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Contributors

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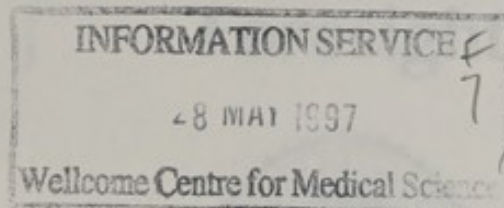
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SOUTH AFRICA TECHNOLOGY FORESIGHT

I had a useful meeting on 28 January with Rob Adam, Deputy Director-General at the Department of Arts, Culture, Science & Technology, and Dhesigen Naidoo, who is part of the project team for South Africa's Technology Foresight exercise. I am reporting separately the non-Foresight issues we covered.

The exercise is somewhat behind schedule, with the precise delineation of the sectors to be covered not yet agreed upon. 16 sectors ^{are} under consideration which the project team have been asked to reduce to 8. In the course of the meeting Rob Adam appeared to be convinced that they should aim instead for 12 sectors. A copy of a brochure giving further details of the Foresight exercise, including a list of Board members, is attached. I have ordered more copies which I will send to MBP for OTIS.

The sectors identified match those of the UK foresight exercise fairly closely, with the exception of areas such as aerospace, where there is no significant South African industry, and with the inclusion of slightly unorthodox sectors such as "Youth" and "Safety of Citizen and Society" (these two must be prime candidates for cutting).

Naidoo said that a final decision on the sectors would be made at a meeting of the full Foresight board at the end of February. Work on assembling the sector groups would then start in earnest. As you are aware, the ODA are putting up money for seminars and travel.

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NATIONAL RESEARCH
AND TECHNOLOGY
FORESIGHT

Department of Arts, Culture,
Science and Technology
Private Bag X894
Pretoria 0001

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To realise the full potential of arts, culture, science and technology in social and economic development, in nurturing creativity and innovation, and promoting the diverse heritage of our nation.

Mission statement of the Department of Arts, Culture, Science and Technology

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1 Research and Technology Foresight

The Research and Technology Foresight Project aims to systematically identify those areas of science and technology that are emerging globally, technologies that are likely to yield the greatest economic and social benefits for South Africa in the longer term. In the process, it seeks to align technology policy with broader national goals.

1.1 Introduction to the Foresight Project

The question "Does it make sense to commit a nation's research resources on the basis of total inexplicability and lack of anticipatory rationale? ... Are we content to be "scientific" about everything but science itself?"

Report on the International Development Research Centre of Canada. The intention to carry out such an exercise was announced by the Minister of Arts, Culture, Science and Technology in mid 1994, shortly after the establishment of the new Ministry.

The outcomes of the Foresight Project, along with other policy initiatives, will contribute to new directions for science and technology in South Africa. It supports the Government's

To realise the full potential of arts, culture, science and technology in social and economic development, in nurturing creativity and innovation, and promoting the diverse heritage of our nation

Mission statement of the Department of Arts, Culture, Science and Technology

The Foresight Project is to help identify those sector-specific technologies and technology trends that will best contribute to an improvement in the economic well-being and quality of life of all South Africans over the next 10-20 years. The Project will encompass technologies that impact on social sciences and education, as well as those promoting economic development and wealth creation through product or process development. In particular, it seeks to:

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1 Research and Technology Foresight

The Research and Technology Foresight Project aims to systematically identify those areas of science and technology (and emerging generic technologies) that are likely to yield the greatest economic and social benefits for South Africa in the longer term. In the process, it seeks to align technology policy with broader national goals.

1.1 Introduction to the Foresight Project

The Research and Technology Foresight Project is one of a number of initiatives being undertaken by the Department of Arts, Culture, Science and Technology as part of its mission to review and reform South Africa's science and technology system. Interest in foresighting has grown in South Africa over the past few years, and received special emphasis in the July 1993 Mission Report on science and technology policy sponsored by the International Development Research Centre of Canada. The intention to carry out such an exercise was announced by the Minister of Arts, Culture, Science and Technology in mid 1994, shortly after the establishment of the new Ministry.

The outcomes of the Foresight Project, along with other policy initiatives, will contribute to new directions for science and technology in South Africa. It signals the Government's commitment to work cooperatively with the private sector and civil society to align science and technology with the economic and social needs of the country consistent with a growth and development strategy.

