

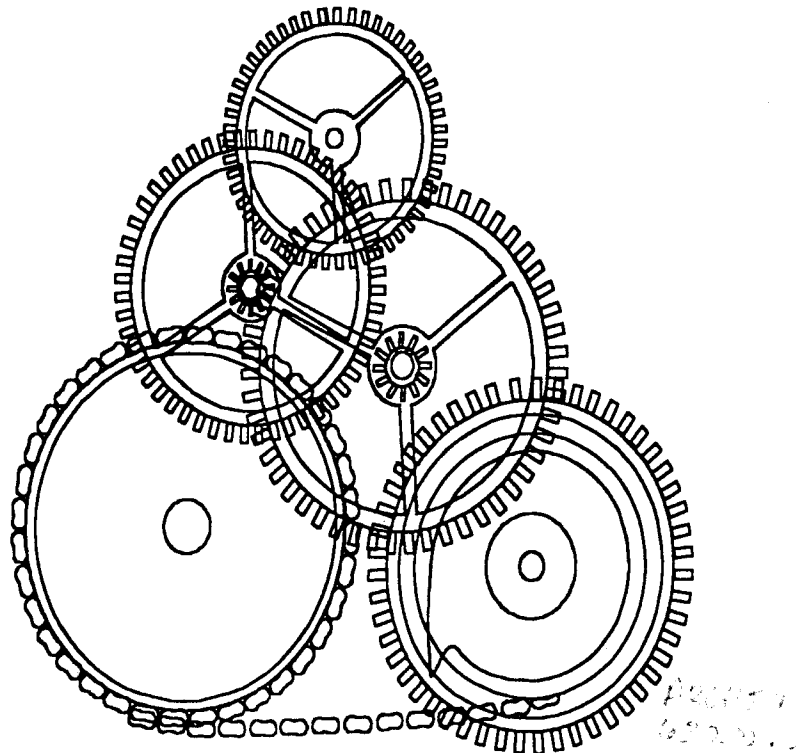
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Science and Technology Policy Research Centre

Annual Report 1997/8



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SCIENCE AND TECHNOLOGY POLICY RESEARCH CENTRE

ANNUAL REPORT 1997/8

This is the third annual report of the STPRC. The STPRC was established in July 1995, and as we enter the fourth year of our existence, it is appropriate to take stock of our past achievements and particularly of our future directions.

The STPRC was comprehensively reviewed in May 1998 by Professor Howard Rush. Professor Rush is currently Professor of Innovation Management in CENTRIM at the University of Brighton and Director of the Complex Product Systems Innovation Centre located at the University of Brighton and the Science Policy Research Unit, University of Sussex. Professor Rush's report and recommendations will form the basis for a comprehensive internal review of the STPRC and a number of his observations and assessments are included in this annual report.

Of considerable importance to the STPRC is that the support that was given to the STPRC by the International Development Research Centre of Canada (IDRC) has now run its course. This support made a major contribution to the employment of two full-time persons - the Director and the Research Officer. For the foreseeable future, unless further institutional support can be secured, the STPRC will have to rely far more heavily on generating project income.

1. BACKGROUND

1.1. MISSION

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.

1.2. VISION

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.

1.3. LONG TERM GOALS

A. *The Centre*

The field of S&T is a very broad one. The "main thrust" of the STPRC is directed at the more applied/technology end of the S&T policy spectrum and the STPRC is committed to support the developments of additional local research centres focused on other aspects of S&T. The establishment of a postgraduate S&T course at the University of Stellenbosch is a most welcome development and the STPRC will engage with this teaching programme in 1998 and beyond.

With only two permanent members, the STPRC is unable to adequately fulfil all areas of its mandate. A major goal, expressed in previous annual reports, has been to increase the size of the centre to ensure an adequate 'critical mass' so as to allow, inter alia, for further specialisation, a broader spread of research and more training and capacity building. The onset of the South African Network of Skills Abroad (SANSA) at the end of 1997 and the support of ORSTOM (see below), provides some further support in this regard, but this is for a limited time and the need remains. In order to meet this need, the STPRC will have to secure some further institutional funding support.

B. *The Research*

There are three broad research areas which have, and will continue to, dominate the research agenda of the STPRC in the medium to long term. The first relates 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 follows from the development and integration of the outcome of the White Paper, the S&T Audit and the Foresight Exercise. In 1997/98, this work continued and the STPRC was engaged in the review of the CSIR and in the S&T System Wide Review. The STPRC was also engaged, to a much more limited extent, in discussions around the National Research Foundation, Indigenous Knowledge and the Audit. The second concerns policies which are designed to provide technological support for Small Medium and Micro Enterprises. The third encompasses Information Technology (IT) policies and is geared to support the national IT policy formulation that has been initiated within government. The former activity was pursued in 1998 through a project on small electronic firms and an invite to join a Danish consultancy in a major project with the Manufacturing Advice Centre in Port Elizabeth (see below). The latter was pursued through the final funding and launching of the collaborative project on IT education in South African schools. The STPRC is accordingly currently active in all of these fields. This "focus" is in accord with the research directions specified for the STPRC at the outset, and will continue to be the dominant research activities.

