Bridging the Gap: The Social Sciences, Humanities, Science and Technology in Economic Development

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A report to the Prime Minister by
the Australian Science and Technology Council
May 1993
The Hon. P. J. Keating MP  
Prime Minister  
Parliament House  
CANBERRA ACT 2600

My dear Prime Minister

We have the honour of submitting to you a report "Bridging the Gap - The social sciences, humanities, science and technology in economic development". The purpose of this study by ASTEC has been to examine the contribution of the humanities and social sciences to economic development and their relationship with the natural sciences and technology, with a view to strengthening the mutually beneficial interactions of the social sciences and the humanities with science and technology.

ASTEC believes that there are significant contributions already being made but opportunities for a much expanded role are being denied by the Australian institutional framework supporting the development and application of knowledge which does not encourage the necessary interaction between the social sciences, humanities, natural sciences and technology. This report proposes changes and specific actions which should help to enhance this interaction, and to increase the contribution of the social sciences and humanities to economic development.

Yours sincerely

L. Michael Birt  
Chairman

For and on behalf of:

G.J. Clark  
A. Henderson-Sellers  
M. Jackson  
R. Johnston  
P.J. Laver (Deputy Chairman)  
J.G. McLeod  
D.J. Nicklin  
W.J. Peacock  
J.D. Vines
PREFACE

The broad issue of the relationship of the social sciences and the humanities to economic development was raised on a number of occasions by people consulted during the preparation of ASTEC's 1991 report entitled Research and Technology: Future Directions. The frequency with which the relationship was raised led ASTEC to report a perception amongst those consulted that:

Research in the social sciences and humanities seems unrelated to contemporary national concerns, and needs to be aligned more closely with economic and social imperatives.

The controversy which this statement produced reinforced ASTEC's belief that the issue required more detailed analysis.

Accordingly, the Council in March 1992 appointed a Working Group to examine the relationship of the social science and humanities, science and technology and economic development. The terms of reference for the study were set by ASTEC following consultation with a Reference Group of people with involvement in the social sciences and humanities.

Terms of reference

While recognising the wide-ranging benefits of the social sciences and the humanities to Australia's economic, social and cultural well-being, this study focuses on their contribution to economic development, and relationship with science and technology. In particular, ASTEC is to

- Make recommendations to strengthen the mutually beneficial interactions of the social sciences and the humanities with science and technology.
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SUMMARY AND RECOMMENDATIONS

The humanities and social sciences have a powerful influence in shaping the way we see our society and evaluate changes and developments in it. By permeating our understanding of issues, and shaping them through use of language and critical analysis, the humanities and social sciences achieve broad changes to people's views of the world. They have a strong ethical component which, when fused with analytical techniques, gives them great strength in tackling complex social questions.

In recent years, efforts to harness Australia's knowledge base to economic development have concentrated on science and technology. In ASTEC's view, more effective use could be made of the investment in these areas if the human, social and economic factors were better understood and this understanding integrated with scientific and technological advances.

The purpose of this study by ASTEC has been to examine the contribution of the humanities and social sciences to economic development and their relationship with the natural sciences and technology, with a view to strengthening the mutually beneficial interactions of the social sciences and the humanities with science and technology.

ASTEC believes that the potential of this relationship has not been fully developed. In particular, a major gap appears to lie between researchers in the humanities and social sciences on the one hand, and potential beneficiaries of their research (including the natural sciences and technology) on the other. The major causes of this gap identified by ASTEC are:

- inadequate communication between practitioners and researchers across disciplines, and with the general public;
- institutional impediments to trans-disciplinary research;
- the lack of an identified responsibility within government for broad policy-making on research in the social sciences and the humanities; and
- ineffective use of humanities and social sciences research in policy-making.

ASTEC believes that the Australian institutional framework supporting the development and application of knowledge does not encourage the necessary
interaction between the social sciences, humanities, natural sciences and technology. There are three groups who can help to bring about the necessary changes: those in government who plan for and fund research; research workers themselves; and users of research results. This report addresses recommendations to each of these groups. ASTEC believes that it is important for people who practice in or use all fields of knowledge to consider the implications of this report.

**The role of the humanities and social sciences**

The social sciences and humanities make direct and identifiable contributions to a wide range of economic activities. In addition to this direct economic contribution, the social sciences and humanities play a vital role by providing essential skills for successful business and economic development. As Australian industry becomes more international in perspective and increases its export activity, particularly into Asia, the social sciences and humanities will provide essential skills of language, cultural understanding and communication to underpin these activities.

Other, equally important contributions are made to the welfare of the community by routes which are not directly economic. There is a range of humanities and social science activities whose primary contribution to society's wellbeing is to the welfare or quality of life of the community, such as health, education and cultural activities.

Finally, and perhaps most significantly, the humanities and social sciences transmit, reinforce and challenge cultural and social values. They provide a basis for understanding and learning from the society in which we live and provide the context within which we can recognise and respond to change.

**The social sciences and humanities in Australia**

No comprehensive analysis exists of the strengths and weaknesses and core capacity of Australia's research effort in the humanities and social sciences. Many submissions to this study argued that there is a need for a comprehensive survey of this type. The absence of a detailed analysis of the strengths and weaknesses of research in the humanities and social sciences make it difficult to make detailed policy recommendations about the role, funding or organisation of the humanities and social sciences. This is a matter requiring the expertise of the whole research community, including the major organisations with an interest in the social sciences and humanities. Such a study would provide a basis for the Australian Research
Council to develop a strategy for research and training in the social sciences and humanities, which ASTEC believes is essential if policy-making in this area is to be improved

RECOMMENDATION 1

ASTEC recommends that, in order to strengthen Australia’s capacity to undertake strategic research, the Australian Research Council in wide consultation with interested bodies, support a study of the distribution, structure and concentration of the research effort of the social sciences and humanities in Australia, including research undertaken in the higher education, government and business sectors. The study should provide a basis for the Australian Research Council to develop a strategy for research and training in the social sciences and humanities.

Improved communication

The problems arising from change are increasingly complex and for their resolution require increased inputs from a variety of research groups. For research to be effective in this role, there is a need for improved communication between people across technical and cultural barriers.

In ASTEC’s view, scientific and technical specialists must acquire a broad understanding of the context within which their research is to be applied and the communications skills to identify and respond to the needs of possible users or beneficiaries of their research. Specialists in all disciplines (including the social sciences and humanities) must disseminate the essence of their research in a form capable of being understood by non-experts. Finally, all educated Australians need to acquire the ability to comprehend broad advances in knowledge in the social sciences, humanities, science and technology.

This may be achieved by postponing specialisation in education or by better dealing with the negative effects of specialisation once they have occurred. In ASTEC’s view, the present criteria for entry into university encourage specialisation at secondary school. The Schools Council of the National Board of Employment, Education and Training is currently examining the post compulsory years of schooling. This inquiry is a suitable mechanism to examine the pressures towards early specialisation and means to avoid the problem.
RECOMMENDATION 2

ASTEC recommends that the Schools Council of the National Board of Employment, Education and Training develop initiatives which will avoid the polarisation and lack of mutual understanding between students undertaking predominantly science/technology/mathematical subjects and those studying predominantly social sciences and humanities.

The other broad area of difficulty in communication is in making specialised knowledge available to the general public. ASTEC has previously recommended a four-year Government process to set national directions for Australian research and development. An important element of this process was wide consultation with government, the research community (including the social sciences and humanities), industry and other users of research. It was proposed that this should occur through workshops, submissions and a major conference. ASTEC reiterates its support for that process, and proposes that a large public conference be held every two years to look at issues in science, technology and engineering, with a proper integration of the social sciences and humanities.

RECOMMENDATION 3

ASTEC recommends that the support of the Prime Minister be sought for a biannual Science and Technology Outlook Conference to be organised by ASTEC and to include, inter alia, specific components addressing the interactions of social sciences and humanities with science and technology.

Impediments to achieving trans-disciplinary research

It has been argued that the most challenging advances in knowledge occur at the interface of different disciplines, sometimes leading to new disciplines. In addition, it is becoming increasingly necessary to draw upon knowledge from many disciplines in meeting the challenges and opportunities of modern society. Scientific or technological research, in particular, benefits from the inclusion of complementary work in the social sciences and humanities.

However, the structures which sustain training and basic research are essentially single-discipline in nature. They may be appropriate to basic research and to education but are not necessarily effective in supporting trans-disciplinary research. The guidelines for many Government research programs in the natural sciences and
engineering either discourage or specifically exclude the involvement of social sciences or humanities researchers. ASTEC considers that barriers to the involvement of social sciences and humanities are detrimental to the quality of the research supported by the programs and ultimately are contrary to their objectives.

RECOMMENDATION 4

ASTEC recommends that the Commonwealth Ministers responsible for Government research programs and initiatives such as the Cooperative Research Centres (CRCs) and Advanced Engineering Centres should amend the guidelines for such activities to allow support for proposals which include the social sciences and humanities, with a view to increasing their strategic impact. Future programs (including the next round of CRCs) should also allow support for proposals including the social sciences and humanities.

Some of the most difficult barriers to trans-disciplinary research occur within the higher education institutions themselves. ASTEC considers that institutional impediments to multi-disciplinary research need to be reduced and that this will require concerted action from Vice-Chancellors and others in universities as well as from the Australian Research Council.

RECOMMENDATION 5

ASTEC recommends that the Australian Research Council, in conjunction with the Australian Vice-Chancellors' Committee and in consultation with the Pro-Vice-Chancellors Research of all universities, identify impediments in current funding procedures which may discourage multi-disciplinary research and make any necessary changes in external and internal arrangements to remove such impediments.

A government focus for social sciences and humanities research

In ASTEC's view, there is an urgent need to improve the visibility of social sciences and humanities research issues within Government. In particular there is a need for a single coordinating and promotional body for social science and humanities teaching and research in order to improve collaboration among researchers and to increase the involvement and contribution of social sciences and humanities
researchers in examining issues of national significance. ASTEC considers that such a body would greatly benefit the research community and could promote improved interaction with other areas of research (including science and technology). The appropriate body to develop such a mechanism is the Australian Research Council, which is able to use its granting mechanisms to promote the development of networks in social sciences and humanities research.

RECOMMENDATION 6

ASTEC recommends that the Minister for Employment, Education and Training provide a reference to the Australian Research Council to develop a mechanism for the promotion and coordination of research and graduate training in the social sciences and humanities. The mechanism should:

- encourage researchers in the social sciences and humanities to develop networked research proposals on matters of strategic importance to the nation;
- act as a clearing house for information on social science and humanities research to facilitate access and participation by public and private sector bodies;
- co-ordinate the formation of research networks;
- identify emerging issues of significance where social scientists and humanists can contribute; and
- facilitate contacts between professional associations, learned societies and academies, and provide links to individual academics, to improve contributions to policy formation and public discussion.

Government departments use social science and humanities knowledge in developing policies in many areas. However, it is often difficult to integrate programs of social science and humanities research into the tight timetables of Government departments and the Budget cycle.

ASTEC considers that the existing structures need to be strengthened by giving more explicit attention to the social sciences and humanities requirements of Government departments and agencies. This will require identification of particular research needs and subsequent support for the organisation and funding of research and training in these areas. One particular step which would immediately give greater
prominence to social science and humanities research amongst other researchers would be to give greater attention to relevant social science and humanities issues during the sessions of the Prime Minister's Science and Engineering Council

RECOMMENDATION 7

ASTEC recommends that the Minister assisting the Prime Minister for Science request that the topics covered at the Prime Minister's Science and Engineering Council be widened to address specifically the role that humanities and social science research has played or could play.

The contribution of the social sciences and humanities community to policymaking

ASTEC believes that there is a need for a strong and confident articulation of the role of the social sciences and humanities in Australian society. The articulation of this role is not being carried out effectively at present. The major elements which ASTEC believes are required are: increased contributions to Government inquiries on particular topics where social sciences and humanities are essential elements; systematic analysis of the capacities of the social sciences and humanities community; increased public forums for discussion of social science and humanities research; and more effective lobbying to research funding bodies for the support of research.

