Western Australian

Technology & Industry

Advisory Council

Annual Activity Report

July 2006 – June 2007

Western Australian
TECHNOLOGY & INDUSTRY
ADVISORY COUNCIL

WESTERN AUSTRALIAN
TECHNOLOGY & INDUSTRY ADVISORY COUNCIL

Annual Activity Report

July 2006 – June 2007

WESTERN AUSTRALIAN
TECHNOLOGY & INDUSTRY ADVISORY COUNCIL

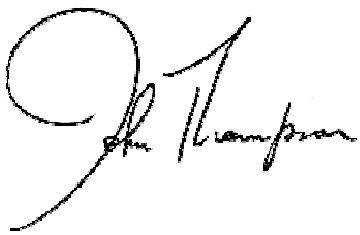
Hon. Francis Logan MLA
Minister for Energy; Resources; Industry and Enterprise
10th Floor
216 St George's Terrace
PERTH WA 6000

Dear Minister

On behalf of Council I am pleased to submit the Annual Activity Report for the Western Australian Technology and Industry Advisory Council (TIAC) for the year ending 30 June 2007, for your information, and subsequent presentation to Parliament in accordance with Section 26(1) and Section 26(2) of the Industry and Technology Development Act 1998.

Council has also reported through the Department of Industry and Resources' Annual Report and Financial Statement in accordance with Section 26(3) of the Industry and Technology Development Act 1998 in compliance with Section 62 of the Financial Administration and Audit Act 1985.

Yours sincerely



JOHN THOMPSON
CHAIRMAN

1 July 2007

On behalf of Council Members:

Ms Sharon Brown	Ms Wendy Newman	Ms Vivienne Snowden
Dr Jim Limerick	Mr David Singleton	Professor Lance Twomey AO
Mr Rob Meecham	Mr Graeme Rowley AM	

Table of Contents

WESTERN AUSTRALIAN
TECHNOLOGY & INDUSTRY ADVISORY COUNCIL

Part 1

1.1 Introduction

The Western Australian Technology and Industry Advisory Council (TIAC) was created by legislation in 1987 (Technology Development Amendment Act - No. 32 of 1987) and was continued under Section 20 of the Industry and Technology Development Act 1998.

TIAC was preceded by the Technology Review Group 1978-1983, and the Science, Industry and Technology Council (SITCO) 1983-1987.

Council is made up of representatives from various sectors of the State's economy who, in terms of the relevant Act, use their varied background and experience, to provide independent policy advice to the Minister so as to make a significant contribution to the development of strategies relating to the State's economic development.

Members of the Council are appointed, by the Minister, under Section 22 of the Industry and Technology Development Act 1998 so as to be representative of the interests of the people of the State. A list of members is provided in Section 1.10.

TIAC reports through the Minister to Parliament under Section 26(1) and Section 26(2) of the Industry and Technology Act 1998.

TIAC reports under the Financial Administration and Audit Act 1985 through the Department of Industry and Resources under Section 26(3) of the Industry and Technology Development Act 1998.

TIAC and the ICT Forum members have agreed to be bound by the Code of Conduct which is registered with the Public Sector Standards Commission (refer to Appendix 5).

1.2 Objectives of the Industry and Technology Development Act 1998

The objectives of the Industry and Technology Development Act 1998 under Section 3 are to:

(a) promote and foster the growth and development of industry, trade, science, technology and research in the State;

(b) improve the efficiency of State industry and its ability to compete internationally;

(c) encourage the establishment of new industry in the State;

(d) encourage the broadening of the industrial base of the State; and

(e) promote an environment which supports the development of industry, science and technology and the emergence of internationally competitive industries in the State.

1.3 Functions of the Western Australian Technology and Industry Advisory Council

The Council, under Section 21 of the Act is required to:

(a) provide advice to the Minister, at the initiative of the Council or at the request of the Minister, on any matter relating to the objects of the Industry and Technology Development Act 1998; and

(b) carry out, collaborate in or produce research, studies or investigations on any matter relating to the objects of the Act, including matters relating to the:

- role of industry, science and technology in the policies of Government;
- social and economic impact of industrial and technological change;
- employment and training needs and opportunities relating to industrial, scientific and technological activities in the State;
- adequacy of, priorities among and co-ordination of, scientific, industrial and technological activities in the State;
- methods of stimulating desirable industrial and technological advances in the State;
- application of industrial, scientific and technological advances to the services of the Government; and
- promotion of public awareness and understanding of development in industry, science and technology.

1.4 Outcomes

In order to deliver its objectives and provide its functions, Council has divided its programmes into two main areas:

(a) provision of Ministerial advice; and

(b) promotion and public awareness raising activities.

1.4.1 Provision of Ministerial Advice

The advisory role to the Minister on the objectives of the Act and the encouragement, promotion and use of technology in the State, centres around three key activities:

(a) the development of reports on issues pertaining to the Act and the role of science, industry and technology development in the State. Council's reports are subject to public consultation before recommendations are submitted to the Minister;

(b) the analysis of reports written or commissioned by various national and international technology and economic development focused organisations and when appropriate, the submission of recommendations to the Minister on strategies relevant to Western Australia; and

(c) Council's participation on various State advisory and funding committees or councils.

In December 2006, TIAC and the ICT Forum were placed under the responsibility of the Minister for Energy; Resources; Industry and Enterprise.

1.4.1.1 Report Activity (July 2006 – June 2007)

In its advisory role to the Minister, Council has:

(i) completed a report entitled, *Building on the Western Australian Boom: The Driver's and Shapers of India's Economic Development in the 21st Century*;

(ii) completed a report entitled, *Building on the Western Australian Boom: The Driver's and Shapers of China's Economic Development in the 21st Century.*

These reports were launched for public comment by the Hon. Francis Logan MLA, Minister for Energy; Resources; Industry and Enterprise during theyear.

Copies of TIAC's reports are available in the Parliamentary Library, State Library, the libraries of the various universities and on the Internet at www.tiac.wa.gov.au.

A copy of the Executive Summary for each of these reports is provided at Appendices 1 and 2.

1.4.1.1.1 Background and Expected Use of Reports

Building on the Western Australian Boom: The Driver's and Shapers of India's Economic Development in the 21st Century; and
Building on the Western Australian Boom: The Driver's and Shapers of China's Economic Development in the 21st Century

In keeping with its strategic "headlights" role, TIAC identified a need to extend its "Knowledge Economy" thinking and background to address the need to broaden the structure of the State's trade. With the State Government committed to a Knowledge Economy, TIAC focused on researching long-term markets for Western Australian knowledge intensive goods and services.

The outcome during 2006-2007 was the launch of TIAC's China and India reports.

Both reports focus on the drivers and shapers of the economies of two of our key trading partners with an aim to identify opportunities for Western Australia to modernise and vertically integrate our trade to meet the challenges of the new world economy. These reports are not intended as "Country Briefs" but rather, correlate Western Australian knowledge and expertise with the requirements of the knowledge economy aspirations of the markets of China and India.

The reports acknowledge and explore the differences of these two nations and Western Australia's relationship with each by developing a better understanding of the strategic drivers of economic development particular to each. Understanding the longer term consequences of current trends is central to identifying new opportunities for Western Australia and to considering policy options to take advantage of those opportunities.

By contributing to this understanding, these reports support Western Australia in positioning itself to maximise its prosperity from the economic development of China and India.

TIAC is of the view that Western Australia needs to position itself so as to build on its "resource based relationship" with China in order to better develop a diverse economic relationship with China. Any changes in China's development policies have implications for Western Australia given that the State is well positioned in its traditional exporting industries of resources, agriculture and some professional services. China will also be attempting to add value to its own export industries and many of the growth opportunities will be in the new knowledge economy industries such as the biosciences, ICT and environmental solutions.

While China's expansion is already having a major impact on Western Australia, this is not yet the case with India. However, the existing strength and growing capability of India in various dimensions of science and technology is widely acknowledged. Coupled with massive emerging markets for knowledge-based services in India, it is TIAC's view that collaborations with Indian partners will be of considerable value in developing knowledge-based service exports from Western Australia.

As a way forward, TIAC proposes the development of a "Knowledge Hub" in Western Australia, significant in global terms and unique in Australia. By a "knowledge hub" we mean an integrated cluster of R&D activities, advanced educational programmes and knowledge-based business services, of sufficient scale and excellence to be recognised as a world leader in R&D, to provide a growing level of exports of services to firms and agencies around the world and to be a world leader in the provision of education services internationally.

A summary of other outcomes from TIAC reports between 1998 and 2007 is provided in Part 3.

1.4.1.2 Participation on State Advisory and Funding Committees and Councils

TIAC has accepted invitations for representation and participated in:

(a) the Centres of Excellence State Funding Advisory Committee of the Office of Science, Technology and Innovation (OSTI).

1.4.2 Promotion and Public Awareness Raising Activities

Council's promotional and public awareness raising programmes consist of two main types:

(a) the 2020 Breakfast seminars, commenced in 1990, are short, economic development focused, information dissemination events; and

(b) TIAC's Internet website, to promote and increase the public awareness of its reports and encourage school students to participate in TIAC's virtual Science and Technology Forum. This activity is managed in conjunction with the Science Teachers' Association (STAWA) Science Talent Search organisation.

TIAC's website received approximately 151,632 hits in August 2006 and 120,146 hits in March 2007 following the release of the TIAC reports on 25 July 2006 and 20 February 2007. An average of 4,093 hits per day was recorded during this report year with a total download of 48.40 gigabytes of reports. The targeted website hits and downloads are considered as indicators of relevance for both TIAC and ICT Forum reports. Annual details of the web activity for TIAC and the ICT Forum are provided in Part 3.

1.4.2.1 2020 Breakfast Seminars

The following 2020 Breakfast seminars were conducted for the 2006-2007 reporting year:

(i) *A Snapshot of Export Activity in Western Australia's SME Sector*;

(ii) *Building on the Western Australian Boom: The Driver's and Shapers of India's Economic Development in the 21st Century;* and
Building on the Western Australian Boom: The Driver's and Shapers of China's Economic Development in the 21st Century.

