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APPLICATION OF MODERN TECHNOLOGIES AND MANAGEMENT SYSTEMS TO IMPROVE SENAI/CETIQT AND THE BRAZILIAN TEXTILE AND APPAREL INDUSTRY

SF/BRA/92/001

Report of the Evaluation Mission*

* This document has not been edited.

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EXPLANATORY NOTES

The measurement units used in this report refer to the International Units System (SI).

The word dollar, $ or US$ refers to the United States of America currency.

The word Project, with capital along the text, refers to Project SF/BRA/92/001 specifically.

LIST OF ACRONYMS

ABIT	Brazilian Textile Industry Association
ABQCT	Brazilian Chemists and Textile Colorimetrists Association
ABTT	Brazilian Textile Technicians Association
CAD/CAM	Computer aided design/computer aided manufacture
CETIQT	Chemical and Textile Industry Technology Centre
CTA	Chief Technical Advisor
INMETRO	National Metrology, Normatization and Industrial Quality Institute
NAC	Support to the Textile and Apparel Commercialization Unit
NAT	Technical Assistance Unit
NIIT	Technological Innovations and Computer Support Unit
NPA	Applied Research Unit
NPE	Testing and Standardization Unit
NPP	Technical Publication Unit
NSI	Technical Information Sectoral Unit
NSQ	Quality Systems Unit
PME	Small and Medium enterprise
UNDP	United Nations Development Programme
PPER	Project Performance Evaluation Report
QT	Total Quality
SENAI	National Industrial Training Service
SQT	Total Quality System
TQC	Total Quality Control
UKAS	United Kingdom Accreditation Service

I. SUMMARY OF PROJECT EVALUATION

The in-depth evaluation of Project SF/BRA/92/001 was undertaken during the month of October, 1995, following guidelines of the "Terms of Reference" (Attachment I).

The evaluation mission visited Cetiqt, in Rio de Janeiro, holding meetings with main Directors of the institution, the CTA and members of the professional teams involved in the Project. Beneficiary companies or future users of Project results were also either visited or contacted, as were class associations of both professionals and companies of the textile and apparel sectors, equipment suppliers and suppliers of textile industry software.

The Project objectives, stated in a very short project document agreed to by all parts, establishes "to strengthen the SENAI/Cetiqt International Technical Assistance Unit in providing high-level training and technical assistance for the Brazilian textile and apparel industry in the special fields of textile computer applications (CAD/CAM, colour matching, dyehouse automation, process optimization etc) as well as in Total Quality Systems." The development objective is "to improve the quality and increase the quantity of textile fabrics produced by up-to-date, high-efficiency methods and equipment to render them competitively exportable."

The Project includes, therefore, as part of its objectives, very relevant aspects for the modernization of an industrial sector which has, over the past years, dealt with serious problems of obsolescence and low competitiveness in a global market open to imports.

Project SF/BRA/92/001 was approved in February 1992 with a total budget of US$ 2,260,000. Funds for its' implementation come from SENAI through a Trust Fund Agreement dated March 1992. The Project provides continuity to the SENAI-UNIDO relationship which started in the 80 with short term missions and was consolidated over the years through a series of medium and long term projects.

Up to 30 September 1995, date of the in-depth Project evaluation, US$ 2,187,262 of the Trust Fund had been committed. This number includes the 13% UNIDO overheads and the extension of the CTA for four months. On the other hand, the Cetiqt income generated through services rendered to industry and which may be directly attributed to the Project reach an approximate amount of US$ 940,000.

The Project has produced positive results from several angles, specially in colorimetry and CAD/CAM. Other Project activities produced less relevant results, as for example, the intended textile industry certification at ISO 9000 quality levels.

A further success of the Project is the loan and/or donation of several hard and software to Cetiqt amounting to approximately US$ 1 million in value. This equipment, provided by the companies as demonstration material, have been incorporated into the various laboratories and are used in training counterpart institution teams as well as for rendering services directly.

Project impact could have been greater for beneficiaries, i.e., textile and apparel industries, had more emphasis been placed on selling of services. This oversight is attributed in part to the amount of the international consultants' time required for team structuring and training. These same teams are prepared to render high-level services to industry. Maintaining the team with Cetiqt is the main Project challenge.

Aiming at ensuring this sustainability, Cetiqt has prepared a Project extension proposal for the next three years. This proposal includes new objectives but maintains the current International Technical Assistance Unit, managed by an UNIDO CTA. If relations between national counterpart team and international consultants are kept at current dependency levels, Project extension will only delay the problem of sustainability without solving it.

The Project lacked a more stringent register of activities and a regular follow-up of obtained results, fully exemplified in the almost complete absence of Project progress reports.

Also lacking was a National Project Coordinator who should have been the Cetiqt counterpart to the International Project Coordinator. The National Project Coordinator (who should not be confused with the National Project Director, duties thereof accumulated by Cetiqt Director-General), would cover routine administrative and commercial duties in lieu of international consultants (mainly the CTA), in this way further supporting integration with the Cetiqt organizational structure.

Despite these drawbacks, the Project was relevant to Cetiqt upgrade, obtained very positive results in several of the envisaged sectors and is contributing, effectively, to solve problems of the textile and apparel sectors in Brazil.

The Trust Fund mechanism was also found to be efficient. This mechanism should be adopted for a new project aiming at the continuity of the Cetiqt improvement programme.

II. PROJECT CONCEPT AND STRUCTURE

A. Project Context

A.1 Macroeconomic Context

The period over which SF/BRA/92/001 was operational was one under which Brazil suffered many important transformations, deeply affecting the performance of its industries and requiring a reformulation of its strategies.

After years of high inflation and having undergone several stabilization plans to curb rising prices through short-lived economic measures, the Brazilian industry has had to face, in a more permanent status, the following two challenges:

a) adapt itself to a new economic reality, in which changes in price to mask process costs distortions and inefficiencies may no longer be attributed to inflation: productivity, competitiveness and efficiency have become essential conditions to company survival;

b) become competitive in an open market, in which foreign products compete with local products in equal conditions, including reduced import taxes and without the protection afforded by the "domestic similarity" or "import substitution" concepts.

These new challenges caught several industrial sectors in serious outdated technology conditions as a result of many years without investments in new equipment or installations. In the case of the textile and apparel sectors, this was even more serious due to the import restrictions of modern production equipment, specially those with microprocessors and computerized controls.

To the above difficulties, one may add the real need for continuous design update to compete in countries where industry did not stop. In these countries the concept of certified quality according to ISO 9000 standards have also been ensured and enterprises aiming at exporting to these countries must comply with same demands.

The Brazilian textile and apparel sector occupies the sixth world position and employs approximately 3.000.000 people, thus constituting one of the main sources of industrial employment in the country.

In 1993 the sector contributed with 12% of the industrial GNP of the country, generating a global income around US$ 17 billion. The sector is made up of approximately 5.000 textile industries and 95.000 apparel enterprises.

The following figures reflect the expectations of sector associations within the next five years:

- annual exports: US$ 6 billion (in 1995: US$ 1,5 billion)
- total investments: + US$ 6 billion
- creation of new jobs: + 1,4 million

A.2 The Project itself

The Chemical and Textile Industry Centre of Technology - CETIQT is an unit within the SENAI system and is the main human resource training centre in Latin America for the textile and apparel sectors.

Created in 1949 in Rio de Janeiro, Cetiqt has four basic activities:

- Teaching
- Testing and Applied Research
- Technical Assistance
- Technological Information

Cetiqt has over 1000 students enrolled in regular technical courses which cover professional education at secondary level (3 years) and special courses for college level training (2 years). Cetiqt also has an agreement with the State University of Rio de Janeiro through which it offers a five year Textile Engineering Course. Another agreement with the Regional Blumenau University (FURB) of Santa Catarina provides allows Cetiqt to offer a course in Mechanical Engineering with special focus on textiles.

Short- and medium-term courses and continuing education courses complete the training opportunities offered to professionals of the textile and apparel sectors, having already prepared over 4000 professionals.

The structure of Cetiqt organization is concentrated under two separate Directories: a Teaching Directory for all training matters and a Technical Directory for activities related to testing and research, technical assistance and technological information (attachment IV).

The Technical Directory hosts Project activities and is composed of eight Units:

- NAC - Support to the Textile and Apparel Commercialization Unit
- NAT - Technical Assistance Unit
- NIIT- Technological Innovations and Computer Support Unit
- NPA - Applied Research Unit
- NPE - Testing and Standardization Unit
- NPP - Technical Publication Unit
- NSI - Technical Information of the Textile and Apparel Sectors Unit
- NSQ - Quality Systems Unit

Project activities are carried out by an International Technical Assistance Unit which is the interface unit between the Project and Cetiqt permanent organizational structure. it functions as a strategic unit, not having a physical presence in the Cetiqt organizational chart.

In the area of testing and applied research, Cetiqt maintains an exchange programme with other similar institutions and renders services to industry and governmental agencies through the Applied Research Unit and the Testing and Standardization Unit. These units test textile material, chemical products, water and effluents through a network of laboratories (applied colorimetry, effluents, chemical tests, fibres, physical and normatization laboratories), as well as developing technical norms and programmes for conformity certification.

As far as technical assistance is concerned, Cetiqt works through four units: Support to the Textile and Apparel Commercialization Unit, Technical Assistance Unit, Quality Systems Unit and Technological Innovations and Computer Support Unit.

The Cetiqt activities concerning dissemination of technological textile and apparel information are channeled through the Technical Information of the Textile and Apparel Sectors Unit and the Technical Publication Unit, which research and produce the information to be disseminated. This includes a roster of companies translated directory of technical articles and the ITT - Institute of Textile Technology data base.

Although Project objectives are related to all units above, its activities and obtained results are mainly concentrated in the Support to the Textile and Apparel Commercialization Unit - NAC and the Applied Research Unit - NPA.

NAC has a fashion library, a theatre with fashion-show walkabouts and Lectra, InfoDesign and ScotWeave CAD/CAM design systems. The last two systems are result of Project negotiations.

NPA hosts the effluents laboratory, result of a previous project with UNIDO, as well as activities related to dyehouse automation and applied colorimetry, the areas in which most Project efforts and results are concentrated.

Project SF/BRA/92/001 continues a series of international cooperation projects with UNIDO. These projects started in 1987 and contributed to turning Cetiqt into an internationally known textile professional training school and industry support centre.

In 1987 UNDP financed a technical assistance project for the modernization of Cetiqt with UNIDO execution. The initial budget was US$ 340,000 but, in 1991, when project DP/BRA/87/033 was finalized, a total of US$ 750,000 had been used, coming from both UNDP and SENAI in equal contributions.

