

Introduction

- 1.1 The end of the twentieth century has been characterised by a further opening up of the world economy and the growth of the knowledge-based economy.¹ In this environment, innovation is critical to enhanced productivity, economic growth and global competitiveness. There is increasing recognition of the importance of innovation to secure Australia's future economic growth, environmental sustainability and social well-being.²
- 1.2 In response to this, in 2001 the Australian Government introduced its five-year (2001–02 to 2005–06) innovation strategy, *Backing Australia's Ability – An Innovation Action Plan for the Future (BAA)*, with a funding commitment of \$3 billion.³
- 1.3 *BAA* is intended to stimulate innovation through the provision of a comprehensive range of integrated initiatives targeting research, commercialisation and skills development.⁴
- 1.4 Since the introduction of *BAA* a number of government reviews and a parliamentary committee inquiry have examined aspects of the Australian Government's innovation policy framework. This review

- 1 Knowledge-based economy describes trends in advanced economies towards greater dependence on knowledge, information and high skill levels, and the increasing need for ready access to all of these by the business and public sectors.
- 2 Organisation for Economic Co-operation and Development (OECD) 2000, *A New Economy? The Changing Role of Innovation and Information Technology in Growth*, p. 7.
- 3 Commonwealth Government 2001, *Backing Australia's Ability – an Innovation Action Plan for the Future*, p. 14.
- 4 Commonwealth Government 2001, *Backing Australia's Ability – an Innovation Action Plan for the Future*, p. 14.

process is a vital mechanism for refining policy initiatives and assessing the effectiveness of programs in achieving their objectives.

- 1.5 In June 2003, a report by the House of Representatives Science and Innovation Committee (40th Parliament), *Riding the Innovation Wave: The Case for Increasing Business Investment in R&D*⁵, was released. The report inquired into the commitment of Australian business to research and development (R&D) and considered ways to improve collaboration between publicly funded research institutions (PFRIs)⁶ and the private sector. It also examined the drivers for major international business investment in Australian R&D, and suggested improvements to the Australian Government's R&D support initiatives and programs.
- 1.6 A significant element of the Australian Government's March 2004 response to the recommendations of the House of Representatives report was its reference to the 2003 science and innovation mapping exercise⁷ and the impact of its findings on the evaluation and future development of BAA.
- 1.7 The 2003 *Mapping Australian Science and Innovation Report* identified strengths, weaknesses and gaps in Australia's science and innovation performance, complementarities and areas of possible greater cooperation between activities of the Australian Government and those of the states and territories.
- 1.8 The report indicated that Australia provides an exceptionally strong contribution to the development of scientific knowledge, but has had limited visibility and impact on the development of world technologies.⁸ In addition, indicators suggested that relatively few Australian businesses are strong developers of innovative new technologies and have been successful in commercialising their innovations.⁹

5 House of Representatives Standing Committee on Science and Innovation 2003, *Riding the Innovation Wave: The Case for Increasing Business Investment in R&D*, Canberra.

6 Publicly funded research institutions (PFRIs) include all Australian universities and publicly funded research agencies (PFRAs) including Australian Institute of Marine Science, Australian Nuclear Science and Technology Organisation, Commonwealth Scientific and Industrial Research Organisation, Defence Science and Technology Organisation.

7 Australian Government 2003, *Mapping Australian Science and Innovation: Main Report*.

8 Australian Government 2003, *Mapping Australian Science and Innovation: Main Report*, p. 72.

9 Australian Government 2003, *Mapping Australian Science and Innovation: Main Report*, p. 12.

- 1.9 Following the publication of the *Mapping Australian Science and Innovation Report*, an additional \$5.3 billion was committed in the 2004 Budget to extending BAA until 2010–11. The program extension, titled *Backing Australia's Ability – Building Our Future through Science and Innovation* or *BAA-II*, commences in 2006–07.¹⁰ It has been stated that many of the weaknesses and gaps identified in the *Mapping Australian Science and Innovation Report* will be addressed through *BAA-II*.
- 1.10 Despite this substantial Government investment and subsequent reviews, there remain concerns regarding the capacity of Australian business and research agencies to successfully innovate.