1.4.2.2 Virtual Science and Technology Forum Activities

The virtual Science and Technology activities were conducted through the Science Teachers' Association of Western Australia (STAWA) Science Talent Search organisation. The topic for the 2006 winner is as follows:

Frog Bog by William Savage, Year 3, Parkerville Primary School

The presentations may be viewed on TIAC's website at www.tiac.wa.gov.au.

1.5 Financial Provisions

The expenses of Council are provided for under Section 15 of the Industry and Technology Development Act 1998 via the Western Australian Industry and Technology Development Account.

TIAC was allocated a total budget for 2006-2007 of $ 605,000 plus superannuation costs.

1.6 Members' Remuneration

Council members' remuneration and allowances were determined under Section 24 of the Technology and Industry Development Act 1998 resulting in:

(a)	Chairperson's Salary	$40,000.00 (per annum)
(b)	Member's Sitting Fee – Non-Public Sector	
	Council Meetings	$1,200.00 (per meeting)
	Other Meetings	Nil
(c)	Member's Sitting Fee – Public Sector	
	Council Meetings	Nil
	Other Meetings	Nil

TIAC has sat for 9 Council meetings and held 3 Steering Committee meetings for the planning and development of reports which were conducted in the reporting year.

1.7 Executive Staff

Council is provided with a full time executive staff of 3 officers seconded from the Department of Industry and Resources.

TIAC's executive staff also provided secretarial and executive services to the Minister's Information and Communications Technology Industry Development Forum (ICT Forum).

The ICT Forum was established in 2004 by Ministerial direction under Section 25 and 23(14) of the ITD Act 1998 as a specialist advisory committee of TIAC reporting through its Chair to the Minister for State Development.

The text of the Minister's direction was attached as Appendix 6 in TIAC's 2003-2004 Report as per Section 25(2) of the ITD Act 1998.

1.8 Financial Statement

TIAC reports under the Financial Administration and Audit Act 1985 through the Department of Industry and Resources' Annual Report and Financial Statements.

1.9 Outlook for 2007-2008

Council has, over the past five years, been developing a series of reports under a theme titled, *Towards a Western Australian Knowledge Economy*. In this series, it has carried out studies which have discussed the advantages of:

(i) encouraging the further development of a "knowledge component" to Western Australia's traditional industry strengths in mining and agriculture; and

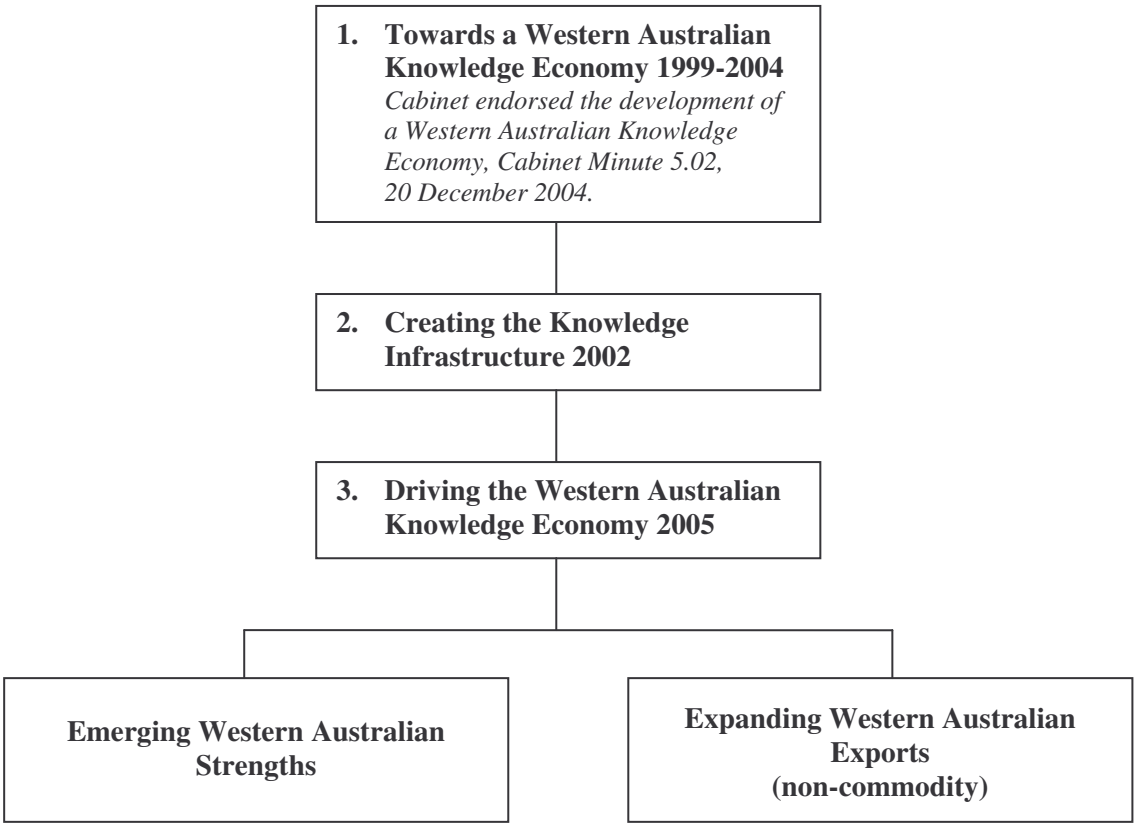
(ii) diversifying the State's economy and exports by developing "knowledge" industries supported by a knowledge infrastructure.

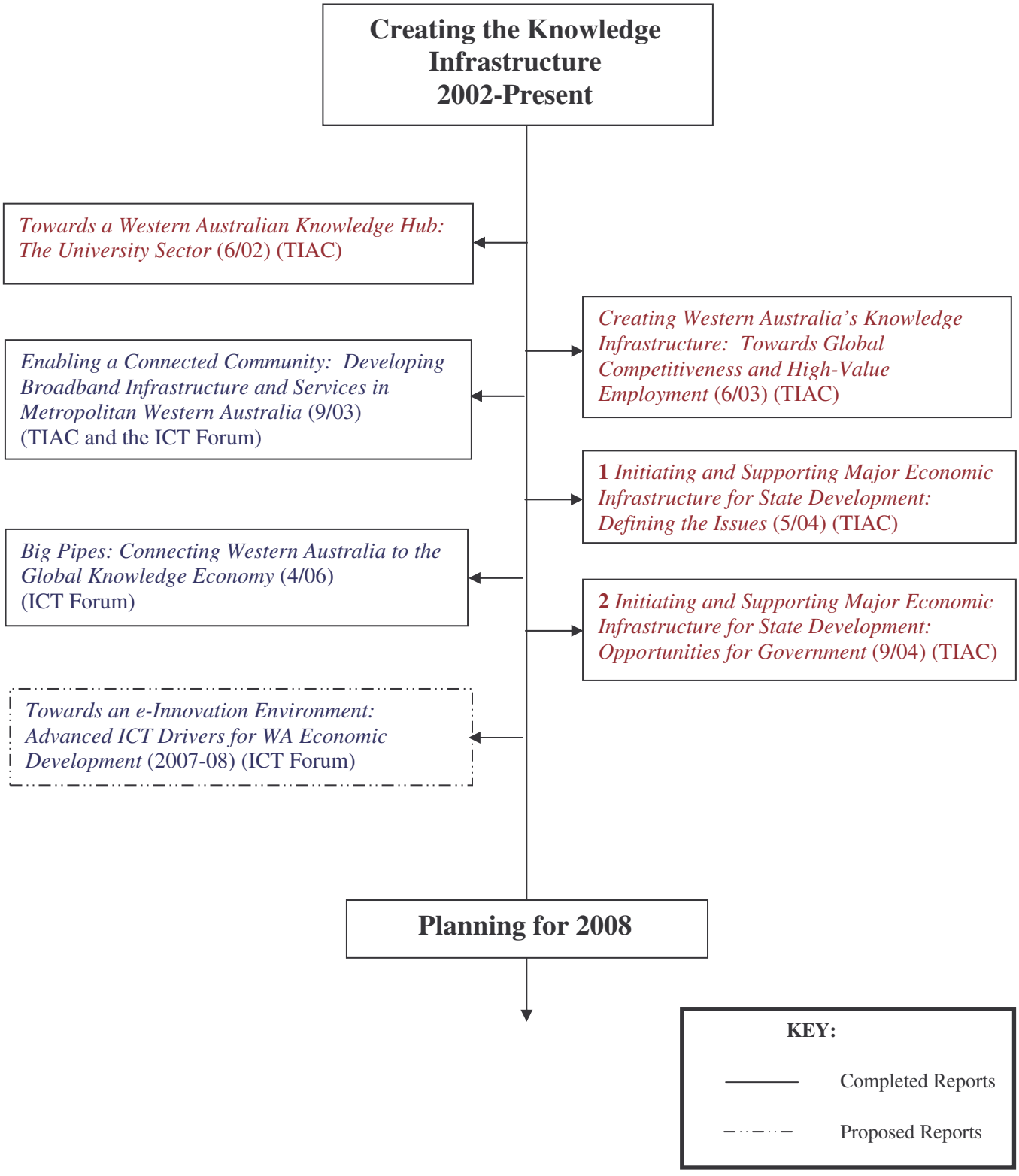
Council proposes to continue its reports to Government on various aspects which will emphasise the need to manage the consequences of globalisation, continue the development of a Western Australian Knowledge Economy and the diversification of the State's exports.

A diagrammatic summary of TIAC's and the ICT Forum's series of reports under the theme, *Towards a Western Australian Knowledge Economy*, and details of the subsequent themes, *Creating the Knowledge Infrastructure 2002*, and *Driving the Knowledge Economy 2005*, is provided on the following pages.

