clients. Thus, it provides national and international telephone, telegraph, telex, telefax, as well as various special services, and it leases circuits for specific, non-public usage. It provides means for most transmission (but not distribution) of radio-broadcasting and television programmes. Mobile radio-telephone and radio-paging services do not yet exist in the country but might be introduced in the course of 1996 or, at the latest, in 1997.

The present government has stated with regret that the telecommunications growth was rather hampered by political measures during the about 17 years of reign of the Derg-government[2]. With a very much changed policy, the government is now placing a heavy emphasis on the telecommunications

[1] At the time of our visit to Addis Ababa, the official exchange rate varied between approximately USD1.00=Birr5.20and Birr 6.35.
[2] "Derg" is the acronym for the military committee (sometimes with up to around one hundred members), which under the chairmanship of Mengistu Haile Mariam had the power in the country from 1974 through April 1991.

services as the most effective means of developing agriculture, agriculture-lead industries, and other rural activities.

Thus, a new statute is being prepared for ETA, which is likely to provide for increased customer-orientation and efficiency. It is also likely to revert to the original idea, prevailing at the time of the creation of ETA, namely that it should have a financial autonomy. The new structure would probably gradually make the operations of regional offices more autonomous than at present[3], which would promote the expansion of facilities in rural productive areas. Moreover, a new basic law is being prepared, which would cover the whole of the information technology sector and would make distinction between the operational level, the regulatory level, and the political level of the sector[4].

Even considering the pronounced need to make the ETA-organisation more efficient and more client-oriented than at present, it is still one of the most efficient telecommunications enterprises in Africa. The early Swedish assistance has really been sustained, even through the Derg-years, which following examples show:

- ETA places relatively more importance than is done in most other countries on the operation and maintenance of existing facilities. Thus, the reliability is high and restoration of service after interruption is relatively rapid and improving by every year.
- The tariffs are lower than in many other countries and are still providing a healthy revenue, with, in FY 1994/95, over 40% net return on average net value of fixed assets in operation.
- Although still to a too high degree dependent on the international telephone for its total revenue, is less so than in many other countries, despite a very low telephone density; the proportions were in last FY: international traffic 60%, local traffic 35%, domestic interurban 5%.
- There is a regulation for all aspects of staff management and a comprehensive job-description with qualification requirements for all posts in the organisation.
- There are detailed stores procedures with rules for optimisation of levels.
- In Addis Ababa, payment on all private telephone bills are collected by persons remunerated in accordance with the speed they carry out the job. This helps keeping down arrears: by 1 July 1995 the amount of Account Receivable (Subscribers) was only 22.6% of total billing during FY1994/95.

Since beginning of the Derg-years, ETA has not *only* been heavily taxed:

Corporate tax	50 % of net income
"Capital charge"	7 % of share capital

[3] A regional manager is already now authorized to, among other things, hire, fire and handle personnel with a monthly salary of a maximum of Birr500, which is slightly below the company average.

[4] During a week in June 1995 I had the opportunity of discussing with Ethiopian authorities questions connected with a needed re-structuration of the telecommunications sector. My visit was followed by a two to three week mission to Ethiopia of a Sida-financed SWEDTEL-team, at the end of August-beginning of September 1995. It had the task of discussing with ETA's re-structuration team and of presenting its views on the ideas behind the mentioned proposed legislative documents.

Customs duties 24 % on all imports,

but the government has *also* required that all pension reservations and all net profit be handed in to the central treasury. This situation has forced diminishing investments and, thereby, the figure of average annual increase of subscribers per year decreasing from above 8% to between 2% and 3%. In turn, this is one of the factors that brought morosity and rendered the Organisation less dynamic than it was before 1974. The government and ETA's management believes that the new legislation mentioned above will cause the situation to change for the better.

5. The Credit to Ethiopia, Efficiency

A. AMOUNT AND TIMING.

The BITS-number of the credit-supported activity is B-162. This was the first Swedish concessionary credit to the telecommunications sector in Ethiopia.[5] The credit amount was SEK82.1 million, of which the cost to BITS is SEK23.0 million. It supported a contract with the supplier Ericsson for SEK127.1 million (equivalent). The project was a relatively minor part of the Sixth Telecommunications Development Programme, the total cost of which was USD151.8 million (about SEK1.0 billion).

The Swedish part was appraised by a BITS-consultant in March 1983; a World Bank three person-team had made an overall appraisal of the Programme in January/February the same year. Negotiations with the co-financiers (see above) began shortly thereafter.

The total Programme, including the BITS-project was supposed to be implemented during the period 1984/88. As mentioned in Section III above, all aspects of the project supported by the BITS-credit were completed in November 1989. Other components of the Programme were dragging on until the early 1990s for reasons mentioned in Sub-section E below.

The contract with Ericsson was, as being part of a World Bank project, subject to a full tender competition, with each tender being scrutinised from its technical and cost-related merits. The concessionary credit was on-lent on more commercial terms from the Government to ETA, which is the normal procedure. Exceptions are made for projects which are fully financed by the World Bank in which case the loans must be on-lent on the same terms as the ones granted by the World Bank.

B. USE.

About one half of the project cost was supposed to cover installations in certain areas of Addis Ababa, with very high unsatisfied demand, and Asmara (which at the time was the second city of Ethiopia); the other half, provincial stations and the national network in general.

C. REVENUES, TARIFFS.

The local preparations for project implementation were very comprehensive and well advanced. So, for example, each single pair in every local cable in

[5] A project in the Seventh Development Programme, intended to be supported by a second credit, is currently under negotiation.

the areas in question had been tested and, if needed, repaired. Training of pertinent categories of staff had been going on for two years. It was thereby possible at an early stage to fill all the local stations with connected subscribers to a high degree, which certainly boosted ETA's revenue from those areas. Unfortunately, the Derg-regime (see foot-note 3 above) took away from ETA its chartered right to fix its tariffs, which earlier on had been set on a commercial basis; they became thus merely a matter of politics. Similar to the local stations, the inter-exchange stations were connected immediately. This eased traffic congestion, which was most welcomed by the clients and encouraged them to increase consumption in both the international and the domestic inter-urban segment; again this was advantageous both to the finances of ETA and to the economic development in the country.

D. LOCAL COST COVERAGE AND CHANNELLING OF REVENUES TO GOVERNMENT.

The coverage of local cost of the Programme became a heavy burden for ETA, due to the political decision (see above) by government to use the telecommunications as a "milking cow". The initially estimated amount was already important, USD48.4 million. Due to this attitude of government and to the military situation in the country with, among other things, war damages that required immediate repair, long periods of non-access by ETA-personnel to various parts of the country, the amount became in the end significantly higher. Scarcity of local funds did not delay directly the completion of the BITS-project, but connections to it could not be implemented fully due to the war situation, which restricted the benefit that could be drawn from the project. Due to its coverage, the BITS component is a more important part of the total national network than its size would imply.

E. TIMING AND DELIVERY PROBLEMS.

The installation was well planned and, as far as equipment and software supplied by Ericsson-Sweden is concerned, the plans were generally well implemented. The only exceptions were Asmara, postponed for political reasons, and some war zones. Some delays occurred though; most of them were within the formal responsibility of ETA but to a large extent caused by constraints imposed on it. So, for example, the customs clearing took unduly long time because military or otherwise strategic equipment was given priority. During long periods, there was a great shortage of good building contractors due to their occupation with military works. The installations were made by Ethiopian technicians under the supervision of Ericsson-staff. The loading and testing were done, without problems, in collaboration between the two groups. However, in regard to the AXE-installations supplied simultaneously by the Ericsson-affiliate FATME, there have been some soft-ware problems which have only been remedied recently and, in the mean-time, they have also to some extent affected parts of the network where the Swedish equipment is installed. The exchange equipment, originally foreseen for Asmara[6], has in the end been used elsewhere.

[6] Asmara was the capital city of the province of Eritrea which, after a long drawn-out civil war, seceded from Ethiopia and assumed independence in 1992.

F. RELIABILITY OF PRODUCTS, BREAK-DOWN, FAULT FREQUENCY, COMPLAINTS.

The answer to questions we posed to ETA on all these points was very positive. There has only been one break-down and this one was "man-made". The fault frequency in exchange equipment is so low, that separate statistics are not kept but the faults are included in the general fault statistics, which are dominated by faults in old cables, followed by faults made by excavation contractors, and thereafter by faults inside subscriber installations. The few faults in exchange equipment occur mostly in printed circuit boards close to the outside plant and are most often caused by lightning. There are no serious complaints -- other than that the capacity to install new subscribers does not suffice; the waiting lists are normally very long in any part of the country.

G. MANAGEMENT.

The total digital network, both the AXE-stations and the digital transmission links, is managed (monitored and controlled) from the Operations and Maintenance Centre in Addis Ababa. The situation in each single installation is shown on computer screens and, by means of connected desk-top computers, detailed analyses can be made. These involve not only potential disturbances but also, for example, the instantaneous traffic situation on both inland and international circuits. From the Centre, soft-ware in individual facilities can be modified or even completely re-loaded, subscriber numbers are assigned, etc. The personnel currently assigned to the Centre is knowledgeable and well trained, but additional staff has to be trained as the network expands, and more advanced level up-grading training has to be given to correspond to the continually increasing sophistication of the network facilities.

