

June 1998
CO1996
IDRC - Lib. *11/16/11*

SCIENCE AND TECHNOLOGY POLICY RESEARCH CENTRE

CENTRE FILE : 01996/94-0413

**SCIENCE AND TECHNOLOGY POLICY RESEARCH CENTER
UNIVERSITY OF CAPE TOWN
CAPE TOWN
SOUTH AFRICA.**

TECHNICAL AND NARRATIVE REPORT

**ASSOCIATE PROFESSOR D E KAPLAN
DIRECTOR**

COMPLETED : JUNE 18, 1998.

This report is presented as received by IDRC from project recipient(s). It has not been subjected to peer review or other review processes.

This work is used with the permission of University of Cape Town.

© 1998, University of Cape Town.

TECHNICAL AND NARRATIVE REPORT

TABLE OF CONTENTS

Introduction and Background	1
1. Goals and Objectives	
1.1 Mission and Vision	2
1.2 Long-Term Goals	3
2. Outputs	
2.1 Projects and Research Directions	4
2.2 Publications	11
2.3 Training, Education and Capacity Building	12
2.4 International Collaboration	13
3. Impact Assessment	
3.1 Dissemination	14
3.2 Contribution and Impact	15
3.3 Overall Perception of the STPRC	16
4. Administrative and Financial	
4.1 Management and Staffing	17
4.2 Financial Sources	18
4.3 Financial Viability	19
Bibliography of Organisations	20
List of Appendices	21

ABSTRACT

The IDRC Grant provided the wherewithal for the establishment of the Science and Technology Policy Research Center (STPRC) based at the University of Cape Town. Through this grant the STPRC was able to employ two full-time researchers over a two year period. In this period of time, the STPRC has become a well-established, nationally recognised and supported research institution. The STPRC has produced a large number of publications. These have included reports, newspaper articles, working papers and articles in academic publications. The STPRC has participated in several government led initiatives to restructure the country's S&T system, undertaken teaching and training in the technology field, amongst students and policy makers, and successfully completed a variety of contracted research endeavours. The STPRC has an increasingly broad range of clients and collaborators, including some significant external agencies. The STPRC has received high acclaim for its work by independent evaluators and by its advisory board.

The STPRC initially committed itself to work in the area of technology policy research in a number of areas. In order to give the STPRC more focus, it was decided to give particular emphasis to three research "thrusters." In the first annual report, two of these areas were singled out for special attention - namely technological support for SMMEs and participation in national S&T restructuring. Later IT was added. These have been important areas for the STPRC, and some two-thirds of the projects have fallen within this scope. In addition, the STPRC has undertaken some work in all of the research directions specified in the original project proposal. Moreover, some new areas have also been developed - namely IPRs and technology in relation to the broad services sector.

Apart from research, the STPRC has engaged in a variety of teaching and training activities amongst both students and policy makers. The one objective that has perhaps not been adequately realised is for the STPRC to be the hub of a network of other research organisations engaged in S&T research. The principal reason for this is that the hoped for development of other research institutions operative in the field has not come about.

The original objective of the grant viz. "...to develop an institutionalised research capacity in the broad field of science and technology policy that will take the form of a research center..." has certainly been realised. Institutionalised research capacity is in place and the STPRC is now in a position whereby it is able to secure some on-going support from local research funding agencies as well as significant income from contract research. Moreover, the STPRC has some large on-going research endeavours.

The STPRC is thus a viable, on-going institution with high levels of output and considerable esteem in both the academic and policy making community. The STPRC however, remains small, and it will, in the future, need to seek further sources of support in order to achieve the necessary critical mass.

INTRODUCTION AND BACKGROUND

The suggested profile for the technical and narrative reports is clearly intended to refer to research projects. Thus, it includes *inter alia* consideration of research objectives, research methods and main research findings. But, the funding for the STPRC was not project support. It was institutional support, albeit destined solely to support the salary component of the organisation. Given this context, it was inappropriate to have a technical and a narrative report. Accordingly, this report combines both the technical and the narrative reports into one document.

In addition, it was necessary to structure the report so as to have different sections which would give consideration to the STPRC in all of its organisational complexity. Accordingly, this report is divided into four major sub-sections.

1. Goals and Objectives
2. Outputs
3. Impacts
4. Administrative and Financial

Details are included of the STPRC's current operations and future prospects in order to illustrate the realisation of the stated objective of this grant viz. "...to develop an institutionalised capacity in the broad field of science and technology.." (Memorandum of Grant Conditions p. 1).

Further substantiation and details, for example regarding publications and projects and the STPRC's personnel, can be obtained from the two completed Annual Reports (the current report is due later this year) and these are enclosed as Appendices 1 and 2.

The formation of the STPRC was preceded by a major consultative exercise with stakeholders and other interested parties. This consultative exercise was driven by Professor Geoff Oldham. There can have been few institutions whose existence was preceded by such extensive discussion. This has been a very positive legacy for the STPRC. Having now been in existence for three years, the STPRC has been fortunate in having been extensively reviewed by an independent, highly knowledgeable and conscientious person who has significant experience precisely in growing small research institutions in this field. This comprehensive review was undertaken by Professor Howard Rush. The terms of reference required Professor Rush to provide specific comment on the following :

- the extent to which the objectives of the Centre have been attained
- the quality of the research
- the quantity of the research
- national and international networking
- graduate training.