The period between 1989-90 was when the SI/BRA/89/801 - High-level Advice on Proper Utilization of Computerized Color Matching project established the Applied Colorimetry

Laboratory (LCA) and the International Technical Assistance Unit (UATI), despite a relatively low budget of US$ 100,000.

From 1990 to 1991 the projects US/BRA/90/086 and US/BRA/90/163 were carried out to provide Cetiqt with CAD/CAM technologies in the apparel sector. These projects were financed by Cetiqt (33%) and the French Government (67%).

1991 to 1992 were the years of SF/BRA/91/003 - CAD Systems for SENAI Textile Schools in Brazil (US$ 200,000 financed by SENAI) and SI/BRA/92/802 - High-level Advisory Services in Textile and Apparel Shade Control (US$ 48,000 financed by UNIDO).

During the three years of SF/BRA/92/001 duration other projects were also executed. These were:

XP/BRA/93/069 - CATAI '93 - Computer Applications for the Textile and Apparel sectors (US$70,000 financed by UNIDO);

TF/BRA/92/002 and TF/BRA/94/X - Designation of specialists financed by the German Government (US$ 130,000); and

XP/INT/95/037 and SF/INT/95/001 - Support to the International Textile and Apparel Conference - CITC' 95 - US$ 230,000 financed by both UNIDO (42%) and SENAI (58%).

A.3 Project Evaluation

The joint in-depth evaluation of the Project was agreed to by all parts involved and has as main objective to verify the results obtained by the Project and to identify the need for additional technical assistance. Should such a need be detected, the evaluation should also suggest the modality of its implementation. It should be noted that a preliminary project document defining such assistance has already been prepared by the CTA and Cetiqt staff.

The in-depth evaluation has various propositions: to compare achieved results with those foreseen, including an examination of project design; identification and evaluation of internal and external factors which both helped and hindered results; and an overall assessment of the extent to which Project results contributed to Cetiqt improvement in teaching, training and services it renders to the industry.

As part of these duties, the mission also analyzed Project relations between the Project and final foreseen beneficiaries, Project integration within Cetiqt and Project sustainability, both from a financial point of view (as in Cetiqt services to industry) and an institutional point of view (preserving project gains after its conclusion).

The in-depth evaluation took place during the month of October 1995 and followed the framework outlined in the Terms of Reference (attachment I).

Although ITMA '95 - International Exhibition of Textile Machinery took place during the same period in Milan, Italy, and many of the sector managers were away to participate in the international event, the mission was able to establish contact and interview several of these professionals prior to departure or upon their return, meeting as well with company and class association representatives of the textile sector in the country. These contacts and interviews allowed the mission to collect a satisfactory volume of information, thus enabling the consultants to reach conclusions and present recommendations.

The in-depth evaluation was performed by Cyro Eyer do Valle, Consultant nominated by UNIDO and Cosmo Buriti, Textile Consultant nominated by the Brazilian Agency for Cooperation - ABC.

B. Project Document

B.1 Problem definition and technical approach

The development of the Brazilian textile production chain during the last 30 years did not manage to keep up with the technological developments achieved by Western Europe, United States and specially, the asian countries.

These development problems were caused by the following events:

1. frequent changes in the national economic policy and inconsistency of government actions in relation to the industry;

2. lack of interest on part of entrepreneurs for making investments in view of unstable economic and industrial situations;

3. severe import restrictions of machinery and equipment, particularly those with electronic components (microprocessors and computerized controls);

4. applied technologies and technical levels below those of other countries;

5. unfavourable cost/efficiency relation in manufacturing and operations;

6. quality of inputs, in particular dyes and chemical products, used in dyeing, printing and finishing of textiles; in many cases these inputs became insufficient and even inefficient in obtaining high levels of quality and efficiency.

The growing seriousness of this state of inefficiency and low quality of Brazilian textile products led the Government to corrective measures consisting mainly of:

- reduction of import taxes surrounding the textile production chain;
- permission to import machinery and equipment related to the textile sector;
- permission to import computerized/automated systems for production control, process optimization and CAD/CAM systems;
- permission to import higher quality inputs which allow for higher levels of quality and nobler products, thus raising the worth of the production process.

Besides these measures, the introduction of modern administration techniques and production and quality management in routine company procedures was widely stimulated.

Having identified and defined the productivity and competitiveness problems affecting the Brazilian textile sector, Cetiqt began to direct its activities so as to act as a problem solving partner to the sector. To do so, it was necessary that Cetiqt itself become a multiplier agent, necessarily totally updated with latest and most advanced international textile technologies. Having been accepted as SENAI Centre of excellence for the textile sector was prepared to take the lead and play the role in international technical cooperation.

Once having updated itself and adapted new technologies to the Brazilian reality, the multiplying process would be launched based on two strategic bases:

- teaching/learning within the educational process already established by Cetiqt;
- training and technical/technological assistance to companies.

In order to meet such standards and develop the required activities, Cetiqt had to submit several of its technical staff and engineers to an intensive training. During this preparation stage, educational resources were developed and new short, medium and long term training programmes prepared.

So as to achieve all the qualification goals described above in the required time framework, Cetiqt looked for support from without. Resources which had been previously channeled through UNDP and other bilateral technical cooperation programmes were not sufficient for the new updating needs. These included laboratory equipment, research team training and assistance to the industry. It was thus decided that a Trust Fund contract with UNIDO would assure the flux of resources the Centre required for the following development needs:

a) the visit of international experts who would provide, through Cetiqt, technical and technological assistance to companies, enabling them to compete within the new market parameters;
b) training of Cetiqt and company professionals in the new fields of expertise;
c) re-equipment of laboratories and existing plants, as well as the creation of new laboratories within Cetiqt.

B.2 Objectives, indicators and critical assumptions

When analyzing the development and immediate objectives of the project itself, it may be noticed that both are very ample and generic, covering the following aspects:

- improved quality and an increment of quantity in textiles produced with modern technologies, higher levels of efficiency and methods and equipments which ensure the required competitiveness in the export market;
- training in state-of-the-art technology;
- international technological assistance;
- advanced technologies in apparel design.

If, on the one hand, the model adopted for the Project assures great flexibility and fast adjustments to cover for emerging needs, the lack of clearly defined goals, on the other hand, does not allow for clear assessment. The lack of indicators does not allow for the measurement of the degree to which proposed objectives where attained nor for the correct identification of the best target user.

It is possible to identify the success of the Project regarding its relevance and effectiveness, as these are general aspects. However, the impact on companies of varying sizes is difficult to assess.

During the conceptual phase of the project, the idea of a Trust Fund was further reinforced as textile industries made their willingness to cooperate financially known to Cetiqt. The sector manifested its interest in paying Cetiqt for the services and technical assistance received. This led to the assumption that only part of the required funds would have to come from Cetiqt budget. The larger part would come from private industry contributions and private donors. The lack of indicators here also makes it difficult to assess the assumption, although the amounts received by Cetiqt for services rendered through the Project units are considerable.

A clearer definition of objectives and measuring indicators will benefit projects such as the one under analysis, specially if care is taken to not over-specify aspects which would take away from the flexibility and adjustment possibilities which are the main qualities of the Trust Fund modality.

B.3 Beneficiaries

The beneficiaries of the Project identified in the prodoc are, besides Cetiqt which is preparing itself to provide training and high level technical assistance, the Brazilian textile and apparel industries. These would become more competitive through the introduction, implementation and application of high-level techniques for the manufacture of textiles and garments as well as TQM.

The textile production industries have now available, thanks to Project results, several engineers and/or technicians with updated knowledge of modern technoiogies and receive, more directly, services and projects prepared and delivered by Cetiqt professionals.

As to the sectors of the industries which should benefit from the Project, the prodoc mentions, in item 2.b (project objective), the training and assistance in the special fields of computer application to textiles as total quality systems. Item 5 (activities for 1992) describes specific jobs for several named industries.

No mention is made in the prodoc to the size of the benefitting companies. There is also no foreseen mechanism for companies that are either too small or under too heavy financial pressure to be able to pay up front for Cetiqt services.

B.4 Workplan

The project document does not incorporate a definite strategy for proposed objectives nor does it define a workplan. Although the importance of keeping the general Project outlines flexible is understandable, a detailed and objective workplan is very important for programme management and even in the identification of routine adjustments which eventually come up. The list of activities foreseen for 1992 (item 5 in the prodoc) cannot be considered a workplan as it is made up of only a few activities previously agreed to and covering only one third of the scheduled Project duration.

In spite of the success obtained by the colorimetry laboratory and CAD/CAM systems, a well defined workplan could have had a positive influence in the achievement of objectives, possibly even lowering costs and time span. The lack of a workplan may be considered responsible, to take an example, for the low commercial results as far as the number of companies reached is concerned.

As to the TQS, the prodoc includes, as Attachment 5, a list of "activities and preliminary workplan" to be implemented by the expert in Quality Systems and Management. As monitoring of implemented activities was relegated to a second plan, the dissatisfaction demonstrated by the selected companies as well as the changes in the workplan as regarding this specific segment of the Project were not correctly, nor timely, assessed.

III. PROJECT EXECUTION

A. Activities

The prodoc establishes, in item 5, only the activities planned for 1992. Besides this list of proposed activities (brief and already designated in terms of company through previous contacts), project activities are listed only in the Project Performance Evaluation Report (March 1995).

These activities may be grouped together as follows, based on the PPER, a detailed and complete document, the interviews and data compiled by the mission within Cetiqt itself and a few of the Project companies:

A.1 Visit of international consultants and experts to Cetiqt

Cetiqt received, during Project cycle, several short-, medium-and long-term consultants and experts through UNIDO indication. These were:

- The Chief Technical Advisor, an expert in colorimetry, printing/dyeing and finishing, has been practically full time in the Project since its beginning (in fact he was at Cetiqt before the Project, working on the previous ones since 1989);

- An expert on quality systems who participated full time from October 1992 to September 1995;

- Medium-term experts whose job it was to train Cetiqt teams or provide advisory services (international technical assistance) to textile sector companies;

- Short-term consultants in spinning, weaving, knitting, dyeing, printing, process optimization, colorimetry, effluent treatments, CAD/CAM systems, computer applications, apparel, apparel costs, education as applied to the textile sector, total quality management, and statistical process control. These consultants developed training courses, seminars, talks, and short courses in their specific areas. Not all were financed through the SF/BRA/92/001 Trust Fund but rather through other UNIDO projects.

A.2 Study tours of Cetiqt professionals to Fairs, Congresses and training courses abroad

As an essential condition to secure Cetiqt the role of a multiplying Centre, emanating knowledge and problem-solving information for the textile industry, the Project promoted international training opportunities abroad for the members of the counterpart team. Within project objectives, visits were arranged to companies, research and training institutions, fairs and congresses.