H. TRAINING.

In addition to digital introduction seminars for all managerial personnel, some twenty technicians and three operators were trained by Ericsson in Sweden and Italy, in formal courses. A general complaint was, that the training needs and course contents were not established before the departure of the students for abroad. Thus, for example, they had insufficient general knowledge of computers and some of the course time had to be wasted on PC-training, which could have been provided locally. Otherwise, the training given was useful. A few of the best students have subsequently participated -- at ETA-cost -- at advanced level courses, for example at the regional centre, the so called AFRALTI, in Nairobi. A training exchange with quite comprehensive facilities was installed at the ETA's school, the so called Ethiopian Telecommunications Training Institute, ETTI, where over one hundred technicians and operators have been trained in AXE-technics. In addition to what is mentioned about training in subsection g), *the training exchange and other ETTI-facilities are in great need of up-grading in several respects; a separate memorandum is prepared on this matter.*

I. COST EFFECTIVENESS.

In view of their relatively low procurement and maintenance costs and of the achieved rapid utilisation of equipment capacity, the material acquired with the help of the BITS-credit must be judged to have been a cost-effective solution. It is hardly possible, though, to single out the project and quantify this ratio. However, in the World Bank's appraisal the internal financial rate of return on the whole Programme would be 13% and the economic rate of return a minimum of 34%. Subsequent evaluation reports from the World Bank confirm that these figures have been at least attained if not surpassed. Exchange facilities are normally those giving the highest returns. The cost-effectiveness of the BITS-supported supply was also augmented by the measures described in the last sentence of Section III.

6. Impact

A. IMPACT ON NETWORK.

This matter was discussed on the basis of item 3.1 the BITS Questionnaire Form B. In regard to impact on "reduced fault rates", "less maintenance", "improved international traffic", and "increased revenues" the form has been marked "*Medium*". It was explained, however, that this was because the question says "the network"; if related only to the "switching facilities", the impact would be qualified as "*Large*". On the point of "shorter waiting list" the impact was "6389XSmall". The waiting lists were very long and, if any change could be noticed, their length had rather increased, which could be explained by the hope of potential clients to get a telephone being raised by them seeing work going on.

In regard to the operation and maintenance, there was a disappointment that the supervision link had only one circuit, in common for the technical operation and maintenance and for the collection of subscriber and billing data. This had created delays and some irritation between personnel in the two categories of activity. It was a strong desire, expressed several times, that the necessary up-grading be made so as to allow the two categories to be handled independently.

B. IMPACT ON ECONOMIC AND SOCIAL DEVELOPMENT IN THE EXCHANGE AREA.

On all the points: "economic growth", "growth of small and medium size business", "person-to-person communication", and "improved transportation economy" the marking was "*High impact*". In our discussion it was added that especially the business clients appreciated the "fast service" they could have with the AXE-exchanges and had increased their calling, enabling extended business. (Many of them had not had the possibility of "Direct Distance Dialling" before but only semi-automatic service.)

7. Sustainability

This matter was discussed on the basis of items 5. to 7. in BITS Questionnaire Form A. In item 5. "Are the procedures or organisational

changes introduced by the project still in use?", it was marked "*Mainly*". Again, if the question would be related only to the BITS-project equipment, the marking could be "*Fully*". Item 6. asks to what extent recommendations made by the consultant have been implemented. Response has been provided on the points: "human resource development", "networks development", and "operations and maintenance", and the markings are "*Most*". It was said that the recommendations certainly had lead to higher efficiency but that some adaptation had been necessary and therefore the marking "All" had not been made.

8. Trade Relations

In item 9. of the same questionnaire, the question :"Has your government/company continued the co-operation with the Swedish consultant after the project came to an end?" the reply was "*No*". It was added that co-operation had continued with FATME, the Italian affiliate of Ericsson, not with Ericsson-Sweden. However, as mentioned above, a new project to be supported by a Swedish concessionary credit is currently under negotiation. (FATME has also in the mean-time changed name to Ericsson-Italia Communicazione S.A.)

9. Concluding Remarks

9.1. The assistance received by the concessionary Swedish credit has been well taken care of and maximum benefit drawn from it, both in regard to network and services and to economic development in the areas where equipment has been installed.

9.2. The ETA has also benefited from the training given by the supplier within the framework of the credit-supported contract. However, the effectiveness of the courses could have been higher if the students had been better prepared before going abroad or, alternatively, if the syllabi of the courses had been better aligned with the training needs of the students.

9.3. Ethiopia is very under-provided with possibilities for access to the telecommunications network. Thus the registered unsatisfied demand for telephone connections is about as big as the total number of connected subscribers. It is estimated that in addition there is a *latent* demand that might be twice as big.

9.4. In contrast, the operation and maintenance of the existing network is of high quality, probably better than those of other countries in the Region (see statistics issued annually by the ITU, Geneva, Switzerland). Faults reported by subscribers are normally repaired the next working day, provided they are not of a major scale, like the breakage of a multi-pair cable by an excavator.

9.5. The Derg-government used the telecommunications services as an important supplier of money to the central treasury and the ETA had difficulty in obtaining funds for any significant network extension. The result was that the average annual increase of the number of lines went down to about a quarter of its earlier figure. The present government has

reversed that policy and is placing a heavy emphasis on the telecommunications services as an effective means for support to the development of agriculture, agriculture-lead industries, and other rural activities. These are the economic sectors currently assigned the by far highest priority in the country. ETA's present policy is therefore to make comprehensive planning and to go ahead with any desirable investment as soon as the necessary funding has been secured. *It would thus wish to obtain as soon as possible another Swedish Concessionary Credit of about the same amount and contents as the one currently under negotiation.*

9.6. Another consequence of the attitude of the Derg-government to the telecommunications has been that very small amounts only could be set aside for the training and re-training of staff. Thus, the ETA's training centre, the ETTI, which once was a cause of pride, has fallen far behind in several respects, for example:

- lack of literature on modern telecommunications system and enterprises;
- shortage and decrepitude of learning and teaching equipment and other facilities;
- insufficient training of instructor personnel in modern technology, management, and administration.

In view of the domination of Swedish administrative systems in ETA, as well as in switching and local network equipment, I would strongly suggest that a Sida grant would be allocated for the re-development of ETTI to the status it deserves. There are two strong needs for the training of big numbers of staff. The first one is brought about by the fact that government has decided on a rapid and far-reaching regionalization, and this would call for managerial, administrative, and technical personnel to be placed in all provinces. Even though a number of them will be reassigned from headoffice positions, many more have to be trained. And also those coming from headoffice would need re-training for their new assignment. The second need is for more people to be trained in digital technology on various levels and in the handling of digital equipment. This would be a pre-requisite to the foreseen significant network expansion.

9.7. A new statute is being prepare for ETA, to give it more autonomy and induce it to operate on a commercial basis and with client-orientation. Further, a basic telecommunications (or information technology) law is being prepared which, among other things, will separate the operational level from the regulatory level and both these from the political level. Implementation of the new statute will require additional training in management, marketing, accounting, etc.

02 January 1996/H A Ruud
(Revised 20 January 1996)

Programme of Visit to Ethiopia with Names of People Met

Date	Hour	Name	Position
1995 Dec.			
12	1000	Carl-Olof Cederblad	Ambassador of Sweden to Ethiopia (telephone conversation only)
	1500	Mr ASMARE Abate	Acting General Manager of ETA (with members of top-management)
	1600	Mr MEKONNEN Alemayehu	Chief, Publ. Rel. & Inform. Branch (ETA)
13	0900	Mr KEBEDE Gabre-Selassie	Manager, Planning Office (ETA)
	1000	Mr ASHEBIR Getachew	Manager, Telephone Division (ETA)
	1130	Mr ALAMU Bawketu	Chief, Oper. & Maint. Centre (ETA)
	1500	Mr YIHEYIS Tekle-Selassie	Manager, Central Region (ETA)
		Mr GABRE-EGZIABHER Wolde	Chief, Filwoha Area, C.R. (ETA)
	1600	Mr BERHANE Wolde-Ghiorgis	Chief, Arada Area, C.R. (ETA)
14	0900	Mr TELAHUN Degefa	Chief, Training Branch and the ETTI (ETA)
	1045	Mr KEBEDE Kiros	Acting Manager, Finance Division (ETA)
	1130	Mr ABRAHA Beza	Manager, Operations Division and Deputy General Manager (ETA)
	1630	Mr TEKLE-HAYMANOT Aberra	Manager, Administration Branch (ETA)
15	0830	Dr Michael STÅHL	Chief, Swedish Development Co-operation Office
	1000	Mr MESFIN Haile	Manager, Finance Division (ETA) with assignment as Co-ordinator Sector Re-structuration Study
	1400	Mr FIKRU Asfaw	(General Manager, ETA, at large)
16	0800	Mr MEKONNEN Alemayehu	(See above) For viewing impact of facilities at Debra Berhan, first AXE exchange outside Addis Ababa, and installations at stations along road from Addis Ababa to Debra Berhan
	1100	Mr TSEGAY Haile	Chief, Debra Berhan Area, C.R. (ETA)

Study of Impact of BITS-support to the Telecommunications Sector in Tunisia

1. Swedish Assistance to the Telecommunications

A. TRAINING AND EXPERT ADVICE

The Tunisian telecommunications sector has been granted five items of support through BITS under this subtitle: TUN 221 through TUN 225. All five were mainly for the training of Tunisian staff; only the last one, TUN 225 contained also a significant element of expert advice in a number of specific, mostly technical fields.

The first grant of this category was approved by BITS in August 1979 and the last in February 1990. See further the table on next page.

B. EQUIPMENT PROCUREMENT FINANCED BY CONCESSIONARY CREDITS

Also under this sub-title, five projects have been approved: 009, approved in August 1981, through 025/91, approved in June 1992. All five concerned supplies, mainly of switching equipment, by the Ericsson Company. All five have been virtually completed; on the two last ones some minor adjustments remain, which have to do with mutual adaptations in the network and not with the supply as such. See further the table on next page.

2. The Present Evaluation

The evaluation has not been based on the standard questionnaire sent to the Telecommunications operators since no reply has been received in spite of several reminders.