There can be few institutions who have the advantage of such a process at the end of their formative stage. Professor Rush's report is referred to at many points in the text and is also enclosed as Appendix 3.

1. GOALS AND OBJECTIVES

1.1 MISSION AND VISION

The original funding proposal commenced with a statement of the vision of the STPRC viz. “The mission of the STPRC is to contribute to an understanding of how science and technology can most effectively be harnessed so as to meet South Africa’s social and economic objectives. “

The mission statement as enunciated in the original funding proposal, remains the mission statement of the STPRC and is spelt out in each annual report. In addition, though, this broad mission was later complemented by a statement of the Vision. This Vision accords with the requirements of the CSD, is included in all Annual Reports, and should be read alongside of the STPRC mission statement.

“The vision of the STPRC is of a research unit producing and disseminating high quality research in-house and acting as the hub of a wider network generating research in the field of S&T policy. The STPRC will be a major source of new policy ideas and experiences derived from the international arena. The STPRC will be critically but constructively engaged with government and other S&T stakeholders retaining the independence and autonomy necessary for such an engagement. The STPRC will be intimately involved in the ongoing processes of re-aligning S&T in South Africa so as to serve our national goals. The STPRC's activities will have widespread local and international recognition.” (Annual Reports, 1995-96 and 1996-7).

This Mission and Vision Statement was accepted by the CSD and by the Advisory Board. The review undertaken by Professor Rush commented very favourably on the performance of the STPRC in terms of the realisation of this mission and vision. The STPRC scored highly as a source of new ideas, for its engagement with government and with other stakeholders and in securing local and international recognition.

1.2 LONG-TERM GOALS

Apart from broad mission and vision statements, at an early stage of the STPRC's existence it was felt that more concrete long-term goals should be specified, particularly in relation to research. The reason for this was that, as it became evident that the hoped for development of other research centres in the S&T was not in fact going to materialise, there was a need to define more sharply the working scope of the STPRC. This was also necessitated because the size of the STPRC was evidently going to be much smaller than was originally intended. With only two full-time researchers, it was clear that the STPRC could not and should not attempt to spread itself too thinly. Given the strengths of the two researchers involved and the close connection with the Department of Trade and Industry and the development of industrial policy, it was decided to focus the "main thrust" of the STPRC on the more applied/technology end of the S&T policy spectrum.

In terms of research areas too, it was decided that some choices would need to be made to define more closely the directions of the STPRC. The original proposal specified a very wide range of research topics. Three broad research areas were selected which it was felt should dominate the research agenda of the STPRC, in the medium to long term. The first related to the policies to govern the national S&T system (what has come to be called, following the Green and White Papers on S&T, "the National System of Innovation"). This followed from the major re-orientation of the entire national S&T system that was underway and continued throughout the last four years. The second concerned policies which are designed to provide technological support for Small Medium and Micro Enterprises. This was strongly stressed in the original project proposal. The third encompassed Information Technology (IT) policies and was geared to support the national IT policy formulation that has been initiated by government.

The CSD funders of the STPRC were particularly concerned that the STPRC make a major commitment to building capacity and that this be added to the research goals. This commitment has been expressed as follows :

"The STPRC aims to increase the number of researchers in the area of S&T, particularly black and female researchers. This is an important goal of the centre and one which needs more emphasis in the future." (Annual Report, 1996/7 p. 2)

2. OUTPUTS

2.1 PROJECTS AND RESEARCH DIRECTIONS

The following is a list of the major research projects undertaken by the STPRC by sponsor, duration of time involved and broad field :

Project Sponsor and Duration

1995

- Science and Technology Green Paper - DACST - 1 month - (national policy focus)
- Manufacturing Technology Services - Business Development Services - 4 months (SMME focus)
- Biotechnology, IPRS and Technology Transfer - African Centre for Technology Studies - 3 months (IPRS - general research on technology)

1996

- Information Technology in South Africa - UNU-INTECH, Maastricht - 4 months (information technology)
- Industrial symbiosis view of SMMEs - Chemical Engineering, UCT - 2 years (SMMEs focus)
- Small-scale firms in the Electronics Industry - Friedrich Ebert Stiftung and DTI - 6 months (SMME focus)

1997

- Electronics Industry - ICDJ (Japanese-European Technology Studies Centre) - 2 months (SMME focus)
- Canning Industry - Western Cape provincial government - 4 months (industrial policy focus)
- Technopolis - High Tech Cluster - IDRC - 1 month (High-technology focus)
- Review of CSIR - DACST - 1 month (national science and technology policy)
- System wide review - DACST - 2 weeks (national science and technology policy)
- Innovation Survey - FRD - 6 months equivalent - technology research)

Current 1998

- IT education - IDRC - 13 months (information technology)
- Globalisation of Producer Services - Christian Michelsen Institute, Norway- 2 years (industrial policy)
- Manufacturing Advisory Center Programme - DANIDA and DTI -8 months (SMMEs)
- Services Sector - DTI - 3 months (industrial policy)
- Migration of Highly Qualified Persons - ORSTOM - 2 years (Brain Gain Strategy)
- EU funding for research for DTI, commencing in 1998 - DTI - 3 years (S&T focus)

Several of these projects were completed in collaboration with other researchers and other institutions. Nevertheless, these projects represent a very wide array of subjects, particularly relative to the small size of the STPRC. While the scope of the research projects is impressive, particularly for such a small unit, there is a danger of becoming too widely spread and also of neglecting more academic work.