There are a number of groups in the humanities and social sciences which could play a similar role to that carried out by groups advocating the interests of science and technology. These organisations include the Academies of the Humanities and Social Sciences, the Federation of Australian Social Science Organisations (FASSO) and the Federation's larger member bodies. The Academies have carried out this role in the past and need to take it up again. ASTEC commends the moves which they have made to create a higher public profile and a more direct interaction with government. ASTEC urges the Academies to continue this trend, particularly by making their symposia and forums accessible to a much wider audience. FASSO also has an important role to play, but this will require greater support from its member bodies.
RECOMMENDATION 8

ASTEC recommends that The Australian Academy of the Humanities, Academy of Social Sciences in Australia and the Federation of Australian Social Science Organisations should develop programs of activity which would increase their effectiveness in advocating the role and interests of the social sciences and humanities and to pursue additional support from government and other sources for these defined activities.
CHAPTER 1

THE IMPERATIVE OF CHANGE

All the really interesting, and for that read ‘difficult’, problems involve understandings from several disciplines yet we rarely try to solve them from that perspective.

Patrick Troy, ANU, 1992

1.1 A changing world

We live in a world of rapid change. In the last five years the political world-order has been transformed, the major economies have slowed in activity or entered recession and the need for changed human behaviour to ensure the long-term sustainability of present lifestyles has been recognised. New technologies are re-shaping the way we work, communicate, conduct wars, treat disease, entertain ourselves, and transact our finances. Information is expanding exponentially and computers have revolutionised the way we use it. Knowledge is not only increasing, but becoming increasingly specialised.

1.2 Framework for change

The opportunities and challenges which such a world presents to Australia are complex. They demand new ways of looking at the world, new kinds of knowledge and new ways of bringing different kinds of knowledge together. Knowledge is the key resource in modern societies; its acquisition and application are the motive power of social and economic development.

Australia is but one small part of the world. Other countries are also struggling to recast their economic base in a technologically advanced mould, oriented to external trade; to reconcile economic development and a fragile environment; and to maximise the welfare of their people. In considering how to achieve these national goals, in an international context, Australia needs to develop and use its intellectual, human and financial resources as effectively as possible. This entails an approach based on an enhanced awareness of the international context, a broader understanding of our society and an increased appreciation of the human factors in economic development.
In recent years, efforts to harness Australia’s knowledge base to economic development have concentrated on science and technology. In ASTEC’s view, more productive use could be made of the investment in these areas if the human, social and economic factors were better understood and this understanding integrated with scientific and technological advances.

In Australia and overseas, the emphasis on science and technology has, to a significant extent, been shaped by the assumption that investment in research will lead to products and hence economic growth. This linear model assumes that science has its origins outside society, that basic scientific discoveries are translated into technologies which then result in economic growth. However, this model is incomplete, since it takes no account of the mutual interaction between society and science and technology. A consequence of this thinking is that scientific research is supported by government, but industry fails to take up the results. This, the linear model presumes, arises from a failure on the part of industry. A more plausible explanation is that the social context in which the results of scientific research will be applied has not been adequately considered, including factors such as market demand and impacts on people.

Recognition of the value of research, and of users’ demand for it, has stimulated an increased integration of research with industry through, for example, the Industrial Research and Development Grants and the Cooperative Research Centres Program. Research which qualifies for support under these schemes is almost exclusively scientific and technological. However, innovation, and related government policy, are not merely about implementing new technology. Instead, technological change is shaped by the wider context of ‘social values, military imperatives, legislative and fiscal regulation and, crucially, prevailing market circumstances...’. The social sciences and humanities are essential elements of the process whereby science and innovation may be translated to economic and social well-being.

The humanities and social sciences have a powerful influence in shaping the way we see our society and evaluate changes and developments in it. By permeating our understanding of issues, and shaping them through use of language and critical analysis, the humanities and social sciences achieve broad changes to people’s views of the world. They have a strong ethical component which, when fused with analytical techniques, gives them great strength in tackling complex social questions.
While the humanities and social sciences are of undoubted value in contributing a broad knowledge of society, the term humanities and social science is generally used to describe an academic activity and an academic body of knowledge. Once humanities and social science research is applied, it is usually no longer recognised as such but becomes identified with its area of application (such as family issues, economic planning, etc.). The result is a lack of recognition in the general community of the broad contribution to knowledge and the wide utility of humanities and social science research.

In ASTEC's view, the complex interactions of knowledge, society, technology and change are of fundamental importance to Australia's future. The model of society which underlies much current thinking about science and technology policy is inadequate, and must be strengthened by a more explicit recognition of human and social factors. Hence, the purpose of this study is to examine the contribution of the humanities and social sciences to economic development and their relationship with the natural sciences and technology, with a view to strengthening the mutually beneficial interactions of the social sciences and the humanities with science and technology.

ASTEC argues that the Australian institutional framework supporting the development and application of knowledge does not encourage the necessary interaction between the social sciences, humanities, natural sciences and technology. The problem is most apparent in two areas. In the first place, people who have been trained in the social sciences and humanities working in government, business and the academic world have insufficient understanding of, or interest in, science and technology. Similarly, scientists and technologists tend to undervalue knowledge from the social sciences and humanities and the contribution which such knowledge could make to understanding the context of their own work. Changes are needed to encourage all parties to recognise that they can benefit from improved interaction. The second area of difficulty is that humanities and social science people do not see their own work as being a contribution to policy-making in society, or that humanities and social science knowledge itself shapes the minds of policymakers.

There are three groups who can help to bring about the necessary changes: those in government who plan for and fund research; research workers themselves; and users of research results. This report addresses recommendations to each of these groups. ASTEC believes that it is important that those who practice in or use all fields of knowledge consider the implications of this report. However, the report is not addressed only to social scientists, technologists, humanists or natural scientists.
ASTEC believes that the issues raised are relevant to all people with an interest in research in Australia and who wish to increase the knowledge and skills available to the nation.

1.3 Barriers to change

The key issues are introduced briefly in this chapter and then developed further in subsequent chapters. A limited number of examples have been used to illustrate the general themes.

While examining the relationship between the humanities and social sciences and the natural sciences and technology, ASTEC has formed the view that the potential of this relationship has not been fully developed. In particular, a major gap appears to lie between researchers in the humanities and social sciences on the one hand, and potential beneficiaries of their research (including the natural sciences and technology) on the other. The major causes of this gap identified by ASTEC are:

- inadequate communication between practitioners and researchers across disciplines, and with the general public;
- institutional impediments to trans-disciplinary research;
- the lack of an identified responsibility within government for broad policy-making on research in the social sciences and the humanities; and
- ineffective use of humanities and social sciences research in policy-making.

1.3.1 The challenge of communication

The ability of individuals and groups to communicate is central to the generation and transmission of our understanding of scientific, technological, economic and cultural phenomena. Researchers clearly need to be aware of the context of their work and the potential contribution of different kinds of knowledge. They also need to be able to explain the results of their research to a broad audience and to assist in its application or use. Thus, it is essential that specialists be able to talk to each other and to communicate effectively with other people who will use or be affected by their advances in knowledge. In ASTEC’s view, these abilities are not as fully developed in researchers as they need to be if the community is to benefit properly from its substantial support for research and scholarship.
Early specialisation in education leads to different world-views, languages and cultures between the social sciences and the humanities on the one hand and natural sciences and technology on the other. Barriers have developed by the time students are taught as undergraduates; major gaps in attitudes between arts and science or engineering students already exist and these become reinforced by the teaching they receive. Researchers tend to publish in scholarly journals of particular disciplines and are not rewarded for publishing in more popular titles. Academic excellence judged by peer review is the basis for rewards such as promotion and tenure. Similarly businessmen, scientists and technologists do not have the time to seek out, or the training to interpret, recent advances in social sciences and humanities which may be relevant to their needs. Where communication does occur, it tends to be on the basis of individual interest or networks, and often takes place from polarised positions.

1.3.2 Problems of achieving trans-disciplinary research

The complex problems facing a modern society increasingly call for solutions drawing on specialised knowledge from a diversity of fields. The scope of modern knowledge is so great, however, that researchers find they have to specialise and thus are generally unable to cover a whole discipline, let alone more than one. The need for trans-disciplinary research is compelling, but the capacity of any individual to carry out such research is severely limited.

The structure of funding programs, universities and government research institutes does not generally support trans-disciplinary research. The Australian Research Council, for example, provides a limited range of support; many other trans-disciplinary projects fall between the major granting schemes and fail to receive funding. Universities have developed along strongly disciplinary or faculty lines, even in institutions created in the 1960s and early 1970s, such as Flinders University, Griffith University and Macquarie University. The single-discipline culture remains strong, and is reinforced by academic reward systems and career structures.
1.3.3 Government responsibility for policy-making on research in the social sciences and the humanities

Government is a major funder of research and shapes the institutions which perform that research in the social sciences and the humanities. It is also a major user of research results, in areas such as the economy as a whole, health and welfare, issues related to Aboriginal people, and family law. This gives the Government a major interest in the organisation of the humanities and social sciences and in policy-making in relation to them. However, there is no focus for policy about the organisation, funding, research, or training and skills requirements in the same way that there exists a Minister with responsibilities for science, an ASTEC, a Prime Minister’s Science and Engineering Council or a Coordination Committee on Science and Technology.

In the United Kingdom, the Economic and Social Research Council provides the beginning of such a focus for the social sciences and humanities. In Australia, the closest equivalent is the Humanities and Social Sciences panel of the Australian Research Council (ARC), but the ARC funds many other disciplines and focuses mainly on research carried out in the higher education sector. The absence of a strong Government focal point for the social sciences and humanities in Australia means that it is much more difficult for the voice of the research community to be heard in Government.

In Australia, grants in support of humanities and social science research are generally small and major projects, particularly those across broad topics, rarely receive support. Furthermore, the structures which provide research funding do not support the longer-term, cumulative research needed by policy makers. The result is that major, cumulated studies of important social or economic issues are not available.

1.3.4 Use of humanities and social sciences research in policy-making

Sound government policy should be based on good information and on clear and effective consultations with the people or groups capable of contributing to policy as well as those affected by it. This principle applies as much to policy affecting
researchers in the social sciences and the humanities and users of their research results as to any other group in the community. However, there is not the same level of coherence in concept and voice about the humanities and social sciences which can influence broad policy-making as there is for science and technology. This makes policy-making in relation to the humanities and social sciences difficult and there is a significant risk that inappropriate policies may be adopted.

There are many groups who can argue forcefully (some more, some less successfully) in support of science and technology research. Up to the present, there have been no similar groups in the social sciences and humanities which have been able to act as effectively and to achieve the same degree of public prominence. Nevertheless, there are a number of groups which could play a similar role for the social sciences and the humanities. These include: the Academies of the Humanities and Social Sciences; the Federation of Australian Social Science Organisation; individual learned societies; the Humanities and Social Sciences Panel of the Australian Research Council; and research organisations. However, the humanities and social sciences Academies have significantly smaller budgets and staff numbers compared with the natural science and engineering Academies, and other organisations lack the funds to lobby effectively. Moreover, none of these organisations appears to regard contributing to policymaking at the Government level as a central role. The result is that the social sciences and humanities lack an effective voice in their relationship with government and receive less government support.

There also appear to be differences in self-perception between researchers in the social sciences and the humanities on the one hand and natural scientists or engineers on the other. The former tend to identify with their own discipline rather than with the broad group; for example, economists or demographers are less likely to classify themselves as social scientists compared with physicists or biologists who tend to think of themselves as scientists. This leads to fragmented lobbying and public presentation of work by social sciences and humanities researchers, based on disciplines, where it occurs at all.
1.4 Defining the framework

Australia needs a more integrated approach to knowledge and its application in order to meet the challenges and opportunities which confront the nation. In Chapters 4 to 7, this report examines the impediments to achieving such an approach, which are outlined in Section 1.3 above. Before doing so, it sets out, in Chapter 2, the very broad contribution to Australia's economic, social and cultural wellbeing made by the social sciences and the humanities. Chapter 3 examines the structure, organisation and funding of research in the humanities and social sciences.

Notes and references for Chapter 1

1. Submission No. 12, Professor Patrick Troy.
2. Economic and Social Research Council, Submission to the White Paper on Science and Technology, ESRC, United Kingdom, 1992.
CHAPTER 2

A FRAMEWORK FOR MANAGING CHANGE

The humanities have a central role in redefining and transmitting a common culture of objectivity, tolerance, judgement by relevant evidence, and fairness.

The British Centre for Industry and Higher Education, 1990

The social sciences could have an important function in ensuring that such debates [e.g. about the environment, industrial relations, living standards, new technology and personal privacy] are informed, rational and balanced, rather than proceeding in an atmosphere of hyperbole, hysteria and ignorance.