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The aim of the Foresight Project is to help identify those sectors, specific technologies and technology trends that will best contribute to an improvement in the economic well-being and quality of life of all South Africans over the next 10-20 years. The project will encompass technologies that impact on social sciences and education, as well as those promoting economic development and wealth creation through product or process development. In particular it seeks to

- identify those technologies and latent market opportunities that are most likely to generate benefits for South Africa;
- develop consensus on future priorities amongst the different stakeholders in selected sectors (industrial, socioeconomic or service);
- coordinate the research effort between different players within selected sectors;
- reach agreement on those actions that are needed in different sectors to take full advantage of existing and future technologies.

Equally as important as these outcomes, is the foresight process itself, which will bring together government departments, industry, science councils, higher education, organised labour, professional organisations and other stakeholders, who previously related to each other in a highly fragmented way. For the foresight to succeed it must escape the charge of being exclusive or biased against full participation. The Foresight Project will not only seek to identify trends, but also to build trust. It is the start of a process that will see a long term strategic approach to science and technology within South Africa, and greater focus on the role that technology has to play in the country's development.

1.2 Background to the Foresight Project

The Foresight Project is being initiated at a time when South Africa's science and technology sector is subject to critical review. In particular, the Science and Technology White Paper sets out the basis for the development of a common vision for the role of science and technology in South Africa through a coherent National System of Innovation. This is to be enabled through dedicated funding and the support of an advisory statutory body which will provide independent scrutiny of progress.

In addition, a National Science and Technology Audit is underway to assess the strengths and weaknesses of the country's science and technology capacity. This exercise, due to be completed within the next year, will yield valuable information on our ability to meet emerging opportunities. The Department of Trade and Industry has launched an 'Industrial Cluster Initiative', a

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programme of independent research projects by different institutions and consultant groups, looking at the competitiveness of clusters of South African industries. The Foresight Project will need to build on and complement these initiatives.

The broader national context in which the Foresight Project is being launched is one of declining international competitiveness and relatively low levels of R&D investment. Moreover, in the past, government funded research has been aligned with the security requirements of government rather than the development needs of the country. Another major challenge facing the nation is a shortage of skills and the unequal distribution of skills.

These circumstances point to an urgent need to rearrange priorities to make best use of the resources available. The White Paper, Audit and Foresight form a mutually complementary set of policy forming and policy delivery mechanisms being brought to bear on these issues.

1.3 Features of 'foresight'

The past decade has seen a surge of interest in the application of foresight techniques to science and technology policy. New technologies are expected to have a profound social and economic impact in the future, but the increasingly capital intensive nature of science and technology has led to a recognition that no country can afford to support top quality research in all areas. In addition, the principle of aligning S&T research to broad national goals is now accepted. This emphasizes the need for high quality policy instruments to inform priority setting.

Alongside the reality of finite resources, there has been a re-evaluation of traditional models of innovation and the role of science and technology in society. The assumption that investment in basic research will lead automatically to technological and product development is now recognised as simplistic. The interaction between different stakeholders in an innovation system is more complex than described by this traditional 'linear model', and involves feedback mechanisms, with research needs arising at

programs of independent research projects by different institutions and consortia groups looking at the competitiveness of South African industries. The foreign project will need to build on and complement these initiatives.

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1.3 Features of Foresight

The past decade has seen a surge of interest in the application of foresight techniques to science and technology policy. New technologies are expected to have a profound social and economic impact in the future, but the increasingly capital intensive nature of science and technology has led to a recognition that no country can afford to neglect top quality research in all areas. In addition, the principle of signing 261 research to profit national goals is now accepted. This emphasizes the need for high quality policy instruments to inform priority setting.

Altogether the reality of finite resources there has been a re-evaluation of traditional models of innovation and the role of science and technology in society. The assumption that investment in basic research will lead automatically to technological and product development is now recognized as simplistic. The interaction between different stakeholders in an innovation system is now complex than described by the traditional linear model, and involves feedback mechanisms with research needs arising at

many points in the process. The emergence of new technologies is as likely to be driven by market pull as science 'push'.

Foresight is a systematic process which seeks to understand the long term. It assumes that there are many possible futures and that the shape of the future we inherit depends on the decisions taken today. An important aspect of foresight is the use of qualitative as well as quantitative methods to set priorities and agree actions. The process of identifying priorities and agreeing actions involves widespread consultation amongst all the relevant stakeholders. This latter feature is perhaps what most distinguishes foresight from forecasting, which tends to be more deterministic and technical in approach.

The overall aim of technology foresight is to help prepare for the future. Taking specific sectors or themes, foresight seeks to align supply and likely future demand. It does this by bringing together users and other stakeholders with researchers and funders, to consider the future of their sector over a 10 to 20 year period.

In developing priorities, at least four main factors may be considered:

- (1) the economic and social needs of the country;
- (2) potential scientific and technological opportunities;
- (3) the country's economic and social advantages and resources;
and
- (4) the scientific strengths and resources available to the country.