An overview of this component allowed the mission to list 47 trips of Cetiqt professionals to USA, Germany, Italy, Switzerland, England, Hungary and Holland.

The participation of Cetiqt professionals in these technical events, although coordinated within Project activities, has been financed, in large part, with Cetiqt funds, not part of the Trust Fund. The results achieved with this activity have brought about a more complete team training including deeper contact with the most updated technologies available in the various areas within the textile sector.

A.3 Courses given by international consultants and Cetiqt professionals

The international consultants allotted to the Project and the professionals partaking of the Cetiqt team have delivered, since May 1992 when the Project was started to September 1995, a total of 48 courses on colorimetry, CAD/CAM, process automation and total quality management.

A.4 Industrial Projects

An important part of the Project activities were the consultancy services provided to textile sector companies, which not only generated resources to at least partly cover Cetiqt disbursements with the Trust Fund but also provided the practical experience for Cetiqt team members to implement the theoretical knowledge acquired with the international consultants.

These consultancy services include the areas of research applied to process optimization, development of specific dyeing and printing optimization recipes, study of computerized installations, etc. Some of these projects were recognized by the companies as fully satisfactory, maintaining significant loss reduction in these companies.

It is important to mention that Cetiqt has used its technical capacity in the area of applied research, accumulated through the Project, in providing services to companies outside of the textile sector such as ceramics, rubber, chemical and steel, as well as support to the Military and Marine Ministries of Brazil.

A.5 Dissemination of Technological Information

In this field of activities, several Cetiqt sectors developed bibliographic research with the textile productive sector.First Assessment and placing, classification, index and even translations of published work were provided. Cetiqt also has a data bank available to sector companies which includes a roster of companies, a directory of translated technical articles, a technical information service for users, translation services and a data bank in Compact Disk form which contains the summary of more than 200 000 technical articles from all over the world.

The five activities listed above implied in disbursements which were covered by SENAI, based on an original budget contained within Attachment III of Project document.

The total value of the Project was estimated in US$ 2,260,000 over three years, through a Trust Fund with UNIDO. Up to 30 September 1995, US$ 2,187,262, including therein four months of contract extension for CTA. Despite the consistency observed in the values estimated and disbursed, the budget contains significant allotment changes in some of the budgeted items. The main differences are expressed in the table below:

Buli	Selected budget items	Estimated expenditure	Actual expenditure	#
11-01	Chief Technical Advisor	340 000	428 068	+25,9%
11-02	Quality Systems Expert	228 000	390 000	+71,1%
11-50/ 1/2/3	Consultants (short/medium)	182 000	100 280	-44,9%
21-00	Subcontracts	28 000	146 699	+424%
41-00	Non-Expandable Equipment	130 000	78 717	-39,4%
42-00	Expandable Equipment	1,060 000	762 615	-31,5%
	Grand Total	2,260 000	2,187 262	-3,2%

The total expenditure with international consultants exceeded the estimate by 22,4%, in a total of 42% of the total expenditures. The subcontracting line was raised due to the MTA-SZTAKI, Hungary, contract. Part of the budget for short-term consultants was used for medium-term consultants.

The other budget items, besides lower allocations, did not show significant deviations. Three unforeseen items were added to the budget:

13-00 Administrative Assistant	US$ 32,116
15-00 Travel	US$ 36,374
17,00 Indepth evaluation	US$ 7,000

As far as could be ascertained, Cetiqt received through Project technical assistance services a total of US$ 914,094, thus distributed according to generating unit:

NAC	application of the Lectra, InfoDesign and ScotWeave systems, including user training:	US$ 80,572
NPA	applied colorimetry services and chemical testing	US$ 247,518
NSQ	services in the area of quality	US$ 616,004

These values include, in NAC, US$ 19,716 generated by the use of the Lectra system, despite hardware having been acquired through another project.

At NSQ, the income of US$ 165,286 concerning contracts for services to be rendered to the three remaining companies after the TQS reformulation, was not included.

To this direct income, one could add as indirect benefits the value of hard and software received, either as donations or as loans, estimated at market value around US$ 1 million.

B. Quality of follow-up and institutional support

The Project did not receive usual UNIDO follow-up procedures, neither those stipulated in item 8 of the Project document (Evaluation and Reports).

Although annual tripartite meetings were held according to item 8.a, with ABC, UNIDO and SENAI/Cetiqt, the support documents for these meetings, excepting the last one held, were very succinct and practically non-existent.

The first meeting (July 1993) did not produce a report and the evaluation mission had only a preliminary agenda of the meeting and a document listing foreseen activities for 1993.

The second meeting (May 1994) generated a document on proceedings but did nor have a Project progress report, an essential document to establish the ratio between planned and executed activities and results.

The third meeting (March 1995) also generated a document on proceedings and with the Project Performance Evaluation Report, received before the meeting for analysis.

The periodic progress reports foreseen in item 8.b of the prodoc were also not identified by the evaluation mission, excepting the sole PPER elaborated for and presented at the third tripartite. This document is quite detailed and complete and would have certainly contributed to the Project having reached more favourable results if it had been produced on the regular recommended basis.

An analysis of the documentation led to the identification of 83 companies which received Cetiqt services. These services depended on resources and improvements introduced directly by the Project. To this number we may add 129 companies receiving NAC support with the Lectra CAD/CAM system, although the system itself was acquired under another project.

A registration form for each company using Cetiqt services would be an important tool for the Project activities evaluation. The form could list name, size, date of service, degree of satisfaction, type of project developed and other information. Once this is elaborated, a comparison between the services requested and those rendered would be possible, thus establishing a memory which, if correctly managed, could increase the range of services provided and come up with plans of action to better adapt these services to the end user.

IV. PROJECT RESULTS

A. Products

The products offered by Cetiqt to the textile and apparel industries cover a pretty wide scope of services which these industries could request of an external organism with credibility and capacity to either complement or supply activities not available within the companies themselves.

Besides traditional teaching activities for textile and apparel sector professional training, Cetiqt offers, today, testing and applied research services, technical assistance and technological information which have allowed it to become, effectively, a national technology centre for the textile and apparel sectors.

Some of the products listed below may be identified as direct Project outcome or of technical cooperation projects before it:

1. Verification of visual acuity of the professionals involved in activities of which colour is a fundamental element;
2. Verfication of the degree of technique in visual colour analysis;
3. Measuring of colours for colourists;
4. Optimization of dyeing and printing recipes regarding parameters of cost, inputs, effluents, consistency, countertyping, intrinsic equipment characteristics and other measurable parameters;
5. Optimization of design and cut of apparel pieces, aiming at the reduction of substract consumption and generation of residues;
6. Production of weaving samples in paper, thus reducing sampling costs and, consequently, commercialization costs;
7. Preparation of printing motives and elaboration of the photolytes;
8. Analysis of effluents and elaboration of treatment plans;
9. Studies for plant automation of textile benefitting companies (dyehouses);
10. Viscosity control for printing pastes;
11. Computerized colour recipe formulation;
12. Modernization and/or optimization of dyeing and printing laboratories with selection and specification of equipments;
13. Bibliografic research services;
14. Gauging of standard measuring equipment (scales and viscosity measurement instruments).

These products cover the application of computers to the textile and apparel industry, proposed as project objective (item 2.b of Attachment II).

In the area of Total Quality the project did not present the same concrete results, providing products which addressed, within proposed deadlines, the problems within companies participating in the Project. The inital product offered by Cetiqt to five selected companies was subdivided into four phases: team training, situational analysis, document base preparation and implementation of the quality system.

After a two-year implementation period the quality systems were expected to be operational and the companies ready for ISO 9000 plant certification. None of the five companies achieved, till today, certification and three of them left the programme. Upon termination of the contract period for the UNIDO international quality consultant, Cetiqt decided to hire an outside company specialized in Total Quality to complement its own experience in this area of services.

In general, one may say that the big companies were the major beneficiaries of Project activities and Cetiqt rendered services. This is specially true in relation to the TQS, colorimetry and technology transfer. The small and medium companies made more use of the CAD/CAM systems and technological information dissemination services which do not require heavy investments in equipment.

Cetiqt itself was one of the main users of Project generated products. Not only through the overall higher level training of its professionals but also through the modernization of its laboratory structures through the acquisition of better-priced equipment and global selection of inputs with UNIDO support.

It is important to emphasize that the technological improvements which were obtained through the Project were not entirely absorbed by the teaching/training multiplication technique of Cetiqt. The regular course students have yet to pass the acquaintance stage with these innovative technologies. It would be necessary to allocate resources for students to began dominating these technologies, learning to actually use them over the training years.

B. Immediate objectives

The Project document states, in item 2.b, as project objective:

> "To strengthen the SENAI/Cetiqt International Technical Assistance Unit in providing high-level training and technical assistance for the Brazilian textile and apparel industry in the special fields of textile computer applications (CAD/CAM, colour matching, dyehouse automation, process optimization etc) as well as in Total Quality Systems. In the frame of the project the Cetiqt International Technical Assistance Unit is going to provide - with the participation of UNIDO consultants - technical assistance (direct support) to participating textile and apparel companies in Brazil in the introduction, implementation and application of high-level advanced techniques of textile and garment manufacturing and quality management."

The prodoc does not detail, besides the above text, the immediate objectives to be reached, although it does list, in item 5, a series of activities to be developed in 1992. It does not mention other activities for the other Project years (three years).

The fact that it is a Trust Fund, thus providing the swift response to a fastly developing technological sector, which, according to the CTA needs speed and flexibility in its actions, does not justify the absence, in the Project document, of detailed expected immediate objectives.

C. Development objective

The development objective proposed in the prodoc is: "To improve the quality and increase the quantity of textile fabrics produced by up-to-date, high-efficiency methods and equipment to render them competitively exportable".

This objective, vague and generic, is difficult to measure. It is, however, beyond doubt that the improvements brought about by the Project in the Cetiqt installations and the scope of new services that the institution is now capable of providing to the national industry do indeed contribute to the attainment of the proposed development objective.

The evaluation mission observed that the transfer of this new Cetiqt capacity to end users (i.e., industries, specially those that export) did not reach a significant number of companies and thus influence sector performance.

The low relevancy of the Project results in Total Quality systems do not contribute to the development objective. It is a coincidence that the quality levels in the Brazilian textile industry are one of the main obstacles to exports of its products. In the first semester of 1995 there were only 8 manufacturing units of the textile and apparel sectors with ISO 9000 certification in the whole country, compared to the several hundred certified units in other industrial sectors as a whole. Even worse: the 8 units all belong to large companies and, with only one exception, all are multinational companies which already have individual and global quality policies.