Institution of Engineers, Australia, 1992

2.1 The humanities and social sciences in Australian society

The humanities and social sciences are pervasive in our understanding of our society, dealing as they do with human individual and social behaviour and culture. No single analysis could examine all of their facets, and this study has restricted its scope to the relationship of the social sciences and humanities with the natural sciences and technology in economic development. In order to provide an appropriate context, it is necessary to start from a wider perspective which includes the diverse contributions of the humanities and social sciences to Australian society. This allows some insight into the social and human context in which the natural sciences and technology and the social sciences and humanities interact.

It is sometimes argued that the social sciences and the humanities are luxuries, to be supported only as a form of high culture appropriate to a civilised nation. ASTEC considers this view to be mistaken, and that it grossly underestimates the essential role played by the social sciences and humanities. It also overstates the economic benefit to be gained from the natural sciences, a significant amount of whose output should also be seen as having a cultural role. The humanities and social sciences transmit, reinforce and challenge cultural and social values. They provide a basis for understanding and learning from the society in which we live and provide the
context within which we can recognise and respond to change. They also offer understanding of human behaviour that can inform effective action by business, by government or by individuals.³

2.2 The contribution to the economy

The humanities and social sciences can contribute in many ways to the complex partnership of politics, economics and technology which is at the heart of the modern democratic industrial state - in the improvement of economic performance, the realisation of human potential, helping to maintain social cohesion, more effectively managing natural resources, strengthening national and global security and improving the process of government.⁴

The social sciences and humanities make direct and identifiable contributions to a wide range of economic activities. Examples where the social sciences and the humanities play an essential role by providing knowledge and key inputs include:

- health, education and public administration (which account for a quarter of production in Australia, far more than agriculture, forestry, fishing, mining and construction put together)⁵;
- international trade, resource mapping and analysis, transport planning and urban development (where human geography specifically has made contributions)⁶; and
- the export of educational services to overseas students (education exports were estimated to have generated about $1 billion in sales of education and consumer goods and services in 1990).⁷

These activities are all in the service sector of the economy. The value of service industries is often underestimated when compared with the more tangible resource-based and manufacturing industries which are more traditional, and better documented statistically. However services are by far the largest sector of the economy in both value and employment and tourism is now our biggest export earner. Increasingly, it is the intangible activities which form the basis of employment and wealth generation in the economy, and the social sciences and humanities have a particular contribution to make to them.
The performing arts, while outside the scope of this report, have important relationships with the humanities and social sciences, and are also very significant economically. Australia's cultural industries generate significant income and employment; for example through the local and international returns from _Neighbours_, _A Country Practice_, _Strictly Ballroom_ and _Crocodile Dundee_ and through local theatre, music and art galleries. The 'cultural industry' in Australia (including such diverse activities as museums, literature, music, visual arts, film and video, television and education) has been estimated as having a turnover in 1988 of $14 billion and employing over 200 000 people.

In addition to the direct economic contribution to particular activities or sectors of the economy, the social sciences and the humanities disciplines play a vital role by providing essential skills for successful business and economic development. ASTEC agrees with the Australian Academy of Technological Sciences and Engineering that there is a need for greater recognition of the importance of these disciplines. Strategic planning, labour relations, human and financial management, commercial law, business ethics and marketing are all linked closely to the social sciences or humanities. Bill Ford and Roy Kriegler among others have argued that successful economies such as Japan emphasise the importance of combining technology with a skilled and committed workforce. As Australian industry becomes more international in perspective and increases its export activity, particularly into Asia, the social sciences and humanities will provide essential skills of language, cultural understanding and communication to underpin these activities.

### 2.3 The contribution to society's well-being

The previous discussion has concentrated on the direct contribution of the humanities and social sciences to the economy. Other, equally important contributions are made to the welfare of the community as a whole by routes which are not directly economic. There is a range of humanities and social science activities whose primary contribution to society's wellbeing is to the welfare or quality of life of the community, such as health, education and cultural activities. It is important to recognise, though, that community welfare and economic development are interdependent and that delineating and understanding the links between them are major research and teaching tasks of the social sciences. For example, analyses of the mechanisms of resource and wealth distribution, population studies, analyses of the family and labour market dynamics are needed for social and economic planning.
Health-related research in the social sciences is primarily directed to the improvement of Australia's welfare, rather than contributing to economic development. The broader economic benefit derives from the fact that a healthier workforce requires fewer resources for medical care and is more productive and efficient. As a specific example, reducing alcohol-related illness, injury, crime and death will make significant saving for the economy through reductions in medical expenses and lost productivity.

Research and scholarship into Aboriginal and Torres Strait Islander issues in a range of social science and humanities disciplines (such as history, anthropology, languages) have been used to inform policy-making in support of social justice and equity, social cohesion and economic development.

Urban and regional development which fully meets the needs of communities also requires a wide range of knowledge from the social sciences. The evaluative and contextual role of the social sciences and the humanities can be used to ensure that economic and other developments are oriented toward the broadly defined well-being of Australian people. A complex mix of costs and benefits needs to be considered, including the immediate economic gains from development, the social needs of the existing and future community, the environmental impact, and demands for improved infrastructure, utilities and social support systems.

Judging the appropriate balance of benefits and costs is not a technical but a value-driven issue, one in which the different perspectives of scientific, technological, social and economic knowledge need to be brought together. The natural sciences, for example, can reveal the extent of environmental problems; the social sciences can analyse the social and economic problems which cause and flow from them; and a combination of the various disciplines can contribute to solutions or amelioration. Similarly, achieving improved energy efficiency or higher levels of innovation depend on the values and behaviour of people as well as on technology.

2.4 A critique of science and technology

An important role of the social sciences and the humanities, in some ways an extension of the role described above, is in providing a critique of science and technology. This is not the exclusive domain of social scientists, since people educated as natural scientists also look at the sciences with a critical eye. But all use
the investigative tools of the social sciences and humanities. Many of the examples discussed above indicate the value of the humanities and social sciences in framing the context within which other knowledge may be applied. Questioning the fit between that knowledge and its context and evaluating its purpose is an extension of that role of critic.

It is important to recognise the potential value of social sciences as an input to technological decision-making from the beginning. It is not enough to use social sciences to explain what went wrong after the event. There are substantial formal training and research programs in technology management, environment, history and philosophy of science, and science and technology in society. These provide both theoretical frameworks and people with practical research skills to support the integration of human and social considerations into the earliest stages of a technological project, to identify potential benefits and costs in advance. This should reduce the tendency for past mistakes, where retrospective analyses have been made, to be repeated.

2.5 Different ways of thinking

The preceding sections discussed the benefits to be gained by the application of substantive knowledge from the social science or humanities. A less tangible but equally important contribution by the social sciences and humanities is to provide education and training in the ability to think analytically, read critically and communicate effectively.

There is debate about whether these abilities are provided more effectively by education in humanities and social sciences or, conversely, whether people with innate abilities in these areas gravitate towards the humanities and social sciences and then develop them further. Nevertheless, such abilities appear to be a strength of graduates in these areas. For example, an analysis of career patterns in the US telecommunications company AT&T found that arts graduates had ‘superior administrative skills such as organising, planning, making decisions and being creative, than business or engineering graduates’.

In part, these abilities derive from the ways of thinking basic to the social sciences and humanities. While they employ scientific method, logic and empiricism, the humanities and social sciences also use interpretive and evaluative modes of thought.
to a greater extent than the natural sciences or technology do, particularly at undergraduate levels. The fact that the 'human sciences' typically deal with open-ended phenomena is believed to develop the capacity to handle ambiguity and uncertainty, to think and act in complex 'messy' situations, and hence to provide a training in interpretive and evaluative modes of thought. As noted earlier, the humanities and social sciences have a strong ethical component which, in combination with analytical techniques, give them great power.

These ways of thinking also derive, in part, from a liberal (as opposed to vocational) education. The liberal education in the classical Greek sense of this phrase attempted to equip students to assume the responsibilities of citizens for the management of a democratic society. In more general terms, a liberal education is one that develops students' higher abilities, especially those of critical analysis, and gives them a sense of heritage and of cultural and human values.

However, undergraduate education in Australian universities has tended towards the vocational, dealing in specialised knowledge, and leading to a particular career or profession. Nevertheless, later year students and graduates in Australian universities recognise the need for a broader perspective and an understanding of the society in which they practice. The shortcoming they see in their education is the absence of emphasis on humane, social or cultural studies.

These concerns were also prominent amongst people who made submissions to this study. They identified the central role for the social sciences and humanities as that of emphasising the humane, social and cultural aspects of the world. While the respondents' commentary was vigorous and varied, two key general functions for the social sciences and humanities were identified to be criticism and evaluation (ways of thinking), and providing a context for human activity. Put another way, the approach of the social sciences and humanities is to ask broad questions, to redefine social and economic problems, to bring a range of historical data to bear, and to arrive at innovative conclusions and possible options for change. In the complex world described in Chapter 1, the humanities and social sciences are able to provide a framework within which to understand and manage change.
Notes and references for Chapter 2


2. Submission No. 13, The Institution of Engineers, Australia.


5. Submission No. 74, Professor R. J. Blandy.

6. Submission No. 15, Institute of Australian Geographers, Inc.


9. Submission No. 11, the Australian Academy of Technological Sciences and Engineering.

10. Submission No. 2, Professor J. Sloan.


15. Submission No. 1, Dr G. Cumming.


17. This submission was from a university which asked that its comments not be attributed.
This chapter briefly outlines the organisation, funding and performance of the social sciences and the humanities in Australia. These factors underlie a number of the issues identified in Chapter 1 and provide important context for further discussion of those issues.

Throughout this report, ASTEC has used the three broad terms ‘natural sciences and engineering’, ‘social sciences’ and ‘humanities’. While there are some difficulties in comparing statistics between different fields, ASTEC has used the Australian Bureau of Statistics (ABS) ‘Fields of Science’; these fields are defined in Appendix D. In the term science and technology, ‘science’ is taken to mean natural sciences and engineering.

In a number of places in this chapter ASTEC has found it necessary to group together the social sciences and humanities as if they were a single entity. Despite making this aggregation, ASTEC recognises the diversity of disciplines within the group which ranges from economics to the arts, from psychology to philosophy. There are also common factors which differentiate them from the natural sciences and engineering, particularly in styles of thinking and research.

### 3.1 Statistical collection and analysis

Statistical analysis of the various disciplines requires decisions about which disciplines are included in the social sciences, the humanities, the natural sciences and engineering. Unfortunately practice not only varies between countries but even in Australia there are definitional differences between the Australian Research Council (ARC), the Department of Employment, Education and Training (DEET) and the Australian Bureau of Statistics (ABS). For example, psychology is included by some in the social sciences, by others in the natural sciences; law may be classified in the humanities or the social sciences. Analysis by discipline might overcome this problem but data at the necessary level of disaggregation are not available from DEET. Thus, the quantitative analysis given in this report is based on data which are not always strictly comparable. However, ASTEC considers that they are sufficient to provide the broad picture appropriate to the scope and generality of this report.
The expression ‘economic development’ was used in the ASTEC report *Research and Technology: Future Directions* and is one of the four ABS Socioeconomic Objectives by which research is classified, the others being national security (defence), community welfare and advancement of knowledge. The Socioeconomic Objective defines the end result of research in terms of the expected national benefit, rather than the discipline or immediate objective of the researcher. For example, research into cold fusion in the disciplines of physics and chemistry may contribute to economic development in the field of energy.

ASTEC believes that the ABS classification of Socioeconomic Objectives is too narrow for the purposes of a study of this type, and for other, wider issues. The classification leads to an understatement of the contribution of the humanities and social sciences to national security; highly relevant areas include international relations, development studies, the North/South debate and studies of Australia’s own political and social systems. The ABS classifications also do not allow an adequate statistical picture to be developed of such areas as the growth of services in the economy, and the importance of communication and information as economic activities.

ASTEC has previously had occasion in several of its reports, most recently in the report *Research and Technology: Future Directions*,¹ to criticise the completeness, comparability and adequacy of available statistical data. ABS has reviewed and changed its research and socioeconomic objectives classifications in response to these and other criticisms. ASTEC considers that the ABS has shown considerable willingness to consult with users of statistics, and is making significant improvements to classification schemes and data collection. However, there will be a continuing need for review, as the requirements of users change. In particular, there is a continuing problem arising from the fact that only the government sector is required to respond using the full detail of the classification; the higher education sector responds using abridged socioeconomic objectives and the business sector is not asked to classify its research at all.