C. *Capacity Building*

The STPRC aims to increase the number of researchers in the area of S&T, particularly black and female researchers. The previous Annual Report noted that this activity needed more emphasis in the future. In 1997/98, the STPRC has made some progress in this regard (see below).

2. PROGRESS REPORT 1997/8

2.1. ACHIEVEMENT OF GOALS

The achievement of the Centre's goals over 1997/98 should be assessed in terms of the scope of the research work undertaken, the contribution and impact of the Unit, its capacity-building achievements and how it is perceived by the policy-making and research community.

A. *Research Scope*

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 1997/8 STPRC projects that can be considered to fall within their scope.

- a) Existing national science and technological capabilities [CSIR Review; System Wide Review]
- b) The economic, social, political and environmental impact of technological change and the implications of public policy [Industrial Symbiosis; Migration of Highly Qualified Persons]
- c) The objectives and effectiveness of public policies designed to enhance local science and technological capabilities [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]
- e) The role of technology in the provision of social infrastructure and meeting basic needs [IT education 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 [Small scale firms in the electronics industry; Evaluation of Manufacturing Advisory Centres; Industrial symbiosis].

B. *Contribution and Impact*

The STPRC has had a sizeable impact on science and technology policy research and policy-making in the last year. It has generated an enormous amount of research for such a small team of researchers. 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. No other comparable institutions exist that focus on science and technology issues, and this diversification has proved invaluable to the broader research and policy-making community. However, there is considerable concern, and Professor Rush has drawn particular attention to this, that the STPRC may be too widespread and therefore lack focus in its research activities.
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.
5. *Dissemination* - the STPRC has already built up an effective system of disseminating research to the broader academic, NGO and government policy-making community. The channels used are the Trade and Industry Monitor, the working paper series, the web site, newspaper articles, the seminar series, conferences and journal articles.

C. *Capacity Building*

Capacity building has been the weakness of the Centre in past years. The Centre has made more progress in 1997/8. The STPRC has been able to support a staff member to undertake a 6 weeks course at the University of Michigan on IPRs in mid-1997. The staff member has subsequently left the Centre to start up the IPR office in UCT Research Support Services. The STPRC has been given two research internships by the CSD and two black females have been appointed (see below). In 1997, we also were given support from the CSD to employ a research intern/RCB assistant. We employed Monde Mjebeza and he successfully completed his economics degree and is now doing a postgraduate diploma. Finally, the STPRC made use of a number of postgraduate students from UCT as contract researchers – giving them an opportunity to develop practical research skills to complement their academic studies. A number of these were either black or female. While the STPRC lacks considerable core funding or long-term projects, the use of contract researchers is a viable means of extending the capacity-building activities of the Centre.

D. *Perception of STPRC*

Understanding how the policy-making and research community perceive the STPRC is best done through some selective quotes from the institutional review conducted by Professor Howard Rush in March/April 1998. 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.

2.2. PROJECTS

A. *Completed Projects 1997/8*

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 August 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 and has involved extensive interaction with the industry. It was undertaken by the STPRC in collaboration with the Institute of Development Studies (IDS) at the University of Sussex. A final report was submitted in

August 1997. A paper will be presented to the TIPS Annual Forum in September 1998 and an article has been prepared for submission to a prestigious international journal.

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.

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 Overview of Services Trade Issues in South Africa

This project was commissioned by the Trade and Industrial Policy Secretariat (TIPS) under the auspices of the Co-ordinated African Programme of Assistance on Services (CAPAS) to extend the original work on Services Trade by James Hodge. The purpose of the report is to provide:

- a quantitative assessment of the contribution of services and international trade in services to the South African economy
- an overview of the market structure of different service sectors domestically
- an overview of imports of services and the barriers faced by foreign providers
- an overview of exports of services and the barriers faced by local firms
- an assessment of South African commitments in service trade agreements
- some initial research and policy direction to the DTI

International Development Centre of Japan : Study and Report of the SA Auto and Auto Component and Electronics Sectors

This study was part of a larger report prepared by the IDCJ for the Japanese Ministry of International Trade and Industry. The STPRC negotiated the contract and Anthony Black completed the report on the auto and auto components industry and David Kaplan the report on the electronics sector. With regard to the latter, broad industry data were required as well as a consideration of the situation of small firms in the sector and the factors determining the rate of innovation in the industry. The report has now been published.