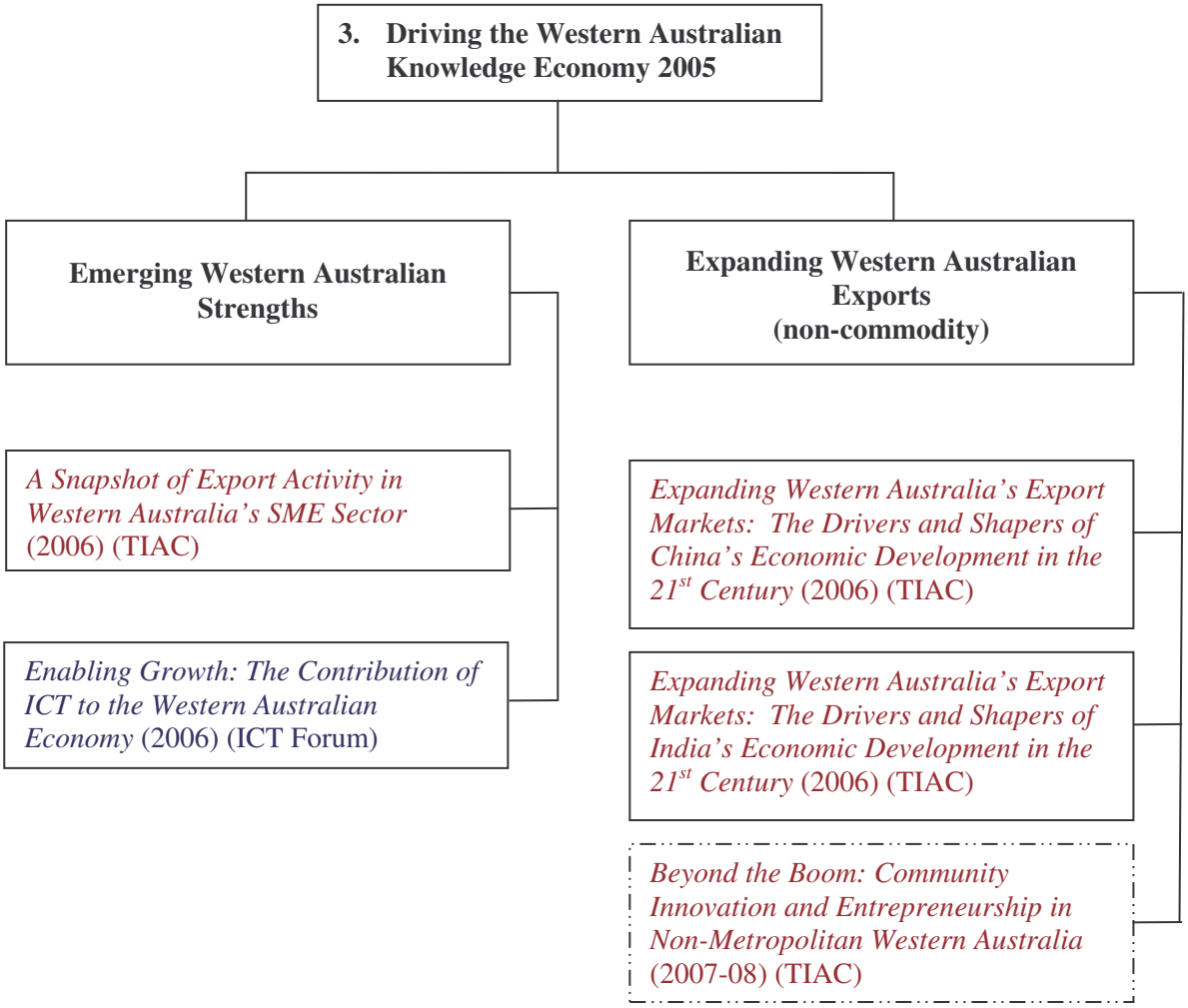
For the 2007-2008 reporting period, TIAC has commenced to develop for public comment, the report:

(i) *Beyond the Boom: Community Innovation and Entrepreneurship in Non-Metropolitan Western Australia.*


1. Towards a Western Australian Knowledge Economy 1999-2004
Cabinet endorsed the development of a Western Australian Knowledge Economy, Cabinet Minute 5.02, 20 December 2004.
2. Creating the Knowledge Infrastructure 2002
3. Driving the Western Australian Knowledge Economy 2005
Emerging Western Australian Strengths
Expanding Western Australian Exports (non-commodity)



Copies of these reports can be obtained from our website: **www.tiac.wa.gov.au**



KEY:

———— Completed Reports

– · – · – Planned Reports

Copies of these reports can be obtained from our website: **www.tiac.wa.gov.au**

1.10 Council Membership

Mr John Thompson
TIAC Chairman

Ms Sharon Brown
Strategic Business Manager
AlphaWest

Dr Jim Limerick
Director General
Department of Industry and Resources

Mr Rob Meecham
A/Director
Australian Centre for
Energy and Process Training
Challenger TAFE

Ms Wendy Newman
Principal Consultant
Quintessence Consulting

Mr Graeme Rowley AM
Executive Director Operations
Fortescue Metals Group Limited

Mr David Singleton
Chief Executive Officer
Poseidon Nickel

Ms Vivienne Snowden
Executive Consultant
Snowden

Professor Lance Twomey AO
formerly Vice Chancellor
Curtin University of Technology

Western Australian Information and Communications Technology Industry Development Forum

Part 2

Hon. Francis Logan MLA
Minister for Energy; Resources; Industry and Enterprise
10th Floor
216 St George's Terrace
PERTH WA 6000

Dear Minister

On behalf of the members, I am pleased to submit the Annual Activity Report for the Western Australian Information and Communications Technology Industry Development Forum (ICT Forum) for the year ending 30 June 2007, for your information, and subsequent presentation to Parliament in accordance with Section 26(1) and Section 26(2) of the Industry and Technology Development Act 1998.

The Forum, similarly to TIAC, has also reported through the Department of Industry and Resources' Annual Report and Financial Statement in accordance with Section 26(3) of the Industry and Technology Development Act 1998 in compliance with Section 62 of the Financial Administration and Audit Act 1985.

Members acknowledge the valuable support given to the Forum by TIAC, your office and the Department of Industry and Resources.

Yours sincerely

MR RICHARD THORNING
INTERIM CHAIRMAN

1 July 2007

On behalf of Forum Members:

Mr Nic Beames	Mr Neil Fernandes	Mr Brett Sabien
Ms Jo Bryson	Dr Walter Green	Ms Lyne Thomas
Dr Bob Cross	Mr Geoff Harben	Mr John Tondut
Mr Peter Fairclough	Ms Cheryl Robertson	

2.1 Introduction

The Western Australian Information and Communications Technology Industry Development Forum (ICT Forum) was established as a committee of TIAC for a term of 3 years by the Minister for State Development in June 2004 under Section 23(14) and 25 of the Industry and Technology Development Act 1998 (ITD Act 1998).

The Chair of the ICT Forum has reported directly to the Minister. The activities of the Forum are reported to Parliament in TIAC's Annual Activity Report under Section 26 of the ITD Act 1998.

The text of the Minister's direction was attached as Appendix 6 in TIAC's 2003-2004 Annual Activity Report as per Section 25(2) of the ITD Act 1998.

A list of members is provided in Section 2.10.

2.2 Objectives of the Industry and Technology Development Act 1998

The objectives of the Industry and Technology Development Act 1998 under Section 3 are to:

(a) promote and foster the growth and development of industry, trade, science, technology and research in the State;

(b) improve the efficiency of State industry and its ability to compete internationally;

(c) encourage the establishment of new industry in the State;

(d) encourage the broadening of the industrial base of the State; and

(e) promote an environment which supports the development of industry, science and technology and the emergence of internationally competitive industries in the State.

The ICT Forum as a specialist advisory committee, is required to focus on the Information and Communications Technology (ICT) Industry under a specific Terms of Reference.

2.3 ICT Forum – Terms of Reference

2.3.1 Scope (PF1)

As a vital part of this State's future development, the Information and Communications Technology Industry Development Forum (ICT Forum) is concerned with:

(a) the advancement of the Information and Communications Technology (ICT) Industry in Western Australia (SF1);

(b) the industry's capacity to support the creation and maintenance of high quality jobs throughout the State's economy (SF2);

(c) access to ICT services throughout the State and ensuring the overall interests of Western Australia are served (SF3);

(d) the promotion of ICT as a driver of competitiveness and efficiency across industry (SF4); and

(e) the facilitation of ICT as a key enabler in a Western Australian "Knowledge Economy" (SF5).

2.3.2 Strategic Role (PF2)

To advise the Minister for Energy; Resources; Industry and Enterprise on policies and strategies necessary to ensure the continuing development of the Information and Communications Technology Industry and the application of information and communication technologies across industry and the community generally in Western Australia.

2.3.3 Outcomes (PF3)

The Forum will assist the Government:

(a) in setting the environment for the development and attraction of expanded and new business opportunities for Western Australia in information and communications (SF6);

(b) by providing policy advice, which will facilitate the establishment of "leading edge" telecommunication systems in the State (SF7);

(c) by providing policy advice on meeting the ICT needs of both regional and metropolitan Western Australia (SF8);

(d) by advising the Minister on broadband related issues namely (SF9);

  (i) identifying the core value propositions and support mechanisms needed by various target groups (e.g. residents, SMEs, non-metropolitan areas) concerning broadband take-up and use; and

  (ii) advising on a strategy designed to raise and maintain a public awareness programme to encourage the take-up and use of broadband services by target groups; and

(e) by providing advice to the Minister, at the initiative of the Forum or at the request of the Minister, on any matter relating to the ICT industry and ICT applications generally (SF10).

2.3.4 Operations

The Forum will meet a maximum of 10 times per year with working parties established and meeting as required from time to time.

An Executive Officer from the Technology & Industry Advisory Council will co-ordinate meetings and prepare minutes. The Forum is to submit to the Minister a copy of the minutes of each meeting within 14 days after the meeting at which the minutes were confirmed.

This Forum will report through the Chairperson to the Minister for Energy; Resources; Industry and Enterprise.

Recommendations for action will be made to the Minister through the Chairperson. This will include business cases to support funding requests to conduct research or undertake specific projects.

2.3.5 Membership

An independent Chairperson will be appointed by the Minister.

The Forum will consist of up to 16 people with the option of initiating working parties with additional expert membership to progress specific projects.

The members will be appointed for their own strategic skills rather than as representatives of sectors or associations of the industry.

The Minister for Energy; Resources; Industry and Enterprise will appoint members.

Members will be appointed for three-year terms.