### 3.2 University structures and reward systems

The current structure of modern Australian universities in the broad has emerged from the nineteenth century British model in which disciplines were divided, particularly between natural sciences and the humanities. These divisions have been
perpetuated and deepened as universities have become more specialised in professional training and also through an increased commitment to research (where different disciplines have different philosophic approaches and specific techniques). The result is a system with structures which separates areas which would otherwise have much in common (for example, palaeontology may have more in common in its research techniques with history than with, say, physics). Reward systems, which place differing value on scholarship versus research, and on differing methods and styles of research and communication, reinforce this separation.

3.3 Student enrolments and graduation

Statistics on student numbers are collected by the Department of Employment, Education and Training using a different classification from ABS Fields of Science. They have been reaggregated to make them as comparable as possible, but there is a large group of ‘Arts, Humanities and Social Sciences (AHSS)’ which cannot be disaggregated. Therefore the statistics in this section do not separate humanities and social sciences.

University enrolments increased very substantially during the 1980s. While AHSS still account for well over half the enrolments, there has been an increase in the proportion of enrolments in natural sciences and engineering. Completions in award courses show a similar pattern.

Figure 3.1 shows the differing patterns (in 1991) in the level of course achieved by students in natural sciences and engineering and AHSS respectively. The much higher proportion of doctorates in natural sciences and engineering may be accounted for by its requirement as a professional qualification in the natural sciences, particularly. This contrasts with the high proportion of graduate diplomas in education and business in AHSS.
3.4 Employment

Figure 3.2 illustrates the employment patterns of first degree graduates. The most striking feature of the figure is the very high proportion of humanities graduates in the 'Other' category; this reflects the high rate (about double the average) of Humanities and Languages graduates undertaking further study, and Visual Arts graduates working part time.4

Social Science and Natural Science and Engineering graduates are most likely to be working full-time. The aggregated figures conceal very marked differences between disciplines. For example, in Physics, only 19% of first degree graduates are in full-time employment; 67% are undertaking full-time study. This reflects the fact that a post-graduate degree is essentially a professional qualification (as noted above). In the aggregated figures this is offset however, by Medicine, where 98% of first degree graduates are in full-time employment (which is their professional requirement). The differences between individual disciplines are less marked in the Social Sciences.
Humanities graduates are more likely not to be working than social sciences or natural sciences and engineering graduates. This reflects the situation of Visual Arts graduates who are more than twice as likely as the average to be looking for work or to be unavailable for work. Again, the Social Sciences show less marked variations between individual disciplines.

Of those in full-time employment, more than half natural sciences and engineering and humanities and 42% of social science graduates are working in the private sector. More social science than natural sciences and engineering or humanities graduates work in the Education sector; this is not surprising, since the social sciences include teaching qualifications. Only about 25% of Humanities graduates work in Government, compared with 41% of natural sciences and engineering and 33% social sciences.
3.5 Granting bodies and other sources of funds

The year 1988-89 is the most recent year for which full ABS statistics were available across the range of funding sources and fields of research, and is the year used for all comparisons given in this section. The Commonwealth government in 1988-89 was the most important source of funds for natural sciences and engineering, social sciences, and humanities (75%, 83% and 97% respectively of total funds in each field). Natural sciences and engineering were less dependent on the one source, although only 8% of their funds were sourced from outside government. All sectors (government, industry, higher education) put the bulk of their effort into natural sciences and engineering research; business invested almost entirely in natural sciences and engineering research.

The Australian Research Council (ARC) is the only Commonwealth body providing grants for research in the social sciences and the humanities. The ARC (at that time the Australian Research Grants Scheme) expenditure in 1988 was $3.3 million for social sciences and $2.5 million for humanities (about 10% and 8% of total grant funds respectively). This compared with $186.9 million and $123.6 million expended in these fields in the government and higher education sectors from Commonwealth sources in 1988-89. Later figures from the ARC show that in 1991 grants for the social sciences totalled $5.3 million and for the humanities totalled $4.5 million. However, a large part of the funds supporting research in the social sciences and the humanities in the higher education sector comes from General University Funds (GUF). Changes in the organisation and funding of higher education have affected the ratio of ARC funding to that supplied through GUF, so the increase in ARC support is not as significant as it might appear.

The main funding sources for non-contract research in the social sciences and the humanities are Australian Research Council and the universities' discretionary funds. Key Centres and Special Research Centres and other forms of centre-based funding have been the main route for increased research funding in the humanities and social sciences. As universities' discretionary funds have come under increasing pressure, there has been a disproportionate effect on research in the social sciences and the humanities.

The increase in research performed through centres, whether in the natural sciences and engineering or the social sciences and humanities, has broadly been aimed at
strengthening strategic research or increasing research and training in areas of identified needs. However, there is no significant base for strategic research in the humanities or social sciences; there is no equivalent of the CSIRO or the Cooperative Research Centres (CRC) program.

The relatively small amount of funds channelled through competitive grants means that there is little opportunity to set priorities for research in these areas. Furthermore, the relatively reduced role of the funding bodies means that they have only a limited opportunity to increase linkages between users and performers of research. Little information is available about the amount of social science research performed under contract and hence directly related to user requirements, which makes it difficult to identify areas of demand.

In addition to research performed in universities and government, a significant amount of work is carried out in ‘think tanks’, independent centres and by consultants under contract. Much of this work is not captured in ABS statistics, and is not reported through the conventional means of books and journals.

In ASTEC’s view these statistics seriously underestimate the levels of strategic and applied research undertaken in the social sciences. Anecdotal evidence and arguments made to ASTEC suggest that the ABS survey questionnaire may predispose respondents to identify their work as basic research, devoted to the advancement of knowledge, rather than to identify its possible applications.

### 3.6 Where research is performed

Table 3.1 sets out the human resources devoted in 1988-89 to natural sciences and engineering, social sciences and humanities in each sector.

More than half the human resources devoted to research are located in higher education institutions. The next largest group (about a quarter of the total) is in the Commonwealth government.
Figure 3.3 R&D Expenditure Socioeconomic Objective by Field of Science

Figure 3.3 illustrates both the level of expenditure on fields of science and socioeconomic objectives, and the resources devoted to each objective within each field. Economic Development receives the largest proportion of the funds, mainly within the natural sciences and engineering, but with some in the social sciences. Because most funds go to natural sciences and engineering, it spends more on Advancement of Knowledge than other fields. However, with both the social sciences and the humanities a greater proportion of their expenditure is on Advancement of Knowledge; this is particularly marked with the humanities.
Table 3.1  Research and experimental development 1988-89: human resources devoted to R&D by field of science by sector of performance (person years)

<table>
<thead>
<tr>
<th>Field of Science</th>
<th>Commonwealth Government</th>
<th>State Government</th>
<th>Private Non-Profit</th>
<th>Higher Education</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural Sciences and Engineering</td>
<td>11 038</td>
<td>7 199</td>
<td>994</td>
<td>17 202</td>
<td>36 433</td>
</tr>
<tr>
<td>Social Sciences</td>
<td>459</td>
<td>390</td>
<td>74</td>
<td>4 606.</td>
<td>5 529</td>
</tr>
<tr>
<td>Humanities</td>
<td>0</td>
<td>52</td>
<td>0</td>
<td>3 094</td>
<td>3 146</td>
</tr>
<tr>
<td>Total</td>
<td>11 497</td>
<td>7 641</td>
<td>1 068</td>
<td>24 902</td>
<td>45 108</td>
</tr>
</tbody>
</table>

Note: This table excludes “Other Government”.

Most research in the social sciences and humanities is reported as being performed in higher education (83% and 98% respectively), with only a small amount of social sciences research undertaken in the government. A total of 459 people are identified as working in the Social Sciences in the Commonwealth. This appears to be a significant underestimate, given that the Treasury, Department of Finance, Economic Policy Advisory Council, Bureau of Industry Economics, Bureau of Immigration Research, the Industry Commission, Australian Bureau of Statistics, the Department of Employment, Education and Training, Department of Health, Housing and Community Services and ASTEC itself undertake research in the social sciences. Much of the work of these organisations is social science research but is not classified as such. The low figure appears to be an artefact of the classification scheme used by ABS, and reflects the attitudes towards the social sciences and humanities discussed in Chapter 1.

While the specialised bureaux are important, they are not as large as the major natural science research organisations such as CSIRO, Australian Nuclear Science and Technology Organisation or Defence Science and Technology Organisation. Nor do they perform longer-term strategic research in the way that CSIRO is able. Despite doubts over the validity of the ABS figures, the higher education sector is the main performer of social science and humanities research, particularly for longer-term research. Thus financial or other constraints in higher education will have a particularly marked effect on the social sciences and humanities.
3.7 Conclusions

In developing this report, ASTEC has noted that there has been no comprehensive analysis of the strengths and weaknesses and core capacity of Australia's research effort in the humanities and social sciences. The ARC's discipline review of the social sciences and the humanities was a welcome addition. However, it did not cover the full spectrum of research, and there is a continuing need for a broad review for Australia's capacity and performance in the social sciences and humanities.

Many submissions to this study agreed that there is a need for a comprehensive survey of research in the humanities and social sciences. There is no body in government obviously appropriate to tackle this task in the way ASTEC undertook the Profile of Australian Science and the analytical study The Core Capacity of Australian Science and Technology. The Australian Research Council could commission such a study, but the brief for it should go beyond the higher education sector. Bodies outside of government, such as the Academies, lack the resources to undertake the study on their own initiative and they are similarly academic in their focus.

The absence of a detailed analysis of the strengths and weaknesses of research in the humanities and social sciences make it difficult to argue for more (or less) funding for the humanities and social sciences or indeed to make any policy recommendations about their role and organisation. ARC discipline reviews are a good start but a more comprehensive analysis (in the style of the ASTEC studies referred to in the previous paragraph) is needed, including research undertaken outside the academic sector in research institutes and in firms. As several submissions pointed out, this is a matter requiring the expertise of the whole research community, including the major organisations with an interest in the social sciences and humanities. It should be funded jointly by them. The study provides a basis for the Australian Research Council to develop a strategy for research and training in the social sciences and humanities, which ASTEC believes is essential if policy-making in this area is to be improved.
RECOMMENDATION 1

ASTEC recommends that, in order to strengthen Australia's capacity to undertake strategic research, the Australian Research Council in wide consultation with interested bodies, support a study of the distribution, structure and concentration of the research effort of the social sciences and humanities in Australia, including research undertaken in the higher education, government and business sectors. The study should provide a basis for the Australian Research Council to develop a strategy for research and training in the social sciences and humanities.

Notes and References for Chapter 3

The simplicities of natural laws arise through the complexities of the languages we use for their expression.¹

Eugene Wigner

4.1 Problem-solving in a complex society

The problems arising from change are increasingly complex and for their resolution require increased inputs from a variety of research groups. For research to be effective in this role, there is a need for improved communication between people across technical and cultural barriers. The process of communication is multi-directional: getting information into the researcher and getting expert knowledge out to the wider public in a non-technical and useful form.

Researchers need to be aware of the broad social and sometimes historical context within which their work is supported or is to be applied. Particularly for applied research, they need to be able to listen to, understand and interpret the user's needs. Specialists also need to make their knowledge accessible to those with an interest in it. If applied research is performed for a particular purpose, the new knowledge must be conveyed in terms the potential user can understand. If the research is more strategic in nature, then dissemination of the knowledge to the wider community could be through general means such as the media. Such knowledge could be scientific (for example, about superconducting materials), or could be about advances in social sciences (such as new models of the innovation process) or the humanities (for example, the prehistory of Australia).

Researchers from different fields need to be able to work together when tackling specific, complex problems, bringing different knowledge to bear. A basic understanding of broad issues in the natural sciences and technology and the social sciences and the humanities is necessary for each in relation to the work of the other. This demands an ability to communicate effectively in a relatively non-technical way, as well as structures which are able to support trans-disciplinary fields. For example, if AIDS research is to be effective in controlling the spread of the disease, then contributions will be needed from epidemiology, sociology and psychology as well as medicine and virology.

²
This chapter focuses on the general issues of effective communication. The specific problems of trans-disciplinary research are examined in the next chapter. As discussed in Chapter 2 the so-called ‘higher abilities’ (critical analysis, lucid communication, cooperative group working) which are emphasised by employers as vital for success in computer science employment, are also essential for people from other disciplines if they are to communicate and work effectively. One engineer has summarised the situation for his profession as follows: ‘Engineers cannot function without communicating with people. If there is a single complaint that is levelled time and again against the modern engineering graduate, it is a general incapacity to satisfy this requirement’.  