Review of the CSIR

David Kaplan was a member of the review team for the CSIR. This formed a part of the review of all South Africa's publicly funded research performing organisations. The Report was completed in November 1997 and was very well received.

System Wide Review

Dave Kaplan was engaged in this review. The review assessed all of the reviews of the various research performing councils and made system wide recommendations. This influential report has been submitted to Cabinet and will have significant impacts upon policy. Dave Kaplan's inputs were particularly related to issues of the commercialisation of research.

B. *Current Projects*

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 in 1999. 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 is providing financial support for this project. Two research interns are also being employed on 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.

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.

2.3. TEACHING, SUPERVISION AND SEMINARS

A. Teaching

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. A seminar considering the role and perception of engineers in Nazi Germany and in Stalinist Russia will be given to the engineering faculty.

There have been discussions concerning the possible role of the STPRC in relation to the new programmes to be taught at UCT, commencing in 1998. A number of suggestions have been made for undergraduate teaching. In addition, a full postgraduate seminar course provisionally entitled "Science, Technology and Development" has been outlined. The Social Policy Studies programme has expressed keen interest and it is hoped that this will take place in the next academic year.

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 and training for a group of middle-level executives from the auto industry in technology policy.

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.

B. Honours, Masters and Doctoral Supervision

Two doctoral students and one masters student have been under supervision. An economics honours student is being supervised to complete her thesis on the research and training relationship between SASOL and the University of Cape Town. There have been other informal contacts to aid the work of other post-graduate researchers in the S&T field. A variety of these proposals have been read and commented on. In addition, the STPRC has been able to support a staff member to undertake a 6 weeks course at the University of Michigan on IPRs in mid-1997.

C. Research Intern/RCB Assistant

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.

D. Seminars

In 1997 the STPRC initiated an economic policy seminar series to be held in conjunction with the other DPRU projects, the South African Labour and Development Research Unit (UCT) and the Budget Project (UCT). The purpose of the series is threefold - first, that the seminars address the most important current issues and debates in South African economic policy;

second, that they will be delivered at an accessible and practical level, in order to reach the widest possible audience including academics, policy-makers, business people and postgraduate students; third, that they raise the profile of the three research units inside and outside the university which will improve avenues for future research funding.

The 1997 series consisted of 9 seminars running every 2 weeks throughout the second university semester. The Programme managed to cover an enormous range of very topical issues including macroeconomic policy, regional economic development, labour market policy and natural resource/land policy. The programme for 1998 has been extended to cover both semesters with 16 seminars in all. The seminars are concentrated in 4 theme areas – industrial policy, science and technology policy, labour policy and fiscal policy. The five seminars on science and technology policy were presented by Prof. Howard Rush (CENTRIM, University of Brighton), Prof. VV Krishna (Centre for Studies in Science Policy, India), Prof. Johan Mouton (Stellenbosch University), Rob Adam (Deputy Director General, DACST) and Dave Kaplan and Jean-Baptiste Meyer (SANSA).

The seminar series as a whole has been reasonably very well attended with an average audience of between 10 and 20 people per seminar. What was also noticeable was the high attendance by non-UCT people. Some of the represented organisations included the Western Cape provincial government, Cosatu, Wesgro, Idasa, Labour Research Service, Argus newspaper, Overseas Development Institute, UWC, Stellenbosch University, Provincial Development Council, Trade and Industrial Policy Secretariat. This broad attendance along with UCT academics implies that the series successfully fulfilled one of its primary goals which was reaching a broader audience than just academia and providing a forum for exchange between academics, policy-makers and business people which should enhance and stimulate research. In addition to the physical attendance, there have been a large number of requests for the seminar papers from people who could not attend. Because of these requests the papers were placed on the DPRU web site where they could be downloaded by the public and remain as a resource for future reference.

2.4. PUBLICATIONS

Each research project has a comprehensive research report as an output. In addition, the STPRC strives to convert these outputs into published articles or books in order to disseminate the research more widely.

A. *Books and/or Reports published or forthcoming*

Kaplan, D, (with William Blankley) *Innovation Patterns in South African Manufacturing Firms. Report on the survey of innovative activity in South African manufacturing firms* , (pp. 142) ISP and FRD, Pretoria. October, 1997

B. *Chapters in Books*

Wolson, R, "Intellectual Property Rights in Agricultural Biotechnology. South Africa" in Erbisch, F. H. and Maredia, K. M. (eds.) *Intellectual Property Rights in Agricultural Biotechnology*. CAB International, 1998