In addition to specific sector analyses, the Foresight Project aims to identify emerging generic technologies that will cut across sectors.

Foresight is part of an ongoing process that seeks to develop a better sense of strategic direction in research and technology. It is best seen as one of many tools that may be used by government or industry to help inform the strategic decision making process, and hence to influence the future. Whilst it achieves this through seeking consensus, it allows counter-intuitive views to be heard. The latter are frequently the seeds of innovation to come. Indeed, given the difficulty of picking 'winners', it is folly to eliminate curiosity driven research from the range of research activities.

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Forecasting is a systematic process which seeks to understand the long term. It assumes that there are many possible futures and that the shape of the future we intend depends on the decisions taken today. An important aspect of forecasting is the use of qualitative as well as quantitative methods to set priorities and agree actions. The process of identifying priorities and agreeing actions involves widespread consultation amongst all the relevant stakeholders. This latter feature is perhaps what most distinguishes foresight from forecasting which tends to be more deterministic and technical in approach.

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Foresight brings focussed thinking to bear upon the role of science and technology in national development through what have been named the six C's:

- communication to interaction by stakeholders
- concentration on the longer term
- coordination and partnership
- consensus
- comprehension of the factors of change
- commitment to implementation

2 The International Perspective

South Africa is among the first of the newly industrialised countries to conduct a foresight study, and will need to design a unique programme. The following examples show the different ways in which technology foresight has been carried out and implemented internationally.

Japan

Japan is considered the 'home' of foresight. Since 1971, the country has made widespread use of Delphi surveys to ask the S&T community about future technological trends. The 'Delphi' method involves iterative questioning with the results of a first round of questionnaires being fed back so that respondents have a chance to revise their responses in the light of the views of others. The surveys, which are conducted every five years, have been carried out by STA (the Science and Technology Agency) which now delegates it to NISTEP (National Institute of Science and Technology Policy). The next survey is due in 1997.

The STA foresight has no formal implementation phase; rather it provides background information for decisions taken by others on their own priorities. Priorities for government funded R&D emerge from a complex process of which STA foresight represents one part only.

Netherlands

In the Netherlands, a form of technology foresight has been integrated into technology policy since 1989 by the Ministry of

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Economic Affairs. These foresight studies aim to outline potential applications of new or existing technologies which can be expected to be widely applied in the Netherlands within five to ten years. The main objectives are to generate information for strategic technology policy, to provide small and medium-sized enterprises with information on recent technological developments and to stimulate innovation through the development of networks.

The Dutch approach differs from that taken in other countries in the extent of consultation, for example wide consultation in assembling lists of candidate technologies and wide consultation in developing a consensus and commitment on which technologies to pursue. There is no guarantee of new money so the emphasis at the implementation stage is on the redistribution of existing resources. In addition, the Ministry of Education and Science is carrying out its own foresight activities. The findings will influence the four yearly Strategic Policy Document produced by the Department in which priorities for Dutch scientific research will be indicated. The aim is to assist in priority setting both in and between different fields of research.

United Kingdom

The United Kingdom's first national foresight programme arose from the 1993 White Paper on science and technology. The motivation for initiating a foresight exercise arose from a perception that the UK was becoming uncompetitive relative to other industrialised nations.

The foresight exercise was run by the Office of Science and Technology. A large-scale Delphi exercise was central to the process of identifying trends. The outcome of the project was a list of sector based and generic technologies. The study resulted in the establishment of a foresight fund from which projects in identified areas could be supported. Another outcome was the establishment of networks amongst 'users' in different sectors. A number of outreach programmes and a series of initiatives to engage SMEs have also been set up. Of special note is the decision by various UK regional authorities to carry out their own foresight studies.

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Germany

Three major exercises have been carried out in Germany since 1990. In 1990, the Federal Ministry of Research and Technology (BMFT) established a committee to review spending on basic science and determine if new priorities were needed. One outcome was a fundamental shift in emphasis from physical to biological and environmental sciences. A second BMFT exercise gave rise to a 'map' showing to what extent technologies interlinked with each other and contributed to various potential applications. The strengths of the German science base and industry were also assessed and the relative importance of each technology to national goals such as economic performance and environmental protection was gauged. Finally, a repeat of a Delphi survey first conducted in Japan was conducted. While the German and Japanese responses showed close agreement on the likely timing of advances, the two countries differed in the importance attached to individual topics.

The German foresight initiatives have influenced budget priorities as well as having an impact on strategic engagement between industry, research organisations and government. Certain German *länder* are now considering their own foresight studies.