The impact of the Project may be observed in some of the assisted companies, but this does not lead to the statement that the development objective is being reached by the textile and apparel sectors as a whole. In the last months, the difficulty in credit obtention, the artificially low foreign exchange rate bad for exports and the arrival of imports at much lower prices than national products has hurt the textile and apparel industry, further slowing its capitalization and delaying its modernization.

D. Unforeseen effects

All along the Project several equipment donations or loans were attracted and thus Cetiqt laboratories and service units at Cetiqt had significant improvements in their processing capacity. These donations allowed the comparison, in several cases, of hardware and competitor software performances. This contributed to providing a concrete perception of available suppliers to Project companies wishing to modernize their installations. Emphasis is placed on the importance of Cetiqt exemption and neutrality in the commercial interests of these loans and/or donations for its image.

The frequent participation of Cetiqt professional team members, as Project counterparts, in technical events, in Brazil and abroad, through the presentation of papers and participation in debates, congresses and seminars, may also be considered an unforeseen effect.

E. Sustainability

In order to secure Project sustainability, it is necessary to fulfill two basic conditions identified by the evaluation mission:

a) to maintain the coherence and Cetiqt professional team which compose the Project units;
b) to secure the continuity of technical information and technological innovation flux which keeps Cetiqt professionals and data bank updated.

The evaluation mission did not identify the dismantling of professional teams as an imminent threat should the Project not be extended or the presence of international consultants permanently secured. This theoretical team dismantling which could come about with the end of SF/BRA/92/001, is in opposition of two observed facts:

1. Job security is today a heavy concern, which inhibits job turnovers involving simple salary attractions; the employee who accepts an invitation to leave his current job wants the assurance that he will not, further down the road, be victim of a reengineering process embarked upon by his new boss. It must also be considered that, although representing a loss for Cetiqt (target institution of project objective - item 2.b of the prodoc), the migration of a professional to a private textile sector company would, in fact, be a contribution to the development objective (item 2.a of the prodoc).

2. The professional growth opportunities provided by Cetiqt in technological areas which undergo a swift and continuous modernization process (CAD/CAM, computer applications in textiles, colorimetry, etc) lead one to assume that the professionals who compose these teams will, in their majority, choose to continue their careers at Cetiqt, excluding, of course, normal turnover. This assumption is directly linked to the guarantee of continued access to updated information and the professional progress that Cetiqt should be able to provide these teams.

In order to ensure this flux of technological updating, it is not, however, essential that the current status quo be maintained, i.e., through an UNIDO administered project with the continued presence of international consultants. Although it is very important to Project sustainability that the flux of information be maintained, as well as the modernization which Cetiqt has achieved in certain Project-related units, these objectives could, in fact, be reached with the periodic (and, within reason, frequent) presence of specialists and international consultants. These could be short and medium-term consultants who could maintain the levels of development attained and direct the progress of the professionals who make up the teams.

F. Foreseen future assistance

To ensure continuity of the successful Project objectives and stimulate Cetiqt training in new textile state-of-the-art technologies. Both these goals will require further assistance in future.

Equipment and software must be kept updated, acquiring and/or receiving loans/donations, of the latest versions.

In the case of the counterpart team, it is important that they be kept abreast of sector state-of-the-art, in contact with modern professionals and that the training of new professionals be stimulated.

Maintenance of the data bank and technical files already at Cetiqt as well as agreements with similar institutions abroad should be ensured.

Accreditation of the Applied Colorimetry Laboratory, both at national level with INMETRO and at international level with UKAS (United Kingdom Accreditation Service, previously known as NAMAS) is an important step which also requires continuity, regardless of the model adopted for the new phase of the Project.

V. CONCLUSIONS

The Project promoted, during its three years span, the credibility of the Cetiqt units which received its influence. The Support to Commercialization (NAC) and Applied Research (NPA) units were the main beneficiaries of this significant increase in credibility.

The professional teams which compose these units are currently capable of fully developing their activities with little support from the international consultants who should, from now on, orient these teams towards a continuous technological update.

The gains achieved through the improved areas of Cetiqt have been widely promoted at the institutional level, both nationally and abroad, through participation in technical events, publication of articles and promotional publications. The commercial results of these efforts have, however, been of small significance. It is the opinion of the evaluation mission that the poor results reflect lack of a sale effort through direct potential client approach.

The sales of services related to quality management were weak and the evaluations made of the Project by the companies participating in the TQS programme were mostly negative. These critiques pointed towards missed deadlines and to difficulties in communication with the international consultant in charge of the topic. These companies felt that the consultant did not perceive the reality of the textile sector in the country. No concrete results were obtained in trying to sell services concerning ISO 9000 series quality systems' implementation, despite the fact that the theme is becoming vital to the survival of export companies.

No effort geared towards support to small and medium sized companies was perceived, although they represent, in numbers, an important part of the apparel sector.

The evaluation mission concluded that the origin of these shortcomings in Project results were in the project document (see attachment II), due to lack of detail and an effective workplan with measurable objectives and goals, as well as in the absence of intermediate performance reports (only one Project Performance Evaluation Report was prepared in March 1995).

The fact that no National Coordinator was formally appointed to the Project further emphasized the difficulties in Project follow-up. This coordination was, in fact, taken up by the CTA, who was already International Project Coordinator.

Although the explanation that the International Project Coordinator and CTA should be the same person for economic reasons is both understandable and valid, the absence of a National Project Coordinator is not. The duties of the National Project Coordinator were partly taken up by the Cetiqt Technical Director and partly by the Cetiqt Director-General, also National Project Director. A National Project Coordinator would have obtained a better interface with the international consultants, freeing CTA from administrative and commercial activities, as well as contributed towards higher Project efficiency vis-à-vis participating companies.

On the other hand, despite the mentioned planning and monitoring shortcomings, it is valid to state that Cetiqt would not have attained, with its human resources and functional structure, the qualifications it now has in colorimetry, CAD/CAM, process automation, etc, without Project SF/BRA/92/001. The significant number of donations to Cetiqt, made by international suppliers of high-tech soft and hardware for the textile sector reflects quite clearly the image Cetiqt has among these suppliers as an effective modernization pole for the textile industry, as well as UNIDO credibility as catalyzing element of this modernization process.

It is the conclusion of the evaluation mission that the improvement programme developed under SF/BRA/92/001 should be continued. This new project should be structured upon fresh assumptions, reinforcing national coordination with Cetiqt personnel and using the international consultants necessary to new programme fulfillment. The new project's financial arrangements could maintain the Trust Fund mechanism which has proven itself efficient.

VI. RECOMMENDATIONS

The results achieved by the Project and the unanimous opinions collected in favour of the continuity of services rendered by Cetiqt as Project result, recommend a few actions which will secure the desired continuity.

It is important to clarify that the following recommendations are valid despite the form selected to provide the continuity of today's Project activities, meaning that it may be an extension of the Project for a new technical cooperation model, with or without UNIDO participation.

- To ensure cohesion and continuity of current counterpart teams, the system of salary bonus, already adopted, should be maintained. This allows team members to participate in Cetiqt results of services rendered by these same teams. This continuity would be further preserved with the continued access to professional growth of team members.

- The creation of posts for trainees with the Project counterpart teams for on-the-job experience of new professionals will allow for the gradual increase of teams and reposition of professionals who decide to leave. The risk of team reduction through departure of trained employees is thus minimized. These trainees should be selected from within Cetiqt student body, with the cooperation of the Technical and Teaching Directories.

- The coordination of professional teams should be exercised by Cetiqt, reserving for outside consultants their specific role of providers of knowledge and information, and freeing them from commercial and administrative activities.

- To promote a better integration with textile sector class associations to provide finer dissemination of the services which Cetiqt may render to associates.

- To expand and reinforce Cetiqt relationship with other SENAI textile schools, thus better disseminating the services which may be rendered to textile and apparel companies in other regions with Cetiqt participation. Support to these companies from Cetiqt directly has proven itself expensive, and, at times, slow, thus making it clearer that at least part of services should be transferred to regional SENAI units.

- Reinforce CAD/CAM and process optimization capacity so as to reach the same level of competence and outside credibility which colorimetry has achieved.

- To establish planning and monitoring procedures for the activities of the several units participating in the project, thus measuring progress obtained in their respective areas, as well as the commercial efficiency of their services.

VII. LESSONS LEARNED

The lack of detail in the project document, without a clear definition of products and goals, brought about the uneven development of products produced by the several segments covered by the Project, although some of these obtained very satisfactory results.

On the other hand, the lack of periodic evaluation documents allowed the Project to reach its end without an adequate assessment of the activities developed during its lifespan. The only performance evaluation document (delivered in March 1995) established in Part III "Evaluation of Project Performance - Products" the products and goals which the Project aimed at (established, a posteriori, therefore) producing, comparing these with what had, de facto, been produced. This shortcoming was provided against in the project extension proposal (named Phase II) dated 28 September 1995.

The negotiation potential of UNIDO and its institutional credibility brought to Cetiqt a valuable collection of equipment and software at an attractive cost, specially if compared to market prices. The Trust Fund is fully justified in this case, even considering the 13% overhead charged on acquisition prices. On the other hand, Cetiqt credibility as a non-profit training and research institution motivated suppliers to donate and lend high value equipment and software.

These considerations on the lessons learned through the Project lead us to consider the Trust Fund as an excellent contract mechanism for cooperation, specially when the competency and objectives of two institutions such as UNIDO and SENAI/Cetiqt are united in the proposed effort.

In-depth evaluation

SF/BRA/92/001

Application of Modern Technologies and Management Systems to improve SENAI/CETIQT and the Brazilian Textile and Apparel Industry

TERMS OF REFERENCE

I. BACKGROUND

1. The Brazilian Textile and Apparel Industry

The textile and apparel industry in Brazil has in recent years lagged behind the U.S.A., Western Europe and particularly the Far East in what concerns technological development. The past restrictions on equipment imports, particularly those microprocessor based or with computerized controls, led to outmoded designs and production techniques.

Liberalization of foreign trade facilitated equipment imports but also exposed the industry to strong competition from abroad.

The "Conselho de Desenvolvimento Industrial" approved in 8 November 1989 an integrated programme for the textile and garment industries which called for the modernization of these manufacturing sub-sectors.

CETIQT is the largest textile school, research centre and extensive service in South America, and some years ago the Rieter Foundation ranked it to be among the 10 best such institutions in the world.

There are 1,200 students enrolled in the Technical Courses: *regular* for those getting their secondary level education together with the vocational training in 3 years, and *special* for those who enter CETIQT with their secondary level education completed and receive the additional professional training in 2 years. CETIQT, in co-operation with the State University of Rio de Janeiro, runs a complete (5 years) Textile Engineering Course.