C. *Articles in Refereed Journals*

- Hodge, J, "The Midrand Area: An Emerging High Technology Cluster?", *Development Southern Africa*, forthcoming July 1998
- Kaplan, D, "Universities and the Business Sector: Strengthening the Links" in *Social Dynamics. Special Issue on Transformation and the University*. August 1997. University of Cape Town
- Kaplan, D, "Reversing the Brain Drain: The Case for Utilising South Africa's Unique Intellectual Diaspora", *Science, Technology and Society*, vol. 2. No. 2. July- December, 1997
- Kaplan, D, (with William Blankley) 'Innovation and South African industry: What are we trying to measure?' *South African Journal of Science*, vol. 94. February, 1998

D. *Articles in Other Publications*

- Hodge, J, "Developing an Information Technology Policy for South Africa", *Trade and Industry Monitor*, vol. 2, July 1997
- Hodge, J, "South African Trade in High Technology Products", *Trade and Industry Monitor*, vol. 3, September 1997
- Hodge, J, "Recent Developments in GATS Negotiations and their Implications for African Countries", *Trade and Industry Monitor*, vol. 5, March 1998
- Hodge, J, "The Impact of Structural and Production Method Changes on Employment Growth of Occupational Groups in South Africa", *Trade and Industry Monitor*, vol. 6, July 1998
- Kaplan, D, (with William Blankley) 'No competitiveness without innovation' *Business Day*, op-ed. February 11, 1998
- Kaplan, D, (with Jean-Baptiste Meyer) "Mobilising our Diaspora: The South African Network of Skills Abroad", *The Graduate*, 1998
- Wolson, R, "Intellectual Property Rights and Their Rise to Prominence in the International Trade Arena", *Trade and Industry Monitor*, vol. 2, July 1997
- Wolson, R, "Technology Transfer in Public Sector and Academic Research Institutions", *Trade and Industry Monitor*, vol. 4, December 1997

E. *Working Papers*

- Hodge, J, "Towards and Understanding of World and South African Trade in Services", *TIPS Working Paper*, no. 4, September 1997
- Hodge, J., "South African Trade in High Technology Products", *TIPS Working Paper*, no. 9, March 1998
- Wolson, R.A., "Aspects of South African Biotechnology", *STPRC Working Paper*, no. 4, January 1998

F. *Unpublished Submissions*

- Kaplan, D., Submission to the Parliamentary Committee on Arts, Culture, Language, Science and Technology on the proposed National Research Foundation, March, 1998

G. Unpublished Reports

- Hodge, J, "The Johannesburg-Pretoria N1 Corridor: A High Technology Belt?". Report for IDRC (Canada) as an input into conference papers for Technopolis 97, Ottawa, Canada. July 1997
- Hodge, J, (with Borat, H and Dieden, S)"The Impact of Structural and Production Method Changes on Employment Growth of Occupational Groups in South Africa". Report prepared for HSRC. May 1998.
- Kaplan, D, Kaplinsky, R, and Bessant, J, Report of the Workshop with the Deciduous Fruit Canning Industry and Suppliers, Report for the Western Cape Ministry of Economic Affairs and RDP, Sept. 1997
- Kaplan, D, Governmental Support for the Development of the Electronics Industry in the Newly Industrialising Countries: A Review, Report for the Friedrich Ebert Stiftung. August, 1997
- Kaplan, D, Small Electronics Firms in South Africa, with particular emphasis on innovation. Report for the Friedrich Ebert Stiftung. December, 1997
- Kaplan, D, The South African Electronics Industry. Report Prepared for the International Development Center of Japan, March 1998

H. Collaborative Reports

- Kaplan, D. Member of the DACST Appointed Panel for the Review of the CSIR. Report completed, December 1997.
- Kaplan, D. Member of the DACST Appointed Review Panel for the National Review of Science, Engineering and Technology Institutions. Report completed, February 1998.

I. Editorial Boards

- Kaplan, D. - *Transformation*. University of Natal
- Kaplan, D. - *The Communication Review*. University of California, San Diego
- Kaplan, D. - *Science, Technology and Society*. ORSTOM (Paris); CSIR/NISTADS (Delhi)

2.5. CONFERENCES AND SYMPOSIA

A. Conference Papers

International

- Hodge, J, "South African Trade in Services", *Coordinated African Programme of Assistance on Services (CAPAS) regional meeting*, Johannesburg, November 1997

Local

- Hodge, J, "An Overview of Services Trade Issues in South Africa", *TIPS Annual Forum 1998*, Johannesburg, September 1998, forthcoming
- Kaplan, D, "Innovation and South African Manufacturing Firms - A Review of the Evidence and Some Policy Implications" *TIPS Annual Forum* Muldersdrift, September 1997
- Kaplan, D, "Democratisation and the Reform of S&T Policy in South Africa" *The Politics of Economic Reform*. ISP - Development Bank of South Africa January, 1998.