Inquiry into Pathways to Technological Innovation

- 1.11 On 16 March 2005 the then Minister for Science and Education, the Hon Dr Brendan Nelson MP, referred to the House of Representatives Standing Committee on Science and Innovation an inquiry into pathways to technological innovation.
- 1.12 Under the terms of reference for the inquiry, the Committee was asked to inquire and report on:
- ... Australian technological innovation and pathways to commercialisation, with particular reference to examples of successful Australian technological innovations that demonstrate strategies to overcome potential impediments and factors determining success.
- 1.13 The Committee sought insights into approaches used by successful innovators to meet the challenges associated with technological innovation, and strategies applied to overcome impediments and barriers. To assist in its inquiry the Committee requested case studies illustrating the pathways leading to successful technological innovation, and additional information relating to:
- pathways to commercialisation;
 - intellectual property and patents;
 - skills and business knowledge;
 - capital and risk investment;

10 Department of Education, Science and Training, *Submission No. 20*, p. 6.

- business and scientific regulatory issues;
 - research and market linkages;
 - factors determining success; and
 - strategies in other countries that may be of instruction to Australia.
- 1.14 With only a short time remaining until funding for the initial five-year *BAA* commitment concludes and commencement of the extended *BAA-II*, the Committee considers that this is an appropriate time to review Australia's innovation performance and identify potential impediments to technological innovation.
- 1.15 The timing of the inquiry also enables an assessment of the effectiveness of the range of Australian Government initiatives implemented to improve Australia's innovation performance, including consideration of reviews of *BAA* programs which have been released since the publication of *Mapping Australian Science and Innovation*.

Conduct of the Inquiry

- 1.16 The Committee received 99 submissions and five supplementary submissions from a range of individuals and organisations. The submissions are listed at Appendix A. Additional material relevant to the inquiry which was received as exhibits is described in Appendix B.
- 1.17 The Committee held ten public hearings in Sydney, Canberra, Melbourne and Adelaide from May 2005 to December 2005, and two inspections in Melbourne and Sydney in April and May 2005 respectively. A list of the hearings and witnesses is at Appendix C.

Structure of the Report

- 1.18 A number of common themes or consensus issues emerged from the evidence. These consensus issues are identified in the introduction to each of the chapters and form the structural basis for consideration of pertinent issues. Committee comment on consensus issues and related matters are included in the text of each chapter.

- 1.19 Chapters two and three provide context and background for consideration of issues associated with innovation and commercialisation. Chapter two begins by examining various understandings of the concepts and definitions of innovation and commercialisation. The chapter reports on Australia's innovation and commercialisation performance, examining the metrics of innovation and commercialisation, and includes consideration of issues associated with data collection, analysis, comparison and interpretation.
- 1.20 Chapter three provides an overview of the Australian Government's major innovation and commercialisation policies. It includes consideration of evidence relating to the balance of support measures for key elements of the innovation system. The chapter also reviews the innovation program framework and issues related to its effectiveness, accessibility and coordination of support initiatives.
- 1.21 Chapters four and five consider factors that form the basis of Australia's innovation capability and competency. Chapter four examines issues raised with regard to human capital and the foundations of knowledge, personal attributes and skills that contribute to innovation. This chapter considers scientific, engineering and technology skills, as well as business and entrepreneurial skills.
- 1.22 Chapter five examines knowledge flows and includes consideration of issues relating to the appropriate management of knowledge. The chapter also considers the role of linkages and collaborations in supporting innovation via the facilitation of knowledge flows between sectors, industries and businesses.
- 1.23 Chapter six examines a range of Australian Government innovation support programs and fiscal initiatives that target specific stages or elements of innovation. The chapter reviews issues arising from the evidence with regard to various support measures directed to basic research, business R&D and commercialisation activities including marketing, sales, business expansion and export.