Tunisia was one of the countries chosen for a field visit, and after various correspondence with the Ministry of Communications and interventions by the Embassy of Sweden in Tunis and by the local Ericsson representative, the dates of 15 through 17 November 1995 were fixed for the field study-visit to Tunis. The visit was made by the undersigned, Herman Ruud.

I arrived in Tunis late afternoon the 14th and got a meeting next morning with Mr Ridha Guellouz, Adviser to the Minister of Communications, especially on international co-operation matters.

I explained in detail the purpose of the mission and Mr Guellouz (politely) said that the Swedish-Tunisian co-operation had always been very good. He revised somewhat the programme he had already despatched to Stockholm. He refused, though, to help me contact major clients in order to obtain their reaction to the supposed improvements in the telecommunications services in areas where Ericsson equipment had been installed. His justification for refusal was, that such a measure would give the clients contacted "the false signal" that the sector authorities cared more for them than for the others. I countered by supposing that in any case he would be caring more for the very big service-consumers than for a mere residential client. His answer was: "In practice, Yes, but in principle, No!"

He provided me with a list of telephone numbers to the sector offices I should contact and advised me to check in advance with each one that the timing was convenient, before going there.

In order to increase the chances to get the two BITS-questionnaires "A" and "B" filled-in by the Tunisian sector authorities, I had translated them into French and brought them with me. I asked Mr Guellouz if we could sit together and fill in them. He requested me instead to bring them to the attention of the Director General of Telecommunications.

I requested to get a copy of a recent Annual Report of the telecommunications operational entity of the sector or a similar documentation but none was said to be available.

He then became occupied with the Minister, and I had to return to the hotel, from where I telephoned the various officials. The final programme, with the name of officials met is at ANNEX 7:1.

I later had a meeting in the Department for Telecommunications. I could not see the Director General himself, because he was occupied, but I met with the Directeur de l'Equipement and two other senior staff members. Among other things, we discussed the BITS-questionnaires. I was advised to leave them with one of the participants and was promised that they would be promptly attended to. Despite several reminders, I have not received them as of the date of revision of this Report.

Thanks to the help of the office of Mr Guellouz I had some other meetings, which were useful. Further, as it happened, two officials of the Ericsson headoffice in Stockholm were in Tunis at the time of my visit. With them and with Mr Lars Johansson, the Director of the Ericsson office in Tunis I also had some pertinent discussions.

3. Objectives and Expected Results of the Assistance to Tunisia

A. TRAINING AND TECHNICAL ASSISTANCE

The objective of the three first technical assistance projects was the training of Tunisian personnel in switching and network technique, in digital technique and in basic and specialised handling of AXE-equipment and of inter-office transmission equipment. The training was performed by Ericsson, partly in Sweden, partly in Tunisia. To a large extent, the training was performed in parallel with installation and testing activities in Sweden and in Tunisia, whereby the students could obtain hands-on experience directly following the formal courses.

The training did not only cover operation and maintenance of installed equipment but also the planning and performance of installations. A management course for optimum utilisation of digital facilities, from both operational aspects and service aspects was also covered.

It deserves being mentioned, that during previous years, Ericsson had trained between 400 and 500 members of the PTT personnel, and this not only for the "Ericsson-areas" in the northern parts of the country. The company had thus acquired a very good knowledge, both of the mentality of Tunisian students and of their needs of training.

The objective of the fourth project was to train personnel in additional aspects of the operation and maintenance or AXE-installations. The project, which was handled by SWEDTEL/ScanSwitch, was cancelled after a brief initial sejour in Tunis of instructor personnel. The excuse was that required local funds were not available.

The fifth project, finally, had the combined objectives of:

(i) the training of Tunisian personnel, partly taking over from the fourth project, partly the training in other specialities concerning higher level technical personnel and instructors at the Tunisian telecommunications training establishment (see below); and

(ii) providing technical advice on various aspects of network handling, especially on the establishment and operation of an operation and maintenance centre for the digital network.

This project also was implemented by SWEDTEL/ScanSwitch.

B. INVESTMENTS FINANCED BY CONCESSIONARY CREDITS

All the five activities in this group concerned the supply and installation of AXE-switching equipment, together with some inter-office transmission facilities, all delivered by Ericsson. The immediate objective of all the activities was to help the Tunisian PTT respond to a big demand from existing and potential customers for extended and improved telephone services. The long-term objective was to enable PTT better to contribute to the economic and social development, especially in the relatively densely populated and commercially important areas of Tunis and the northern parts of the country; these were the parts of the country which at the time were provided with Ericsson installations.

In 1980 the average telephone-density in the country was 1.75 connected main telephone lines per 100 population; currently the figure is about 5.0. The ambition of government is that this figure shall be increased to about 10 by the end of the century. The population increases by about 2.5% a year and the number of telephone lines is intended to be increased by 14% to 15% a year. (The last few years, the latter figure has been around 10% to 11% but government is intent on augmenting it additionally.)

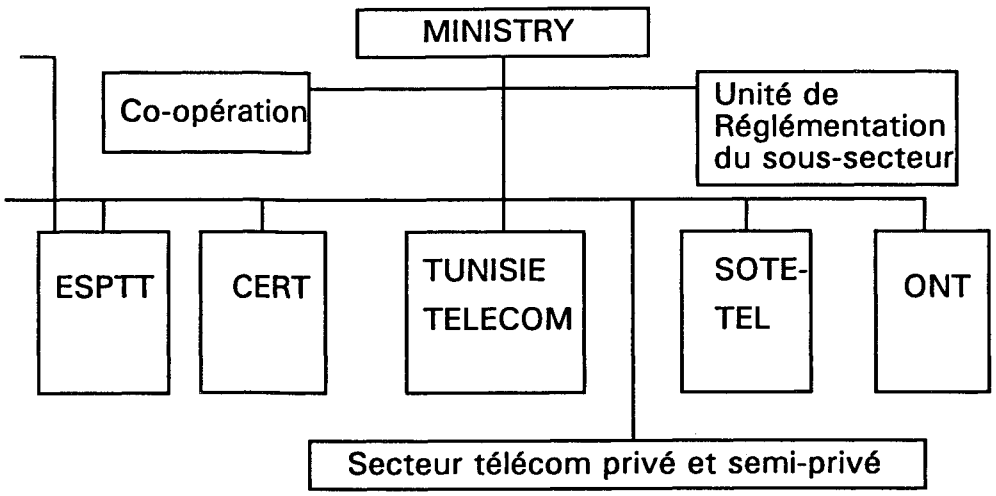
4. General Context

A. THE SECTOR

The telecommunications services of Tunisia have been organised in the form of a Department of the Ministry of Communications. As from 1 January 1996 the organisation is changed and the operations will be re-located in a so called "Office national des télécommunications (Tunisie Télécom)", a "public establishment of an industrial and commercial character".

B. THE MINISTRY

In summary, the Ministry is organised as the drawing shows, as far as the telecommunications sub-sector is concerned:



Légende:

TUNISIE TELECOM designation of the successor to DGT, as from Jan. 1996 (see below)

SOTETEL A company for the construction and installation of facilities in the national telecommunication network as well as PABXs and other subscriber terminal equipment (see further below)

CERT(see explanation below)

ONT Office national de télédiffusion, created in 1992 with updating in 1994, a semi-autonomous enterprise, which has a monopoly for the transmission and diffusion of television and sound-broadcasting programmes in the country

C. TUNISIE TELECOM

The Office National des Télécommunications, officially abbreviated Tunisie Télécom, has been created by Law No. 95/36 and its basic functioning was established by a Presidential Decree No. 95-2031 of 16.10.95. Its future internal organisation was not known during my visit but was under discussion.

The Tunisie Telecom is a fully State-owned monopoly operational organisation. It is sorting directly under the Ministry, as the drawing above shows. It is ruled by a Board of Directors, consisting of representatives of various Ministries and with the Minister of Communications as Chairman *ex officio*. Chief Executive is a Director General, who is also a voting member of the Board and, like the other Board members, he is nominated by the Minister of Communications. The Director General is also to serve as Vice Chairman of the Board.

By the changed legislation, Tunisie Télécom was supposed to be given the basis for, and possibility of, an accelerated institutional development, considered by the Authorities to be necessary for it to handle efficiently the envisaged big expansion programme laid out for the next mid-term. The Decree was supposed to give the organisation more autonomy and enable an adaptation from an administrative entity to one which is client-driven and operated with a commercial orientation.

However, after having studied the Decree, I am not sure that this adaptation would be an immediate reality. My main reason for this opinion is, that the tutelary Authorities

assume for themselves too much the managerial responsibilities by retaining numerous *a priori* controls of various kinds, in stead of reducing controls to *a posteriori*.

D. SOTETEL

This organisation, which is also under the tutelary authority of the Minister of Communications, was created in 1988, with 30% of its capital owned by State. The remaining 70% is supposed to have private ownership, although it may very well be that a smaller or bigger part of it is in the hands of parastatals. It appears that the lion's share of the 70% is held by the Development Bank of Tunisia.

The first tasks of SOTETEL were to create private enterprises for (i) the installation in clients' premises of PBXs and other terminal facilities and networks; and (ii) the construction and installation of local cable distribution networks.

Later has been added the tasks of installation -- together with suppliers -- of infrastructure and equipment for transmission and switching centres for DGT in the national network. SOTETEL has thus installed the Ericsson equipment, financed by BITS-credits, under the supplier's supervision. Ericsson has in fact been very much contributory to the establishment of SOTETEL which, as I have understood it, is a well-run company with quite a qualified staff.

Nowadays, SOTETEL also constructs local cable distribution networks, itself or with contractors.

Moreover, it serves in many cases as Tunisian partner when the legislation requires that a foreign supplier of telecom goods and services must work with or through a national enterprise.

For whatever is constructed under SOTETEL's responsibility, the preliminary and final acceptances are performed by DGT with the engineering assistance of CERT.