2.4 Outcomes

In order to deliver its strategic role, the ICT Forum has divided its programmes into two main areas:

(i) activities focused on strategic issues relating to the advancement of the ICT industry; and

(ii) submissions on policies under development by the State or Federal Governments.

2.4.1 Strategic Issues

The ICT Forum has focused deliberations on two key issues during 2006-2007.

2.4.1.1 High Speed Real Broadband

The vision statement in *WA Connected: State Communications Policy*, states that:

"Western Australians will have access to functional and affordable communications services, allowing them to fully participate in opportunities available."

The ICT Forum is of the opinion that broadband is a fundamental building block of the "Knowledge Economy" that has created a platform for new technologies which support applications in e-commerce, education, health care, entertainment and e-government.

Western Australia's remoteness, size and thin markets make it essential for government, business and the community to have access to high speed broadband infrastructure.

Actions

- Whilst the production and announcement of the report, *Big Pipes: Connecting Western Australia to the Global Knowledge Economy* had occurred late in the previous financial year, the chairman and individual members were active in raising widespread awareness of the report findings and recommendations through 2006-2007.

- In particular, the need and demand for broadband infrastructure investment in Western Australia became progressively accepted during this period, partly as a result of the ICT Forum activity. Both at a state level, with the announcement of the State Broadband Network (SBN) project, and to a lesser extent at a federal level, the ICT Forum's influence, we believe, has played a significant role in raising awareness and promoting urgency of action. Three specific activities were as follows:

  (i) the ICT Forum delivered a public information seminar entitled, *Services and Enterprises Resulting from Broadband Infrastructure*.

  (ii) the ICT Forum continued to advocate the critical importance of developing Western Australia's broadband infrastructure through participation on the State Infrastructure Strategy Reference Group.

  (iii) representation of the ICT Forum at the ATUG 2006 International Connectivity Forum held at the Australian Technology Park, Sydney in September 2006. On behalf of the ICT Forum, Dr Walter Green delivered a presentation which introduced the ICT Forum, provided an overview of ICT Forum activities and outlined the key findings and recommendations of the ICT Forum's 2006 report, *Big Pipes: Connecting Western Australia to the Global Knowledge Economy*.

2.4.1.2 Digital Content: The Feasibility of a WA Digital Content Industry Serving High Value Niche Markets

The digital content sector of the ICT industry is one of the major drivers of economic competitiveness in the coming decade. This sector will make a major contribution to ensuring high levels of economic growth, a robust export capacity and a highly trained workforce.

It is important because it is economically significant, with a conservatively estimated worth of $21 billion (almost 3.5 per cent of Australia's GDP) and employing approximately 300,000 people; it is a high growth industry, growing faster worldwide than other economic sectors; and the economic multipliers arising from the digital content sector are significant, being higher than for most other categories of economic activity.

Actions

- In 2006-2007, the ICT Forum formed a Digital Content Working Group with representatives from the Department of Industry and Resources and Central TAFE to formulate a proposal to develop a digital content cluster on Technology Park, Bentley. This proposal was submitted to the Minister for consideration.

2.4.2 Submissions

The ICT Forum's submissions on policy consist of two types. They are submissions to the State Government and submissions responding to initiatives of the Federal Government. In the 2006-2007 period, they consisted of the following:

- submission in response to the State Government's *Framework for State Infrastructure Strategy Green Paper*;
- submission to the Economics and Industry Standing Committee (EISC) *Inquiry into the State Government's Role in Developing and Promoting Information Communications Technology (ICT) in Western Australia;*
- the ICT Forum also developed a draft Terms of Reference for a proposed study intended to build on the Forum's 2006 work. The Forum's 2006 work analysed the contribution of ICT to the Western Australian economy and then sought ways of developing "the roads and railways of the 21st century" to pave the way for productivity gains across global knowledge economies. The draft Terms of Reference continues that trend and explores methods by which advanced ICT grid services and management practices can be deployed to deliver productivity growth and resulting economic development to Western Australia. This draft Terms of Reference has been submitted to the Minister for consideration and comment.

2.5 Financial Provisions

No specific budget allocation was made for the ICT Forum in the 2006-2007 TIAC budget.

2.6 Members' Remuneration

The Forum members' remuneration is determined by the Public Service Commission.

(a)	Chairperson's Salary	$21,700.00 (per annum)
(b)	Interim Chairperson's Salary	$480.00 (per meeting)
(c)	Member's Sitting Fee – Non-Public Sector	$300.00 (per meeting)
(d)	Member's Sitting Fee – Public Sector	Nil

The ICT Forum has sat for 8 Forum meetings and held 2 Steering Committee meetings for the planning and development of Forum activities in the reporting year.

2.7 Executive Staff

TIAC's executive staff provided secretarial and executive services to the ICT Forum.

2.8 Financial Statement

The ICT Forum via TIAC, reports under the Financial Administration and Audit Act 1985 through the Department of Industry and Resources' Annual Report and Financial Statements.

2.9 Outlook 2007-2008

The Western Australian Information and Communications Technology Industry Development Forum (ICT Forum) was established as a committee of TIAC by the Minister for State Development in June 2004 under Section 23(14) and 25 of the Industry and Technology Development Act 1998 (ITD Act 1998) for a term of 3 years. This term concluded as at 30 June 2007.

A continuation of a Western Australian Information and Communications Technology Industry Development Forum (ICT Forum) is under consideration.

2.10 Forum Membership

The Hon. Mal Bryce AO retired as the Chairman of the Western Australian ICT Industry Development Forum on 30 April 2007. To ensure continuity for the ICT Forum until the end of the financial year 2006-2007, Mr Richard Thorning was invited by the Minister to take up the position of Interim Chair until 30 June 2007.

Hon. Mal Bryce AO
Chairman

Mr Nic Beames
Director of Content
Dynamic Digital Depth

Mr Geoff Harben
Regional Director
Business Development
Ernst & Young

Ms Jo Bryson
Executive Director
Office of e-Government

Ms Cheryl Robertson
ICT Consultant

Dr Bob Cross
Principal Director
Whiteknight Consulting

Mr Brett Sabien
Manager – Telecentre Support Branch
Dept of Local Government and Regional Development

Mr Peter Fairclough
Executive Director Telstra Country Wide
Telstra Corporation Limited

Mr Neil Fernandes
Managing Director
Central TAFE

Dr Walter Green
Director
Communications Expert Group Pty Ltd

Ms Lyne Thomas
Assistant Director General
State Development Strategies
Department of Industry and Resources

Mr Richard Thorning
Director – Entrepreneurship
Executive Education and Consulting
Curtin Business School

Mr John Tondut
Executive Director (Government Procurement)
Department of Treasury and Finance

WESTERN AUSTRALIAN
TECHNOLOGY & INDUSTRY
ADVISORY COUNCIL

WESTERN AUSTRALIAN
INFORMATION AND COMMUNICATIONS
TECHNOLOGY INDUSTRY DEVELOPMENT **Forum**

Part 3
Indicators of Relevance

3.1 Indicators of Relevance

TIAC was reviewed in 2004 with the resulting report being tabled as Parliamentary Paper No. 2810 on 22 September 2004. The review's conclusion on TIAC's effectiveness were as follows:

(i) TIAC has been effective in its activities of provision of advice and in raising public awareness and is not constrained in carrying out these roles by the current ITD Act.

(ii) The activities of TIAC are essential for promoting policy debate and assisting in policy formation. TIAC has strongly informed policy development.

(iii) TIAC has demonstrated its flexibility in responding to Ministerial requests to develop and implement three-year programmes targeting specific industry sectors.

(iv) TIAC should have specific appropriation identified within the responsible Department budget including forward estimates.

Other indicators of relevance that are monitored by TIAC and the ICT Forum include:

(a) Publications of TIAC linked to its functions as per the ITD Act 1998;

(b) Publications of the ICT Forum linked to function as per the Terms of Reference;

(c) Outcomes of TIAC's reports;

(d) Outcomes of the ICT Forum's reports;

(e) TIAC and ICT Forum website statistics.

Details of this monitoring are given in Section 3.2, 3.3 and 3.4 respectively.

3.2 Publications of TIAC Linked to Function

Publication Title	Linkage to Function	Date
Support for West Australian Software Industry	PF5, SF5	July 1988
New Challenges & Opportunities	PF5, SF7	July 1988
Technology Parks	PF1, PF5	July 1988
Intelligent Buildings: What role for the WA Government?	SF6	Sept 1988
US State Government Policies Designed to Encourage the Commercialisation of New Ideas: Some Recommendations for WA	PF1, PF3, SF5	Sept 1988
WA Software Industry (Second Report)	PF5, SF5	Oct 1988
An Industrial Science Policy for Western Australia: Some Seed Ideas	PF5, SF1	Oct 1988
Towards a West Australian Science Policy for the 1990's	PF5, SF1	Nov 1988
Inquiry into Venture Capital in Western Australia	PF1, PF3, SF5	March 1989
The Case for a New Branch of Manufacturing to Provide Smart Equipment for the Mining Industry	PF2	March 1990
The Export Debate	PF5	May 1990
Tomorrow's People in Science & Technology	SF1	March 1991
Bentley Technology Precinct: An Exploratory Study	PF1	Sept 1992
The Western Australian Technology School of the Future: A Feasibility Study	SF3, SF5	Oct 1992
Capturing Opportunities in Asia with Western Australian Science & Technology	PF5	Nov 1992
Telecommuting 2000: Making the Future Work for Western Australia	PF2, SF5	Dec 1992
Telework 2000: Making the Future Work for Western Australia	PF2, SF5	July 1993
R&D and the State's Economic Development: What is the best fit?	PF1, SF4	April 1994
Medical Research Infrastructure Funding in Western Australia	PF1, SF4	April 1995
Towards an Information Infrastructure Policy for Western Australia – the Business Aspect	PF2, SF1	Feb 1996
Financing Options for Regional Infrastructure in Western Australia	PF1, PF4	Nov 1996
Telecommunications Deregulation – Is Western Australia Prepared?	SF7	Dec 1996
Western Australia's Minerals and Energy Expertise: How can it be optimised? – Defining the Issues – A Background Paper	PF5, SF3	Sept 1997
Research & Development: Role of the State Government in attracting External Funding	PF1, SF1	May 1998