Examining the wide breadth of the research work, the external evaluator commented. "This can have both positive and negative repercussions. On the positive side, the Centre has been able to develop a wide portfolio of work which can serve both as a testament to their abilities to be policy relevant and act as a foundation for future work. It also attests to the Centre's high degree of adaptability and flexibility...On the negative side, the taking on of a large number of short-term pieces of work makes it difficult for the Centre to establish itself in particular niches and does not seem to have been the result of any strategic plan and has probably been at the cost of more academic undertakings.

This is not to suggest that had such a strategic plan been developed, that the portfolio developed by the STPRC would not have been the route selected. Every policy-oriented research group, particularly those in the process of establishing themselves, has to be opportunistic. The desire of the Centre to make a contribution to be in a position to do so, is itself important. Having established roots in the policy community however, it is equally important to develop the academic reputation which a University-based research group requires. Two aspects will be important in achieving this dual aim. More longer-term research projects in specifically selected areas would be valuable in helping to generate the in-depth empirical data upon which to base its policy analysis. Additionally, longer-term research can provide the time to reflect which is necessary in order to locate the work within and make a deeper contribution to theoretical debates." (Rush p. 4)

The original proposal stated that the STPRC would give effect to its Mission by developing integrative policy-oriented research programmes in seven broad areas. These areas are specified below, together with the STPRC projects that can be considered to fall within their scope.

- a) Existing national science and technological capabilities [IT in South Africa; Innovation survey]
- b) The economic, social, political and environmental impact of technological change and the implications of public policy [Biotechnology; Industrial Symbiosis; Migration of Highly Qualified Persons]
- c) The objectives and effectiveness of public policies designed to enhance local science and technological capabilities [S&T Green Paper; Review of the CSIR; System Wide Review]
- d) The role of technology in fostering and enhancing industrial development [Electronics industry; Canning Industry; Globalisation of Producer Services; Biotechnology]

- e) The role of technology in the provision of social infrastructure and meeting basic needs [IT in schools]
- f) Public policies designed to enhance science and technological capabilities pursued elsewhere and the implications and lessons these may have for South Africa [Technopolis; Migration of Highly Qualified Persons]
- g) Policies to provide appropriate technological support for the development of Small Medium and Micro Enterprises [Manufacturing Technology Services; Small scale firms in the electronics industry; Evaluation of Manufacturing Advisory Centers; Industrial symbiosis].

Moreover, the STPRC has supported projects in other areas where there has been a significant technological component. Of particular note here has been the development of South Africa's telecommunications policy in 1996 and 1997, through a Green and White Paper process. Members of the STPRC participated directly in the Green Paper process, and the STPRC helped to secure funding for and supported a visiting fellow from the University of San Diego at the STPRC, Professor Robert Horwitz. Prof. Horwitz was located at the STPRC for some ten months, in 1995-96, during which time he played an important role in the formulation of the White Paper in telecommunications.

The following are more detailed descriptions of the projects undertaken, thus far, by the STPRC :

Projects Undertaken and Completed by End of 1997

Biotechnology Transfer in South Africa

The research was undertaken for the African Centre for Technology Studies, Nairobi, Kenya (ACTS), in order to provide information on the South African legal, policy and institutional situation relevant to the transfer of biotechnology, for the purpose of informing negotiations surrounding the implementation of the 1992 Rio Convention on Biological Diversity. The report examines the current status of biotechnology in South Africa and supplies institutional background data in order to contextualise the discussion on the factors which influence the transfer of biotechnology. Special reference is made to the role of intellectual property rights in this regard. The report formed the basis of a chapter of a book entitled *Laying Ground*, published in 1998.

Manufacturing Technology Services for SMMEs: A Needs Assessment

This research was completed for Business Development Services (BuDS) with the purpose of determining the needs of small manufacturing concerns in a number of industrial sectors within South Africa. These needs would then be translated into a framework for the design of Manufacturing Assistance Centres (MACs) and the services to be provided by such centres. The emphasis of the study was on the production technology needs of firms, with production technology being broadly defined to include production skills and knowledge in addition to the physical machinery which embodies much of the technology. Further, the business and management skills of SMMEs were assessed as these are seen by BuDS to be crucial areas for intervention. The research concentrated on the clothing industry in the

Western Cape and the greater Durban metropole, and the metals industry in Port Elizabeth and the greater Johannesburg metropole.

Information Technology in South Africa

The research was conducted for UNU/INTECH in partnership with Jonathan Miller of the Centre for Information Systems (CIS) at the UCT Graduate School of Business. The report is the first to take such an extensive look at IT in South Africa. The first component provides an analysis of the IT industries - telecommunication services, telecommunications equipment manufacture, computer hardware manufacture, software development and professional services. The second section looks at the application of IT within the major industrial sectors as well as the public sector. This is followed by an examination of the IT human resource base - which includes both IT professionals and computer literacy - as well as the IT education system in South Africa. Finally recent IT related policy initiatives are discussed.

Innovation in South African Manufacturing Firms: A Survey

This survey measured the innovation expenditures (as opposed to R&D) on the part of South African manufacturing firms. It is the first time that this has been attempted in South Africa. This major study, a survey with 244 manufacturing firms responding to a very detailed questionnaire similar to that employed by the EU, was done under the auspices of the ISP jointly with the FRD. The monograph was completed in September, 1997 and the publication is available from the FRD.