Kaplan, D, and Kaplinsky, R, "Pursuing Comparative Advantage on Uneven Playing Fields. The South African Deciduous Fruit Canning Industry" *TIPS Annual Forum 1998*, Johannesburg, September 1998, forthcoming

B. Conference Discussant

Kaplan, D. Panel Member. *Industrial Structure, Innovation Dynamics and Technology Policy*, UNU-INTECH Conference, Lisbon October 1998

2.6. TRADE AND INDUSTRY MONITOR

As part of the DPRU, the STPRC participates in the publication of the Trade and Industry Monitor. The Monitor is a joint DPRU and Trade & Industrial Policy Secretariat (TIPS) publication which is released on a quarterly basis. There is a national circulation of one thousand.

2.7. VISITS ABROAD

David Kaplan visited France on a Fellowship awarded by the Institut Francais Afrique du Sud (IFAS) and the Cultural, Technical and Cooperation Services of the French Embassy in Pretoria. Courtesy of la Maison de Sciences de L'Homme he was housed at the Maison Suger in Paris. The Fellowship was utilised for research and writing, for visits to some French research institutions such as CNRS-INIST and l'Observatoire des Sciences et des Techniques. and, in particular, to spend time at ORSTOM and secure their support for the SANSA project.

David Kaplan was invited to a workshop initiated by the Dutch Foreign Ministry in Leusden, Holland in November 1997. He then visited the Dutch Foreign Ministry in the Hague in February, 1998. These visits resulted in the formulation of a research proposal - Comparative Study of the Impact of Donor-Initiated Programmes in the Research Capacity of the South which has been submitted to the Dutch Foreign Ministry for approval and for funding (see below).

David Kaplan has been invited to Lisbon in September to the UNU-INTECH International Conference on Industrial Structure, Innovation Dynamics and Technology Policy. Dave Kaplan will be on an expert panel to speak on the policy relevance of the Economics of Technological Change. The panel will feature leading scholars and policy analysts from developed and developing countries.

David Kaplan has been invited to be a Visiting Scholar in the Politics Department at the University of Toronto. The Politics Department has the Program on Globalisation and Regional Innovation Systems (PROGRIS) located in the Center for International Studies. David Kaplan will be spending his sabbatical there for the first half of 1999.

James Hodge has been invited to spend November 1998 and May 1999 at the Christian Michelsen Institute at Bergen University, Norway to complete research work on the globalisation of producer services project. The work will entail developing and testing theoretical models in the fields of industrial organisation and economic growth.

2.8. VISITORS RECEIVED

1. *Prof. VV Krishna*, Centre for Studies in Science Policy, India -
2. *Prof. Johan Mouton*, Stellenbosch University – to present a seminar on the patterns of research in SA tertiary institutions.
3. *Rob Adam*, Deputy Director General, DACST – to present a seminar on indigenous knowledge.
4. *Dr. Hildegunn Nordas*, Christian Michelsen Institute, Bergen University, Norway – to develop and plan the joint research product on the globalisation of producer services.
5. *Prof. Licker*, IS Department, UCT – to discuss the development of a PhD programme on IT and National Development and the STPRC's involvement in it.
6. *Prof. R. Kaplinsky*, Fellow, Institute of Development Studies, University of Sussex
7. *Prof. John Bessant*, Director CENTRIM, University of Brighton
8. *Prof. Howard Rush*, Deputy-Director CENTRIM, University of Brighton
9. *Gaspar Mateus Dzimba*, Research Officer, UNICAMP, Brazil
10. *Dr. Benoit Antheaume*, ORSTOM SA Representative, ORSTOM, Paris

2.9. AFFILIATIONS AND COLLABORATIONS WITH OTHER INSTITUTIONS

A. International

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.

B. *Local*

The STPRC forms part of a few projects housed under the Development Policy Research Unit (DPRU). This close affiliation continues to provide a number of distinct benefits to the STPRC - namely lower administrative overheads, immersion in a vibrant research environment, and access to an established network and resource base.

In addition, the Centre has built links with other research institutes throughout the country based on collaborative research projects. These include the Education Policy Unit (UWC), the Centre for Information Studies (UCT), Dept of Chemical Engineering (UCT), Ntsika Enterprise Promotion Agency, the Trade and Industrial Policy Secretariat (TIPS), and the Centre for Interdisciplinary Studies at Stellenbosch University.

2.10. IMPLEMENTATION OF RESEARCH

Most of the research projects of the STPRC are undertaken for a particular 'client'. The existence of a 'client' provides both a structure and a clear recipient who is able to guide and direct the research to fulfil particular needs. Important clients in the past year include the Department of Trade and Industry (DTI), the Department of Arts, Culture, Science and Technology (DACST), the Department of Education, the Western Cape Ministry of Economic Affairs and RDP, the Western Cape Investment Promotion Agency (Wesgro), and the CSIR's Western Cape office.