Furthermore, there are shorter duration post-college and continuing education courses ranging from 40 hours to 1 semester. Over 4,000 professionals from the industry have participated in a wide variety of short and medium duration courses.

CETIQT also provides technical assistance to the industry in all fields of textile technology from spinning to garment manufacturing, fashion and marketing. This assistance has consisted traditionally of consultancy services in conventional technologies, chemical and physical testing services and trouble-shooting. These activities have been recently extended to cover modern technologies such as computer applications. In recent years, as a direct result of the CETIQT/UNIDO technical co-operation projects, services in computerized colour matching (recipe formulation and optimization in dyeing and printing) and in CAD/CAM (creation of woven and printed textile designs, colourways and separations, sketching, grading

and marker making for garments etc.) and consultancy services in these fields have been delivered to industry.

2. UNIDO Technical Assistance to CETIQT

UNIDO assistance to CETIQT dates to 1987 with a UNDP financed (with 50% cost sharing) institution-building project which included state of art advice in various CAD/CAM systems. This project terminated in 1991 with a total contribution of $750,000 and was complemented by a number of smaller projects implemented by UNIDO and financed by UNIDO itself, SENAI and the French Government (for details, please see Mr. Tenan's undated paper - Effective Utilization of Existing Opportunities from National and International Organizations - the CETIQT/UNIDO Experience). The assistance provided was instrumental in the upgrading of CETIQT's educational training activities and extension services, the latter having been well received by industry. This assistance led to a self-financed project SF/BRA/92/001 - Application of Modern Technologies and Management Systems to improve SENAI/CETIQT and the Brazilian Textile and Apparel Industry, which had a budget of $2,3 million to be partly recovered from payments from industry for services rendered. The aims and modus operandi of this project are described in the project document signed in February/March 1992. Its progress is illustrated by various technical reports and the Project Performance Evaluation Report (PPER) dated March 1995.

3. The Evaluation

The joint in-depth evaluation has been agreed by all parties concerned and is to assess the overall achievements of the project and identify the need for further technical assistance and modalities of implementation. A draft project document for further assistance has been already prepared by CETIQT and UNIDO.

II. SCOPE, PURPOSE AND METHODS OF THE EVALUATION

In accordance with the provisions of UNIDO stated in document DG.B/106 regarding in-depth evaluations, the primary purposes for the exercise are as follows:

a. To assess the achievements of the project against its objectives and expected outputs, including an examination of the project design.

b. To identify and assess the factors (internal and external of the project) that have facilitated the achievement of the project's objectives, as well as those factors that have impeded or slowed down the fulfilment of those objectives.

c. To examine the extent to which the results of the project have contributed towards increasing CETIQT capabilities in education, training and extension services to industry.

As part of the above-mentioned tasks, the evaluation mission will also review whether the approach utilized in the project has led to optimum results, or whether another or modified approaches should have been utilized.

In particular, the mission should look into:

a. The sustainability of the project i.e. its capacity to continue to provide services to industry after the completion of the technical assistance provided.

b. Relations of the project with end-users (enterprises and associations).

c. Financial self-sustainability of CETIQT's extension services to industry.

d. Integration of the project in CETIQT.

e. Linkage of the UNIDO-executed project with the German bilateral assistance project.

While a thorough review of the past is in itself important, the in-depth evaluation is expected to advise on further assistance to the textile and garment industries including possible alternatives of implementation modalities. While the evaluation will centre on project SF/BRA/92/001, it will also consider previous UNIDO projects to CETIQT as indicated in section I.2 of these TOR.

III. COMPOSITION OF THE MISSION

The mission will be composed of the following:
One nominee of UNIDO
One nominee of the Brazilian Government (ABC)

These nominees will combine experience on textile industry, Brazilian industrial environment and evaluation of technical co-operation. They should not have been directly involved in the design, appraisal or implementation of the project.

IV. CONSULTATIONS IN THE FIELD

The mission will maintain close liaison with the UNIDO office in Brasilia, the Government and private sector organizations concerned with the project and the project's national and international staff.

The mission is expected to visit industries which received services from the project as well as potential users.

Although the mission should feel free to discuss with the authorities concerned all matters relevant to its assignment, it is not authorized to make any commitment on behalf of UNIDO or the Brazilian Government.

V. TIMETABLE AND REPORT OF THE MISSION

A briefing note will be prepared by the backstopping officer in lieu of a briefing in UNIDO Headquarters. The mission should start on 28 September 1995 in the Headquarters of CETIQT for review of documentation and analysis of the project activities. It should

afterwards visit end-users of the project (actual and potential) following a structured questionnaire to guide interviews. It should again assemble in Rio de Janeiro on 11 October 1995 for a presentation in draft of its preliminary conclusions and recommendations and eventual exchange of views on these. To this presentation all Brazilian authorities concerned with the project should be invited (by the UNIDO office in Brazil).

A further week should be allowed for the preparation of the final report of the evaluation (in Sao Paulo, home base of both consultants). Total duration of the evaluation mission is estimated to be three weeks.

The report should be prepared in accordance with the guidelines included in the DG.B/106. Particular attention and degree of detail should be provided on "Sustainability"and "Further assistance required". The report should be submitted by the evaluation mission simultaneously to UNIDO and the Brazilian Government (ABC). The latter will be responsible for the distribution of the report to the institutions involved in the project.

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

Project Document

COUNTRY:	Brazil
PROJECT NUMBER:	SF/BRA/92/001
PROJECT TITLE:	Application of Modern Technologies and Management Systems to improve SENAI/CETIQT and the Brazilian Textile and Apparel Industry
SCHEDULED START:	March 1992
PROJECT DURATION:	3 years
ORIGIN AND DATE OF OFFICIAL REQUEST:	Agência Brasileira de Cooperação ABC letter dated 3/8/92 27 February 1992
TRUST FUND DONOR/BENEFICIARY:	Serviço Nacional de Aprendizagem Industrial
TRUST FUND CONTRIBUTION:	US$ 2,260,000 (Incl. UNIDO support costs)
UNIDO BACKSTOPPING DIVISION/SECTION	Industrial Operations Division/ Agro-Based Industries Branch

Agreed on behalf of the Government of Brazil — 26 FEB 1992 — Date

Agreed on behalf of Serviço Nacional de Aprendizagem Industrial (SENAI) — Date

Agreed on behalf of UNIDO — 12 March 1992 — Date

1. LEGAL CONTEXT

This Project Document shall be the instrument referred to as such in the Technical Co-operation Trust Fund Agreement between the United Nations Industrial Development Organization and Servico Nacional de Aprendizagem Industrial/Centro de Tecnologia da Industria Quimica e Textil (SENAI/CETIQT), signed by the Parties on ....

Revision to this Project Document may only be made with the written agreement of the authorized representative of the Donor according to Article III, of the aforementioned Trust Fund Agreement.

2. OBJECTIVES

a) Development Objective

To improve the quality and increase the quantity of textile fabrics produced by up-to-date, high-efficiency methods and equipment to render them competitively exportable.

b) Project Objective

To strengthen the SENAI/CETIQT International Technical Assistance Unit in providing high-level training and technical assistance for the Brazilian textile and apparel industry in the special fields of textile computer applications (CAD/CAM, colour matching, dyehouse automation, process optimization etc) as well as in Total Quality Systems. In the frame of the project the CETIQT International Technical Assistance Unit is going to provide - with the participation of UNIDO consultants - technical assistance (direct support) to participating textile and apparel companies in Brazil in the introduction, implementation and application of high-level advanced techniques of textile and garment manufacturing and quality management.

3. BACKGROUND AND JUSTIFICATION

(a) Justification (Development Hypothesis)

The textile manufacturing industry in Brazil has in recent years developed at a much lower rate than those in the U.S.A., Western Europe and particularly the Far East. The lack of interest on the part of the entrepreneurs in investing in this field - due to the economic climate of the country on the one hand, and the Government's policy of severe import restriction on equipment and machinery (particularly on those having microprocessor-based or computerized controls) on the other hand - have resulted in the Brazilian textile industry falling behind the technical level of the industrialized countries.

In addition to the obsolescence of machinery and equipment, the technical level and cost efficiency of the processes, technologies and even the dyes and chemicals used in the dyeing, printing and finishing sector of the Brazilian textile industry have also become lower, in many cases much lower, than that needed for production of high quality and efficiency.

The former Government, recognizing the necessity to remedy this situation had changed its previous policies. This change has been approved by the present Government, and the drastic reduction of import tariffs has been announced both for textiles and garments (making it imperative for the industry to modernize its production techniques to remain competitive), and for equipment (making it possible to install really up-to-date machinery). This is the realization of the Integrated Sectorial Program of the Textile and Garment Industries (PSI: PROGRAMA SETORIAL INTEGRADO DAS INDUSTRIAS TEXTEIS E DE CONFECCAO) approved by Resolution #17 of 8 November 1989 of the Industrial Development Council (CONSELHO DE DESENVOLVIMENTO INDUSTRIAL) of Brazil which calls, *inter alia*, for:

- the liberation of importing textile machinery and equipment;
- the acquisition of new technologies for the Brazilian textile industry from abroad;
- giving priority, in the importing procedures, to computerized production control systems, process optimization and CAD/CAM systems in the textile industry; and
- the introduction of special training courses in modern production-administration techniques such as JUST-IN-TIME, QUICK-RESPONSE, etc.

These goals may only be achieved in a reasonably short time scale with significant outside help. The Constitution of UNIDO gave its Secretariat a clear mandate (among many others) to build up co-operation between the entrepreneurial sectors of developing countries and those of industrialized countries.

SENAI/CETIQT - the largest textile and garment technology center of the SENAI system - has a long tradition of international co-operation. The impact of particularly the two latest projects - DP/BRA/87/033 [Support to SENAI/CETIQT Applied Research Unit] and SI/BRA/89/801 [High-level Advice on Proper Utilization of Computerized Colour Matching] - has been considerable, raising new demands from the industry for continuing - and extending - technical cooperation. CETIQT, with its extensive experience and connections as well as its increasing acceptance as a center of excellence in a number of fields, is ideally suited to play the role of multiplier in international technical cooperation projects.

This is clearly indicated by the willingness of many textile companies throughout the country to contribute to the financing of further technical cooperation projects. In the frame of the Trust Fund Project CETIQT is going to strengthen and enhance the activities of its recently established International Technical Assistance Unit, drawing its resources partly from CETIQT's own budget, but mainly from the contributions of private industry and possibly those of third party donors. Utilizing these resources international experts will be fielded to provide direct assistance for participating industries under the co-ordination of CETIQT and train CETIQT professionals in their special fields on the job.