Building Linkages between Tertiary Education Institutions and Firms in South Africa

The project aimed at assessing the linkages that currently exist between tertiary education institutions and firms in South Africa. It focused on their weaknesses and how they might be strengthened. It included an examination of the S&T White Paper proposals in this regard and surveyed submissions made to the S&T White Paper and to the THRIP programme. Publication on this theme is pending in the Journal of Social Dynamics. Dr. Les Rencontre (Cape Technikon) was the STPRC researcher.

Presidential Commission to Investigate the Development of a Comprehensive Labour Market Policy

DE Kaplan was a member of the Commission, particularly concerned with technology and productivity issues. The duties involved contributions to the writing of the final report. The report was presented to President Mandela, June 19, 1996.

Innovation in South African Manufacturing Firms: Two Case Studies

This was an ISP funded project. The three researchers were A. Black Economics Department, UCT; R. Kaplinsky, Institute of Development Studies, University of Sussex; Edmund Mhlono, National Peace Committee, Durban. The project was supervised and directed by DE Kaplan. There are two case studies and they have both been published:

- a. R. Kaplinsky and E. Mhlono 'South African Industrial Policy and the Learning Firm' ISP Phase Two, Working Paper No. 6.
- b. A. Black 'Learning, Technical Change and the Trade Regime in the South African Automotive Component Sector' ISP Phase Two, Working Paper No. 7.

High Technology Trade in South Africa

This project was performed for the Trade and Industrial Policy Secretariat (TIPS) and examined trends in South Africa's trade in high technology products. It made use of a technique devised by the US Bureau of the Census which takes a far more detailed look at trade figures in order to accurately account for high technology trade. In this way low tech products in high tech industries are excluded from calculations.

Small Scale Firms in the South African Electronics Industry

This study was supported by the Friedrich Ebert Stiftung and was intended to produce policy proposals for the development of SMMEs. It included a review of policies in a number of key countries and extensive interviews with small firms to assess the factors underlying their technological and marketing practices. The interviews were conducted by Saul Levin from Ntsika. Two papers were completed - one in May 1997 and another in December, 1997.

Democratisation and Economic Reform

This project looked at the manner in which the policy processes have or have not facilitated both more democratic outcomes and more effective policy outcomes. The Centre concentrated on the policy making process in S&T. It was part of a larger project on this issue supported by the ISP and the Development Bank of South Africa. The paper is to be completed for publication in early 1998.

Restructuring the Deciduous Fruit Canning Industry

This project entailed facilitating the SA industry to reposition itself in relation to new developments in the market and production. The project was initiated and supported by the Department of Economic Affairs in the Western Cape. It was undertaken by the STPRC in collaboration with the Institute of Development Studies (IDS) at the University of Sussex. A report was completed in August 1997 and an article is to be submitted to an international journal in 1998.

The Johannesburg-Pretoria N1 Corridor: A High Technology Belt?

The IDRC (Canada) invited the STPRC to perform a short research project examining the emergence of a high-technology industrial cluster in the Gauteng region. The project examined the following factors:

- Why the technology cluster emerged along the N1 corridor?
- What is the nature of the cluster?
- What is the future potential of the cluster?

This project served as an input into a major international conference, *Technopolis '97*, held in Ottawa, Canada, in September 1997.

Projects Ongoing in 1998

The Migration of Highly Qualified Persons. The South African Network of Skills Abroad (SANSA)

This a very major project for the STPRC and a significant input of time and resources have been expended to get this project underway. The project aims to comprehend the migrations of skilled persons to and from South Africa and to build a network for South Africans now living abroad in order that they may make some contribution to local developments. This project is in collaboration with ORSTOM . ORSTOM has sent a researcher to the STPRC for a 2-3 year period and will probably send a further person skilled in data base management. ORSTOM will support all the expenses that their personnel will incur. It is intended that this project will have a significant input into policy processes and the formal support of the Department of Arts, Culture, Science and Technology has been secured. The Franco-South African Fund will be providing financial support for this project.

An Investigation into IT Education in South Africa

From the initial study on IT in South Africa, a number of new research areas emerged. One of the most important revolved around developing IT human resources and its implementation through the public education system. Little is known about what exactly is happening with IT education in the schools. The aim of this project is to audit what is happening with IT education in South Africa (from resources in schools to teacher competency to curriculum used to external funding and support), then benchmark it against international trends and finally emerge with some medium and long term policy implications. The project will be done in partnership with the Education Policy Unit at the University of the Western Cape (UWC) and the CIS.

Globalisation of Producer Services - The Impact of GATS

The objective of this study is to analyse the interrelationship between producer services and the mineral sector, focusing on technological development. In addition we aim to study how producer services serve as a channel of technology diffusion between the mineral sector and other sectors of the economy. Finally, we analyse how the market for the relevant producer services changes with the implementation of the General Agreement on Trade in Services (GATS). The questions we raise are the following:

1. To what extent have producer services contributed to technological progress in the mineral sector, and vice versa?
2. To what extent has producer service production served as a channel for technology transfers among sectors (where the mineral sector is either the receiving or the delivering sector).
3. How will exogenous changes in the market for producer services, in particular the GATS, affect:
 - organisational forms in the market for producer services
 - the degree of division of labour in the mineral sector
 - the diffusion of technology through the producer services channel.