4.2 A failure in communication

The scope of modern knowledge is so great that researchers find they have to specialise within a field and are generally unable to cover a whole discipline, let alone across more than one. This applies across all disciplines.

Specialisation in school education begins early, usually in Year 10 or its equivalent in most parts of Australia. It is quite possible for a student to focus entirely on science and mathematics, or on humanities subjects from that point onwards. This influences the development of attitudes, knowledge, ways of thinking, and communication skills. Early specialisation encourages the scientific or technological specialist in narrow substantive knowledge and linear thinking, and may limit verbal skills. This early acculturation forms attitudes which persist into professional life. Similarly those who specialise in humanities and social sciences continue to develop communications skills and general thinking abilities (in addition to specific substantive knowledge), but may retain a fear of science and technology.

Many submissions to this study argued that such a separation has significant costs. One consequence is a failure in understanding and communication across disciplines, and at its worst an adversarial attitude between them. Amongst the general public, the result is a deep suspicion of some aspects of science and technology (such as nuclear technology or gene technology) but a relatively uncritical admiration of others (such as medical research or space science). To the scientific or technical expert on the other hand, the benefits of a particular area of research may appear obvious, while the concerns may seem poorly based. However, the expert may lack the broad perspective needed to understand community concerns. The attitudinal and cultural reasons for such failures have been referred to earlier.
The costs associated with failure to communicate adequately with the users of new technology may be seen in an example from Telecom.³

Telecom implemented a new computer system used daily by several thousand operators. A study to identify problems with the system was carried out shortly after its introduction. Staff turnover at the time was 100% over three months and a significant amount of this staff discontent was attributed to working with the new system. A number of improvements were made in the light of the study, to make it easier to use. Subsequently staff turnover reduced to 20% in 12 months. A conservative estimate suggests that $6.5 million per annum could be saved by improving simple aspects of the user interface.

The humanities and social sciences have been relatively ineffective in disseminating their knowledge through the general media. The natural sciences and technology have a strong media presence in for example, the ABC Science Show, Beyond 2000, Quantum and science journalists in the major daily newspapers. A similar focus for the social sciences and the humanities is lacking. The arts (music, theatre, visual arts, literature) are quite well represented in the magazine pages of the press, on ABC Radio and on ABC and SBS television. However, research in the social sciences is often less well covered. Problems which are the province of the social sciences (such as crime, child abuse, industrial relations) are covered in the news media and experts are asked to comment, but there is little or no systematic reporting of research as such.

4.3 A recognised problem

In 1988, the Standing Committee on Education of the Australian Vice-Chancellors Committee (AVCC) expressed its concern to the AVCC over

shortcomings in the preparation of graduates from professional and science faculties and an increasing emphasis on utilitarian outcomes ...

(i) [their] limited critical and analytical capacities ... their lack of skill in the use of the English language, and for humanities graduates, their lack of facility with mathematical and scientific concepts:

(ii) little systematic knowledge or understanding of the history, economy, political system or social structure of the society ...
(iii) little encouragement ... to think about values concerning the connection of the profession with the wider community ... ⁴

The AVCC has thus already recognised many of the issues arising from early specialisation by graduates from professional and science faculties. Actions to improve the communications skills of students have been taken in both the secondary and tertiary education systems.

Skills in reading, writing and listening do not come naturally; they need to be taught. These skills could be more fully developed during secondary level education or taught through `remedial' classes in tertiary education once the problem presents itself. For example, Monash University provides additional communication classes for engineering and computing students in response to employer's concerns.

In recent years, the Commonwealth, State and Territory governments have been working together to develop national curriculum statements and profiles in eight areas of learning. The statements and profiles are due for completion in June 1993. More recently, the final report of the Mayer Committee, Putting General Education to Work: The Key Competencies Report, has concluded that there are seven Key Competencies that all young people need to enable them to participate effectively in the emerging forms of work and work organisation.

These are: collecting, analysing and organising information; communicating ideas and information; planning and organising activities; working with others in teams; using mathematical ideas and techniques; solving problems; and using technology. It is anticipated that a decision on the integration of key competencies into the general and vocational education systems will be mad by Ministers of Education and Ministers of Vocational Education, Employment and Training in July 1993. There have been some trial classes in Primary School Philosophy or Thinking which appear to promise good results.⁵ Training in humanities subjects helps to develop these skills.

There is also the more straightforward issue of learning to use clear language and to avoid unnecessary jargon. Technical language has developed: to convey the maximum information as compactly as possible; to minimise alternative interpretation of the information; and, sometimes, to maintain professional control over information or provide a protective distance from events. Medical jargon in particular combines compression and exactness with the necessity to protect the professional from constant exposure to the human emotions associated with illness and pain.
Difficulties arise when it is necessary to convey technical information to those who do not understand the language, particularly to those affected by it. Approaches which already address this problem include the development of Plain English legal and bureaucratic documents, the employment of science journalists to translate technical information for the public, and new approaches to medical education.

4.4 Solutions

In ASTEC's view, scientific and technical specialists must acquire a broad understanding of the context within which their research is to be applied and the communications skills to identify and respond to the needs of possible users or beneficiaries of their research. Specialists in all disciplines (including the social sciences and humanities) must disseminate the essence of their research in a form capable of being understood by non-experts. Finally, all educated Australians need to acquire the ability to comprehend broad advances in knowledge in the social sciences, humanities, science and technology.

This may be achieved by postponing specialisation or by better dealing with the negative effects of specialisation once they have occurred. In ASTEC's view, the present criteria for entry into university encourage specialisation at secondary school. The Schools Council of the National Board of Employment, Education and Training is currently examining the post compulsory years of schooling. This inquiry is a suitable mechanism to examine the pressures towards early specialisation and means to avoid the problem.

RECOMMENDATION 2

ASTEC recommends that the Schools Council of the National Board of Employment Education and Training develop initiatives which will avoid the polarisation and lack of mutual understanding between students undertaking predominantly science/technology/mathematical subjects and those studying predominantly social sciences and humanities.

At university level, the pressure in vocational education to maximise the substantive knowledge in courses, at the expense of 'inquisitive learning' and contextual understanding, has long-term adverse implications for the effectiveness of that education. It is important that adverse effects be avoided by teaching students in
ways which integrate and synthesise knowledge from various disciplines. Courses in science and technology, or the social sciences and humanities, need to involve analyses of issues in their full social or technical context. One institution which is following such an approach is the University of Canberra, which within three years will require all professional teaching to include the history, social context and ethical dilemmas facing the profession. Bond University currently includes ethical and cultural components in its first year courses.

The Institution of Engineers, Australia has developed national competency standards which require engineering graduates in the workforce to be proficient in written and oral communication. Experienced engineers are expected to demonstrate skills in communicating engineering information to non-engineering audiences. Initiatives of this sort, which place greater emphasis on communication skills, are important and should be pursued by other professional bodies.

The other broad area of difficulty is in making specialised knowledge available to the general public. In the short-term, it should be possible to improve the accessibility of technical information through: continued and improved use of the press and electronic media (particularly in relation to the humanities and social sciences); joint seminars and symposia on the part of academies and professional associations; more effective promotion of the annual ANZAAS conference; and contact with universities through public seminars. A possible model for initiatives by the social science and humanities research community is the joint Academies symposium held in April 1993 on changing patterns in scholarly communications. The symposium included speakers on advanced technology, economics, social science, humanities and literature.

In its report Setting Directions for Australian Research, ASTEC recommended a four-year process, including a White Paper, which would set national directions in Australian research and development. An important element of this process was a period of wide consultation with government, the research community (including the social sciences and humanities), industry and other users of research. It was proposed that this consultation should occur through workshops, submissions and a major conference similar to the major Outlook Conferences organised by the Australian Bureau of Agriculture and Resource Economics and the Bureau of Industry Economics. ASTEC reiterates its support for that proposal, and proposes that a large public conference be held every two years to look at issues in science, technology and engineering (including public policy).
ASTEC notes the recent demise of the National Science and Technology Analysis Group and the annual meetings which they have conducted since 1987. While the loss of a forum of this type is unfortunate, declining attendances made it difficult to continue the event. The problem of communicating with a broad audience is one which faces the natural sciences and engineering as well as the social sciences and humanities, and ASTEC believes that a major public event of the type outlined in the previous paragraph (but not competing with ANZAAS) would be useful. Such a conference should integrate the natural sciences, technology, social sciences and humanities.

RECOMMENDATION 3

ASTEC recommends that the support of the Prime Minister be sought for a biannual Science and Technology Outlook Conference to be organised by ASTEC and to include, inter alia, specific components addressing the interactions of social sciences and humanities with science and technology.

Notes and References for Chapter 4

5.1 Single or multi-disciplinary research?

Research and its purposes may be defined in many different ways. In ASTEC’s view, three equally important purposes for research are: to advance knowledge; to maintain and extend the knowledge base for the longer term; and to create opportunities in the immediate term.

It has been argued that the most challenging advances in knowledge occur at the interface of different disciplines, sometimes leading to new disciplines; examples include biochemistry and molecular biology. In addition, as previous chapters have discussed, it is becoming increasingly necessary to draw upon knowledge from many disciplines in meeting the challenges and opportunities of modern society. However, the structures which sustain training and basic research are essentially single-discipline in nature. These structures, which may be appropriate to basic research and to education, are not necessarily appropriate to support trans-disciplinary research.

As one submission put it,

We have first rate social and natural scientists and technologists and our humanities scholars are among the world’s best but we have chosen to operate as though they were in separate self contained worlds. The imperatives of political life and life in our academic and research communities are such that we have striven to define and protect disciplinary and territorial boundaries in such a way that the interfaces between them become ever harder to breach.

This comment identifies both institutional and cultural differences which inhibit development of a multi-disciplinary approach to the solution of problems.
5.2 The difficulties of achieving multi-disciplinary research

While institutional factors are often identified as impeding inter-disciplinary research, Bauer suggests that it is as much the innate differences between disciplines and their practice (their 'culture') that create the gap. The institutional differences have sprung up in response to such differences.

Bauer draws an analogy between disciplines and language groups; both derive from and feed into 'cultures'. This analogy is useful because it helps to clarify the nature of the problem in trying to achieve multi-disciplinarity. Just as German speakers have difficulty comprehending the English sentence 'that's not cricket' so, Bauer suggests, it is an unusual sociologist who can understand what a scientist means by 'objective' and an unusual scientist who understands how a sociologist can think of knowledge as 'constructed'.

The 'two cultures' identified by C.P. Snow may be more appropriately thought of as many cultures, each discipline having its own. 'Disciplines differ, not simply through being knowledge about different subjects, nor because they happen to use different methods for getting knowledge... [They] differ in epistemology, in what is viewed as knowledge, and ... over what sort of knowledge is possible...what is interesting and valuable.'

The first obstacle to overcome is the attitudes of individual researchers, who need to accept that other disciplines have relevant knowledge to contribute to their work. An example where researchers from varied backgrounds have worked together successfully is in the CSIRO Division of Water Resources based in Western Australia. The Division is working on solutions to a range of problems concerning water use and reclamation. It is unusual in that it not only has social scientists on staff, but also integrates their work in multi-disciplinary projects. One project which illustrates this integration is about salinity in the Kent River, Western Australia. It combines natural, physical and social science; the socioeconomic element of the project involves local land care and soil conservation groups and other potential users of the research results. The initiative to support projects of this type was taken by a former Chief of the Division, Ray Perry, in the mid 1970s when he saw the need and brought people with socio-economic skills into the Division. Staff in the Division are now strongly supportive of multi-disciplinary research.
Another example, which has both positive and negative elements, is AIDS research, which also involves many disciplines. Initially there were problems in achieving an appropriate institutional structure to support multi-disciplinary research, but these have been overcome. The key to this improvement appears to have been the appointment of a strong overall leader for the research, with a broad perspective on the different types of input needed for success. Details are given in the Case Study box.