This approach has the clear advantage over individual Trust Fund Projects with companies that the activities of the experts are co-ordinated, and thus for any one company services of not only longer periods, but of 1 or 2 weeks duration or even less become viable. Further advantages of this approach are that CETIQT provides counterparts, who will, in the future, also be able to provide technical assistance on their own, as well as participate in the educational and training programmes of CETIQT at a higher level. Finally, through the Trust Fund Project the very latest techniques and equipment shall be implemented in CETIQT, providing thereby the facilities to train future textile technicians and engineers at the state-of-the-art level. (CETIQT as part of the SENAI system has exemption of import duty on equipment, so the advantage of channelling the purchase through the UNIDO project is in the utilization of UNIDO's expertise - and its good connection to the suppliers - proven by the previous projects.)

(b) Approach (Project Hypothesis)

The Trust Fund Project is planned to operate in the following manner. CETIQT makes individual agreements with textile manufacturing companies of the private sector of providing the technical assistance they require in a number of fields related to textile and garment manufacturing: e.g. recipe and process optimization, preparation of feasibility studies and development concepts, assistance in investment decisions (specification and selection of equipment and machinery), introduction of Total Quality Management Systems, special training courses etc.

The companies pay CETIQT for these services according to an agreed schedule, and CETIQT pays UNIDO through the Trust Fund for the services provided. The Trust Fund is thus only between CETIQT and UNIDO, while the participating private companies make individual Technical Assistance Agreements with CETIQT. In accordance with the Trust Fund agreement UNIDO through the co-ordination of its CTA will make its services available upon receipt of contributions from CETIQT.

The source of over 75% of the equipment component of the project is that part of the regular budget of CETIQT which is earmarked for the renovation of the laboratories and the pilot plants (laboratory and pilot scale machines, demo material, computers, special and general purpose software etc.), the rest is covered by the International Technical Assistance Fund for the purchase of specialized equipment needed at a very short notice to perform services (in the laboratories and pilot plants of CETIQT) for the industry. The participating companies may receive through the Trust Fund only expertise, fellowships or study tours ; under no conditions are they going to receive equipment through the project.

In the first year of the project about 35% of the budget is planned for fielding experts, 20% for the modernization of the textile computer applications laboratory of CETIQT (for teaching and training basic and advanced level computer applications with simultaneous upgrading of the computer facilities of the related departments) and 40% for the modernization of the laboratories and pilot plants of dyeing and finishing and garment making.

4. OUTPUT

The International Technical Assistance Unit of CETIQT operational with increased capabilities in training textile professionals at the state-of-the-art level in computerized textile and garment applications and in Total Quality Management Systems.

5. ACTIVITIES FOR 1992

Specification of equipment textile computer applications (see provisional list in ANNEX 2.)	MARCH
Applied research in computerized colour matching for printing - assistance to SANTANENSE	MARCH to JUNE
Applied research in colour matching (production control, whiteness, colour order systems, data transfer) - assistance to HERING	MARCH to DEC
Placing orders for equipment in textile computer applications	MARCH/APRIL
Orientation in the specification and selection of colour matching and dyehouse automation equipment; technical assistance in training, installation and operation for co-operating companies: COTEMINAS, SANTANENSE, CEDRO E CACHOEIRA, CACHOEIRA DE MACACOS, SAYONARA, BUETTNER and SAO JOSE are foreseen at present, others are expected to join during the year.	MARCH to DEC
Applied research in comparing different methods for the value analysis of dyes	MARCH to JUNE
Installation of equipment	APRIL to JUNE
Introduction of computerized recipe optimization for BUETTNER	APRIL to SEPT
Installation of equipment	APRIL/MAY

Fielding of Expert in Quality Systems and Management (24 w/m). Detailed work-plan and activities see ANNEX 5.	JULY
Fielding of Consultants in Dyeing, Printing and Finishing and in Garment Manufacturing (4 w/m). Specification of equipment for the Applied Research Laboratories and the Pilot Plants.	JULY to SEPT
Fielding of Chief Technical Adviser (36 w/m). Detailed work-plan and activities for 1993-1994 to be developed together with CTA.	SEPTEMBER
Placing orders for equipment in Dyeing and Finishing and Garment Manufacturing	OCTOBER
Installation of equipment	DEC 1992 to MARCH 1993

6. PROJECT INPUTS

(a) SENAI/CETIQT contribution in kind

- Project Personnel: 7 counterparts (4 textile technicians or chemical engineers, 1 quality systems expert and 2 computer applications experts);
- Full Post Adjustment, Daily Subsistance Allowence, international and local travel of international experts;
- Laboratories and offices;
- Secretarial services, translations;
- Locally available equipment;
- Sundries.

(b) UNIDO Inputs

Through the Trust Fund established between UNIDO and SENAI/CETIQT and in accordance with the payment schedule attached to the Trust Fund Agreement UNIDO shall provide the following:

Bu-li		w/m	US$
11-01	Chief Technical Adviser/Specialist in Dyeing-Printing-Finishing	36.0	342,000
11-02	Expert in Quality Systems and Management	24.0	228,000
11-50	Short term consultants	20.0	182,000
11-99	Sub-total international experts	80.0	752,000
16-00	UNIDO staff missions		16,000
19-99	Total Personnel Component		768,000
21-00	Subcontracts		28,000
29-99	Total Subcontracts		28,000
	Equipment		
41-00	Expendable equipment		130,000
42-00	Non-expendable equipment*		1,060,000
49-99	Total equipment component		1,190,000
51-00	Sundries		7,000
55-00	Hospitality		7,000
59-99	Total Miscellaneous Component		14,000
99-99	Project total		2,000,000
	UNIDO Support Costs (13%)		260,000

* Provisional list of equipment attached in ANNEX 2.

8. EVALUATION AND REPORTS

(a) Evaluation

The project will be subject to evaluation in accordance with policies and procedures established for this purpose by UNIDO in co-operation with SENAI/CETIQT.

For monitoring purposes a yearly tripartite review meeting will be held (Agência Brasileira de Cooperação [ABC] - UNIDO - SENAI/CETIQT) evaluating the activities of the previous year and planned activities for the following year.

(b) Progress and Terminal Reports

The progress of the project as well as findings and recommendations of the experts will be submitted through periodic reports to UNIDO and SENAI/CETIQT by the Chief Technical Adviser (team leader). Copies of these reports will be sent for information to ABC. A final report will be submitted by the Chief Technical Adviser upon completion of the project within a period of two months.

9. FURTHER CO-OPERATION

This project may be prolonged or extended subject to the conclusion of project documents and trust fund agreements.

ANNEX 1.

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

U N I D O

Request from the Government of Brazil

J O B D E S C R I P T I O N

SF/BRA/92/001/11-01

POST TITLE	Chief Technical Adviser/ Specialist in Dyeing/Printing/Finishing
DURATION	1 year with possible extension
DATE REQUIRED	1 September 1992
DUTY STATIONS	Rio de Janeiro with travel within the country
DUTIES	The Chief Technical Adviser will co-ordinate the work of an international team assigned to SENAI/CETIQT for strengthening the Internatinal Technical Assistance Unit.

The Chief Technical Adviser will specifically be expected to:

- co-ordinate the work of the international personnel assigned to the project, giving them all necessary support, assistance and advice throughout the duration of the project;
- ensure effective co-operation between international and national project staff;
- ensure co-ordination of project activities with related activities undertaken in Brazil by UNIDO or other agencies;
- ensure the compliance with instructions concerning the timely preparation of the required reports;

- participate, as required, in the review and evaluation of the progress of the project;

- as Consultant in Dyeing/Printing/Finishing professionally direct the work of the Applied Colorimetry Laboratory in both research and technical consultancy for the companies;

- participate in the training/teaching activities in his/her special field as need be;

The consultant will also be expected to prepare a final report, setting out the findings of the mission and give recommendations to the Government on further action which might be taken.

QUALIFICATIONS — Textile chemist with extensive (minimum 10 years) industrial experience in dyeing-printing-finishing, full acquaintance with up-to-date Computerized Colour Matching systems, Dyehouse Automation and Chemicals Dispensing systems, good overview of computer aided textile design (CAD/CAM) systems and up-to-date PC applications.

LANGUAGE — English. Spanish or Portuguese an asset.

BACKGROUND INFORMATION — See attached.

BACKGROUND INFORMATION

The textile manufacturing industry in Brazil has in recent years developed at a much lower rate than those in the U.S.A., Western Europe and particularly the Far East. The lack of interest on the part of the entrepreneurs in investing in this field - due to the economic climate of the country on the one hand, and the Government's policy of severe import restriction on equipment and machinery (particularly on those having microprocessor-based or computerized controls) on the other hand - have resulted in the Brazilian textile industry falling behind the technical level of the industrialized countries.

In addition to the obsolescence of machinery and equipment, the technical level and cost efficiency of the processes, technologies and even the dyes and chemicals used in the dyeing, printing and finishing sector of the Brazilian textile industry have also become lower, in many cases much lower, than that needed for production of high quality and efficiency.

The former Government, recognizing the necessity to remedy this situation had changed its previous policies. This change has been approved by the present Government, and the drastic reduction of import tariffs has been announced both for textiles and garments (making it imperative for the industry to modernize its production techniques to remain competitive), and for equipment (making it possible to install really up-to-date machinery). This is the realization of the Integrated Sectorial Program of the Textile and Garment Industries (PSI: PROGRAMA SETORIAL INTEGRADO DAS INDUSTRIAS TEXTEIS E DE CONFECCAO) approved by Resolution #17 of 8 November 1989 of the Industrial Development Council (CONSELHO DE DESENVOLVIMENTO INDUSTRIAL) of Brazil which calls, inter alia, for:

- the liberation of importing textile machinery and equipment;
- the acquisition of new technologies for the Brazilian textile industry from abroad;
- giving priority, in the importing procedures, to computerized production control systems, process optimization and CAD/CAM systems in the textile industry; and
- the introduction of special training courses in modern production-administration techniques such as JUST-IN-TIME, QUICK-RESPONSE, etc.

These goals may only be achieved in a reasonably short time scale with significant outside help. The Constitution of UNIDO gave its Secretariat a clear mandate (among many others) to build up co-operation between the entrepreneurial sectors of developing countries and those of industrialized countries.

SENAI/CETIQT - the largest textile and garment technology center of the SENAI system - has a long tradition of international co-operation. The impact of particularly the two latest projects - DP/BRA/87/033 [Support to SENAI/CETIQT Applied Research Unit] and SI/BRA/89/801 [High-level Advice on Proper Utilization of Computerized Colour Matching] - has been considerable, raising new demands from the industry for continuing - and extending - technical cooperation. CETIQT, with its extensive experience and connections as well as its increasing acceptance as a center of excellence in a number of fields, is ideally suited to play the role of multiplier in international technical cooperation projects.