3.2 Publications of TIAC Linked to Function (Cont'd)

Publication Title	Linkage to Function	Date
From Mines to Minds: Western Australia in the Global Information Economy	PF1, PF2, PF5, SF1, SF5	Feb 1999
Western Australia's Minerals and Energy Expertise: How can it be optimised? – *Growing the R&D Sector*	PF1, PF5, SF3	June 1999
Technology, Skills and the Changing Nature of Work	PF5, SF1, SF3	April 2000
Drivers and Shapers of Economic Development in Western Australia in the 21st Century	ALL PF, ALL SF	Sept 2000
Export of Western Australian Education and Training: Constraints and Opportunities	PF2	Oct 2000
Biotechnology West: Strengths, Weaknesses and Opportunities	PF4, PF5, SF5	Dec 2000
Directions for Industry Policy in Western Australia within the Global Knowledge Economy	SF1	Mar 2002
The Organisation of Knowledge: Optimising the Role of Universities in a Western Australian Knowledge Hub	PF1, PF2, PF5	Jun 2002
Creating Western Australia's Knowledge Infrastructure: Towards Global Competitiveness and High-Value Employment	PF2	Jun 2003
Enabling a Connected Community: Developing Broadband Infrastructure and Services in Metropolitan Western Australia	PF2, PF5	Sept 2003
Initiating and Supporting Major Economic Infrastructure for State Development: Defining the Issues	PF1, PF2, PF3, PF5	May 2004
Initiating and Supporting Major Economic Infrastructure for State Development: Opportunities for Government	PF2, PF3, PF5, SF1	Sept 2004
Trade in Western Australian Health Industry Services: Directions for Development	PF1, PF2, PF5, SF1, SF4	Nov 2004
A Snapshot of Export Activity in Western Australia's SME Sector	PF1, PF2, SF2	July 2006
Building on the Western Australian Boom: Drivers and Shapers of India's Economic Development in the 21st Century	ALL PF; ALL SF	Feb 2007
Building on the Western Australian Boom: Drivers and Shapers of China's Economic Development in the 21st Century	ALL PF; ALL SF	Feb 2007

*** 5 Primary Functions (Objects of the Act) = PF(1-5)**
*** 7 Secondary Functions (Functions specific to TIAC) = SF(1-7)**

3.3 Publications of the ICT Forum Linked to the Terms of Reference

Publication Title	Linkage to Function	Date
Enabling a Connected Community: Developing Broadband Infrastructure and Services in Metropolitan Western Australia	PF1, PF3, SF3, SF6, SF7, SF8, SF9, SF10	Sept 2003
Enabling Growth: The Contribution of ICT to the Western Australian Economy	PF1, PF2, PF3, SF1, SF2, SF4, SF5, SF10	Feb 2006
Big Pipes: Connecting Western Australia to the Global Knowledge Economy	PF1, PF2, PF3, SF1, SF2, SF4, SF5, SF7, SF10	April 2006

*** 3 Primary Functions = PF(1-3)**
*** 10 Secondary Functions = SF(1-10)**

3.4 Outcomes of TIAC Reports

Report Title	Date Published	Possible Indicator of Relevance - Date
Towards a West Australian Science Policy for the 1990s	1988	Launch of a State Science and Technology Policy (1997).
Inquiry into Venture Capital in Western Australia	1989	Part of Industry Policy (2004).
Bentley Technology Precinct: An Exploratory Study	1989	Precinct Plan implemented (2004).
The Western Australian Technology School of the Future: A Feasibility Study	1992	Part of ALP election promise (2001). Part of Perth Modern Development (2004).
Tomorrow's People in Science and Technology *R&D and the State's Economic Development: What is the best fit?* *Research and Development: Role of the State Government in attracting External Funding*	1991 1994 1998	Issues and elements contributed to the formation of the Science Council and contained in OSI projects (2001).
Medical Research Infrastructure Funding in Western Australia	1995	Funding implemented (1997).
Towards and Information Infrastructure Policy for Western Australia – the Business Aspect *Telecommunications Deregulation – Is Western Australia Prepared?* *From Mines to Minds: Western Australia in the Global Information Economy*	1996 1996 1999	Issues relating to ICT and Telecommunications Policy included as part of Industry Policy (2004). Proposed development of ICT Strategy and Telecommunications Strategy (2004).
Western Australia's Minerals and Energy Expertise: How can it be optimised? – Defining the Issues – A Background Paper *Western Australia's Minerals and Energy Expertise: How can it be optimised? – Growing the R&D Sector*	1997 1999	One of the proposed Research Institutes under the OSI plan (2003-2004).
Drivers and Shapers of Economic Development in Western Australia in the 21st Century	2000	Quoted in Innovate WA Policy – ALP (2001). Climate Change and Sustainable Development now acknowledged as a mainstream issue of significance (2006-2007)
Export of Western Australian Education and Training: Constraints and Opportunities	2000	Part of Industry Policy (2004).
Biotechnology West: Strengths, Weaknesses and Opportunities	2000	Part of Coalition election promise (2001). Part of DoIR work programme – development of Biotechnology Strategy (2004). WA Biotechnology Industry Development Strategy launched (2006). WA Biotechnology Industry Directory launched (2007).
Directions for Industry Policy in Western Australia within the Global Knowledge Economy	2002	Industry Policy Statement launched 2004.
The Organisation of Knowledge: Optimising the Role of Universities in a Western Australian Knowledge Hub	2002	Elements and issues contributed to OSI Research Institutes plan (2004).
Creating Western Australia's Knowledge Infrastructure: Towards Global Competitiveness and High-Value Employment	2003	Issues and elements to contribute to the Government's Knowledge Economy Strategy (2004).

3.4 Outcomes of TIAC Reports (Cont'd)

Report Title	Date Published	Possible Indicator of Relevance - Date
Enabling a Connected Community: Developing Broadband Infrastructure and Services in Metropolitan Western Australia	2003	Federal Government budget provides $50m for metro broadband subsidy to disadvantaged (2005).
1. *Initiating and Supporting Major Economic Infrastructure for State Development: Defining the Issues*	2004	Business Council takes up issue of Federal Government involvement in infrastructure development (2004).
2. *Initiating and Supporting Major Economic Infrastructure for State Development: Opportunities for Government*	2004	State Government creates Cabinet Taskforce to oversee major infrastructure projects (2005). State Government established Commonwealth-State Relationship Taskforce. The State Treasurer established Infrastructure Taskforce (2004). Terms of Reference and timeframe for development of State Infrastructure Strategy released (2005). Strategy Green Paper released (2006).
TIAC's *Towards a Knowledge Economy* theme of reports	1999-2004	State Cabinet endorses coordinated development of a Western Australian Knowledge Economy (2004).
Trade in Western Australian Health Industry Services: Directions for Development	2004	State Government (via DOIR) begins to progress a number of the report's recommendations including: (i) Establishing a Western Australian Health Services Industry Association (ii) Release of a Western Australian Health Industry Capability Directory, database and web site (2007).

3.5 Outcomes of ICT Forum Reports

Report Title	Date Published	Possible Indicator of Relevance - Date
Enabling a Connected Community: Developing Broadband Infrastructure and Services in Metropolitan Western Australia	2003	State Infrastructure refers to Telecommunications as part of infrastructure. Chair of ICT Forum appointed as member of Taskforce (2005). State Government announces the State-wide Broadband Network Strategy intended to provide reliable, high-speed and affordable broadband access to all Western Australians (2006).
Enabling Growth: The Contribution of ICT to the Western Australian Economy	2006	Tasmanian Government's Economic Development Department seeks support of the ICT Forum to develop a similar report for Tasmania (2006).
Big Pipes: Connecting Western Australia to the Global Knowledge Economy	2006	State Government announces the State-wide Broadband Network Strategy. Under the strategy, this money will be pooled together and offered as a 10-year, $1 billion contract to facilitate the installation of the State-wide broadband network by the private sector (2006).

3.6 Website Statistics for TIAC (1999-2007) and the ICT Forum (2006-2007)

Budget Year	Targeted Requests (Annual)	Total Data Transfer (Annual)
1999-2000	94,041	0.85 gigabytes
2000-2001	225,288	2.90 gigabytes
2001-2002	403,442	4.96 gigabytes
2002-2003	691,377	9.39 gigabytes
2003-2004	901,071	13.35 gigabytes
2004-2005	1,398,786	17.74 gigabytes
2005-2006	1,420,545	22.87 gigabytes
2006-2007	1,494,060	48.40 gigabytes

WESTERN AUSTRALIAN
TECHNOLOGY & INDUSTRY ADVISORY COUNCIL

Building on the Western Australian Boom: The Drivers and Shapers of India's Economic Development in the 21st Century

February 2007

Additional copies of this report can be obtained from our website: www.tiac.wa.gov.au

Contents

Appendices

Supporting Documents

Copies of these documents can be obtained from our website: www.tiac.wa.gov.au

1. Evolution of the Indian Economy
2. India: Growth with Equity
3. India: Geopolitical and Socio-political Dimensions
4. India: Agriculture and Water
5. Infrastructure in India
6. Education and Health in India
7. Health Care and Innovation: The Case of Poverty and Disease Prevention in India
8. India's Defence Industries
9. India's Cultural Industries
10. Employment, Inequality and Diversity in India
11. Western Australia and India: Recent and Current Economic Links

Executive Summary

After three centuries of relative and often absolute poverty, India has in recent decades begun to return to its previous position as a global economic power, and this process has accelerated over the last few years. Growth in the Indian economy was quite low in the planning period during the first 30 years after Independence – from 1950 to 1980. The next two decades saw gradual but sustained improvement, in spite of some fluctuations, with an average rate of growth of 5.7% per annum for the 20 years to 2000. Building on that base, the economy appears to have achieved take-off into a higher growth plane since 2003, with real GDP growth averaging 8.1% per annum in the three years 2003-04 to 2005-06. In the first quarter of 2006-07 GDP was 8.9% higher than a year earlier, and the Indian Planning Commission is using a growth rate of 8.5% as the working basis for the 11th Plan period, 2007-12.