E. ECOLE SUPERIEUR DES POSTES ET DES TELECOMMUNICATIONS DE TUNIS (ESPTT)

The program fixed a meeting with the Mr Ahmed Mahjoub, Director of ESPTT. The location is at Ariana, a few km outside of Tunis. Two of senior members of his staff were also participating.

The school started in 1974, with UN-assistance for the training of mainly middle level technicians. It was one of the first schools of its kind in Tunisia. The level was later raised to that of ingénieurs d'application (junior engineers).

In 1990 it was made "école supérieure". As such it is an independent entity under the administrative supervision of the Minister of Communications and the academic supervision of the Minister of Higher Education. The latter is the one who approves the curricula and gives the diplomas.

It has now about 600 students, on four main activities:

(i) formation des ingénieurs de conception, who are given a diploma and recognised in the civil service regulations as ingénieurs diplomées;

(ii) techniciens supérieurs (entrance requirement is a full baccalaureat, that is a minimum of 13 school-years);

(iii) retraining of sector staff; also of these students the major part must have the "bac", but in some cases employees of a lower educational level are admitted (nowadays, however, more and more of the sector staff have already at the intake an educational background of "bac" or higher); and

(iv) continuing training.

The school trains mainly for the sector but it has almost always also students from other sectors and even from private employers; the charge for students of these latter categories are agreed in contracts. Quite a lot of students are nationals of other countries, Mahgrebians or other Arabs, in particular. The recruitment is made within a national program from which the ESPTT requests a certain number of students. As from about two years ago, this number has been 30 per year; the distribution of this number is made, at least preliminary, from the outset in consultation with the various clients. Physical extension of the School will start soon, with the addition of some 20 class-rooms and an auditorium.

Normally in Tunisia -- as elsewhere -- it takes five years from a full "bac" -- to get a student to become an ingénieur diplômée. By various preparatory courses and intensive training, the ESPTT manages to do it in three years. Of this time, the first two years are for courses in common for all students, but during the third year there is a specialisation on one of the branches of management, operation, design, services, economy and compatibility, informatics, etc. The director himself is a Dr. in informatics and has worked abroad, with the title of Professor, at universities and similar institutions, before taking up his present post, which might have been some three years ago.

The BITS technical assistance projects had been followed mainly by the Director of Telecom-studies. In discussing this matter, I got the same reaction as elsewhere, namely that the first three training projects, contracted to and handled by Ericsson, had been successful. A large number of technicians had been trained (some 400) and not only for the Ericsson equipment but also for equipment from other suppliers, for which Ericsson had not got due recognition.

The two latter BITS-projects had been a mixed bag, due mainly to their inadequate preparation in several respects (see elsewhere in this report).

F. CERT

This is a fully State-owned agency, organised with a Board of Directors representing the communications and other economic sectors and Government interests. It was created at the end of 1989. It has currently about 100 staff members, of which a significant portion is made up of well qualified engineers and senior technicians. Its work is divided into three main tasks as follows.

1. "*Studies and Research*".

One part of this is techno-economic planning of installations and smaller or larger parts of the national telecommunication network, as well as the subsequent preparation of the technical specifications, to be included in tender documentation.

Another part is the critical study of suppliers' descriptions and formulation, most often in collaboration with resp. supplier, of proposals for an optimum adaptation to Tunisian local conditions of various facilities and network designs.

A third part is applied research, which can be rather general or more specific, on tasks formulated from time to time by Management or the Board of Directors. This research is in many cases conducted in co-operation with universities and similar institutions, both in-country and abroad.

2. "*Homologation*".

This covers home- and office-electronic facilities. The aim is to ensure among other things: (i) that such facilities can be used by anybody without dangers of electric shocks and similar; and (ii) that the facilities in question do not emit radio frequencies, spurious or regular, that can interfere with lawful use of the radio frequency spectrum.[1]

3. "*Technical approvals*"

This activity covers: (i) factory tests of material and equipment ordered and intended to be supplied; (ii) tests, as required, upon arrival in the country of telecommunication material; and (iii) tests required for preliminary and final acceptance of installed equipment.

G. "SISTERING" WITH SCANSWITCH

Mr Triki, the President-Director General of CERT, was very much interested in the possibilities for establishment, with Swedish official assistance, as need be, of a bi-lateral arrangement between ScanSwitch and CERT (as a sort of "sistering").

His intended aims with the suggested arrangement were:

a) to develop further the handling by CERT of its current activities by:

(i) staff training in modern-most telecommunication and other information technology (in collaboration with the ESPTT) and the application in CERT of such additionally acquired knowledge; and

(ii) the introduction of various other institutional development measures with the double purpose of increasing the efficiency of operations inside CERT, and of enabling it to undertake more and more qualified and sophisticated tasks; and

b) to establish tri-partite agreements, whereby the "joint venture" of CERT and ScanSwitch could sell services on a permanent or occasional basis to clients inside Tunisia and in other countries, to begin with Arab and other neighbouring countries. (As an example was mentioned that, according to non-confirmed reports, Palestine might be quite an important client for such services.)

H. DEVELOPMENT PROGRAMME

With Mr Triki, I discussed furthermore, the foreseen development programme of DGT-Tunisie Télécom, which programme was the purpose of various CERT-studies. I showed him a newspaper cutting from 1994 (Fin Times 18.10.94) in which it says that Tunisia was going to invest an annual average of about $200 million during a number of years.

[1] These activities correspond in large measure to the Swedish "SEMKO" approvals and the type-approvals through the Post- & Telestyrelsen. The regulatory activities in Tunisia are overseen by an entity in the Office of the Minister of Communications.

He confirmed that this was true and that the intention was to have about one million lines local switching capacity installed by the end of 1998. A big procurement, which has recently been awarded covers four suppliers with together about 880,000 lines (2*320 plus 2*80,000).

I said that in view of the low prices for digital switching equipment offered today, this order will only cover about $100 million. For what would the rest be used?

M Triki mentioned that Tunisia is investing heavily in sub-marine cables in various directions. It is introducing country-wide the signalling system No. 7 and the transmission terminals SDH. It is expanding its rural networks and the transmission of data. It will introduce in some areas ISDN network and begin to explore the possibilities of Intelligent Networks.

I mentioned that I had taken up with the Director of Engineering in DGT the fact that the ITU statistics show a filling degree of local exchanges which was much lower in Tunisia than in most other countries. If the new organisation of DGT, supposed to start by 1.1.96, introduces any kind of commercial accounting, such a low utilisation of big investments will load the Profit and Loss Account unduly.

He said, that there were several explanations for the figure. The most obvious one was, that Tunisia had a more spread-out "rural" network than most of its neighbouring countries. A big number of relatively small manual or analogue exchanges had been replaced during the last few years with modern exchanges, and although there was generally a heavy demand, the organisation had not yet had the time to follow suit with the distribution networks. When one builds a new exchange, what costs most money is the infrastructure, i.e. building, power, transmission, moving of staff for installation and testing, etc. By contrast, there is very little difference in the overall cost, if instead of for example an exchange of 1,000 you choose one of 2,000 lines, or even (in a place with development potential) you install 6,000 lines instead of 1,500. In Tunis and other dense areas, M Triki believed, however, that the filling degree was well over 80%.

V. The Assistance to Tunisia, Efficiency

A. TRAINING AND TECHNICAL ASSISTANCE

According to an Ericsson report on the projects TUN221, 222, and 223, the training enabled a big number[2] of concerned staff of PTT to obtain a very good knowledge of not only the AXE-system but of digital telecommunications technology in general; according to the report, the project objectives were achieved to about 95%. This very positive evaluation was confirmed by statements of various persons I met during my visit.

I have no information available on the efficiency of implementation of project TUN224 prior to its being cancelled, nor on result obtained -- if any -- during its short life.

Project TUN225 had two parts: training of staff and technical assistance. The training was inadequately prepared, which caused delay in the starting-up and some waste in the mobilisation efforts. In September 1992 (about two years after contract signature) the training plan was thoroughly revised. Thereafter, the training part of the project ran smoothly and to the full satisfaction of both the Tunisian and the Swedish parties. The technical assistance part of the project was intended for advice on the running of the

[2] This report says "at least 150 to 200", but during my visit to the ESPTT, the number was given as 400. The latter figure is more likely to be correct, because this school has in general good statistics.

Operations & Maintenance Centre (OMC). The initial directives and staff training had been provided by the supplier, Ericsson; the OMC part of TUN225 was for intended additional utilisation. A proposal was prepared in co-operation between Swedish experts and Tunisian engineers. However, it was not implemented during the stay in Tunis of the former, the main reason for which appears to have been that it affected the structural responsibilities within the sector more than management was prepared to accept. It can be hoped that with the new organisation of Tunisie Télécom mentioned above, such a reason should not be allowed to influence efficiency.

In conclusion it has to be stated though, that the projects TUN224 and TUN225 *had not been adequately prepared,* neither on the Swedish, nor on the Tunisian side. However, despite the short-comings in the preparations and start-up, the contributions of instructors and advisers sent out from ScanSwitch to Tunisia were well appreciated, and the telecommunications authorities, the ESPTT and (as is mentioned elsewhere in this Report) the CERT, wished to continue co-operation with ScanSwitch.

B. INVESTMENTS FINANCED BY CONCESSIONARY CREDITS

The planning of the investment projects had been done in collaboration between the supplier, Ericsson, and the Tunisian parties concerned: for the earlier activities, PTT itself, and for the later, PTT, SOTETEL, and CERT. Some delays have occurred, though, which have mainly been the consequence of delays in building works and in the provision of transmission circuits for inter-exchange connections, both of them outside the responsibility of Ericsson.

Everybody I talked to witnessed that the co-operation between Ericsson and the various offices in the Tunisian telecommunications administration had been good to excellent. Moreover, very few equipment compatibility problems had occurred and, those that had occurred, had been made good. There are very few faults in the equipment and so far no serious one has occurred.