A Regional Industrial Strategy for Developing the High Technology Sector in the Cape Metropolitan & Stellenbosch Area

The rationale behind this research proposal is threefold, and revolves around:

- the importance of developing South Africa's high tech sectors;
- increasing recognition of the need for regional industrial strategies (as opposed to just national ones);
- the hypothesis that the Cape Metropolitan and Stellenbosch Area (CMSA) has substantial potential to be a high tech centre.

Strategies for the development of high tech sectors are being formulated at national level, but the critical role of regional or metropolitan policies has been largely ignored. At the same time, regional and local authorities have acquired additional powers to promote economic development, but lack knowledge about which policies to introduce and how they complement national initiatives. A further factor has been the rise of private sector initiatives which have had a significant impact on the development of regions. The potential for the CMSA to become a high tech centre enables one to combine these research issues into one project. The project is funded by the CSIR, Wesgro and the DPRU.

The Impact of Structural and Production Method Changes on Employment growth of Occupational Groups in South Africa

The world economy has undergone enormous changes in the past 15-20 years. Increasing competition combined with new technologies has seen vast changes in production methods with a move away from classic Fordist paradigms to post-Fordist flexible specialisation. The dawning of the information age has seen the rapid rise of huge new industries employing a growing share of the world's population while other sectors are in decline. Across all nations the service sector is becoming of increasing significance due to growing incomes and the growing complexity of manufacturing. These structural and production method changes in the world and South Africa are having an impact on the mix of skills required by the formal sector economy. Traditional occupations are in decline while new occupations see unprecedented demand growth. These changes in turn can have enormous impacts on groups of society whose skills do not match the skill requirements of industry. The object of this project is to statistically map these changes and analyse the implications for labour market policy in South Africa.

An Industrial Symbiosis View of SMMEs: Targeting Greater Eco-Efficiency through Innovative Business Practice

This trans-disciplinary project, funded by the IDRC, involves collaboration between the STPRC, UCT's Chemical Engineering Department, the Pollution Research Group at the University of Natal and African Environmental Solutions. It aims to demonstrate that economic and environmental performance of SMME industries can be optimised by exploiting the positive synergism and interdependencies which exist within the sector, and that co-operation between firms can realise gains in eco-efficiency for the sector as a whole, up and down the supply chain, to a greater extent than were all firms to act individually. Networks comprising inter-sectoral and intra-sectoral linkages will be explored, and the nature of the linkages between the firms

which participate in a shared network will be quantified. This model of industrial co-operation draws on parallels with models of biological ecology. Small to medium enterprises in the textiles and metal-finishing sub-sectors are the focus of this study, these sub-sectors being two of the most polluting sectors of the South African economy.

Manufacturing Advisory Centre Pilot Programme in South Africa: Training and Tools for the Programme

This project aims to provide industrial advisers located in the Manufacturing Advice Centres (MACs) with (i) tools for the diagnosis of individual client SMMEs and with (ii) problem oriented tools and approaches for the identification, analysis and solution of problems common to groups of SMMEs. The work is being undertaken for the Department of Trade and Industry. It is being co-ordinated by DANIDA and a Danish consultancy T&B Consulting and the suitably modified tools will be based on work done by the Saskatchewan Research Council (Canada) , with training provided by Canadian trainers from Pacific West Training Ltd.

2. 2 PUBLICATIONS

By the end of 1997, the STPRC publications were as follows :

International Journal Articles	3
Local Journal Articles	5
Monographs	1
Occasional Papers	6
Chapters in Books	6
Research Reports	8
Local Conference Papers	5
International Conference Papers	4
Number of Significant Research Projects Completed	11

This excludes newspaper articles (including three op. ed. pieces in the premier business newspaper) and articles in the Trade and Industry Monitor (see below).

In addition to these publications, there were a large number of collaborative projects in which the STPRC or its members were engaged in contributing substantive written materials, but where STPRC “authorship” would not be acknowledged. These include, in particular -

1. Chapters in the Report of the Presidential Commission to Investigate the Development of a Comprehensive Labour Market Policy
2. The Green and White Papers on S&T
3. The Task team for the institutional review of the CSIR
4. The Report of the Review Team for the System Wide Review of the South Africa S&T system.

Furthermore, the STPRC in collaboration with the DPRU and the Trade and Industry Policy Secretariat (TIPS) produced the Trade and Industry Monitor. This quarterly bulletin has had a large number of articles dealing with technology and technology policy issues (not listed above) and has a circulation of approximately 1,000.

2.3 TRAINING, EDUCATION AND CAPACITY BUILDING

As outlined above, the STPRC has committed itself to building research capacity, particularly amongst black and female researchers. In addition, the STPRC is, as a part of the University of Cape Town, committed to developing teaching programmes in the area. The STPRC is also committed to developing capacity amongst policy makers and generally enhancing understanding of S&T amongst the broader public.

The STPRC has engaged in activities in all of these areas.

The STPRC has been able to support a female staff member to undertake a 6 weeks course at the University of Michigan on IPRs in mid-1997. In 1998, the STPRC was awarded two research intern posts by the CSD to work on the SANSA project. These posts have been filled by two black females. Moneys were raised from SANPAD for the appointment of a student who would simultaneously undertake a masters to work on the symbiosis project, under the direction of the STPRC, but no suitable candidate was forthcoming.

Two doctoral students and one masters student have been under supervision. There have been other informal contacts to aid the work of other post-graduate researchers in the S&T field. A variety of theses proposals have been read and commented on.