The AIDS case study indicates the need for an appropriate structure to support diverse inputs to a complex research problem. However, it is more often the case that if researchers wish to work together, then the structure of funding programs tends to inhibit such cooperation and many trans-disciplinary projects fall between the major granting schemes. The Australian Research Council (ARC) has a trans-disciplinary panel to examine projects that fall between its other, discipline-based panels. This panel is able in principle to support large, multi-disciplinary projects: it has funds available ($600 000 was available in 1992-93) but these have not been taken up in recent years. However, researchers have a strong perception (based in many cases on past experience) that multi-disciplinary projects will not receive support and many experienced researchers have stopped making proposals. These people are often those who would be most capable of making high quality proposals for large, multi-disciplinary projects.

Universities historically have developed along strongly disciplinary lines. While there is now increased emphasis on interaction between disciplines in universities, there are still problems. Perhaps the most fundamental of these lies in the reward system. The reward system, operating through career structures, promotion and tenure, is based primarily on peer review within the single discipline structure. Evaluation of research achievement through mechanisms such as bibliometric analysis tends to be biased towards single-discipline research, since monographs and those journals which focus on multi-disciplinary research are often not included. Professional and learned societies also tend to be discipline-based. Graduate students (because of the single-discipline undergraduate structure and the career imperative to specialise) tend not to enter multi-disciplinary research; nor does the Australian Postgraduate Research Awards scheme encourage it.
Research in HIV-AIDS (Human Immunodeficiency Virus—Acquired Immune Deficiency Syndrome) is an example of a strategic program that includes basic biomedical, clinical, epidemiological and social sciences. There is evidence that the HIV-AIDS program in Australia has not only been successful according to the usual "academic" criteria (publications, peer review) but also that the research outputs have been applied to HIV-AIDS control; and have resulted in a reduction of spread of HIV and improved quality of life for those who are infected. The application of basic research to improved health outcomes has only been achieved by integrating the natural and social sciences.

The Commonwealth AIDS Research Grants Committee (CARG) was established in 1986 separately from NH&MRC where HIV-AIDS had been a special initiative area. Research was promoted by way of project grants, training awards and the establishment of National Research Centres in:

- virology
- epidemiology and clinical research
- social research

At the outset, research in the various disciplines (biomedical, clinical, social) was conducted more or less independently. There were tensions between the natural and social scientists in terms of priorities, resource allocation and criteria for judging the quality of effectiveness of research. This led to an insistence that the medical and social sciences be equally represented on committees and there were strong proposals to separate the resource allocation to separate groups (e.g. NH&MRC and ARC for social sciences).

In recent years attitudes have changed somewhat, partly due to a review process, but more likely because it became apparent that the solution to control of a lethal epidemic that is associated with private behaviours can only be achieved by cooperative research and measuring of success of research by control of infection.

Examples of cross-disciplinary research include and epidemiological/behavioural case control study of recently infected gay men; a combined clinical/behaviour cohort study of homosexual men in Sydney; and work in preparation for vaccine trials in Australia, which combines technical assessment of candidate vaccines with legal, ethical and social aspects of a trial.

In order to achieve this integration, it has been necessary for CARG to assess research in terms of intrinsic scientific merit relevant to overall control of HIV-AIDS. A crucial aspect of the CARG program has been to ensure the outputs of research are applied to policy and control programs. As well as being an allocations committee, CARG has also played a major role in formulating policy and establishing systems to monitor success. To establish a research program with effective, integrated inputs from a range of disciplines it is essential to have a strong leader with an active commitment to collaboration.

Case study AIDS research: a medical and social science partnership
Finally, multi-disciplinary research particularly requires an effective leader with broad skills. The AIDS case study and CSIRO Water Resources example demonstrate the importance of a leader who provides the initial impetus, promotes the concept, and brings together disparate parties in pursuit of a multi-disciplinary approach to a research problem. Such leaders are not common.

5.3 Demand for trans-disciplinary research

While there may be increasing recognition of the need for research which draws upon knowledge from many sources, this has yet to be expressed in terms of demand for research which is properly integrated into an effective program of trans-disciplinary research. Governments potentially have a strong need for such research in a number of areas, including population forecasting, regional and environmental planning and development of social welfare policies.

There has recently been an increase in regional and urban planning studies, in recognition of the distinctive problems and opportunities in particular regions or cities. These are increasing the demand, at a Government level, for trans-disciplinary research. A particular example is the Cape York Peninsula Land Use Strategy (CYPLUS) established by the Commonwealth and Queensland Governments in 1992. The aim of the strategy is to provide a basis for ecologically sustainable resource use and management in Cape York Peninsula. The strategy has three stages: data collection and analysis to ensure that broad scale information is available (including an analysis of cultural and social factors to ensure that community values and heritage are properly included); development of policies and guidelines for land use decisions; and review and implementation of the policies. The data gathering phase is supported by total funding of $7.65 million over three years. An important part of the study is the development of a geographic information system incorporating data obtained from a number of data collection and analysis projects. CYPLUS has suggested that the information collected should be used to identify and set priorities for further research into ecologically sustainable natural resource use according to the values of both Aboriginal and Torres Strait Islander and non-Aboriginal groups. A study of this broad nature involves a large number of contributions from many areas of research, including a significant amount of research in the social sciences and humanities.
5.4 Solutions

ASTEC considers that it is important for strategic research to include inputs from a range of relevant disciplines. The recommendations in Chapter 4 for improving communication between specialist researchers and wider communities should contribute to improving the climate for multi-disciplinary research of this type. Scientific or technological research, in particular, benefits from the inclusion of complementary work in the social sciences and humanities. For example, the Cooperative Research Centre for Waste Management and Pollution Control has found it valuable to involve social scientists in their research program.

However, the guidelines for many Government research programs in the natural sciences and engineering either discourage or specifically exclude the involvement of social sciences or humanities researchers. The guidelines for the Cooperative Research Centres, for example, indicate that the program will support research with a primary focus on the natural sciences and engineering and their application, though it was recognised that many Centres will be multi-disciplinary and may involve contributions from other disciplines. ASTEC considers that barriers to the involvement of social sciences and humanities are detrimental to the quality of the research supported by the programs and ultimately are contrary to their objectives.

RECOMMENDATION 4

ASTEC recommends that the Commonwealth Ministers responsible for Government research programs and initiatives such as the Cooperative Research Centres (CRCs) and Advanced Engineering Centres should amend the guidelines for such activities to allow support for proposals which include the social sciences and humanities, with a view to increasing their strategic impact. Future programs (including the next round of CRCs) should also allow support for proposals including the social sciences and humanities.

The analytical study recommended in Chapter 3, and subsequent development of a strategy for the social sciences and humanities, would be a natural vehicle for identifying priorities in research, including the need for major, trans-disciplinary studies. Research workers in the social sciences and humanities need to work with potential major users (particularly Government departments) to identify a number of large trans-disciplinary projects for which there would be significant demand. An
example of this approach is the cognitive science program supported by the Australian Research Council and major users of the research results. Such an approach, which places emphasis on identifying the demand for strategic research, should improve the prospects for support for major projects. The early involvement of social sciences and humanities researchers, and potential users of the research is essential.

In addition to these initiatives, solutions to the institutional impediments are needed. Some of the most difficult barriers to trans-disciplinary research occur within the higher education institutions themselves. Within many universities, for example, a proposal for multi-disciplinary centre has to be handled by one particular school or discipline. The view was expressed by a number of university researchers that university structures of this type inhibit the development of trans-disciplinary research. ASTEC considers that institutional impediments to multi-disciplinary research need to be reduced and that this will require concerted action from Vice-Chancellors and others in universities as well as from the Australian Research Council.

RECOMMENDATION 5

ASTEC recommends that the Australian Research Council, in conjunction with the Australian Vice-Chancellors' Committee and in consultation with the Pro-Vice-Chancellors Research of all universities, identify impediments in current funding procedures which may discourage multi-disciplinary research and make any necessary changes in external and internal arrangements to remove such impediments.
Notes and references for Chapter 5

1. The term trans-disciplinary is used most often in this report, although interdisciplinary or multi-disciplinary are also used. Each of these terms signifies a different intensity of collaboration (in decreasing order of intensity). ASTEC's use does not imply that one has greater merit than other.

2. Submission No. 12, Professor Patrick Troy, Australian National University. This point was made by many submissions in different ways.


6. This problem was identified in several submissions.

6.1 The need for change

This report began by identifying the imperative of change and the key role of knowledge in social and economic development. In recent years Australia, in common with many other countries, has looked to science, technology and research to help the nation to become internationally competitive, and has created government bodies to develop policy and programs in relation to these activities. However, Australia has yet to accept the important and complementary role of the social sciences and the humanities in providing the new ways of looking at the world and new kinds of knowledge. Nor have we been effective in finding new ways to bring together different kinds of knowledge, in particular to promote the mutual interaction of the humanities and social sciences with the natural sciences and technology.

6.2 The present framework

Policy-making by government depends, among other things, on information; an organisation or group of people is required to search out and to receive the information, to analyse it, to consider implications across relevant issues and to develop policy alternatives. At present, government structures do not exist to perform these functions in relation to social sciences and humanities research.

The social science and humanities have a profound influence on the thinking and actions of Government, but this is often not recognised. Perhaps the most pervasive influence occurs through 'knowledge creep', which is the cumulative, long-term effect of the social sciences and humanities through shaping of language and frameworks of thought and analysis. This influence was identified by the economist J. Maynard Keynes:
The ideas of economists and political philosophers, both when they are right and when they are wrong, are more powerful than is commonly understood. Indeed, the world is ruled by little else. Practical men, who believe themselves to be quite exempt from any intellectual influences, are usually the slaves of some defunct economist.¹

Government departments make explicit use of social science and humanities knowledge in formulating policies in many areas. Examples include the structure of the economy, health and welfare, aboriginal issues, family law, foreign affairs and defence. However, it is often difficult to integrate programs of social science and humanities research into the tight timetables of Government departments and the Budget cycle. Because such research is generally intuitive, qualitative and argument-based, and is rarely hypothesis-testing or experimental, it is difficult to complete research quickly or on a tight timetable. As a result, it is difficult to predict when research results will be available for use by policy-makers. It is also a feature of the social sciences and humanities that there is enormous diversity of views on any particular topic, which tends to fragment research and reinforce boundaries between disciplines.

A consequence of these features of social science and humanities research and its use in Government policy development is that there is no identifiable location for policy about the organisation or funding of the research which is so extensively used in these areas. There is no social sciences and humanities equivalent to the Minister for Science and Small Business, ASTEC, the Prime Minister's Science and Engineering Council, or the Coordination Committee on Science and Technology.

When developing policy for the national research system, the Australian Government does not explicitly (or even implicitly) integrate the humanities and social sciences with other areas of research. In contrast, Sweden's Research Bill targets areas of cultural and social research as well as science and technology, and the Japanese white paper on science and technology makes repeated reference to the importance of social issues.² As discussed in Chapter 3, much of the detailed information about Australia's research effort in social science and humanities is either incomplete or not available. As a consequence, the Australian Government is poorly informed about the capacity of the social sciences and humanities and has not identified its overall requirements for social science research.
In addition to the question of coordination and information-gathering across Government portfolios, there is the question of balance and emphasis in support for different areas of research. The disciplines under the Australian Research Council's social sciences and humanities panel perceive themselves as being disadvantaged in competing for research funds because they are grouped together, while the natural sciences and engineering are split into a number of separate panels. The total dollar value of all grants by the Australian Research Council (ARC) for research in the social sciences and the humanities is smaller than for other areas, despite the fact that the social sciences and humanities are more numerous in students and staff. The average ARC grant size is also smaller, but the success rate is not significantly different.

The ARC has recently received a ministerial reference to examine the balance of effort in Australia's academic research. This reference arose from the ASTEC study entitled Government Funding of Academic and Related Research in Australia which concluded that there is a considerable divergence in the funding priorities for different fields of research between Australia and other countries.3

In particular, ASTEC suggested that the ARC might usefully analyse the extent to which Australian national priorities correspond with the disciplinary distribution of spending on academic and relative research identified in the report. The ARC is updating the figures used in the ASTEC report and will be examining the distribution of social sciences and humanities research as well as other areas of work.

6.3 Conclusions

In ASTEC's view it would not be appropriate at this stage either to set up a separate bureaucracy for the humanities and social sciences research effort, or a separate ministry for research in the humanities and social sciences. However, there is an urgent need to improve the visibility of social sciences and humanities research issues within Government.