The contract with Ericsson was negotiated directly with the supplier in the form of a "limited international request for offer", without a formal open tender procedure. During the present extension programme quotations were sent to - and received from - the companies that the operator in the first hand was interested in. After evaluation, negotiations took place with the companies with the most favourable offers. Since the operator until recently has been part of the ministry, the issue of who benefited from the grant element has been irrelevant.

6. Impact

Much of the basic planning and design of the present country-wide network had been done during the 1970s and early 1980s in co-operation between Ericsson and the PTT.

In the course of the planning, installation, and testing work for the BITS-credit projects, Ericsson provided a lot of assistance in the setting up of SOTETEL and CERT, which was much appreciated at the time. Both of them are now relatively well run entities and with competent staff; SOTETEL even has contracts for installations in other countries.

The training exchange Ericsson has installed at the ESPTT has helped to train good technicians and this fact, together with the generic low-fault character of the AXE-system has significantly contributed to the good functioning and high reliability of the Tunisian telecommunications services in comparison with those in neighbouring

countries. This is indeed making a non-negligible contribution to the development of the important tourist industry and to other sectors of economic and social development.

Ericsson also furnished a card-repair (printed circuit-boards) centre about three years ago, which is now completely staffed by Tunisian personnel. The centre repairs about 80% of faulty cards, the remainder is being sent to the factory in Sweden. Although the centre necessitated a significant investment, it has already repaid this by the lesser stock of cards that DGT has needed to keep locally. It is also a source of great satisfaction to the personnel to be able to do most of the card-repair work in the country.

7. Sustainability

Although I would have needed the filled-in questionnaires for this section of the report, I can say from what I learned during my discussions in Tunis, that practically all measures and methods recommended in the course of the implementation of the projects, are being applied. The exceptions are some of the recommendations made within the project TUN225, see above.

8. Trade Relations

The good Swedish/Tunisian relations that prevailed for many years within the telecommunications seem not to have perpetuated themselves, let alone facilitated for other economic sectors. The local representative of Ericsson was quite pessimistic on the point. He meant that the services Ericsson has rendered to the sector in the past no longer get due recognition. This appeared to him to be even more the case now that the OECD ruling makes concessionary credits difficult to arrange.

Thus, in a recent international call for bids for exchange equipment of a total volume of about 880,000 local lines, the main contracts had gone to Siemens, of Germany, and Northern, of USA, for 360,000 lines each, while Ericsson and Alcatel had to satisfy themselves with the "paltry quantities" of 80,000 lines each.

I took up in the Ministry of Communications the question of a possible trade development, from the current relatively low level, between Sweden and Tunisia. For other areas than telecommunications, my interlocutor was rather pessimistic and joked: "Would the Swedes switch to buying more of our dates directly from us instead of buying them from Marseilles?"

Furthermore, I took up the question raised by M Triki of CERT (see above) of the possible establishment of a partnership between CERT and ScanSwitch, with initial assistance granted by Sida. The idea had in fact originated from M Guellouz, Counsellor to the Minister, and M Guellouz was still interested to pursue it.

The Director of Ericsson, Tunisia was somewhat hesitant. His point was, that ScanSwitch was a commercial enterprise, 50% owned by Ericsson Telecom AB and 50% by Telia. If a "sistering" should be successful, arrangements must be made to ensure that it not be a "one-way street" only, with ScanSwitch providing and CERT mainly taking the advantages.

It *might* succeed, but for this to happen, the agreement must be well thought through by persons who have proper background in both technical and economic/financial

matters as well as a wide and diversified experience. They must also be accustomed negotiators.

9. Concluding Remarks

1. Tunisia has had five technical assistance projects and five concessionary credit projects, amounting to a total sum of about SEK408 million. In addition, a number of Tunisians have been trained at the Kalmar school. Overall, it could be said that the telecommunications sector has enjoyed quite a diversified BITS-assistance. Thus there is in the country a rich possibility to study the impact of Swedish assistance of these kinds, which should have been reflected in the filled-in BITS-questionnaires. Unfortunately and in spite of several reminders, I have not been able to obtain any so far.

2. Partly within BITS-assistance, partly at an earlier stage, Ericsson has played a significant part in the developing the sector throughout the 1970s and 1980s by, for example, the training of a very significant number of staff on various levels and assisting in network configuration and design, combined with traffic flow estimates. It has helped in the establishment and development of both CERT and SOTETEL. Furthermore, the Ericsson training exchange installed at ESPTT has contributed to create a basis for good functioning and high reliability of the national Tunisian network. Finally, the card repair centre, installed by Ericsson in Tunis has, in addition to other advantages, helped reduce outage times at reasonable cost.

3. The monopoly State-owned operator is restructuring, as from 1 January 1996, into a "national office for telecommunications" (Tunisie Télécom) from having been just a ministerial department. Government is taking this action with the aim of increasing efficiency; the result remains to be seen.

4. SOTETEL, an independent and fully corporatized parastatal, is handling almost all installation and construction work in the national telecommunications network. It appears to work well.

5. ESPTT is an important and well run training facility, covering all levels from university equivalent to technicians and the whole spectrum of both technical and non-technical subjects. Within the TUN225 project, ScanSwitch made a well appreciated contribution to ESPTT, which made the Director express a strong desire of continued co-operation. Earlier contributions by Ericsson were also highly valued. However, insufficient preparation, on both the Swedish and Tunisian sides, of projects TUN224 and TUN225 caused them to leave less impact than corresponded to their potential.

6. CERT is again a fully State-owned independent organisation, with the tasks of conducting network and equipment studies, making technical approvals, and offering possibilities for research. It appears to have a good economy but is somewhat short-staffed as far as the most qualified posts go. It wishes to be "sistered" in a joint venture with ScanSwitch, for both its own development and for the undertaking of tasks on contract basis, both inside Tunisia and in other countries. To me, it seems not a bad idea, but the joint venture-contract will have to be well thought through and negotiated.

7. With few exceptions, all the BITS-projects in Tunisia seem to have had a good sustainability.

8. As regards trade relations as a consequence of Swedish assistance, the impression is rather negative, which goes for both the telecommunications sector and for other commodities. The reasons should be discussed with the appropriate Swedish authorities.

9. One point that could be mentioned is that Tunisia enjoys, among other things, technical assistance provided free from the International Telecommunication Union, Geneva, Switzerland.

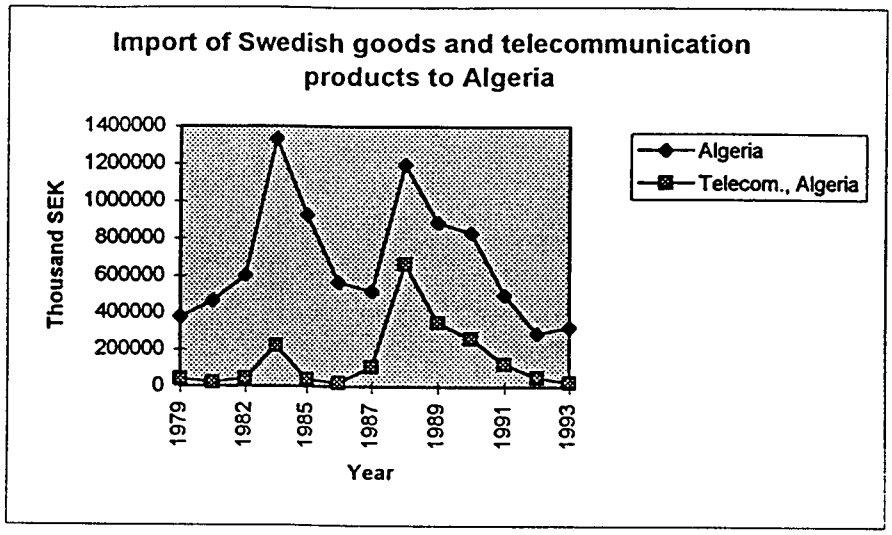
06 January 1996 Revised 26 January 1996/Herman Ruud

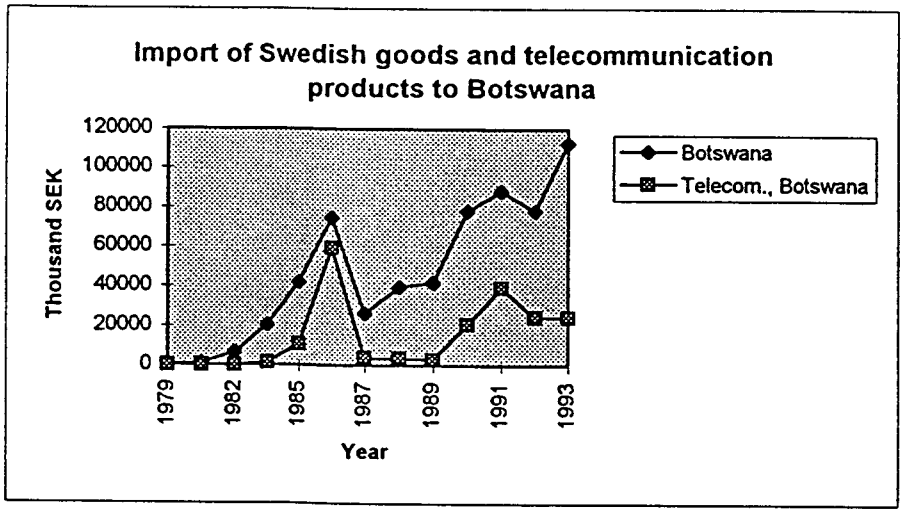
ANNEX 7:1

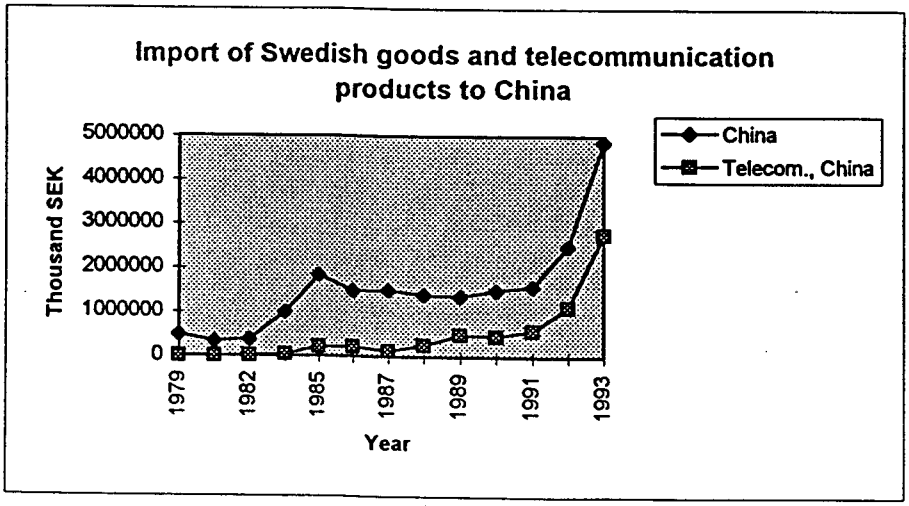
Programme of Visit to Tunis with Names of People Met