Korea

Korea in 1992 initiated a foresight exercise as part of a newly launched national R&D programme, the HAN (highly advanced national) project. The aim of the HAN project was to improve the competitiveness of domestic industries by increasing indigenous S&T capability. It was hoped to reduce the dependence of Korea's industries on foreign technology. The Korean government intends that the outcome of the exercise will translate directly into establishing priorities and funding targeted areas. Total investment directed toward the realisation of this aim is anticipated to be \$4,6 bn over ten years. The conduct of the foresight represented a shift in government thinking that the direction of science and technology should be determined less by individual research interest and more by national goals, i.e. a shift from bottom-up to top-down.

Germany

These two exercises have been carried out in Germany since 1990. In 1990 the Federal Ministry of Research and Technology (BMT) established a committee to review scientific activities in science and determine if new projects were needed. One outcome was a fundamental shift in emphasis from physical, biological and environmental sciences. A second BMT exercise gave rise to a top-down review to what exist technologies identified with each other and compared to various external applications. The strengths of the German science base and reality were also assessed and the relative importance of each technology in national goals such as economic performance and environmental protection was judged. Finally a report of a Delphi survey that existed in Japan was conducted. While the German and Japanese responses showed close agreement on the key areas of science, the two countries differed in the response attached to individual topics.

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The HAN project involved government scientists and technologists, independent research organisations, firms and universities. The foresight procedure involved monitoring emerging technologies and identifying problems, setting priorities and selecting key technologies, planning and implementation, and finally, control and evaluation. The monitoring phase turned up 214 candidate technologies, which were then grouped into 60 areas. A set of foresight committees was then established to monitor each technology, discuss possible impacts, and reach consensus in relation to national goals. The process has been described as "planning as learning by interacting". The final outcome was a list of five product-oriented technologies and six fundamental technologies.

United States

The United States has not carried out foresight exercises as such, but has concentrated instead on drafting lists of critical technologies. In 1990, the US established the National Critical Technologies Panel which was charged with identifying and reporting on up to 30 national critical technologies considered 'essential for the long term national security and economic prosperity of the US'. This panel produces biennial reports, the first published in 1991. The US Congress also set up a Critical Technologies Institute. Its remit was to explore and develop proposals to advance critical technologies and to develop a strategy for federally funded R&D in each critical technology.

Other countries

A number of other countries have embarked on foresight exercises or foresight related activities. France has adapted the German and Japanese surveys to look at technology scenarios, the need for international cooperation, and potential technological or institutional barriers. Australia has employed foresight techniques at agency level, while New Zealand, Sweden and Norway have also undertaken foresight activities. Thailand is in the early stages of planning a foresight exercise.

The HAT project involved government scientists and technologists independent research organizations, firms and universities. The foresight processes involved monitoring emerging technologies and identifying problems arising priorities and selecting key technologies planning and implementation and finally control and evaluation. The monitoring phase turned up 25 candidate technologies which were then grouped into 60 areas. A set of foresight committees was then established to monitor each technology, discuss possible impacts and reach consensus in relation to national goals. The process has been described as 'planning or learning by interacting'. The final outcome was a list of five product-oriented technologies and six fundamental technologies.

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3 A Foresight Project for South Africa

The underlying thrust behind South Africa's first national Research and Technology Foresight Project is to achieve alignment between the National System of Innovation and a growth and development strategy. The Foresight Project is expected to take 18 months to complete and will involve representatives from industry (including SMMEs), higher education, science councils, government and civil society. Women and other groups previously excluded from the S&T arena will be particularly targeted for participation in the Project.

Although the country has much experience in the use of innovative planning techniques in the social, political and economic spheres, the use of foresight techniques in science and technology is less well developed. The Foresight Project is not a once-off exercise and part of the process will be the development within the country of foresight expertise in science and technology, building where possible on existing local capacity.

In view of the enormity of the challenges facing South Africa, the Foresight Project requires a focused approach and a clear sense of direction. The following 'mission statement' provides a developmental framework for the Project:

Mission statement

"To promote technological innovation and deployment by identifying opportunities for economic and social development through a national research and technology foresight project".

The success of any project in part depends on the establishment of clear objectives at the outset. For a project of the scale and complexity of the Foresight Project, the importance of identifying objectives cannot be over emphasized. Although foresight exercises have been carried out in many countries, the objectives and focus have differed according to circumstances. The objectives laid down at the outset of South Africa's Foresight Project will provide a framework for its design as well as a

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yardstick against which the Project may be evaluated.