There are many signs that this is not just a temporary growth spurt but the beginnings of a fundamental economic transformation of the type seen in several countries in East Asia in recent decades, although using a quite different model. For example, the government has a deep and extensive program of reform under way, within the framework of market forces but with a sophisticated planning process; there is rising confidence and high levels of energy within the economy, with many Indian firms now becoming global leaders; exports of IT and some other services are rising rapidly, and providing an export base to permit rapid domestic growth. Even on the basis of fairly conservative projections – in particular an ongoing growth rate over 2010-30 of 6.5% – India's economy will be the third largest national economy in the world by 2030, larger than that of the USA and twice the size of that of Japan. Such is the scale of India that it will play a significant part, in conjunction with China and some other emerging countries, in creating a new world economic order in the next few decades. How Western Australia responds to this emerging new world order will hold the key to its continued prosperity in the 21st Century.

Relevant Features of Emerging India

A Distinctive Model of Rapid Growth

There are many distinctive features of the Indian growth model, especially by comparison with that which has become common in East Asia. These include gradual rather than sharp acceleration; a reliance on services and domestic consumption rather than on industry and exports; an emphasis on high technology and ICT services rather than on low cost labour inputs to manufactured exports; growth driven by local private entrepreneurs as government withdraws rather than by government agencies and enterprises or foreign investors; low reliance on foreign direct investment; and, more generally, more emphasis on increased productivity than on a rapid increase in the factors of production (capital and labour).

Perhaps the most striking of these features is the heavy reliance on services. Table 1 illustrates the central role of the service sector as the driver of growth in India, in stark contrast with the position in China. In 2005, industry (defined as including mining, manufacturing, energy production and water, and construction) amounted to only 27.3% of GDP in current prices in India, by comparison with 47.5% in China. In terms of growth contribution, the difference is even greater: the service sector provided 65.1% of growth in real GDP in India over 2000-05, by comparison to 41.9% in China; industry provided 52.1% of growth over this period in China, but little over half that in India (27.7%). This is a stark difference between the two economies.

Table 1 The role of industry and services in India and China

	Share in GDP, 2005		Real growth rate		Share of GDP growth 2000-2005	
	India	China	India	China	India	China
	(%)		(% per annum)		(%)	
Agriculture	19.6	12.6	2.6	3.9	7.2	6.1
Industry	27.3	47.5	6.9	10.7	27.7	52.1
Services	53.2	39.9	8.5	10.1	65.1	41.9
Total	100.0	100.0	6.8	9.5	100.0	100.0

Source: Ministry of Statistics and Programme Implementation, India; National Bureau of Statistics China.

This type of growth driven by the service sector, and facilitated by rapid growth in exports of services which underpin the balance of payments, is quite new for developing countries.

Growing Strength in Science, Technology and Business Services

The existing strength and growing capability of India in various dimensions of science and technology is now widely acknowledged. This includes, for example, a long tradition of high quality work in various scientific fields; the very high level of good quality engineering graduates produced each year, and the international renown of the seven Indian Institutes of Technology. But perhaps the most remarkable development, also well known, is the explosion of Indian exports of software and IT enabled services, including engineering and R&D services. As Table 2 shows, these exports totalled US$23 billion in 2005-06, having almost doubled since 2003-04.

Table 2 Indian IT and IT enabled exports, 2004-2006, US$ billion

	2003-04	2004-05	2005-06E
		(US$ billion)	
IT software and services exports			
IT services	7.3	10	13.2
ITES-BPO	3.1	4.6	6.3
Engineering services and R&D, software products	2.5	3.1	3.9
Total	**12.9**	**17.7**	**23.4**

Source: NASSCOM (2006a).

This experience may have important potential implications for Western Australia. Not only does it show what can be done in terms of the development of services exports, but also suggests that collaborations within Indian partners might be of considerable value in developing knowledge-based service exports from Western Australia.

Serious Limitations in Infrastructure and Energy

Infrastructure will continue to occupy central stage in India's economic development strategy for many years to come. The problem of energy scarcity is just one of the many infrastructure challenges facing India, as most other forms of infrastructure require substantial expansion and upgrading to meet the increasing demands of economic growth. The pressures on India's infrastructure are coming from a variety of sources, including rapid expansion of trade, a new priority for higher growth of manufacturing, the rapid pace of urbanisation, the revival and diversification of agriculture and a commitment to improve conditions of the rural economy.

These pressures are being manifest in serious bottlenecks in moving people and goods across the country, and in sub-standard access to power, drinking water and sanitation for the vast majority of India's population. India's infrastructure facilities compare rather unfavourably with several other Asian countries. Reflecting the high priority for infrastructure, a high powered Committee on Infrastructure was established in 2005 under direct chairmanship of the Prime Minister. The Planning Commission's Approach to the 11th Five Year Plan reflects the recommendations of this Committee and proposes that spending on infrastructure will be raised from the current level of 4.6% of GDP to between 7 and 8% by 2012-13.

Signalling a break from the traditional approach of keeping the provision of infrastructure within the public sector, the government of India is now keen to involve private sector investment in infrastructure. Opportunities exist therefore for Western Australian firms, academic institutions and even government agencies for new business in India.

Major Challenges in Agriculture, Water and the Environment

The agricultural sector grew strongly in the wake of the Green Revolution for about two decades during the 1970s and 1980s. In the past decade, however, rates of growth in agricultural output have fallen. Rejuvenating the agricultural sector has become a priority for the Government, for a number of reasons. The deceleration in agriculture has contributed to rural distress in many parts of the country and has affected both large and small farmers. The government has developed a strategy of accelerated growth, incorporating a near doubling of the rates of growth of agriculture, during the next Five Year Plan (2007-12). The Commission has stressed the need for a second green revolution in India to raise the growth rate of agricultural GDP to around 4%, from less than 2% during the previous five-year period. It must be emphasised that rapid growth is important not only because it will generate opportunities for the poor to earn income, it will also generate higher demand for industrial products and assist the budgetary situation of the governments through higher growth of tax revenues. These revenues can in turn be used to finance various anti-poverty programs.

The rejuvenation of agriculture depends, however, on ample supplies of water for irrigation. But increased water use would exacerbate the severe shortage of water in many parts of India, as well as the environmental risks associated with excessive extraction of underground water for irrigation. These pressures are additional to those generated by rapid urbanisation for drinking water, sanitation and waste disposal.

Rapid Population Growth and Deep Poverty

Very different population trends are in train in India and China, and these will have a big impact on future development patterns. India's population (1.02 billion in 2000, of which 4.9% was 65 years and over) is expected to continue to rise to about 1.6 billion by 2050, with 14.8% in the older age group. In contrast, China's population was estimated at 1.27 billion in 2000, with 6.8% of that population aged 65 years and over. It is projected to peak at 1.45 billion in 2030 and decline to about 1.40 billion by 2050, at which time 23.6% will be 65 years and over. Thus India faces a continued population expansion and a much less rapid ageing of its population than is expected in China. While there are large numbers of very poor people in both countries, the problem seems to be deeper and more endemic in India. With the population still growing, with growth less advanced and with low levels of spending in critical areas such as education and health, this issue is likely to remain a key constraint on Indian growth for the foreseeable future.

Growing Heavy Demand in Education and Health

With the Indian economy growing at a robust rate, the demand for white-collar jobs has increased significantly and, along with it, higher and vocational education in India has been growing tremendously in recent years. Among those who can afford it, higher and technical education is greatly valued in India, and its pursuit has recently caught attention in a serious way. The perceived return to education is very high and this is particularly so for managerial, technical and vocational jobs. There is also a great demand for students to go abroad for such education, and the English language provides a great opportunity to both Indians and Australians. There is thus scope for exploring the possibility of increasing numbers of Indian students studying in Western Australia.

Similarly, demand for health services is far in excess of supply, especially for those who cannot afford to pay high prices for private treatment. Public spending on health in India is one of the lowest among comparable countries and access to health care is therefore denied to many in both urban and rural areas, especially the latter, where supply of health professionals is also very thin. Escalating costs of health technologies and medicinal drugs further exacerbate the situation of the poor.

Bureaucracy and Legal System

Perceptions of India's bureaucracy continue to be unfavourable for India, and there are many reports of serious delays. One source often used for assessing the quality of business environments in different countries is the Doing Business series of reports published by the World Bank group. According to the International Finance Corporation report on Doing Business (IFC 2006), in 155 countries, India's ranking was 134, an improvement from 138 in 2005, but still a very low ranking for a country that is aiming to increase FDI inflows. Starting a business still takes 88 days in India (by comparison with 128 in China, 115 in Brazil and 116 in Korea). Enforcing contracts is also known to take much longer in India, compared with China, Brazil and Korea.

It is worth noting, however, that India is a federal country in which business procedures and bureaucratic performance vary significantly from one state to another. It may be misleading to form an impression on the basis of any single measure that purports to abstract from regional differences, as the above rankings do. This is because some of the states – for example Tamil Nadu, West Bengal, Karnataka and Punjab – have made considerable progress in streamlining their government regulations. On the other hand, states like Bihar, Uttar Pradesh and Orissa have still a long way to go before being able to attract large scale overseas business investment.

Unique Cultural Base and the Economic Significance of Indian Diaspora

It is apparent that there remain fundamental differences in cultural and political values, traditions and institutions, both between India and Western countries and also between India and the emerging countries of East Asia.

For example, although the business model is changing to accommodate globalisation of business, India's business tradition still remains heavily based on family ties. Business houses like the Tatas, Birlas and the Dalmias have proved that the family business model can not only survive, but also flourish in the modern world economy.

Related to India's specific cultural base is the central role of the Indian diaspora in the nation's recent growth. The Indian diaspora is not only a source of capital transfers to India, but also has become increasingly influential in the establishment of export oriented high-tech IT and ITEB services in India. Large scale migration from India to England, Canada, and the USA started in the late 1950s and early 1960s – Australia joined these countries as a destination of Indian migrants in the mid to late 1970s. Over the years, while the numbers of such migrants from India have increased, the early migrants have also gained prominence in their adopted countries in business and commerce, medical profession, academia and IT industries. After the opening up of India's economy in the early 1990s, Indian diaspora has become increasingly active and influential in shaping the country's export drive. As a sign of this role is the high level of remittances from non-resident Indians – outstanding deposits have increased from US$13.7 billion in March 1991 to US$35.2 billion in March 2006.