Postgraduate teaching - generally at the Masters level - has been undertaken in the economics department at the University of Cape Town, as a part of a module on industrial and trade policy. However, commencing in 1998, the STPRC will teach a full masters module (of 12 seminars) on "The Economics of Technological Change." In addition, the STPRC will be engaged in teaching at the University of Stellenbosch on the first Master's programme in S&T. There have been occasional lectures to engineering and business course students.

Of considerable importance have been education/training programmes outside of the academic context, to policy makers. Inter alia, seminars have been organised for the Department of Trade and Industry in the area of industrial and technology policy; training for South Africa's foreign trade representatives and technology policy issues for middle-level executives at the CSIR.

For a broader audience, there have been numerous public seminars on S&T issues. Formal seminar series were held in 1997 and in 1998. The STPRC did a presentation at the Year of Science and Technology in Cape Town in early 1998.

2.4 INTERNATIONAL COLLABORATION

The STPRC has formal co-operative agreements with two institutions abroad - the United Nations University Institute for New Technology (UNU-INTECH) in Maastricht, Holland and the Japanese European Technology Studies (JETS) in Edinburgh, Scotland. The Directors of both of these institutions have visited the STPRC and formal research projects have been undertaken with UNU-INTECH.

There have always been strong linkages with the Institute of Development Studies at the University of Sussex, and with Professor Raphie Kaplinsky in particular. Collaboration with IDS in two projects - namely the projects dealing with small electronics firms and the deciduous fruit canning industry. The later project, also involved Professor John Bessant of the Centre for Research in Innovation Management (CENTRIM) at the University of Brighton. Links with CENTRIM and with the Science Policy Research Unit (SPRU) at the University of Sussex have also been strengthened by the visit of Professor Howard Rush. Professor Rush holds an appointment at both institutions and he spent some weeks at the STPRC, in April 1998, evaluating the unit for the CSD. During the course of that evaluation, potential areas for future collaboration were discussed.

Perhaps the most significant international partnership for the STPRC is with the French organisation ORSTOM. After numerous visits to Paris by the STPRC Director including participation in a conference commemorating 50 years of ORSTOM's existence, and of visits by ORSTOM researchers and officials to the STPRC, a major joint project was agreed to. The SANSA project aims to build a network to link skilled South Africans living abroad who wish to make a contribution to South Africa's economic and social development and connects them with local experts and projects. ORSTOM will provide all the support for one an ORSTOM researcher to be located at the STPRC for a period of between two and four years. The researcher has been at the STPRC since September 1997. It is likely that, as the SANSA project develops, ORSTOM will also support a data base manager from France who will be based with the STPRC for at least one year. The project has collaborative agreements also with the National University of Colombia in Bogota.

The STPRC does not have formal contacts with research institutions in Africa, and this is a major gap. However, some informal contacts with Tanzania may lead, in the near future, to a joint research programme. Elsewhere in the Third World, the STPRC has had visits from Professor Linsu Kim in Korea and very recently from Prof. VV Krishna of the Centre for Studies in Science Policy, Jawaharlal Nehru University. Collaborative formal research projects with the latter institution are now being investigated.

3. IMPACT ASSESSMENT

3.1 DISSEMINATION

The STPRC has already built up an effective system of disseminating research to the broader academic, NGO and government policy-making community. The following channels are used:

1. *The Trade & Industry Monitor* – the Trade and Industry Monitor is a joint initiative between the DPRU and the Trade and Industrial Policy Secretariat (TIPS). The Monitor is published quarterly and encompasses a broad range of issues incorporating trade, industrial and technology policy. The objective of the Monitor is, firstly, to contribute to policy debate in South Africa by reflecting important research in non-technical, accessible articles, and secondly, to provide a newsletter on information about events, seminars, scholarships and publications of relevance to trade and industrial policy. The publication's distribution has been expanded dramatically to around 1000 and it remains a key means of targeting NGOs, business, government, international organisations and academia. The STPRC has been very active in the Monitor and members of the unit have published 8 articles in the first 6 issues.
2. *Working Paper Series* – the STPRC operates its own working paper series that has 4 editions to date. The working paper series is an effective means of providing summarised research findings to a broad audience. The working papers that have been issued have proved very popular reference pieces for people involved in the science and technology field.
3. *Web Site* – the STPRC forms part of the DPRU web site which has been in existence since mid-1996. The web site is forms an integral part of the STPRC dissemination strategy and therefore contains a complete database of the Centre's research work in addition to downloadable reports for interested browsers. As it is registered with all the major search engines, including a premier international economics-specific search engine, our visibility on the Internet is high.
4. *Newspaper Articles* – the STPRC has made some use of the popular press to disseminate research with broader appeal. Members of the Centre have written 3 op-ed. pieces for the Business Day during the existence of the unit.
5. *Seminar Series* – the STPRC was a key player in initiating a seminar series titled "Key Economic Policy Issues in South Africa" that address the most important current issues and debates in South African economic policy. The series is run by the Budget Project, the DPRU and the Southern Africa Labour and Development Research Unit (SALDRU), all of the UCT Economics Department. The seminar series comprised of 9 seminars in 1997 and has been extended to 16 in 1998. Seminars around science and technology issues have featured prominently in the programme to date. This series has proved a perfect way of reaching a broader audience beyond academia and national government.
6. *Conferences* – the STPRC has been actively involved in a number of local and international conferences where research of the Centre has been presented.