The objectives of the Foresight Project are:

Process objectives:

- to identify those technologies and latent market opportunities that are most likely to generate benefits for South Africa;
- to develop consensus on future priorities amongst the different stakeholders in selected sectors (industrial, socioeconomic or service);
- to coordinate the research effort between different players within selected sectors;
- to reach agreement on those actions that are needed in different sectors to take full advantage of existing and future technologies.

Output and Implementation objectives:

- to contribute to broad policy guidelines in S&T, consistent with the National Strategic Vision;
- to develop a consensus on priority areas between different stakeholders in S&T;
- to identify possible funding priorities for publicly funded research;
- to build capacity in foresight methodologies;
- to gather intelligence, particularly for industry, on future opportunities;
- to encourage greater R&D investment from industry;
- to improve communication between public and private sector in S&T.
- to advise on the implications of the findings for skills development;
- to focus capacity development in the tertiary sector.

Outcome objectives

Over time, the foresight exercise will lead to:

- alignment amongst the major role players in the National System of Innovation
- institutionalization of foresight capacity in government departments and firms

jointly against which the project may be evaluated

The objectives of the foresight project are:

Process objectives

- to identify those technologies and latent market opportunities that are most likely to generate benefits for South Africa
- to develop consensus on future priorities amongst the different stakeholders in selected sector/industrial associations or services
- to coordinate the research effort between different players within selected sectors
- to reach agreement on those actions that are needed in different sectors to take full advantage of existing and future technologies

Output and implementation objectives

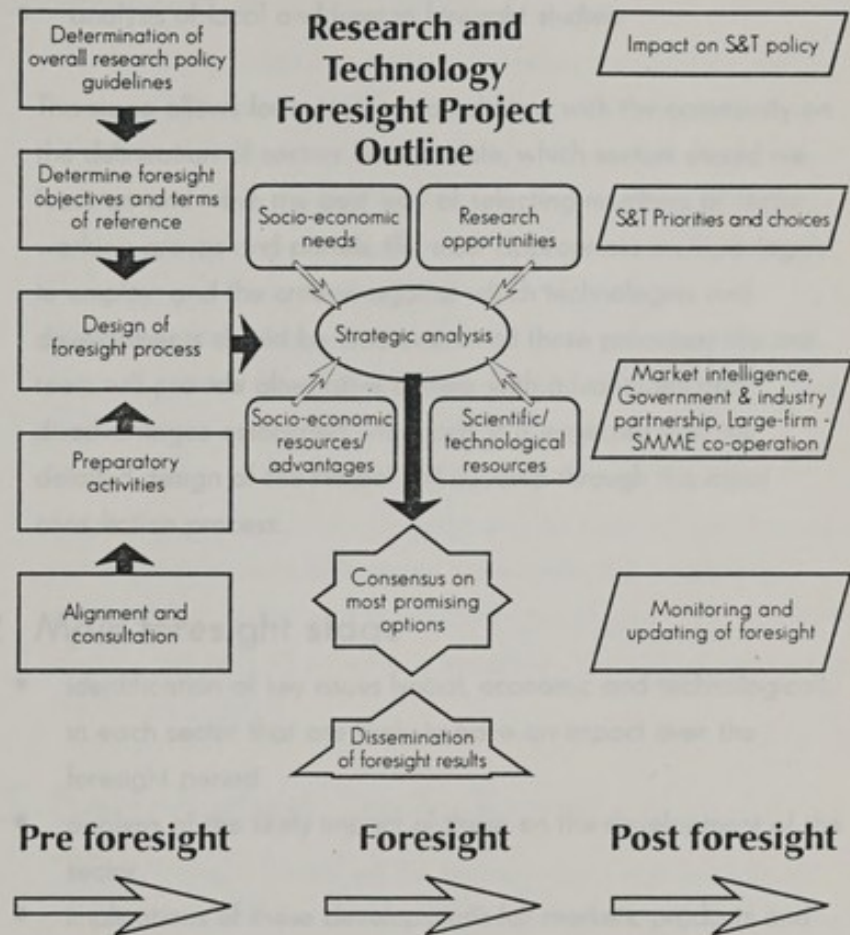
- to contribute to broad policy guidelines in 2025 consistent with the National Strategic Vision
- to develop a consensus on priority areas between different stakeholders in 2025
- to identify possible funding priorities for publicly funded research
- to build capacity in foresight methodologies
- to gather intelligence, particularly for industry, on future opportunities
- to encourage greater R&D investment from industry
- to improve communication between public and private sector in 2025
- to advise on the implications of the findings for skills development
- to focus capacity development in the tertiary sector

Outcome objectives

- Over time, the foresight exercise will lead to alignment amongst the major role players in the National System of Innovation
- Institutionalization of foresight capacity in government departments and firms

4 Research and Technology Foresight Project plan

The Foresight Project is expected to take 18 months to complete. The Project is divided into three key stages. These are presented schematically in the accompanying diagram.