This is clearly indicated by the willingness of many textile companies throughout the country to contribute to the financing of further technical cooperation projects. In the frame of the Trust Fund Project CETIQT is going to strengthen and enhance the activities of its recently established International Technical Assistance Unit, drawing its resources partly from CETIQT's own budget, but mainly from the contributions of private industry and possibly those of third party donors. Utilizing these resources international experts will be fielded to provide direct assistance for participating industries under the co-ordination of CETIQT and train CETIQT professionals in their special fields on the job.

This approach has the clear advantage over individual Trust Fund Projects with companies that the activities of the experts are co-ordinated, and thus for any one company services of not only longer periods, but of 1 or 2 weeks duration or even less become viable. Further advantages of this approach are that CETIQT provides counterparts, who will, in the future, also be able to provide technical assistance on their own, as well as participate in the educational and training programmes of CETIQT at a higher level. Finally, through the Trust Fund Project the very latest techniques and equipment shall be implemented in CETIQT, providing thereby the facilities to train future textile technicians and engineers at the state-of-the-art level.

ANNEX 1. contd.

UNITED NATIONS DEVELOPMENT ORGANIZATION

UNIDO

Request from the Government of Brazil

JOB DESCRIPTION
SF/BRA/92/001/11-02

POST TITLE	Expert in textile quality systems & management
DURATION	24 months
DATE REQUIRED	July 1992 - June 1994
DUTY STATION	Rio de Janeiro with travel within the country
PURPOSE OF THE PROJECT	To elaborate and introduce quality systems in textile companies, meeting the requirements of ISO 9000 standard series and Total Quality Control.
DUTIES	The expert will be a member of an international team assigned to SENAI/CETIQT, providing technical assistance for the Brazilian textile and apparel industry. Under the overall guidance of the National Project Director (NPD) the Chief Technical Adviser (CTA) the expert will be expected to:

- conduct training for CETIQT personnel and the representatives of participating companies in the field of Total Quality Control and Systems, incl. the ISO 9000 standard series;
- visit the participating companies, survey and evaluate their existing quality systems, and present the findings to the top management of each company;
- direct the preparation of the development concept for each participating company and assist in elaborating quality documentation, description of procedures, schemes for quality assurance organization, etc necessary to implement a quality system;

- direct the implementation of the quality systems and conduct a pre-audit on implemented systems in each participating company;

- prepare written reports for the top management of each company evaluating the work and the achievements.

The expert will also be expected to prepare a final report, setting out the findings of his/her mission and recommendations to the Government on further action that might be taken.

QUALIFICATION — Degree in textile/mechanical engineering, high-level knowledge of the state-of-the-art practice, concept and methods of and minimum 10 years experience in elaborating, introducing and auditing quality systems with special regard to the textile industry. Knowledge and practice of quality management methodology. At least 10 years practice in training of quality systems for personnel of various levels.

LANGUAGE — English. Portuguese or Spanish is an asset.

BACKGROUND INFORMATION — See attached.

BACKGROUND INFORMATION

The Centro de Technologia da Indústria Quimica e Têxtil (CETIQT) is a unit of the Servico Nacional de Apprendizagem Industrial (SENAI) system, exclusively devoted to assist the textile and ready made industry in technological research, training and dissemination of technological information.

A survey that has been conducted recently proved, that the Brazilian textile and apparel manufacturers are not familiar with and have not made use of up-to-date quality systems. Therefore, CETIQT has decided to expand its activity by assisting companies to elaborate and introduce quality systems, meeting the requirements of ISO 9002, taking into consideration the principles of Total Quality Control, furthermore providing the necessary training to the personnel of the participating companies. To meet this goal, CETIQT is due to restructure itself, creating a new department responsible to render service to the industry in the area of quality systems and management.

The project will provide assistance both to CETIQT (enabling to reform its organization and to train its staff) and to participating companies (in training their personnel and introducing quality systems that can be certified by a third party.

ANNEX 1. contd.

UNITED NATIONS DEVELOPMENT ORGANIZATION

UNIDO

Request from the Government of Brazil

JOB DESCRIPTION
SF/BRA/92/001/11-51

POST TITLE	Consultant in quality systems
DURATION	1 month
DATE REQUIRED	November 1992
DUTY STATION	Rio de Janeiro with travel within the country
PURPOSE OF THE PROJECT	To elaborate and introduce quality systems in textile companies, meeting the requirements ofISO 9000 standard series and Total Quality Control.

DUTIES

The consultant will be a member of an international team assigned to SENAI/CETIQT, providing technical assistance for the Brazilian textile and apparel industry. Under the overall guidance of the Chief Technical Adviser and the Expert in Textile Quality Systems and Management the consultant will be expected to:

- conduct training for CETIQT personnel and the representatives of participating companies in the fields of different techniques and elements of quality systems, like Statistical Quality Control (SQC), Statistical Process Control (SPC), Design of Experiments, Information Systems, Profit Plan for Quality, Supplier Quality Management, Creative Problem Solving etc.

- review project activities and procedures and give recommendations (where applicable) for improvements.

The consultant will also be expected to prepare a final report, setting out the findings of his/her mission and recommendations to the Government on further action that might be taken.

QUALIFICATION	Degree in engineering, high-level knowledge of the state-of-the-art practice, concept and methods of and minimum 10 years experience in training, elaborating, introducing and auditing quality systems. Knowledge and practice of quality management methodology. Knowledge of using computers in the area of SQC, SPC and Design of Experiments.
LANGUAGE	English. Portuguese or Spanish is an asset.
BACKGROUND INFORMATION	See attached.

BACKGROUND INFORMATION

The Centro de Technologia da Indústria Quimica e Têxtil (CETIQT) is a unit of the Servico Nacional de Apprendizagem Industrial (SENAI) system, exclusively devoted to assist the textile and ready made industry in technological research, training and dissemination of technological information.

A survey that has been conducted recently proved, that the Brazilian textile and apparel manufacturers are not familiar with and have not made use of up-to-date quality systems. Therefore, CETIQT has decided to expand its activity by assisting companies to elaborate and introduce quality systems, meeting the requirements of ISO 9002, taking into consideration the principles of Total Quality Control, furthermore providing the necessary training to the personnel of the participating companies. To meet this goal, CETIQT is due to restructure itself, creating a new department responsible to render service to the industry in the area of quality systems and management.

The project will provide assistance both to CETIQT (enabling to reform its organization and to train its staff) and to participating companies (in training their personnel and introducing quality systems that can be certified by a third party.

ANNEX 2.

Preliminary list of equipment

1. To be ordered in March 1992

4	i486-33 computers	US$ 18,000
10	i386-33 computers	21,500
1	Macintosh computer with CCM SW and installation	18,000
1	full colour printer	9,500
1	full colour scanner	10,000
1	Project car	20,000
	Application Software	5,000
	Field Purchase (unspecified)	5,000
	Sub-total	107,000

2. To be ordered by December 1992

Laboratory printing table	20,000
Pilot scale dyeing machines	80,000
Automated sewing machines	150,000
Field Purchase (unspecified)	23,000
Sub-total	273,000
TOTAL for 1992	380,000

3. For 1993 and 1994 equipment of US$ 385,000 each year will be specified by the CTA and the consultants after their fielding, but it is going to be along similar lines as in 1992.

Remark: these values are net figures, the corresponding gross values are US$ 430,000 and 435,000 for 1992 and 1993/94 respectively.

ANNEX 3.

PROJECT BUDGET (all figures net in US$)

Bu-li	TOTAL	1992	1993	1994	1995	
11-01	342,000	38,000	114,000	114,000	76,000	
11-02	228,000	57,000	114,000	57,000	-	
11-50	182,000	20,000	54,000	54,000	54,000	
16-00	16,000	8,000	-	8,000	-	
21-00	28,000	-	14,000	14,000	-	
41-00	130,000	30,000	35,000	35,000	35,000	
42-00	1,060,000	350,000	350,000	350,000	10,000	
51-00	7,000	1,500	2,000	2,000	1,500	
55-00	7,000	1,500	2,000	2,000	1,500	
TOTAL NET	2,000,000	506,000	685,000	636,000	173,000	
13%	260,000	65,780	89,050	82,680	22,490	
TOTAL GROSS	2,260,000	571,780	774,050	718,680	195,490	

It is understood that, in accordance with UNIDO rules and regulations, UNIDO will provide services only to the extent that these services are covered by advance cash contributions to the trust fund account.

ANNEX 4.

ACTIVITIES AND PRELIMINARY WORK PLAN

for the Expert in Quality Systems and Management

The activities to be run in the framework of the project are to be grouped into four phases.

1st Phase

Time scheduling

Scheduling the time for the training. Preparing the necessary equipment. These activities will last about 1 week.

Training

1. Training of the selected technical staff of the companies about ISO 9000 standard series and TQC. This training will include methods and techniques of introducing and running quality systems. The training will be carried out in CETIQT and will last about 2.5-3 weeks. Training will be finished with the examination of the participants. CETIQT will issue a Certificate to all those who have passed the exams.

2. Training of top management of companies about Quality Management and TQC. This will deal with the different managerial tools enabling companies to increase their profit margin through quality systems. The training will be provided on the spot and lasts 1 day for each factory, a total of 3 weeks.

The whole phase will last about 2-3 months.

2nd Phase

Survey of the Quality Systems of the companies

The Quality System Survey is a comprehensive review conducted at the producer's manufacturing facility to evaluate the quality system, including organization, procedures, tooling and facilities, furthermore to evaluate producer's qualifications for producing production quantities of adequate quality.

1. Preparation of the questionnaire and evaluating method

2. Carrying out the survey

3. Preparing the results and calculating producer's qualification separate for each company
4. Analyzing producer's situation from the point of view of quality system and quality cost

5. Preparation of a document containing the establishments of the survey and the results of the analysis for each company

6. Presenting the findings and giving supplement to the top management of each company separately, providing facilities for discussion.

This phase will be completed by the acceptance of the results by the top management, and will take approximately a total of 4-5 months.

3rd Phase

Preparing the concept of development

This will be based mainly on the results gained in the 2nd Phase but will take into consideration conception of the top management as well. This concept will aimed at the introduction of TQC system, that takes into consideration not only the requirements of the ISO 9002 quality assurance system, but the economical standpoints, respectively. It will include the most important activities to be carried out to introduce profit oriented quality system covering the area of ISO 9002, the selection of the break-through areas and the necessary activities.