7. *Journal Articles* – the STPRC has, where possible, converted research work into local and international refereed journal articles in order to disseminate results to a broader academic audience.

After a series of interviews, Professor Rush evaluated the STPRC's dissemination activities as follows :

“In those interviews, which explored the question of dissemination, there was the occasional suggestion that the Centre had perhaps been to "low-key" or had " not blown their own trumpet enough". While it is true that the group is modest about "talking-up" their achieves, it is not clear what more the Centre could be expected to do. The STPRC has a website and has been actively promoting its work at a variety of conferences where nine papers have been presented (four in South Africa and five abroad). There appear to have made good use of the national press, with at least ten newspaper articles resulting from the press releases issued by the Centre, and are regular contributions to the Joint Trade and Industrial Policy Secretariat (TIPS) and Development Policy Research Unit (DPRU) Trade and Industry Monitor, a high quality newsletter which is widely circulated. One imaginative dissemination techniques has been used to generate interest in the work of one project currently underway (the "Brain Gain" project) with project information having been sent over to the alumni of the University of Cape Town.”(Rush, p. 7)

3.2 CONTRIBUTION AND IMPACT

The STPRC has had a considerable impact on science and technology policy research and policy-making since its inception. It has generated an enormous amount of research for such a small team of researchers. It has also had a significant impact on the science and technology policy process in South Africa. In particular the STPRC has made a large impact in the following manner:

1. *Collaborative Research Projects* – the STPRC has initiated a large number of collaborative research projects which has enabled it to generate a research output far higher than would be possible given its small size. This has also helped build interest and capacity in science and technology policy research in other institutions in South Africa
2. *Interaction with Policy-makers* – members of the STPRC have frequent interactions, formal and informal, with policy makers in the Department of Trade and Industry and the Department of Arts, Culture, Science and Technology. This enables the research of the STPRC to actively influence policy in South Africa.
3. *Diversified Research* – the emphasis of the STPRC on shorter, market-led research projects has resulted in a diversified research portfolio. As no other institutions exist that focus on science and technology issues, this diversification has proved invaluable to the broader research and policy-making community.
4. *Quality Research* – the research by the STPRC is considered to be of a very high quality and is therefore frequently used within policy debates.

3.3 OVERALL PERCEPTION OF THE STPRC

Professor Rush made the following observations as to how the STPRC is perceived :

“In most policy-orientated research there is, necessarily, a time lag between research and implementation. It is, therefore, difficult to assess the applicability of this work, given the early stages of development of the Centre. Nevertheless, there are a number of examples, which support the case that the Centre is having a direct input into the policy-making process. Prime examples of this have been their input into the consultative documents and White Papers on Science and Technology Policy, Telecommunications and the review of the CSIR. Further to these examples, are statements, such as those made by interviewees from the policy community, which respectively described Centre members as being "pivotal to a number of groups within the policy system"... "having an excellent mind for policy analysis"...of..."being in a strong position in matters of IT, telecommunications policy and general industrial policy"...and "having produced work which is still referred to although it is out of date by now". The applicability of their work has clearly been one of the strengths of the STPRC.” (Rush, p. 10)

Furthermore -

“There was a high degree of consensus among those interviewed that researchers in the STPRC were “serious” people. Their work was perceived as being consistently good and in some cases excellent. ...the Centre scores particularly high in regard to the perceived utility of the output, with nearly all sponsors and users interviewed giving high marks on this dimension. Only one interviewee suggested that a particular piece of work might have been more useful but admitted that the Centre may well have been asked to undertake work for which it wasn’t ideally suited and that the sponsoring agency wasn’t particularly experienced in commissioning work at the time. He felt that both had gone through a necessary learning curve and held the Centre in high regard for their overall contributions”. (Rush, p.11).

Nearly all of the STPRC projects were commented on favourably by at least one interviewee. The academics however, had some reservations. They felt more could have been made of the data that the STPRC had collected. They also perceived the Centre as not having made methodological breakthroughs or theory building or testing, but rather as adapting existing methods.

4. ADMINISTRATIVE AND FINANCIAL

4.1 MANAGEMENT AND STAFFING

For the first six months of its existence, the STPRC consisted only of the Director and a part-time administrator. There were delays in recruiting a second researcher, who could only be appointed in January, 1996 (see STPRC Provisional Report, 1995 p. 1). From 1996, the core of the STPRC has been the Director and the Research Officer. These have been full-time posts. In addition, from early in 1996, we were able to secure support for a researcher on a part-time basis. This researcher worked principally on IPRS and in June 1998, she joined UCT administration as the university's first IPR Officer.

Although this staff complement was reinforced by a number of visitors and, on occasion, part-time researchers attached to one of the projects, it remained extremely small. With such a small grouping of people, management has always been fairly informal.

Professor Rush commented -

“Thus far the STPRC has adopted an informal style of management which has suited its purposes. Overly formalised procedures in such a small group would not have been appropriate. The fact that the management style has been informal does not imply that it has not been of a high level. Attendance by this reviewer meetings with sponsors and research collaborators provided sufficient evidence as to the attention to detail and ability to handle important project management issues.” (Rush p. 12).

The Directorship has remained with Associate Professor David Kaplan. UCT requires that all research units be directed by full-time members of the permanent staff and the other full-time researcher does not qualify in this role.