The Foresight Project will be sector based. Sectors may refer to specific industries, services or themes; some sectors may be cross cutting. The final choice of sectors will be made after consultation, but will be informed by the relative importance to South Africa's economy, and the potential for contributing to social and economic development. To broaden perspectives and encourage creativity, membership of sector working groups will be chosen from a wide range of stakeholders. The Foresight will run accordingly to three stages.

1 Pre-foresight stage:

- establishment of detailed objectives for the Project in the context of national policy initiatives
- detailed design of the project
- establishment of internal and external liaison structures
- alignment with other initiatives and consultation with the community
- analysis of local and foreign foresight studies.

This stage allows for extensive consultation with the community on the delineation of sectors (for example, which sectors should we focus on and why); the best way of selecting members of sector working groups and panels, the most appropriate methodologies to employ; and the criteria against which technologies and developments should be assessed. In all these processes the task team will provide alternative options with advantages and disadvantages associated with each. It is expected that the detailed design of the Project will develop through this initial consultation process.

2 Main foresight stage

- identification of key issues (social, economic and technological) in each sector that are likely to have an impact over the foresight period
- analysis of the likely impact of these on the development of the sector
- implications of these developments for markets, products and processes
- analysis of the technological developments underpinning new products and processes
- assessment of the actions needed to realise new developments.

The main foresight stage will be carried out by Sector Working Groups. Working Groups will be expected to consult widely with their relevant constituencies, using appropriate methodologies.

3 Post-foresight stage

- dissemination of foresight findings
- development of implementation plans based on findings

1 Pre-forensic stage

- establishment of detailed objectives for the project in the context of national policy initiatives
- detailed design of the project
- establishment of internal and external liaison structures
- alignment with other initiatives and consultation with the country
- analysis of local and foreign forensic studies

This stage allows for extensive consultation with the company on the definition of sectors for example, which sector should we focus on and why? The best way of selecting members of sector working groups and panels, the most appropriate methodologies to employ, and the criteria against which technologies and developments should be assessed. In all these processes the total team will provide alternative options with advantages and disadvantages associated with each. It is expected that the detailed design of the project will develop through the initial consultation process.

2 Main forensic stage

- identification of key issues (social, economic and technological) in each sector that are likely to have an impact over the forensic period
- analysis of the likely impact of these on the development of the sector
- implications of these developments for markets, products and processes
- analysis of the technological developments underpinning new products and processes
- assessment of the actions needed to realize new developments

The main forensic stage will be carried out by Sector Working Group Working Groups will be expected to consult widely with their relevant counterparts using appropriate methodologies.

3 Post-forensic stage

- dissemination of forensic findings
- development of implementation plans based on findings

- monitoring and updating of foresight
- institutionalization of foresight capacity in government
- institutionalization of foresight capacity in industry.
- quality will be maintained through the work of an independent and external formative and summative evaluation.

External and internal liaison

The Foresight Project is not being undertaken in isolation and an important component will be the establishment of good liaison structures with other relevant initiatives. Given the research and data needs of the Foresight Project, a close working relationship with the Audit is necessitated.

The results of foresight studies carried out in other countries will be assessed to identify those findings that may be relevant to the South African project.

Some external technical assistance may be required, particularly in training participants in foresight techniques. But an important consideration is the need to establish foresight capacity within the country and to build on existing expertise. This will be reflected in the Project's design.

5.1 The Board

5 Board and Task Team

The Foresight Project will be overseen by a high level Board, appointed by the Minister, whilst the day to day work of the Project will be carried out by a project management team. The Board has been selected on the basis of public nomination as well as through other processes of consultation, in order to be representative across sectors and communities.

This team will be based at the Department and will report to the Director-General. The team is intended to comprise a co-ordinator, eight sector technical co-ordinators, and six support staff.

Sector Working Groups will be established with members drawn from different stakeholder groups. The organisational structure is shown in the figure below.

- monitoring and updating of forestry
- institutionalization of forestry capacity in government
- institutionalization of forestry capacity in industry
- quality will be maintained through the work of an independent and external formative and summative evaluator.

External and internal liaison

The forestry project is not being undertaken in isolation and an important component will be the establishment of good liaison structures with other relevant sectors. Given the research and data needs of the forestry project, a close working relationship with the Audit is necessary.

The results of forestry studies carried out in other countries will be assessed to identify those findings that may be relevant to the South African project.