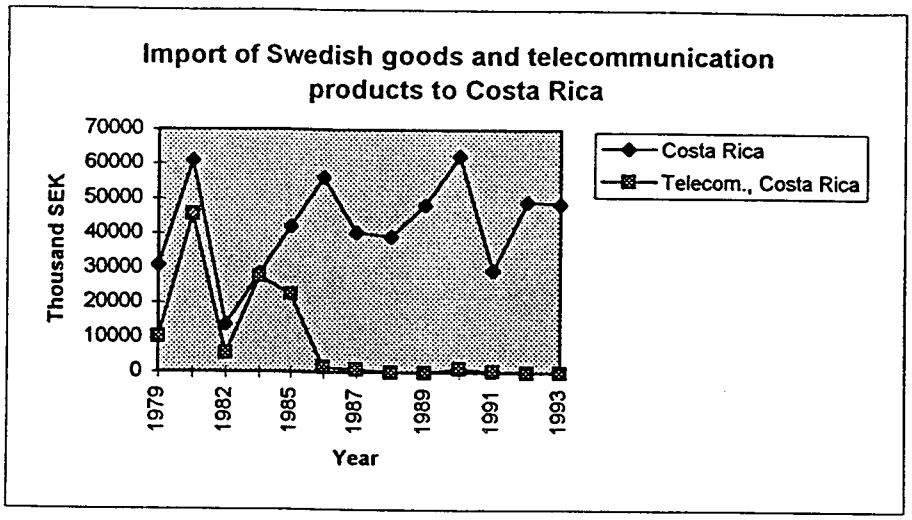
Date	Hour	Name	Position
1995 Nov.			
15	0830	M Ridha GUELLOUZ	Conseiller du Ministre des Communications sur Co-opération
	1345	M John HAGARD	Ambassador of Sweden to Tunisia
		M Erik BACKMAN	Counselor in the Embassy
	1500	M Hassoumi ZITOUN	Directeur Général des télécommun-ication, DGT *(Meeting cancelled)*
	1610	M Omar M'SEDDI	Directeur de l'Équipement (DGT)
		M Mohamed FEIN	Sous-directeur des Marchés (DGT)
		Mlle Smaeli AHLEM	Chef, des Rel. Publ. et Inform. (DGT)
16	0915	M Mohsen TRIKI	Pres. et Directeur Général du CERT
	1200	M Lars JOHANSSON	Directeur Tunisie Branche, Ericsson Telecom A.B.
		M Glenn LINDER	Market Director, Ericsson Telecom A.B.
		M Ove NORDIN	Business Controller, Ericsson Telecom A.B.
	1400	M Ahmed MAHJOUB	Directeur de l'ESPTT
		Mme Khadija GHARIANI	Chef, Division des études en télécommunications de l'ESPTT
		M Hédi HMIDA	(ESPTT)
	1700	M Ridha GUELLOUZ	(See above)
17	0900	M Erik BACKMAN	(See above)
	1100	Mlle Smaeli AHLEM	(See above)
	1400	M Lars JOHANSSON	(See above)