In particular there is a need for a single coordinating and promotional body for social science and humanities research in order to improve collaboration among social science and humanities researchers and to increase the involvement and contribution of social sciences and humanities researchers in examining issues of national significance.
A possible model is the Netherlands' University Institute for Coordination of Research in Social Sciences (SISWO), which was founded to promote social science research by extending co-operation among researchers in Dutch universities. The Institute has also come to function as a clearing house for information about international developments in the social and environmental planning sciences. SISWO's staff coordinate approximately 50 research groups, comprising more than 3000 Dutch researchers. Apart from engaging in research projects, these groups play an important role in the exchange of information. They develop research proposals, prepare trend reports, and evaluate research projects. Graduate teaching in the social sciences and humanities in the Netherlands is coordinated in a broadly similar way using a national structure.

ASTEC considers that a coordinating body for social science and humanities teaching and research, similar in function to that of SISWO, would greatly benefit the research community and could promote improved interaction with other areas of research (including science and technology). The appropriate body to develop such a mechanism is the Australian Research Council, which is able to use its granting mechanisms to promote the development of networks in social sciences and humanities research.

RECOMMENDATION 6

ASTEC recommends that the Minister for Employment, Education and Training provide a reference to the Australian Research Council to develop a mechanism for the promotion and coordination of research and graduate training in the social sciences and humanities. The mechanism should:

- encourage researchers in the social sciences and humanities to develop networked research proposals on matters of strategic importance to the nation;
- act as a clearing house for information on social science and humanities research to facilitate access and participation by public and private sector bodies;
- co-ordinate the formation of research networks;
- identify emerging issues of significance where social scientists and humanists can contribute; and
- facilitate contacts between professional associations, learned societies and academies, and provide links to individual academics, to improve contributions to policy formation and public discussion.
ASTEC considers that the existing structures need to be strengthened by giving more explicit attention to the social sciences and humanities requirements of Government departments and agencies. This will require identification of particular research needs and subsequent support for the organisation and funding of research and training in these areas. One particular step which would immediately give greater prominence to social science and humanities research amongst other researchers would be to give greater attention to relevant social science and humanities issues during the sessions of the Prime Minister's Science and Engineering Council.

RECOMMENDATION 7

ASTEC recommends that the Minister assisting the Prime Minister for Science request that the topics covered at the Prime Minister's Science and Engineering Council be widened to address specifically the role that humanities and social science research has played or could play.

Notes and references for Chapter 6

2. ASTEC, Setting Directions for Australian Research, AGPS, Canberra, 1990.
CHAPTER 7

THE CONTRIBUTION OF THE SOCIAL SCIENCES AND HUMANITIES COMMUNITY TO POLICY-MAKING

7.1 The need for the community to contribute

The previous chapter considered the need for a clearly identifiable location of responsibility for policy on the social sciences and the humanities within government. This chapter deals with the equally necessary location within the community of a body or bodies to interact with government.

Within a democracy, government is informed by a range of sources and it is important that one of those sources be the people affected by its decisions. Contributing to policy development is complex, time-consuming and resource-intensive. It is not simply a matter of submitting relevant information or views to government. It requires an understanding of the processes and cultures of government, a capacity to build networks, and to identify mutual interests and needs. It is important that the research community in the social sciences and the humanities contributes to the policy-making process, both as experts in particular fields (for example, a pre-historian may advise on traditional patterns of visits by offshore indigenous people to the north west of Western Australia) and as people affected by decisions (for example, demonstrating the effect of changes to university funding on library resources). This chapter concentrates on the latter role.

One particular feature which separates the social sciences and humanities from the natural sciences and engineering is the language used to describe the different forms of knowledge. English-speaking societies have developed different terms to refer to different forms of knowledge (as noted in Chapter 3), but many societies recognise the unity of knowledge by using just a single term for it. There is no exact equivalent in English for the broad concept conveyed in German by the word wissenschaft. Use of the word 'science' raises connotations of precision and verifiability, while the words 'social science' or 'humanities' raise connotations of imprecision and subjectivity. These broad attitudes in the general community make it difficult to achieve a proper recognition of the role which the social sciences and humanities can make to policy-making.
In relation to science and technology, there are many groups who can argue forcefully in support of science and technology and help to identify its needs. There is also a clearly identifiable public media presence for science and technology as well as a regular supply of news and analysis about science and technology in the media. This combination means there is a coherent concept and an effective public voice for science and technology which can influence policy-making in government and maintain a strong public presence.

The social sciences or humanities do not have a distinctive profile in the community. However, there are a number of groups in the humanities and social sciences which could play a similar role to that carried out by groups advocating the interests of science and technology. These organisations include the Federation of Australian Social Science Organisations (FASSO), the Academies of the Humanities and Social Sciences, individual learned societies, the Humanities and Social Sciences Panel of the Australian Research Council, and individual research organisations.

7.2 The Academies and FASSO

The Australian Academy of Science was established in 1959, the Australian Academy of the Humanities in 1969, the Academy of the Social Sciences in Australia in 1971, the Australian Academy of Technological Sciences and Engineering in 1976 and the Australian Academy of Design in 1990. The humanities, social sciences and design academies have significantly smaller budgets and staff numbers compared with the other academies and receive smaller government grants (Refer Table 7.1). This may reflect the earlier connection of the humanities and social sciences academies with the Department of Science, and a perception of a relatively low contribution to economic development. Certainly, in 1989-90 and 1990-91 after their transfer to the Australian Research Council, funding for the Australian Academy of the Humanities and the Academy of the Social Sciences in Australia increased by a much greater proportion than for the other two Academies. In addition to Commonwealth Government funding, the Academies receive support from other sources such as annual fees paid by Fellows, gifts and endowments and sales of publications.
TABLE 7.1 Features of learned academies (details for 1992)

<table>
<thead>
<tr>
<th>Academy name</th>
<th>Number of fellows</th>
<th>Commonwealth administrative grant $000</th>
<th>Total income $000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Humanities</td>
<td>232</td>
<td>218</td>
<td>263</td>
</tr>
<tr>
<td>Social Sciences</td>
<td>244</td>
<td>219</td>
<td>350</td>
</tr>
<tr>
<td>Science</td>
<td>265</td>
<td>215</td>
<td>3200</td>
</tr>
<tr>
<td>Technological Sciences and Engineering</td>
<td>413</td>
<td>255</td>
<td>638*</td>
</tr>
<tr>
<td>Design</td>
<td>268</td>
<td>130</td>
<td>333</td>
</tr>
</tbody>
</table>

* Includes a $112 000 International Relations Grant for Department of Industry Technology and Commerce.

The aims of the Academies are broadly to advance knowledge in their respective fields. In the case of the Academy of the Humanities, the objectives are (within the humanities): to advance knowledge; to encourage and support scholarship; to promote international relations and to act as a consultant and advisory body. The functions of the Academy of the Social Sciences in Australia are (within the social sciences): to encourage the advancement of knowledge; to foster and act as a coordinating group for the promotion of research; and to act as a consultant and adviser. Thus both Academies have explicitly set a role for themselves as a consultant and adviser in their respective fields, and to act in coordination and promotion. The four scholarly Academies maintain contact with each other through a consultative committee. This committee examines issues of common interest and has been able to catalyse the establishment of joint projects and conferences. The Academy of Design aims to provide a national focus for design in Australia, to advise government, industry and the community on matters relating to design and to represent the interests of all those involved in design in Australia.

The Academies are recognised by the Department of Employment, Education and Training as advisory bodies on educational and research matters, but their small budgets limit their effectiveness, particularly the Academies of the humanities and social science. Furthermore, submissions to ASTEC were divided about the potential contribution they could make. Some see the Academies as unrepresentative, a largely irrelevant 'club'; others see them as focal points of knowledge and ability. ASTEC has not examined this issue, nor did it see it as appropriate to do so. But the problem remains that, while their constituency is divided, the Academies will not be fully effective. In order to realise their potential, the Academies need to promote, develop and focus their respective constituencies.
The Federation of Australian Social Science Organisations (FASSO) was formed in 1988 and comprises a wide range of bodies with an interest in the social sciences. Member bodies range from the Statistical Society of Australia to the Australian Historical Association. FASSO was established to provide a link between people in the various fields of social science and to act as an additional voice for the social sciences in dealings with Government and in presenting social science to the general public.

However, FASSO has very limited resources and has taken a limited view of its role. If it is to be more effective in future, the Federation will need to address its limitations and to develop a greater coherence in its actions on behalf of the social sciences and humanities. Greater support from its member bodies will be essential.

7.3 Need for more effective contributions

The Academies and FASSO in general have a lower public profile than their counterparts in science and technology. One reason for this is the lack of a clearly identifiable location within government, as discussed in the previous chapter. The lack of such a focal point makes it difficult to engage in effective lobbying for the social sciences and humanities as an organised activity. However, there are some areas which can be strengthened within the community itself, through increased activity by the academies and professional associations.

The Academies tend to focus on the academic side of the social sciences and the humanities, while the professional associations and learned societies may include ‘applied’ researchers (as, for example, does the Australian Psychological Society). Some submissions to ASTEC suggested that these more focused, single-discipline groupings were more appropriate to interact with government. They have an important function in relation to their own specific membership and interests. However, many of these bodies lack the financial or membership strength to play a large role, nor can they argue the case on matters affecting the social sciences and the humanities research constituency as a whole. In lobbying government or developing a high public profile, a consolidated voice is both more effective and more widely representative. Thus, ASTEC believes that the Academies and FASSO need to be more active in the public promotion and advocacy of the interests of their communities.
The Australian Academy of the Humanities and the Academy of the Social Sciences in Australia have begun to move in appropriate directions. They need to build on this, focussing more on the world outside academe, reconsidering the breadth of their membership, and the ways in which they can reach out to the wider world. For example, the Australian Academy of the Humanities symposium Languages of Australia held in November 1992 included aspects of business and political language, with speakers drawn from outside academy membership. In 1988, the same Academy was able to obtain funding from Esso for a bicentennial historical project. However, such support is not easily obtained during more difficult economic circumstances.

Some submissions to ASTEC, and sources elsewhere have expressed the view (either directly or implicitly) that it is in some way inappropriate for researchers to deal directly with government, and in particular to lobby for their interests. In the current climate of fierce competition for Government research funds, such an attitude will ensure that support for the social sciences and humanities does not increase. The Hon. Barry Jones, Minister for Science, took the scientific community to task for the same attitude in 1986 when he castigated them as being the ‘wimpiest collection of lobbyists’ for their failure to support his efforts on their behalf. His words may have offended some, but the subsequent united action from the science and technology lobby changed the government’s behaviour towards science and technology. Farmers, health consumers and practitioners, small business people and many other groups inform government about their contribution to Australia’s economic and social well-being, about their needs and about their proposals for Australia’s future. This is all part of the legitimate political process. If the social sciences and humanities researchers do not do this on their own behalf, amid many competing voices, no one else will.

7.4 Conclusions

It is clear to ASTEC that there is a need for a strong and confident articulation of the role of the social sciences and humanities in Australian society. The articulation of this role is not being carried out effectively at present. The major elements which ASTEC believes are required are: increased contributions to Government inquiries on particular topics where social sciences and humanities are essential elements; systematic analysis of the capacities of the social sciences and humanities community; increased public forums for discussion of social science and humanities
research; and more effective lobbying to research funding bodies for the support of research. The Academy of Technological Sciences and Engineering has been very effective in a number of areas of similar interest to its constituent disciplines and could provide a useful model for consideration.

There are a number of groups in the humanities and social sciences which could play a similar role to that carried out by groups advocating the interests of science and technology. These organisations include the Academies of the Humanities and Social Sciences, the Federation of Australian Social Science Organisations (FASSO) and the Federation's larger member bodies. The Academies have carried out this role in the past and need to take it up again. ASTEC commends the moves which they have made to create a higher public profile and a more direct interaction with government. ASTEC urges the Academies to continue this trend, particularly by making their symposia and forums accessible to a much wider audience. FASSO also has an important role to play, but this will require greater support from its member bodies.

RECOMMENDATION 8

ASTEC recommends that The Australian Academy of the Humanities, Academy of Social Sciences in Australia and the Federation of Australian Social Science Organisations should develop programs of activity which would increase their effectiveness in advocating the role and interests of the social sciences and humanities and to pursue additional support from government and other sources for these defined activities.

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APPENDIX A: METHODOLOGY

A.1 Origin of the study

The broad issue of the relationship of the social sciences and the humanities to economic development was raised on a number of occasions by people consulted during the preparation of ASTEC's 1991 report entitled Research and Technology: Future Directions. The frequency with which the relationship was raised led ASTEC to report a perception amongst those consulted that:

Research in the social sciences and humanities seems unrelated to contemporary national concerns, and needs to be aligned more closely with economic and social imperatives.