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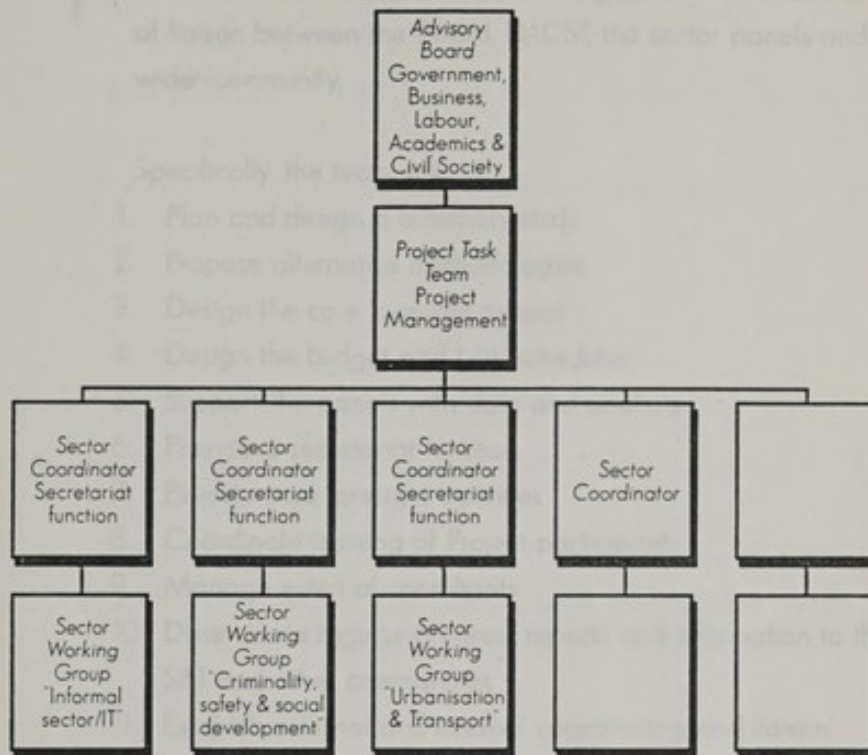
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Research and Technology Foresight Organisational Structure



Sectors mentioned are illustrative only

5.1 The Board

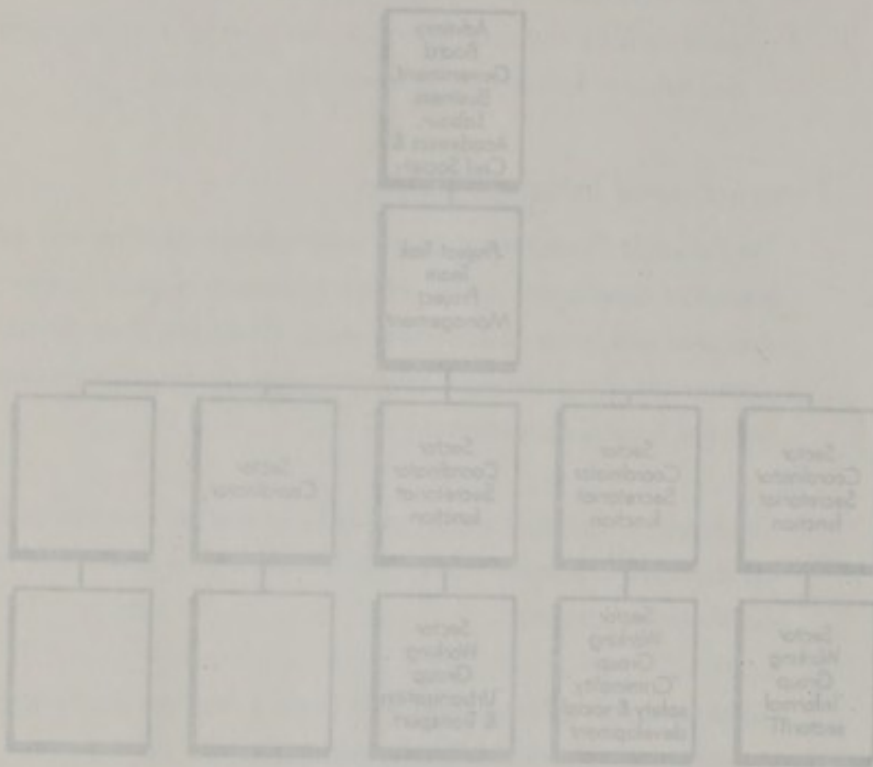
The Board will be responsible for setting the overall direction of the Foresight Project. Specifically the Board will:

1. Advise on formulating policy concerning the conduct of the Foresight Project
2. Guide the work of the task team and panels
3. Agree appropriate methodologies
4. Assist in identifying sectors, names and sector panel members
5. Receive all sector panel reports
6. Review and approve the final report and recommendations
7. Advise on the implementation of the recommendations
8. Oversee an external evaluation of the Foresight Project
9. Advise the Minister of any other matters related to the Project

5.2 The Task Team

The task team will be responsible for the overall organisation and

Research and Technology Foresight Organisational Structure



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5.2 The Task Team

The task team will be responsible for the overall organization and

6 Board Members

management of the Foresight Project. It will represent the analytical and research arm of the Project and will advise the Board on approaches and methodologies. It will act as the point of liaison between the Board, DACST, the sector panels and the wider community.

Specifically, the team will:

1. Plan and design a feasibility study
2. Propose alternative methodologies
3. Design the core foresight project
4. Design the budget and time schedules
5. Support the panels with data and analysis
6. Provide a secretariat function
7. Execute core foresight activities
8. Coordinate training of Project participants
9. Manage external consultants
10. Disseminate regular progress reports and information to the S&T and other communities
11. Establish external and internal coordinating and liaison structures
12. Produce the final report in consultation with the Board
13. Develop the implementation plan to carry through recommendations.

An important part of foresight is the development of a sense of common ownership of the process. With that in mind, input from the broad community is essential.

As a project of government, the Foresight will be conducted through the usual mechanisms. Various functions of the Foresight will therefore be tendered out as the need arises.

Further information may be obtained by calling the Foresight Project office at:

Department of Arts, Culture, Science and Technology
Private Bag X894
Pretoria 0001

Tel: (012) 314-6467

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Further information may be obtained by calling the foresight project office on:

Department of Arts, Culture, Science and Technology

Private Bag X594

Pretoria 0001

Tel: (011) 381-047

6 Board Members

Dr B Clark (Chair)	Telkom
Mr JPL Alberts	Denel
Dr D Band	Premier Group
Mrs M Davison	South African Institute of Electrical Engineers
Prof B Gourlay	University of Natal
Mr R Jardine	Department of Arts, Culture, Science and Technology
Dr J Job	Sentrachem
Dr M Jeena	Department of Health
Mr Llew Jones	Altron
Prof G Lenyai	Technikon Northern Transvaal
Dr NM Magau	Development Bank of Southern Africa
Dr R Maharaj	University of Natal
Prof M Makgoba	National Science and Technology Forum
Dr R Marcus	Engineering Council of South Africa
Mr J Naidoo	National Economic Development and Labour Council
Prof N Ndebele	University of the North
Mr N Ngcaba	Department of Posts & Telecommunication
Ms B Njobe-Mbuli	Department of Agriculture
Dr A Patterson	CSIR
Prof M Ramphela	University of Cape Town
Dr Z Rustomjee	Department of Trade and Industry
Prof F Sellschop	University of the Witwatersrand
Mr P Steyn	Defence Secretariat
Mr C Strauss	Standard Bank
Dr R Stumpf	HSRC
Prof L Tager	Transnet
Mr J Tsotetsi	Multichoice
Prof C Viljoen	University of Stellenbosch
To be announced	Congress of South African Trade Unions

6 Board Members

Dr B Cori (Chair)	Dr B Cori
Mr J. Alberts	Mr J. Alberts
Dr D Bond	Dr D Bond
South African Institute of Electrical Engineers	South African Institute of Electrical Engineers
University of Natal	University of Natal
Department of Arts, Culture, Science and Technology	Department of Arts, Culture, Science and Technology
Secretary	Secretary
Department of Health	Department of Health
Atterton	Atterton
Technical Northern Institute	Technical Northern Institute
Development Bank of Southern Africa	Development Bank of Southern Africa
University of Natal	University of Natal
National Science and Technology Forum	National Science and Technology Forum
Engineering Council of South Africa	Engineering Council of South Africa
National Economic Development and Labour Council	National Economic Development and Labour Council
University of the North	University of the North
Department of Post & Telecommunication	Department of Post & Telecommunication
Department of Agriculture	Department of Agriculture
CSIR	CSIR
University of Cape Town	University of Cape Town
Department of Trade and Industry	Department of Trade and Industry
University of the Witwatersrand	University of the Witwatersrand
Defence Secretariat	Defence Secretariat
Standard Bank	Standard Bank
HSRC	HSRC
Forum	Forum
Mutichwa	Mutichwa
University of Stellenbosch	University of Stellenbosch
Congress of South African Trade Unions	Congress of South African Trade Unions