Trade statistics





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1991
1993
Year
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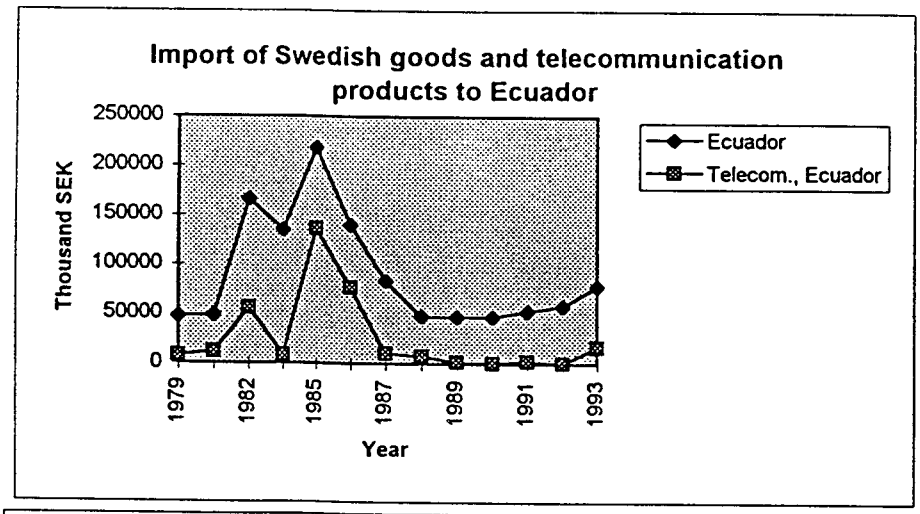
Telecom., Costa Rica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Year
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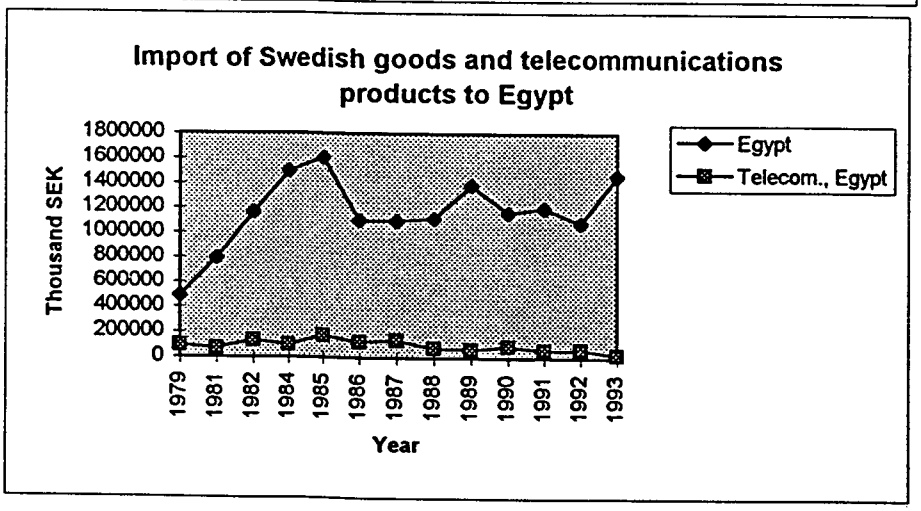
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800000
600000
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Year
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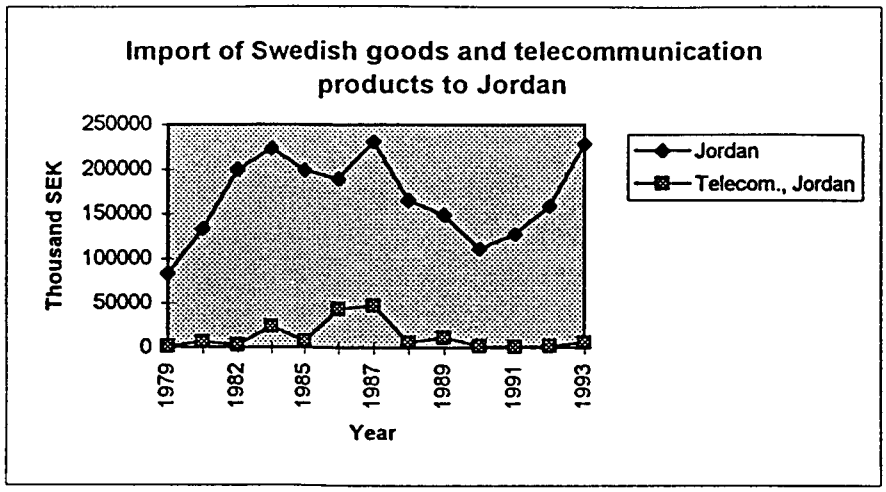
Telecom., Egypt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Year
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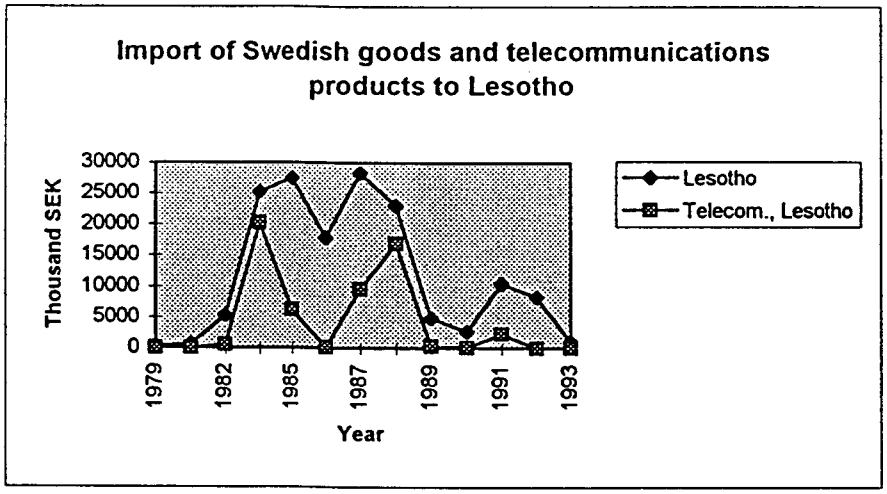
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1985
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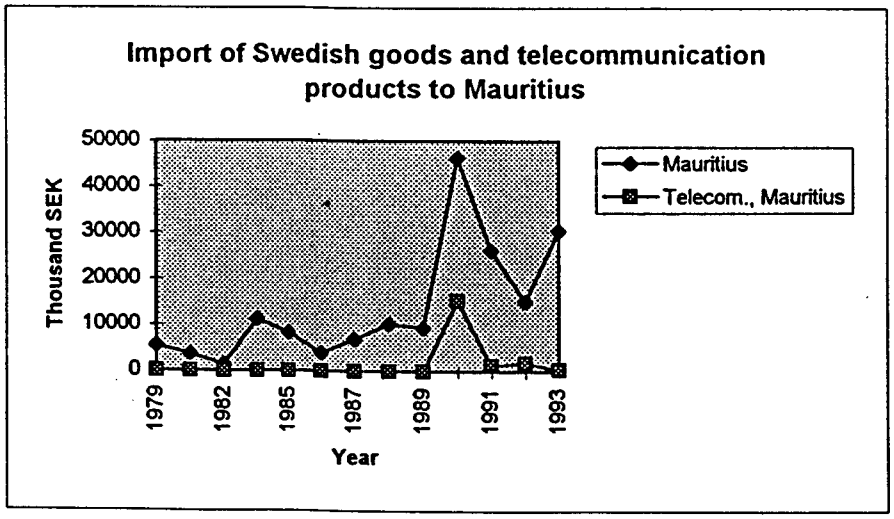
1991
1993
Year
Lesotho
Telecom., Lesotho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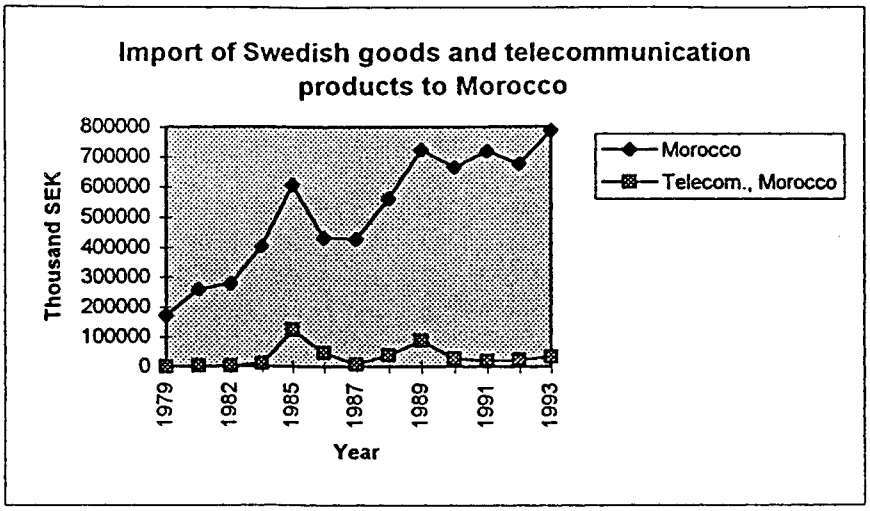
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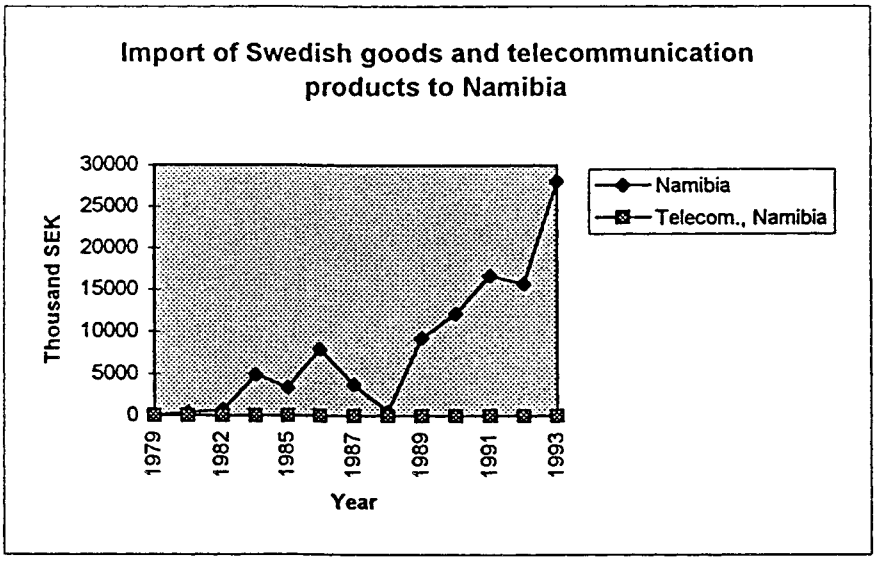
Telecom., Morocco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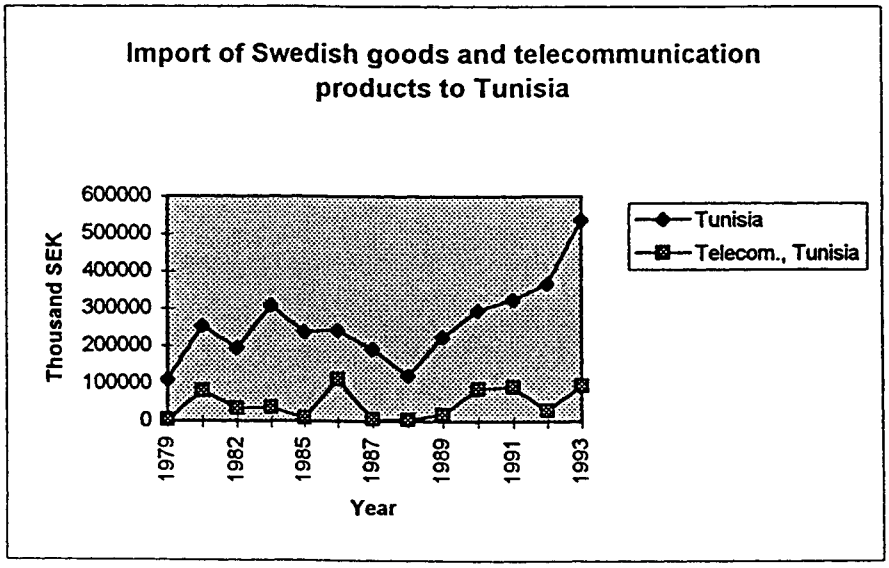
Telecom., Namibia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Year
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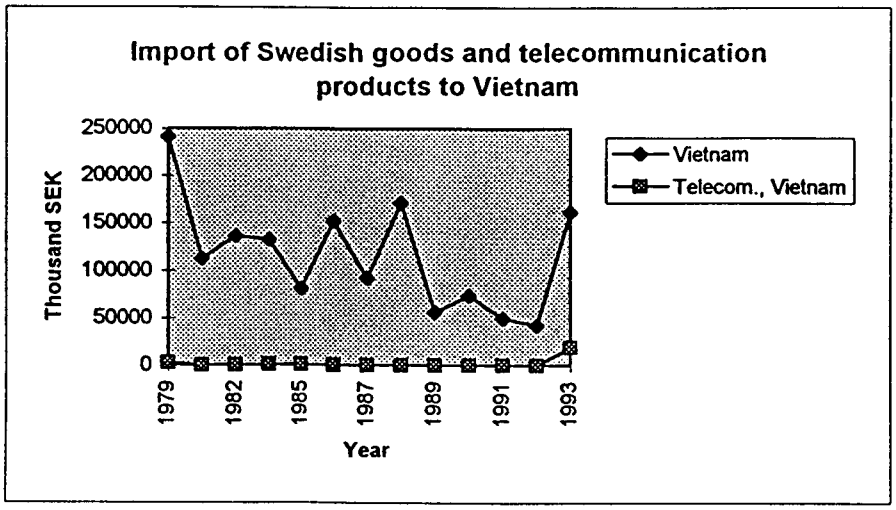
Telecom., Tunisia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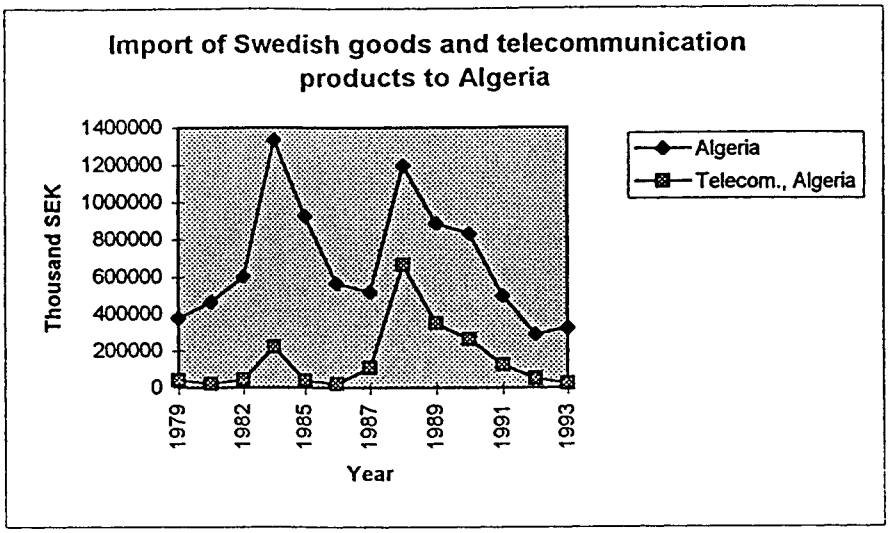
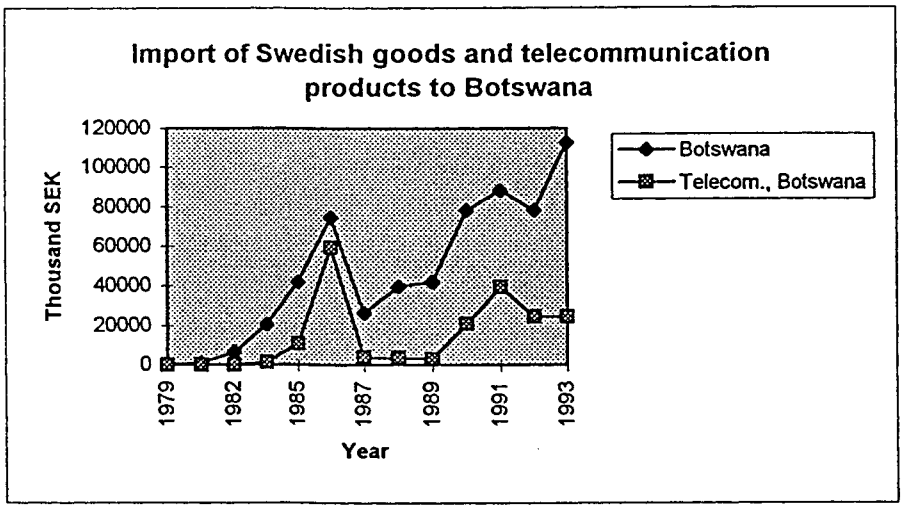
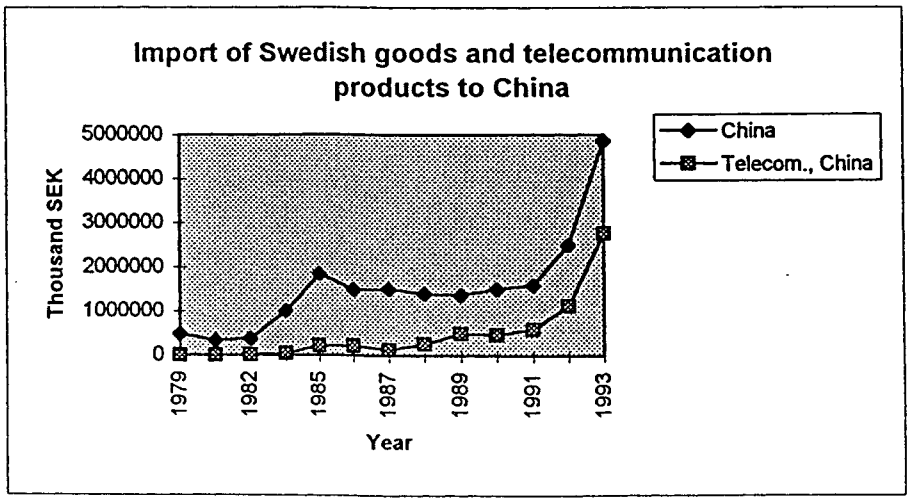
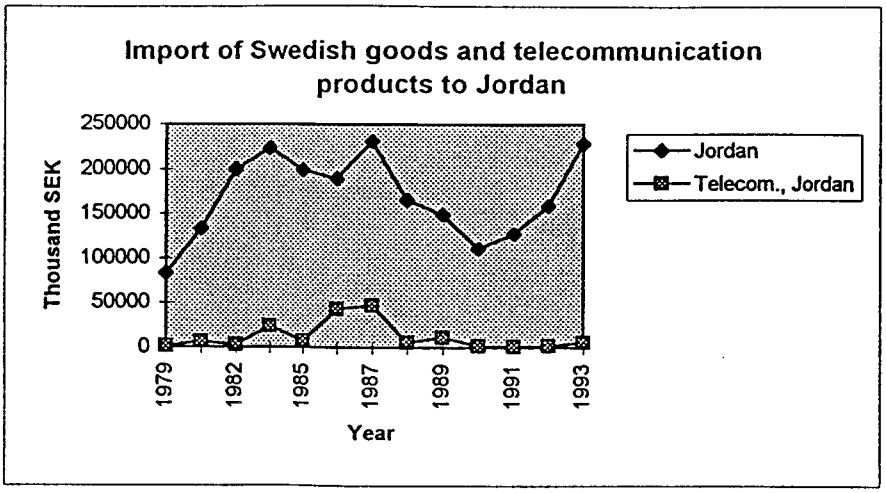
Year
Vietnam
Telecom., Vietnam