In addition, independently funded research work and 'client' work has found its way into the policy and research arena. For example, work on the IT industry has formed the basis for the IT report in the Technology Foresight Programme, work on innovation in the manufacturing industry has been conveyed and discussed with the DTI. Further, as linkages with government departments are strong and generally effective, and as government is recasting its policies in the technology area, the policy ideas and debates from the STPRC often enter into the policy formulation process informally. The STPRC has published a number of academic articles and conference papers. Our academic output has been increasing and has been well received.

3. INFRASTRUCTURE

3.1. STAFF

The STPRC lacks a significant number of core staff but through collaborative research work is able to generate research output well in excess of its individual members ability. The Centre has also contracted researchers during 1997/98 to assist on research projects.

A. *Permanent Staff*

Director:

Associate Professor D E Kaplan B.A. B.Com (UCT), MA (Kent), D.Phil (Sussex)

Senior Researcher:

James Hodge B.Bus Sci Hons (Ecos) (UCT), M.Com (Ecos)(UCT)

Administrative Assistant:

Eleanor Neethling

B. *South African Network of Skills Abroad (SANSA)*

Co-Director :

Dr. Jean-Baptiste Meyer MA (Bordeaux), MA (Boston), PhD (Paris)

Research Interns:

Mercy Magdalene Brown B.Soc.Sci (UCT)

Cecilia Van Staden B.Soc.Sci (UCT)

Administrative Assistant

Merle Brigitte Daniels

C. *Contract Staff Used*

Liat Dagan

Paul Delpont

Saul Levin

Thomas Pogue

Rosemary Wolson

3.2. RESOURCES AND EQUIPMENT

The STPRC is slowly building up resources. In terms of equipment, the STPRC now has two Pentium and two 486 computers, two laser printers, a telephone answering machine and a fax machine. In addition, it shares other necessary equipment with the other projects of the DPRU, including a photocopier, a binding machine, and other PCs. Additional equipment required for the SANSA project have been provided by ORSTOM.

The STPRC has also built up a wealth of academic resources including journals, books and data. The Centre is currently negotiating to house the resources in the SALDRU library

(located in the same building) with each item catalogued and entered into the electronic search facility.

3.3. WORLD WIDE WEB SITE

The STPRC world wide web site was established in 1996 in conjunction with the other research groups in the DPRU and is maintained in-house. The site is fairly comprehensive and includes detailed information on staff, research reports, working papers, current projects and the seminar series. A number of research reports are also available to download. The site has been registered with all the major search engines. The web address is:

<http://www.uct.ac.za/depts/dpru>

4. INSTITUTIONAL REVIEW

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. The report identified a number of strengths and weaknesses of the STPRC and made an objective assessment of performance to date.

Copies of Professor Rush's review are available from the STPRC office.

5. PLANNING FOR 1997/8 FINANCIAL YEAR

The institutional review provided the STPRC an opportunity to think strategically about its future and isolate any weaknesses that need to be addressed.

5.1. PROJECTS AND ACTIVITIES TO BE INITIATED

The STPRC will continue to be involved in its three 'core' areas of concern namely policies to govern the national S&T system, policies designed to provide technological support for SMEs and information technology policy. Particular projects being looked at include:

- *IT Industrial Policy*

The government has embarked on the development of a national IT industrial policy under the guidance of the DTI and the funding of CIDA. The STPRC plans to play some role in this process.

- *A Comparative Study of the Impact of Donor-Initiated Programmes in the research Capacity of the South*

In November 1997, David Kaplan was invited, along with a dozen other researchers based in research institutions in the South, to a workshop organised by the Dutch Foreign Ministry. The workshop deliberations gave support to the importance of institutional support to develop research capacity in the South. The Dutch have an important programme in this regard which currently operates in seven countries. Three researchers, one from Africa - Dave Kaplan, one from Asia and one from Latin America - were invited back to Holland in February 1998, in order to develop a concrete research proposal. The first draft was completed in Holland and a final proposal is now under consideration. This would entail the STPRC supervising a research project in Uganda and Tanzania - the two African countries in which the Dutch programme operates. The main aim is to assess the efficacy of such programmes and how they are impacted upon by local conditions, the level of development and the depth of the research structure, in particular.

- *The DTI Policy Support Programme*

The DPRU/STPRC has been associated with a bid to get funding from the EU to support mid-longer term research that can aid the policy capacity of the DTI. This programme has finally come into being. The DPRU/STPRC will be concerned with technology/innovation related issues and to this end will be advancing a number of projects for consideration by the DTI and the policy steering committee. It is expected that a range of projects will emerge from this programme and that this will be a significant source of research work for the STPRC over the next three years.