4.2 ACCOUNTABILITY

The STPRC is a recognised research unit of the University of Cape Town. As such, it is recognised by the University's Research Committee. It is located within the Department of Economics.

The STPRC is also a recognised national research unit by the CSD. There are currently only 13 such units throughout the country, spanning the whole spectrum of the Arts and the Social Sciences. The CSD requires that each unit has an Advisory Board or Panel. The Advisory Board meets every year. The Advisory Board is given a copy of the Annual Report and the certified financial statement covering the CSD's funding to the unit. In a lengthy process, the Director is formally asked to explain and account for the performance of the unit. The Board then makes a recommendation to the CSD as to whether it should continue its funding of the unit.

The CSD anticipates funding national research units over two four year funding cycles. In the fourth year of the first cycle, the unit is extensively evaluated by an external evaluator approved of by the CSD. This is the task that was undertaken by Professor Howard Rush.

The original Advisory Board consisted of the Chief Director for Industry and Technology Promotion in the DTI; the Director of BuDS; the Dean of Science at UWC and the Dean of Science at Fort Hare. The Advisory Board has remained in place throughout, except that the former dean of science at UWC has been replaced by his successor. The composition of the Advisory Board had to be weighed carefully in terms of balance between academics and non-academic customers/clients; to include persons from other universities and to be racially representative. CSD approved the Advisory Board, which is recognised to be very well-balanced in terms of all of these dimensions.

The Board plays a critical role not only in terms of oversight and control, but also in helping to disseminate the STPRC's activities and outputs.

4.3 FINANCIAL SOURCES

Apart from the IDRC grant, the STPRC received financial support from the following organisations :

1. The University Research Committee of the University of Cape Town
2. The Friedrich Ebert Stiftung (FES)
3. The Centre for Science Development (CSD).

CSD and UCT monies were and are principally directed towards the running costs, research costs and administrative costs of the STPRC. FES supported the Center with the provision of equipment. Because the STPRC generally had project incurred expenditures refunded, the STPRC, in each year, ran a surplus in respect of CSD grant.

In essence, this division of expenditure as was spelt out by the STPRC Director in September 1995 and agreed to by the IDRC. The IDRC provided the major support for the salary component in respect of the Director and the other full-time research officer (the latter taking up his appointment only in January 1996).

CSD funding is ongoing. The usual expectation is that the CSD will fund nationally recognised centres for two funding cycles of four years each. The first funding cycle for the STPRC will end on April 1, 1999. The STPRC requires an external review in the fourth year of the first funding cycle. This review has now been completed. The review is favourable and the strong expectation is that the CSD will therefore continue to fund the STPRC until April 1, 2003.

In addition, there are on-going projects which receive funding, covering research and administrative expenditures. At this point in time, projects are also likely to cover the salary components. But, this is where the STPRC is most vulnerable. Baseline research and administrative expenditures will be covered, but researchers salaries, which make up some 75% of the STPRC's expenditures must now rely solely on project funding.

4.4 FINANCIAL VIABILITY

The CSD will continue to provide funding. This will take care of the larger part of the administrative and research expenditures. It is very likely that the rest of these expenditures can be charged against research projects. However, funding for salaries for the two researchers is much less certain - reliant as they are on project funding. Salary costs may well be supplemented by smaller grants from the University of Cape Town, but these will remain fairly small amounts.

At present, covering the salaries of two full-time researchers is likely to be possible. There are some projects that are likely to provide salary funding support over the short-medium term. Especially important here is a contract with the Christian Michelsen Institute and an engagement with a consortia which has raised monies through the European Union to undertake research, including research on technology, that will be useful for the DTI's policy processes.

However, there is, of course, no certainty here. The STPRC, while well-established and highly reputed in every other way, remains vulnerable so long as it continues to rely so heavily on project funding. Some form of institutional funding will be vital to the long term survival and growth of the STPRC.

Raising such support, will be a critical activity for the medium-term future of the STPRC.

The first report of the STPRC to the IDRC, in December 1995, concluded -
“...over the longer term, the STPRC is too small and its resources, particularly its human resources too limited. A two-person show leaves little room for flexibility; for more longer term research or for rotations that would allow for periods of reading and consolidation. Before the end of this four-year cycle, the STPRC will need to grow in size, in order to become more effective.” (STPRC, Provisional Report, 1995 p. 4)

Almost three years later, for all its undoubted success since its inception, the STPRC has not really been able to grow, at least in terms of being able to make further research appointments. The problems pointed out in 1995, are therefore as true today as they were then.

BIBLIOGRAPHY OF ORGANISATIONS

CSD - Center for Science Development

CSIR - Center for Scientific and Industrial Research

DACST - Department of Arts, Culture, Science and Technology

FRD - Foundation for Research Development

EU - European Union

Ntsika - government agency to provide non-financial services to SMMEs

ORSTOM- Instiut Francais de Recherche Scientifique pour le Developpement en Cooperation

SANPAD - South African Netherlands Research Programme on Alternatives in Development

THRIP - Technology and Human Resources for Industry Programme

UCT - University of Cape Town

UWC - University of the Western Cape

APPENDICES

1. STPRC, Annual Report, 1995-96
2. STPRC, Annual Report, 1996-97
3. Professor Howard Rush, Review of the Science and Technology Policy Research Centre. June, 1998
4. STPRC, Science and Technology Policy Research Center : Current Activities and Future Directions. A Provisional Report to the IDRC. December 1995.

idrcprep4.doc