Trade statistics





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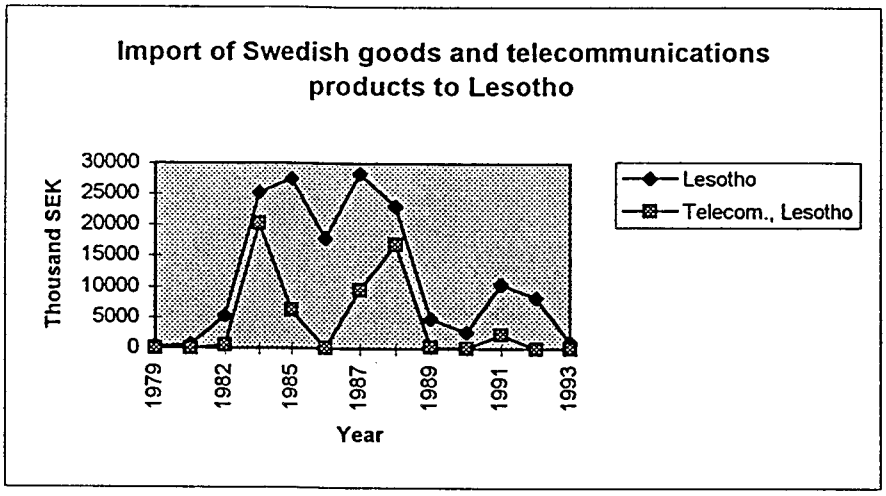
Telecom., Jordan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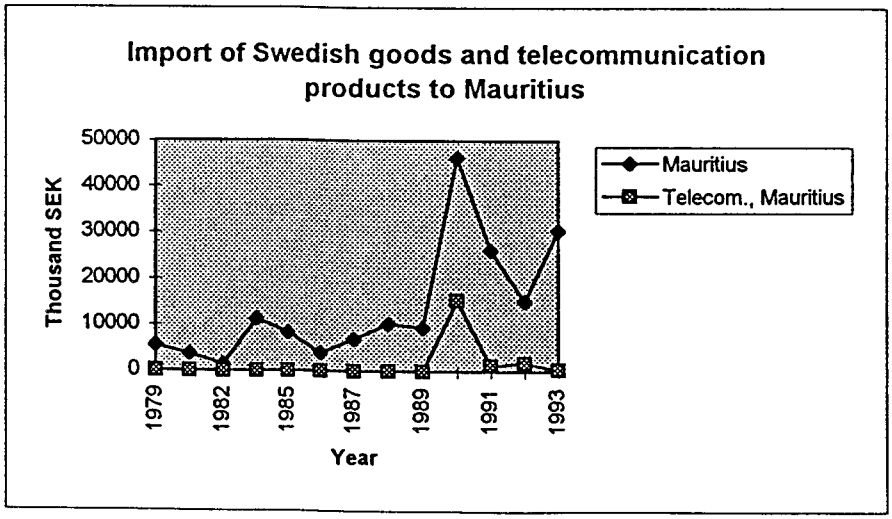
Telecom., Lesotho


Import of Swedish goods and telecommunication products to Mauritius
Thousand SEK
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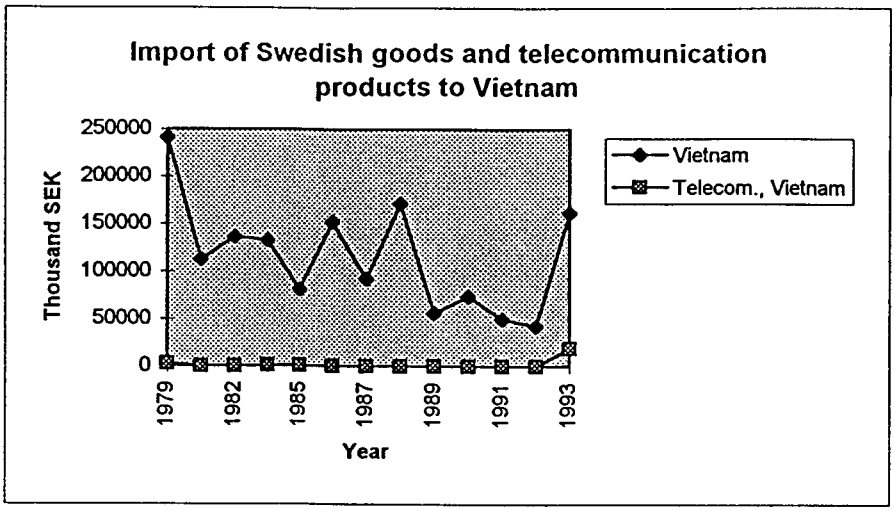
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Vietnam
Telecom., Vietnam

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