5.2. SPECIFIC NEEDS TO BE ADDRESSED

With the ending of IDRC support for the STPRC at the end of 1997, the STPRC will be very reliant on project income to support salaries of its research staff. The STPRC needs to secure some sources of longer-term institutional funding. Seeking such funding will be a matter of priority. The STPRC and its "sister" organisation, the DPRU, have developed considerable goodwill based on a proven track record of producing sound and relevant research over a period of eight years. The two organisations will be co-ordinating their efforts to secure institutional support funding in 1998-99.

The STPRC will need to upgrade some of its computer equipment and applications have been made to potential funders.

The STPRC will need to define a clear relationship to the teaching activities at UCT, particularly with the implementation of new teaching programmes. To this end, some graduate and undergraduate courses have been proposed and are under discussion.

The relationship with the DPRU confers very significant advantages on the STPRC. Professor Rush recommends that this relationship be continued and strengthened. The projects and activities of the two institutions will be assessed, particularly with a view to gaining maximum synergies between the different research activities.

5.3. STAFF

Professor Rush strongly recommended that the STPRC introduce systematic reviews for staff development. We have begun to implement this and intend to undertake this with respect to all staff. As well as immediate issues, consideration will be given to developing a career track entailing further education and training for all staff. Rosemary Wolson has left the STPRC to

take up a post as IPR Officer in UCT Research Support Services. We anticipate hiring further temporary staff in 1998-99, particularly if proposals for the large projects come to fruition.

5.4. FUTURE GOALS

The STPRC and the DPRU are to engage in a major review of strategic direction. This will consider all aspects of the Center's functions and activities. This will be undertaken in mid-1998. Inputs into that review will include Professor Rush's evaluation of the STPRC and the recommendations contained therein. Since this exercise is still to happen, more cannot be said at this stage, but a number of important issues/needs of the STPRC will be addressed. These include *inter alia*:

1. The need to secure institutional non-project related support. In particular, to secure funding for research salaries
2. The need to review focal areas and to ensure effective research focus
3. Decide on the balance between long-term academic research and commissioned work
4. The need to enhance academic output
5. The development of more research linkages - particularly with the Third World and especially the region
6. Devise ways of intensifying links with other research organisations

APPENDIX – PAST PROJECTS AND PUBLICATIONS

PROJECTS COMPLETED 1996/7

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. It is envisaged that the report will form the basis of a chapter of a book entitled *Laying Ground*, to be published during the course of 1997.

Manufacturing Technology Services for SMEs: 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 SMEs 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 aims to measure 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 was done under the auspices of the ISP jointly with the FRD. The Report is due August, 1997.

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 Mhlongo, 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. Mhlongo '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.

PUBLICATIONS 1996/7

A. Books and/or Reports published or forthcoming

- Blankley, W. & Kaplan, D., *Report of a National Survey on Innovation in South African Manufacturing Industry*, FRD, Pretoria
- Hodge, J. & Miller, J., 'Information Technology in South Africa' in *Information Technology and Exclusion in Developing Countries*, UNU/INTECH, Maastricht
- Hodge, J. & Miller, J., 'IT Policy for South Africa' in *Telecommunication for Business in Africa*, Mgombeo, H. & Werner, M. (eds.), IOS Press
- Kaplan, D., 'An Afterward' in *Building a New South Africa: Science and Technology Policy*, International Development Research Center (IDRC), Canada Ottawa, 1995
- Kaplan, D., 'Science and Technology in a Democratic South Africa', in *Sciences et Development. Les Sciences Hors D'Occident Au XX Siecle*, Roland Waast (ed.). ORSTOM, Paris, 1996
- Labour Market Commission, *'Restructuring the South African Labour Market. Report of the Presidential Commission to Investigate Labour Market Policy'*, CTP Books, June, 1996
- Wolson, R.A., 'Biotechnology Transfer in South Africa, with special reference to the Role of Intellectual Property Rights',
- Wolson, R.A., 'The Impact of South Africa's Intellectual Property Regime on National Agricultural Biotechnology', in *Intellectual Property Rights in Agricultural Biotechnology*, Erbisch, F., Dodds, J. and Maredia, K. (eds.), CAB International, Wallingford, United Kingdom

B. *Articles in Refereed Journals*

- Kaplan, D. & Van der Walt, T., 'Industry-academic-government co-operation in technological innovation and human resource development- the challenge for South Africa', in *Industry and Higher Education*, vol. 10 (6), December 1996
- Kaplan, D., 'Science and Technology in a Democratic South Africa - New Challenges and New Policy Directions' in *Science, Technology and Society*, vol. 1 (1), January 1996, Sage, India (pp. 101-128)
- Kaplan, D., 'Reversing the Brain Drain: The Case for Utilising South Africa's Unique International Diaspora', in *Science, Technology and Society*, Sage, India. - accepted and forthcoming in 1997
- Kaplan, D., 'Universities and the Business Sector: Strengthening the Links' in *Social Dynamics. Special Issue on Transformation and the University*, University of Cape Town