A recent study by the World Bank Institute highlighted the economic contribution of Indian diaspora when it noted: *Riding the wave of growing reputation and visibility of Indians in the IT sector, many well-placed senior executives (of Indian origin) in big corporations who had moved to US, UK and Canada in the 1960s influenced outsourcing-related decisions in India's favour. As the networking and mentoring role of diaspora increases India will continue to retain the edge in outsourcing* (Dahlman and Utz 2004).

Growing Global Role of Indian Firms

India's firms are becoming global. Firms such as Reliance Industries, Tata Steel and Infosys are among the most efficient in the world. A television manufacturing firm Videocon was recently reported as the front-runner in a bid to take over Korean consumer goods giant Daewoo for $650 million. Indian firms acquired 76 foreign companies between January and June 2006 for $US5.2 billion. The purchases this year follow last year's shopping spree when Indian companies acquired stakes in 104 companies for $US3.5 billion, up from $US2.0 billion in 2004. Increasingly, Indian firms are also investing in R&D capacity. In 2004, Indian pharmaceutical firms filed around 200 patents.

Importance of Invisibles and Services Trade

India is the world's leading remittance recipients, accounting for nearly 20% of global flows. India is the world's leading outsourcing destinations and is fast emerging as one of the top 10 tourism destinations. India's service exports account for one-third of India's total trade (goods and services combined) – higher than world average share of around 20%. The composition of India's exports of services has undergone a transformation during the past four years, lifting the share of software services and other business and professional services in total service exports to nearly 75% by 2005-06.

Few Existing Links with Western Australia

While China's expansion is already having a major impact on Western Australia, this is not yet the case with India. While the State's total merchandise exports to India ($3.2 billion in 2005) dwarf its imports from India ($112 million), all but $245 million of those exports were in semi-manufactured gold. While these exports have surged over the past three years, in volume terms this has been a matter of the divergence of a stagnant or declining level of production from other markets rather than a stimulus to growth. Thus a deeper Indian relationship is something to be achieved rather than a present reality.

Towards a Global Knowledge Hub in Western Australia

The State Government has identified four pillars for Western Australia's diversification beyond the boom – biotechnology, information and communications technology, marine, sub-sea and defence technologies and renewable energies, including biofuels. We believe there is a major opportunity to build a knowledge hub in Western Australia, significant in global terms and unique in Australia, on the basis of these four pillars and initiatives to date, and through strong collaboration with India and China. By a 'knowledge hub' we mean an integrated cluster of R&D activities, advanced educational programs and knowledge-based business service activities that is recognised as a world leader in R&D, which provides a growing level of exports of services to firms and agencies around the world and is a leader in the provision of education services internationally. In terms of the State's specific strengths, such a cluster could involve engineering and technical services, especially related to resources and energy; environmental services; marine science and technologies, related both to offshore and sub-sea platforms and to coastal management; and agriculture and water.

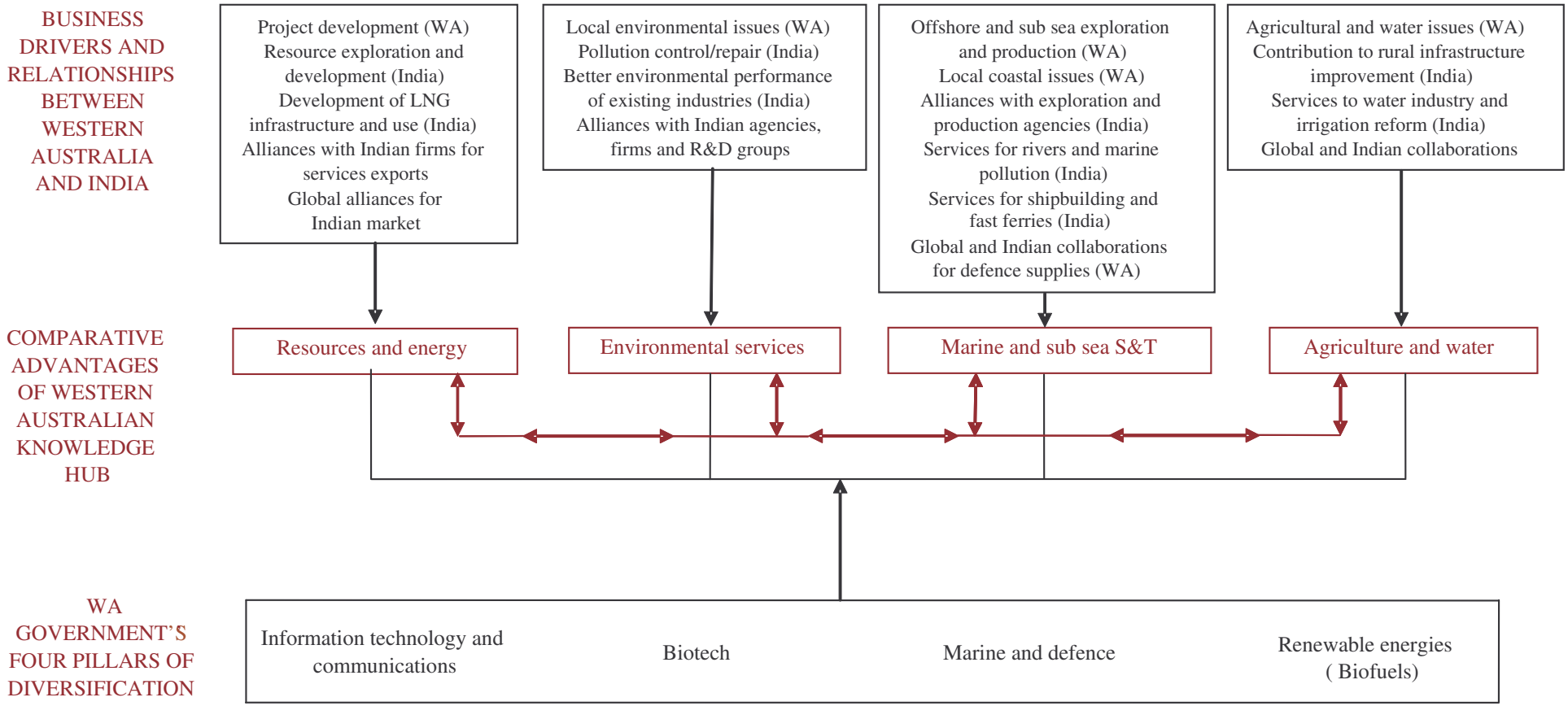
Thus a world leading cluster would be founded in part on emerging trends within Western Australia, including the 33% per annum rise in business R&D in the State between 2001-02 and 2004-05, an increasing trend for major companies to establish R&D centres in the State and rapid growth in R&D in the State's universities. But the other foundation for a global knowledge hub would be the greatly increased focus on the massive emerging markets for knowledge-based services in India, and collaboration with R&D institutions, firms and government agencies from India and other countries to provide such services to those markets.

Many aspects of India's present situation make it particularly relevant for the development of such a knowledge hub. First, while much has already been achieved, India is still in the early stages of a sustained period of rapid growth. It is thus a good time to build alliances and to develop market position, both in terms of producing knowledge and of applying it to India's needs. Secondly, those needs are substantial, and likely to increase rapidly, in the specific areas in which Western Australia has competitive strength. As spelled out further in Figure 1, India has a real need for expert support, for example, in resource development and exploration, in increasing clean energy production rapidly, in the development of infrastructure for the import and use of LNG, in improving the environmental performance of existing industries and sites and in addressing the major issues that it faces in agriculture and in water management, preservation and distribution.

Recognising this opportunity, the Commonwealth Government has established, with an allocation of $20 million over three years and in conjunction with the government of India, the Indo-Australian S&T Fund for Scientific and Technological Cooperation (Indo-Australian S&T Fund). Jointly managed by the Australian Government Department of Education, Science and Training (DEST) and the Indian Government Department of Science and Technology (DST), The Indo-Australian S&T Fund supports collaborative activities through projects that build productive alliances, enhance opportunities for Australian and Indian expertise, and create opportunities for researchers, in both the private and public sectors in both countries.

While applications in other areas may be considered, the current priority areas of the Indo-Australian S&T Fund are: Agricultural Research; Astronomy and Astrophysics; Environment Sciences; Micro-electronics devices and Materials; Nanotechnology; Renewable Energy and Marine Sciences. Support is provided on a competitive basis for collaborative research activities and workshops. Projects may range from short international visits or activities to more complex projects spanning up to three years, but cannot extend beyond the life of the Indo-Australian S&T Fund (30 June 2011).

Figure 1 Developing a global knowledge hub in Western Australia: Indian linkages



Third, India has shown what is possible in terms of the exports of services of this type. As noted above, from a low level 10 years ago India's exports of IT and enabled services reached US$23.4 billion in FY 2006, and are growing at a rate in excess of 30%. The India IT industry association, NASSCOM, is targeting a new US$50 million export revenue stream for India by 2020 by taking a major share in the global outsourcing of engineering services (NASSCOM 2006b). Firms and agencies from India could thus prove very valuable partners for Western Australian firms and agencies in developing the State's global knowledge hub.

In the scope of this report, it has not been possible to explore fully this potential to create a global knowledge hub in Western Australia, nor to analyse fully the policies required to develop it. But it is, in our view, a major opportunity and a realistic possibility. In quantitative terms it might involve, by 2012-15, outcomes such as the following: a level of business expenditure on R&D in excess of 2% of GSP; exports of knowledge intensive business services in excess of $1 billion per annum; over 5,000 students from each of India and China , many of the highest quality, studying in the State's universities and a wide array of international collaborations with these countries' firms, agencies and research and educational institutions. It is recommended that such an opportunity, and the policies necessary to achieve it, be the subject of further detailed study.

Other Opportunities for Western Australia

Collaborations in Education and IT Enabled Services

While the global knowledge hub is focused on particular areas where Western Australia has a distinctive position, increased collaboration with India in other areas would also be beneficial. For example, the All-India Institute of Medical Sciences (AIIMS), Indian Institutes of Technology (IITs), Indian Institutes of Management (IIMs) and several others are world class institutes of learning. These are ranked in the top 100 institutions in the world ranking of academic institutions. The competition for admission into these institutions has been tough and tightening over the years. Thus for these top management schools, not even one in a hundred make it, and in the IITs, barely two out of a hundred get in. Thus, there are large numbers of very bright Indian students who cannot get admission in these institutions and are in search of good overseas alternatives. It is puzzling that, with its world-class universities, Western Australia is only getting a very small share of this market for education.