The controversy which this statement produced reinforced ASTEC's belief that the issue required more detailed analysis.

Accordingly, the Council in March 1992 appointed a Working Group to examine the relationship of the social science and humanities, science and technology and economic development. Details of the membership of the Working Party and of ASTEC are given in Appendix C.

A.2 Terms of reference

Terms of reference for the study were set by the Council following discussions with the Academy of the Humanities and the Academy of the Social Sciences in Australia. The terms of reference are set out below.

While recognising the wide-ranging benefits of the social sciences and the humanities to Australia's economic, social and cultural well-being, this study focuses on their contribution to economic development, and relationship with science and technology. In particular, ASTEC is to

- Make recommendations to strengthen the mutually beneficial interactions of the social sciences and the humanities with science and technology.
A.3 Information gathering and consultations

The Working Party sought information from a range of sources, including through meetings with individual members of the social science and humanities research community and invitations to a large number of individuals and organisations to comment on an issues paper prepared by ASTEC. Submissions were received from 57 individuals and organisations, in response to an invitation in July 1992 to provide comments. Names of individuals or organisations who made a submission are given in Appendix B. People with an interest in the progress of the study were kept informed through the use of a Newsletter.

A.4 Preparation of report

A paper covering the main issues to be covered in the report was considered by ASTEC in October 1992, following contributions from the Reference Group. Drafts of the report, prepared by the Working Party, were considered by the Council at its meetings in February, March and April 1993. The final report was approved following the ASTEC meeting in April 1993.
APPENDIX B:

PEOPLE OR ORGANISATIONS MAKING A SUBMISSION

In total 140 groups were invited to make submissions to the study. The groups included 28 professional associations, 4 Academies, 53 academic bodies (universities and associated institutions), 27 Government bodies, 10 institutes, 11 industry bodies, 4 individuals and 3 from miscellaneous fields. The Australian Vice-Chancellors' Committee was invited to make a submission on behalf of all Universities but because of time constraints in assembling an integrated submission chose instead to provide submissions from individual universities.

<table>
<thead>
<tr>
<th>NAME</th>
<th>ORGANISATION</th>
<th>SUBMISSION NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr Geoff Gumming</td>
<td>Department of Psychology, LaTrobe University</td>
<td>001</td>
</tr>
<tr>
<td>Professor J Sloan</td>
<td>National Institute of Labour Studies, Flinders University of South Australia</td>
<td>002</td>
</tr>
<tr>
<td>Professor P B Dixon</td>
<td>Centre of Policy Studies, Monash University</td>
<td>003</td>
</tr>
<tr>
<td>Professor D Chappell</td>
<td>Australian Institute of Criminology</td>
<td>004</td>
</tr>
<tr>
<td>Professor C P Mackerras</td>
<td>Key Centre for Asian Languages and Studies</td>
<td>005</td>
</tr>
<tr>
<td>Professor Bill Melody</td>
<td>Centre for International Research on Communications and Information Technology</td>
<td>006</td>
</tr>
<tr>
<td>Professor R J Blandy</td>
<td>Institute of Applied Economic and Social Research</td>
<td>007</td>
</tr>
<tr>
<td>Dr Z Barnea</td>
<td>School of Physics, University of Melbourne (unsolicited)</td>
<td>008</td>
</tr>
<tr>
<td>Professor Tim Brown</td>
<td>Statistical Society of Australia</td>
<td>009</td>
</tr>
<tr>
<td>Professor Peter Sheehan</td>
<td>Academy of the Social Sciences in Australia</td>
<td>010</td>
</tr>
<tr>
<td>Dr Neville J McCarthy</td>
<td>Australian Academy of Technological Sciences &amp; Engineering</td>
<td>011</td>
</tr>
<tr>
<td>Dr Patrick Troy</td>
<td>Urban Research Program RSSS ANU (unsolicited)</td>
<td>012</td>
</tr>
<tr>
<td>Mr J H Kemp, Acting Chief Executive</td>
<td>Institution of Engineers</td>
<td>013</td>
</tr>
<tr>
<td>Dr Elspeth Young</td>
<td>Dept of Geography and Oceanography ADFA</td>
<td>014</td>
</tr>
<tr>
<td>Dr Morgan Sant</td>
<td>Institute of Australian Geographers, University of NSW</td>
<td>015</td>
</tr>
<tr>
<td>Professor D J Mulvaney</td>
<td>Australian Academy of the Humanities</td>
<td>016</td>
</tr>
<tr>
<td>Professor J E Clark</td>
<td>Pro Vice-Chancellors' (Research) Committee</td>
<td>017</td>
</tr>
<tr>
<td>Professor Max Neutze</td>
<td>Australian National University (personal)</td>
<td>018</td>
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<tr>
<td>Dr B Fisher</td>
<td>Australian Bureau of Agricultural &amp; Resource Economic</td>
<td>019</td>
</tr>
<tr>
<td>Professor Tony Coady</td>
<td>Australasian Association of Philosophy</td>
<td>020</td>
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<tr>
<td>Professor David Goodman</td>
<td>Asia Research Centre, Murdoch University</td>
<td>021</td>
</tr>
<tr>
<td>Professor Peter Sheehan</td>
<td>University of Queensland</td>
<td>022</td>
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<tr>
<td>Professor Kevin McConkey</td>
<td>Australian Psychological Society Ltd</td>
<td>023</td>
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<tr>
<td>Professor J Lo Blanco</td>
<td>National Languages and Literacy Institute of Australia</td>
<td>024</td>
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<table>
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<tr>
<th>NAME</th>
<th>ORGANISATION</th>
<th>SUBMISSION NUMBER</th>
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<tbody>
<tr>
<td>Ms Marie Keir for Dr John Stocker</td>
<td>CSIRO</td>
<td>025</td>
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<tr>
<td>Mr F S Hambly</td>
<td>Australian Vice-Chancellors' Committee (separate subs from 23 universities)</td>
<td>026</td>
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<tr>
<td>Geoff See for Mr G Taylor</td>
<td>Department of Employment, Education &amp; Training</td>
<td>027</td>
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<tr>
<td>Kate Funder</td>
<td>Institute of Family Studies (unsolicited)</td>
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<tr>
<td>Mr Frank Fisher</td>
<td>Department of Geography and Environmental Science, Monash University</td>
<td>029</td>
</tr>
<tr>
<td>Professor Deryck Schreuder</td>
<td>ARC discipline panel on the Social Sciences and Humanities</td>
<td>030</td>
</tr>
<tr>
<td>Dr David Williamson (for Mr N Stevens)</td>
<td>Department of Industry, Technology and Commerce</td>
<td>031</td>
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<tr>
<td>Mr Bruce Wilson</td>
<td>Union Research Centre on Office Technology (unsolicited)</td>
<td>032</td>
</tr>
<tr>
<td>Mr Don Barrett</td>
<td>University of Queensland Academic Staff Association (unsolicited)</td>
<td>033</td>
</tr>
<tr>
<td>Mr K J Morgan</td>
<td>The University of Newcastle</td>
<td>034</td>
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</table>

### Submissions Received - (provided to the Australian Vice-Chancellors' Committee)

- Curtin University of Technology
- The University of New England
- The University of Southern Queensland
- James Cook University
- The Flinders University of South Australia
- The University of Adelaide
- Edith Cowan University
- University of Wollongong
- The University of Canberra
- Queensland University of Technology
- Murdoch University
- University of Western Sydney Nepean
- University of Western Sydney Macarthur
- Charles Sturt University
- Deakin University
- Royal Melbourne Institute of Technology
- Swinburne University of Technology
- La Trobe University
- The University of Western Australia
- Monash University
- Griffith University
APPENDIX C: MEMBERSHIP OF ASTEC, WORKING PARTY AND REFERENCE GROUP

C.1 Members of ASTEC

Members of ASTEC in April 1993, when the report of this study was approved by the Council, were:

Professor Michael Birt, AO CBE FTS
Chairman

Dr Gregory J Clark, FTS
Director Science and Technology
IBM Australia

Professor Ann Henderson-Sellers
Director
Climatic Impacts Centre
Macquarie University

Ms Margaret Jackson
Chairman
TAC Insurance

Professor Ron Johnston, FTS
Director
Australian Centre for Innovation
and Industrial Competitiveness
University of Sydney

Mr Peter Laver, FTS
General Manager
External Affairs
The Broken Hill Proprietary Co Ltd

Professor Jim McLeod, AO FAA FTS
Department of Medicine
University of Sydney

Professor Don Nicklin, FTS
Professor of Chemical Engineering
University of Queensland

Dr James Peacock, FRS FAA FTS
Chief
CSIRO Division of Plant Industry

Mr John Vines
Executive Director
The Association of Professional Engineers, Australia

C.2 Working Party

Members of ASTEC who were appointed in March 1992 to form the Working Party were:

Mr Peter Laver (convener)
Professor Ron Johnston

In addition, Professor Alice Tay and Professor Ashley Goldsworthy were members of the Working Party until 1992 (when their membership of ASTEC expired).

Ms Elizabeth Smith was Secretary to the Working Party from March 1992 until March 1993; Dr Martin Wardrop completed the editing of the report.
C.3 Reference Group

To ensure effective communication with a broad cross-section of the social sciences and humanities community, ASTEC invited a number of people to join a Reference Group for the study. Members of the Reference Group were:

Professor Don Aitkin  
Vice-Chancellor  
University of Canberra

Professor Richard J. Blandy  
Director  
Institute of Applied Economic and Social Research  
University of Melbourne

Ms Heather Carmody  
Executive Director  
Council for Equal Opportunity in Employment

Professor Max Coltheart  
School of Behavioural Sciences  
Macquarie University

Mr John Gibbins  
Partner  
KPMG Peat Marwick

Professor Stephen Hill  
Centre for Research Policy  
University of Wollongong

Professor Graeme Hugo  
Department of Geography  
University of Adelaide

Mr Robert Kynaston  
Director  
Abcon Services

Professor Jane Marceau  
Urban Research Program  
Research School of Social Science  
Australian National University

Professor Millicent Poole  
Pro-Vice-Chancellor (Research)  
Queensland University of Technology

Professor Deryck Schreuder  
Associate Director  
Humanities Research Centre  
Australian National University

The Reference Group met with the ASTEC Working Party on four occasions (October 1992, November 1992, February 1993 and April 1993) to discuss the scope and terms of reference for the study, the major issues to be considered, and finally to comment on drafts of the text of the report.

ASTEC is grateful for the generous contribution of knowledge and time by members of the Reference Group to the study. However, ASTEC wishes to stress that the views expressed in this report are solely those of the Council and do not necessarily reflect the views of individual Reference Group members.
Throughout this report, ASTEC has used the broad groups 'natural sciences and engineering', 'social sciences' and 'humanities'. For more detailed analysis, the Australian Bureau of Statistics of 'Fields of Science' have been used (see Box 1). In the term science and technology, 'sciences' means natural sciences and engineering.

<table>
<thead>
<tr>
<th>Humanities</th>
<th>Social Sciences</th>
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<tbody>
<tr>
<td>language and literature</td>
<td>economics and commerce</td>
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<td>historical studies</td>
<td>political sciences</td>
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<td>social studies</td>
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<td>religious studies</td>
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<td>other humanities</td>
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<td>education</td>
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<td>other social sciences</td>
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Box 1 ABS Fields of Science

The term 'economic development' is one of the four broad ABS Socioeconomic Objectives by which research is classified; the detailed objectives are set out in Box 2. The Socioeconomic Objective defines the end result of research in terms of the expected national benefit, rather than the discipline or immediate objective of the researcher.

<table>
<thead>
<tr>
<th>National Security (defence)</th>
<th>Community Welfare</th>
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<tbody>
<tr>
<td>Economic Development</td>
<td>Urban and regional planning</td>
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<td></td>
<td>environment</td>
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<tr>
<td>agriculture</td>
<td>health</td>
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<tr>
<td>forestry and fisheries</td>
<td>education</td>
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<tr>
<td>mining (prospecting and extraction,</td>
<td>welfare</td>
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<tr>
<td>including energy sources)</td>
<td>community services nec</td>
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<tr>
<td>manufacturing</td>
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<tr>
<td>construction</td>
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<td>Earth, ocean and atmosphere</td>
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<td></td>
<td>nec</td>
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<td></td>
<td>general advancement of knowledge</td>
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