C. *Articles in Other Publications*

- Hodge, J. & Miller, J., 'What Should a National IT Policy involve?' in *Information Technology Review*, vol. 4 (3), April 1997
- Hodge, J., 'The Structure of World Services Trade', *The Trade Monitor*, vol. 15, December 1996
- Hodge, J., 'Trade in Services', *The Trade Monitor*, vol. 13, March 1996
- Hodge, J. & Miller, J., 'SA must elbow way into IT revolution', in *Business Day*, op. ed., 11 July 1997
- Kaplan, D., 'An input to Facilitate the Department of Trade and Industry Submission to the Science and Technology Green Paper' March, 1996 (pp.25).
- Kaplan, D., 'A Report on Innovative Activity in South African Manufacturing Firms', in *The Trade and Industry Monitor*, vol. 1, April 1997
- Kaplan, D. & Lewis, D., 'Skills Shortage resulting from Voodoo Economics', in *Business Day*. op. ed., 19 February, 1997
- Wolson, R., 'A role for biotechnology in industrial development in South Africa', *The Trade Monitor*, vol. 15, December 1996

D. *STPRC Working Paper Series*

- Hodge, J. & Miller, J., *Information Technology in South Africa: The State-of-the-Art and Implications for National IT Policy*, Feb. 1997
- Horwitz, R., *Telecommunications Policy in South Africa in the Light of International Experience*,
- Kaplan, D.E., *The State of Science and Technology in South Africa. New Priorities, New Policies*,

E. *Editorial Boards*

- Kaplan, D. - *Transformation*. University of Natal
- Kaplan, D. - *The Communication Review*. University of California, San Diego
- Kaplan, D. - *Science, Technology and Society*. ORSTOM (Paris); CSIR/NISTADS (Delhi)

F. Conference Papers

International

Hodge, J. & Miller, J., 'Information Technology in South Africa', at *The Information Revolution and Economic and Social Exclusion in Developing Countries*, Maastricht, Netherlands, October 23-25, 1996, hosted by The United Nations University, Institute for New Technology (UNU/INTECH)

Kaplan, D. & Van der Walt, T., 'Industry/Academic/Government Co-operation in Technological Innovation and Human Resource Development in South Africa', at *The International Conference on Industry/University/Government Collaboration*, Istanbul, Turkey, June 24-26, 1996, hosted by UNESCO Chair on Megatronics and Bogazici University.

Kaplan, D., 'Migration of the Professional, Semi-Professional and Technical Occupations in South Africa: Past Patterns, Current Trends and Policy', at *International Scientific Migrations Today, New Problematic.*, Santa Fe de Bogota, Colombia, June 24-26, 1996, hosted by ORSTOM and the National University of Colombia.

Local

Braun, R., Kaplan, D. & Horwitz, R., 'Reform of the South African Telecommunications Sector - Some ramifications thereof', at *Africa Conference of the Institute of Electrical and Electronic Engineers*, Stellenbosch, 25-27 September, 1996.

Hodge, J. & Miller, J., 'Information Technology in South Africa: The State-of-the-Art and Implications for National IT Policy', at *TEL.COM 97: 8th Biennial Conference and Exhibition on Telecommunications in Southern Africa*, Gallagher Estate, 24-26 March 1997

Kaplan, D., 'Innovation in South African Manufacturing Firms: A Report on some Recent Research', at *Southern Africa in Global Context*, Durban, July 7-11, 1996, hosted by The South African Sociological Association

G. Conference Discussant

Kaplan, D., *Europe and the Globalised Information Society; Implications for Employment, Trade and Education*, Maastricht, Netherlands, October 17-19, 1996, hosted by UNU/INTECH

Kaplan, D., *Information Revolution and Social and Economic Exclusion in Developing Countries*, Maastricht, Netherlands, October 23-25, 1996, hosted by UNU/INTECH

H. Conferences Organised

D. Kaplan was a member of the four-person Scientific Organising Committee for the Conference, *International Scientific Migrations Today, New Problematic.* hosted by ORSTOM and the National University of Colombia in Santa Fe de Bogota, Colombia June 24-26, 1996.

D. Kaplan was a member of the Social Sciences Studies Programme (SSSP) Steering and Conference Committee for *Intellectuals and the production of knowledge for policy.* hosted by the Human Sciences Research Council, Center for Science Development, SSSP in Cape Town, April 19-20, 1996.