1. Preparation (assisting in and directing the preparation) of the quality documentation, i.e. the Quality Manual, determination of the Quality Policy of each company, furthermore the elaboration (assisting in and directing the elaboration) of the TQC system, including all elements of ISO 9002 as well.

2. Elaborating schemes for the quality assurance organization that is suitable to run and to maintain the system effectively. Preparation of material to develop the measuring and qualification systems of the company.

This phase is closed with the report to and the acceptance of the top management of each company and will last approximately 5-7 months.

4th. Phase

Introduction of the Quality System in the Companies

(Training and supporting program to assist in introducing TQC system.)

Training

Special training provided for the top (½ day) and medium management (4-5 days).

Supporting activities

This is aimed at to assist in solving the problems raised during introduction of the system and to assure the most effective use of time. During this phase CETIQT team members will visit regularly participating companies and will have a close watch on the activities.

This phase will be completed with an audit, run by CETIQT team and reporting to the top management at every company. The phase is due to last about 10-13 months, depending on the activities of the delegated members of the companies, furthermore, on the acceptance of the company as a whole.

Annex III

LIST OF ORGANIZATIONS, ENTERPRISES AND PERSONS CONTACTED BY THE EVALUATION MISSION

1.Organization and enterprises

ABIT - Associação Brasileira da Indústria Têxtil

ABQCT - Associação Brasileira de Químicos e Coloristas Têxteis

ABTT- Associação Brasileira de Técnicos Têxteis

Adexim-Comexim Matérias Primas e Equipamentos Indústria e Comércio Ltda

Braspérola Indústria e Comércio Ltda

Buettner SA Indústria e Comércio

Companhia de Fiação e Tecidos Cedro e Cachoeira

Companhia de Tecidos Santanense

Davos Industrial Têxtil Ltda

Fiação e Tecelagem Eliana SA

Fiação e Tecelagem São José SA

Hering Têxtil SA

INMETRO - Instituto Nacional de Metrologia, Normalização e Qualidade Industrial

Lanifício Sanyo do Brasil Ltda.

MIT-Exacta Ind. e Com. de Instrumentos e Sistemas de Automação Ltda.

Nova América SA

P. Sayeg e Companhia Limitada

SEBRAE - Serviço de Apoio às Micro e Pequenas Empresas, São Paulo

SENAI - Centro de Formação Profissional de Blumenau

SENAI - Escola Francisco Matarazzo

Sintequímica do Brasil Ltda

Textil Norma Ltda

2. Persons

Adelgicio Leite, Chefe-adjunto da Divisão Têxtil, INMETRO

Alexandre Burihan Neto, Diretor Comercial, Textil Norma Ltda.

Alexandre Figueira Rodrigues, Diretor Geral, SENAI

Almir Teixeira de Souza, Assistente de Diretoria Técnica, CETIQT

Aloísio A. Neves, Gerente de Acabamento, Fiação e Tecelagem São José SA

Arieh Hamoui, Diretor Técnico, Davos Industrial Têxtil Ltda.

Artur Menezes Silvares, Chefe do Núcleo de Pesquisa Aplicada, CETIQT

Átila Meirelles Borges da Silva, Analista de Sistemas, NIIT,CETIQT

Carlos Costa, Gerente Comercial, Adexim-Comexim Ltda

Carlos Russo, Diretor, Adexim-Comexim Ltda

Domingos A. Costa, Responsável Técnico, Fiação e Tecelagem Eliana SA

Eleno Paes Gonçalves, Vendas e Aplicação, Superlab Instrumentação Analítica Ltda.

Elisa Kaspareit Justino, Diretora, Polo Avançado Têxtil e de Confecção de Blumenau-SENAI

Fernando Lima, Chefe do Depto. Técnico do Acabamento, Fiação e Tecelagem São José SA

Gastão Leônidas de Camargo, Vice-Presidente da ABQCT

Gerson Haacke, Chefe Engenharia de Produtos, Buettner SA

Gerson Pereira Abranches, Diretor Técnico, CETIQT

Gil Leonardo Aliprandi Lucido, Engenheiro Químico, CETIQT

Kelson dos Santos Araujo, Técnico de Acabamento Têxtil, CETIQT

Jennifer Kathrin Gay, Especialista Associada, CETIQT

João Leônidas Machado, Diretor, Escola SENAI "Francisco Matarazzo"

José Carlos Braga Pinheiro, Técnico em Confecção, SENAI - Blumenau

José Clarindo de Macedo, Diretor Técnico-Comercial, Sintequímica do Brasil Ltda.

László Tauszig, Diretor Técnico, Mit-Exacta Ind. e Com. Ltda

Liene França Barbosa, Secretária Administrativa, CETIQT

Lilian Furlan, Chefe de Laboratório, Adexim-Comexim Ltda

Loruhama Bognar Gonçalves, Laboratório de Colorimetria, Hering SA

Lúcio Geraldo Taboada Tenan, Diretor Geral, CETIQT e Diretor Nacional do Projeto

Luiz Antônio Alexandrini de Rezende, Gerente Industrial, P.Sayeg e Cia.Ltda.

Luiz Atoline, Economista, ABIT

Luiz Cláudio Ramalho de Almeida, Engenheiro Químico, CETIQT

Márcia Rosa Pereira Franco, Chefe da Divisão Têxtil, INMETRO

Marcos Erbe, Diretor Técnico, Buettner SA

Mário Eiiti Sasaki, Diretor Técnico, Lanifício Sanyo do Brasil Ltda

Maria Adelina Pereira Galheini, Presidente do Núcleo de São Paulo, ABTT

Murilo Cesar Ferrari, Gerente Seção de Beneficiamento, Hering Têxtil SA

Nadja Lima Gorsza,Coordenadora do Programa SQT, Braspérola Ind. e Com. SA

Newton de Oliveira, Gerente de Engenharia, Companhia de Tecidos Santanense

Paulo Jassi, Gerência de Produto, Hering Têxtil SA

Ranieri Emerson Krambeck, Engenheiro de Automação Industrial, Hering SA

Raquel Souza de Mello Araújo, Engenheira Química, CETIQT

Ricardo E. Luna, Coordenador do NAC, CETIQT

Robert Hirschler, Chief Technical Adviser, UNIDO-CETIQT

Sérgio Luz, Analista de Sistemas, CAD/CAM, Hering Têxtil SA

Silvio Roth, Consultor Técnico, SEBRAE - SP

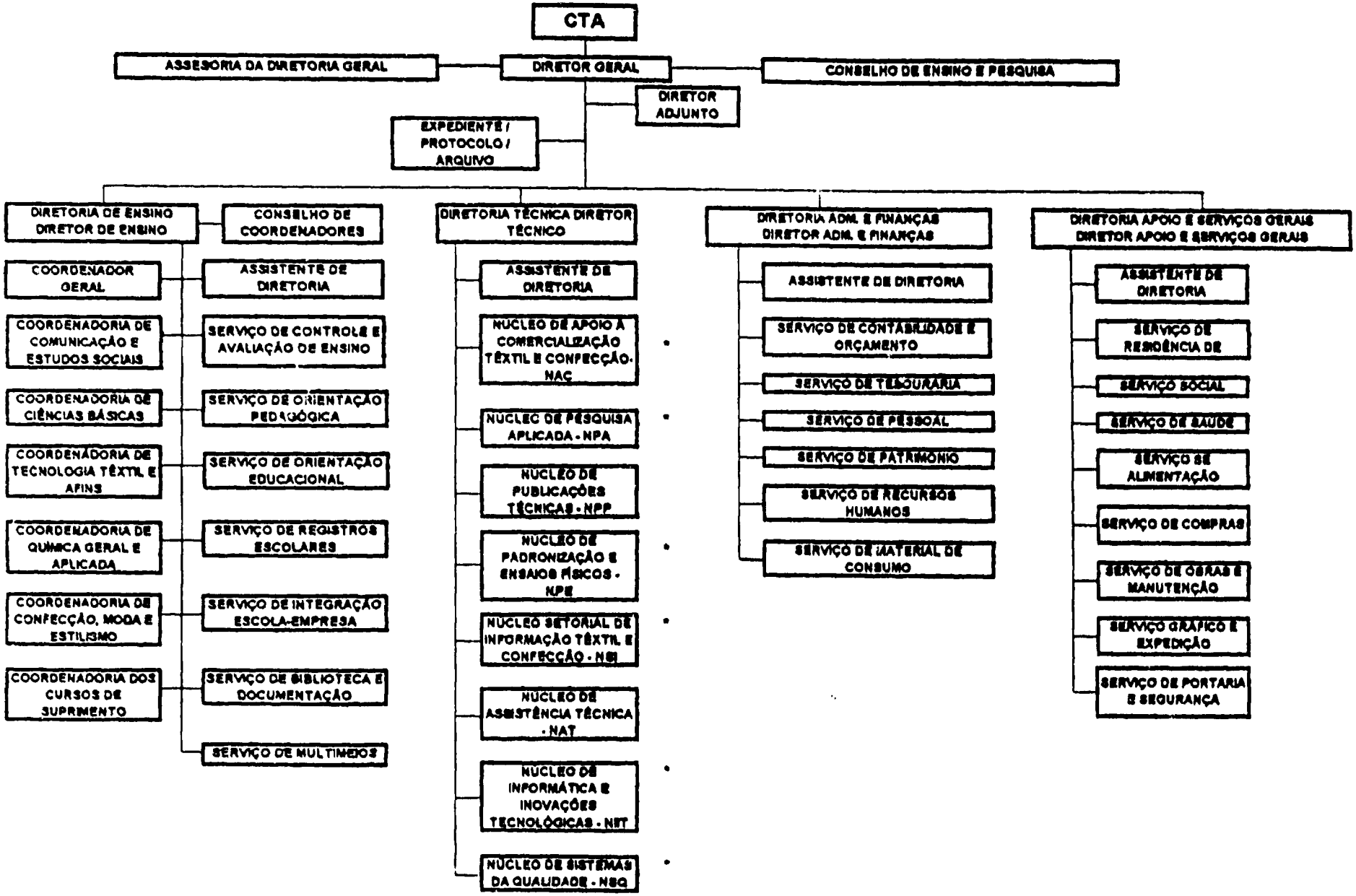
Tito Hobolt, Supervisor do Laboratório Químico, Buettner SA

Valdir Ciocci Junior. Assistente da Gerência, Têxtil Norma Ltda

Vandir Meller, Gerente, Fiação e Tecelagem São José SA

Viclei Teixeira Coimbra, Coordenador da Equipe de TQC, Companhia de Fiação e Tecidos Cedro e Cachoeira

ORGANIGRAMME OF SENAI/CETIQT



CTA - Conselho Técnico Administrativo

* Núcleos que receberam maior influência do Projeto SF / BRA / 92 / 001