Healthcare Industry

India's healthcare industry employs over four million people, making it one of the largest service sectors in the economy. Healthcare spending is predicted to double over the next 10 years. Private healthcare and private cover insurance will form a large part of expenditure and growth in the sector. Growth in high-end private hospitals such as the Apollo and Escorts Groups, with a network of comparable Western standard style and post-operative care facilities, is rising. Both groups are now seeking certification from the US-based Joint Commission on Accreditation of Healthcare Organizations. Specialised opportunities exists for Australian service providers in heath care architectural services, aged care services; online medical training services and medical products that are transportable and assist in rural medical care.

The Western Australian Country Health Service (WACHS) is the largest country health system in Australia. It services an area of some 2.55 million square kilometres with a combined regional population of 454,000 people (almost a third of the State's population), including 44,900 Aboriginal people (around 10% of the State's total population).

As such, the Government is committed to the goal that rural, regional and remote Australians will be as healthy as other Australians and have the skills and capacity to maintain healthy communities. There is enormous scope for developing partnerships with India's health providers – at the central and state levels – for improving the access to health services for rural and remote populations.

Defence Industries – Shipbuilding and Fast Ferries

There is also scope for productive partnerships and collaborations in India's defence industries, in which a privatisation policy in defence procurement continues to be driven by the country's heavy import reliance. According to the Indian Defence Minister, in 2004-2005 just over half of India's defence capital expenditure (Rs2700 million) was spent on imports. The new privatisation policy allows private Indian firms with up to 100% private equity to obtain licenses for defence production and procurement. Foreign firms can be involved in these licensing arrangements with up to 26% foreign equity. This is the first time since the passing of the Industrial Policy Resolution in 1956 that the defence sector has been open to foreign interests. These rules apply to the entire range of Indian defence production and procurement. By September 2005, the Indian government had given out 23 licenses to private Indian manufacturers with options to buy, or buy and make or make defence goods. Opportunities need to explored in relation to defence supplies, shipbuilding, construction and delivery of patrol boats and of ferries for metropolitan centres such as Mumbai, which consists of several islands and where the market for ferry services appears ready for development.

Tourism and Cultural Industries

Given Perth's proximity to India – it is the closest Australian capital city to India – significant opportunities exist for collaboration in tourism and cultural industries. The typical Indian tourist likes to visit at least two or three countries in a holiday package and stoppages in Singapore, Malaysia, Bangkok or Indonesia provide an attractive package for relaxing holiday combined with shopping on the way. With backing and research from Western Australia Tourism, packages of this type are worthwhile exploring. Bollywood productions like to include foreign city sequences for the song and dance routine. The possibilities of packaging potential Swan River locations for consideration by Bollywood needs to be explored. Accessing Bollywood productions is a cost effective way of making inroads into the tourism market. Emerging opportunities in the cultural industries of India should also be explored, perhaps by developing collaborations with Indian museums and galleries for cultural tours and exhibitions.

Policy Responses

To realise the available opportunities for Western Australia three issues need to be addressed. There needs to be an *increased orientation* of private services firms, government agencies and universities to export markets, especially in India. Building stronger *relationships and collaboration*s with Indian firms and agencies will be crucial. Finally, *building recognition of quality* is necessary if firms, agencies and individuals in other countries are to participate in knowledge activities in Western Australia. While this recognition is growing rapidly in some sectors, in others, such as higher education, a perception in some countries that the major knowledge centres in Australia are located in the eastern states may hinder the growth in high quality student enrolments in Western Australia.

Two specific programs could contribute greatly to achieving these objectives and to building the global knowledge hub. Firstly, a program is required to support private firms embarking on knowledge based collaborations with India, and to encourage universities and government agencies to enter into such relationships. This could provide funding, on a competitive basis, to joint R&D activities in India and Western Australia, to local companies developing products in conjunction with Indian partners, to government agencies embarking on research or development activities with their Indian counterparts, to shared R&D and teaching activities and so on. If such a program were of significant scale, say $40-50 million over five years, it would also signal the Government's intention to create a more export-oriented culture in knowledge-based services in Western Australia. Similar programs have been implemented in relation to India by other governments around the world, with some signs of success.

Secondly, a central part of the knowledge hub would be a growing level of internationally engaged, high quality activity in post-secondary education in Western Australia. To increase the involvement of high quality Indian postgraduate students in the State's universities, the Government could offer, as a variation on the Indo-Australian S&T Fund noted above, a PhD program for leading graduates from these two countries. Such a program, perhaps reaching a total stock of students of about 200 by the third year at a cost of about $7 million per annum, would attract good students emanating from leading universities in both India and China. If widely advertised within these countries, it could help to build recognition of the State as a knowledge base and as a student destination. Preference could be given to students embedded in a broader collaborative relationship.

For practical purposes the report proposes a knowledge hub that can deliver to both the China and India markets by respecting their differences and unique characteristics. The proposed knowledge hub also forms a framework for any future markets that Western Australia wishes to engage.

WESTERN AUSTRALIAN
TECHNOLOGY & INDUSTRY ADVISORY COUNCIL

Building on the Western Australian Boom: The Drivers and Shapers of China's Economic Development in the 21st Century

February 2007

Additional copies of this report can be obtained from our website: www.tiac.wa.gov.au

Contents

Appendices

A **Steering Committee and Consultation Team**

B **Western Australian Technology & Industry Advisory Council**

C **TIAC Themes and Published Reports**

Supporting Documents

Copies of these documents can be obtained from our website: www.tiac.wa.gov.au

1. Summary Projections and the Global Economy to 2030
2. Energy Use and CO_2 Emissions in China: Retrospect and Prospect
3. The Geopolitical and Social Dimensions of China's Development
4. Changing Trading of Goods and Services Trade
5. China and ICTs
6. Agricultural Products and Value Added Products
7. Environmental Products and Services
8. Health and Education
9. Employment, Inequality and Regional Diversity
10. Trends in Key Resource Areas
11. China's Outbound Tourism and Western Australia
12. The Western Australian Biofuel Industry

Executive Summary

China's surging economy, underpinned by strong demand in the USA and other developed economies, is the key factor driving the high rate of growth of the world economy at the present time. This is leading to large-scale investment in the resources sector in Western Australia and around the world. China's expansion is not, however, just another case of a rapidly growing East Asian economy, and should not be seen only in terms of growing markets for particular products, such as resources, energy and educational services. Rather it involves a fundamental reorientation of global patterns of demand and supply, of sources of innovation, and of economic and political power. China is becoming not only a richer country, but also a leader in science and technology, education and social affairs, and an important political power. By 2020, only 14 years hence, China's economy will be by far the largest in the world and its R&D spending will be higher even than in the USA (in purchasing power parity terms). China will then account for more than 15% of world merchandise trade. China is, in short, a key player in the creation of a new world order that will hold the key to Western Australia's continued prosperity in the 21st Century.

Both the speed and the scale of change towards this new world order are unprecedented, but it will not be created in a smooth and steady manner, free of crisis and upheaval. Severe strains are developing in the global economy – in terms of unsustainable growth in energy use and its impact on the climate, a chronic imbalance in financial flows between East Asia and the oil producers on one hand and the developed world on the other, and rising geopolitical tensions related to energy and trade. Imbalances are also mounting within China. Rapid growth based on exports, heavy industry and construction is leading to further pollution of the environment and widening the gap between rich and poor, leaving many dissatisfied with the limited benefits they have received from development. Adjustment to these imbalances may be gradual, or it may involve a sharp slowdown in the world economy, but it will inevitably take place. However this adjustment, when it comes, is unlikely to reverse the underlying trend to a new centre of gravity in the world economy.

Implications for Western Australia

These facts – the extent of Western Australia's current links with China, the historic nature of China's transformation and the likelihood of severe disturbances along the road – provide both major opportunities and big risks for Western Australia. In our judgment it is likely that demand for resources will continue to be strong for the next two to three years. This will drive further major investment in new resources and energy projects, although a strong supply response is already under way. China's economy is growing strongly, even as the imbalances build, and this seems likely to continue for the next few years. Western Australia's unique resource endowments, especially in terms of iron ore and offshore natural gas fields, will generate further large scale investments in such an environment. The boom, however, will come to an end, and this ending could be quite abrupt if the global and Chinese imbalances are not effectively managed. This could mean a return to the boom/bust cycle that has plagued Western Australia in the past.

There is both a real need, and a major opportunity, for Western Australia to build sustainable, long term sources of growth out of the present boom, and on the back of the close links with China that it is generating. The difficulty of this task arises from the fact that, while the economy is booming, it is hard to focus public and private resources on the longer term; but when the boom breaks, much of the opportunity has been lost. The policy challenge is to build these sustainable sources of growth now, while the opportunities abound.

Building a Global Knowledge Hub in Western Australia

Existing Foundations for a Global Knowledge Hub

The State Government has identified four pillars for Western Australia's diversification beyond the boom – biotechnology, information and communications technology, marine and defence and renewable energies. There is, in our assessment, a major opportunity to build a knowledge hub in Western Australia, significant in global terms and unique in Australia, on the basis of these four pillars and of initiatives to date, and through strong collaboration with China (and India). By a 'knowledge hub' we mean an integrated cluster of R&D activities, advanced educational programs and knowledge-based business services, of sufficient scale and excellence to be recognised as a world leader in R&D, to provide a growing level of exports of services to firms and agencies around the world and to be a world leader in the provision of education services internationally.

Both scale and excellence are vital in the creation of such a global knowledge hub. This means that the core activities must be focused in a cluster of related areas where Western Australia can claim, or can reasonably set out to achieve, world best practice and in which it can attract and maintain a high level of demand. In our assessment, the related areas in which these two criteria can be met are: engineering and technical services, especially related to resources and energy; environmental services; marine science and technologies, related both to offshore and sub-sea platforms and to coastal management; and agriculture and water.

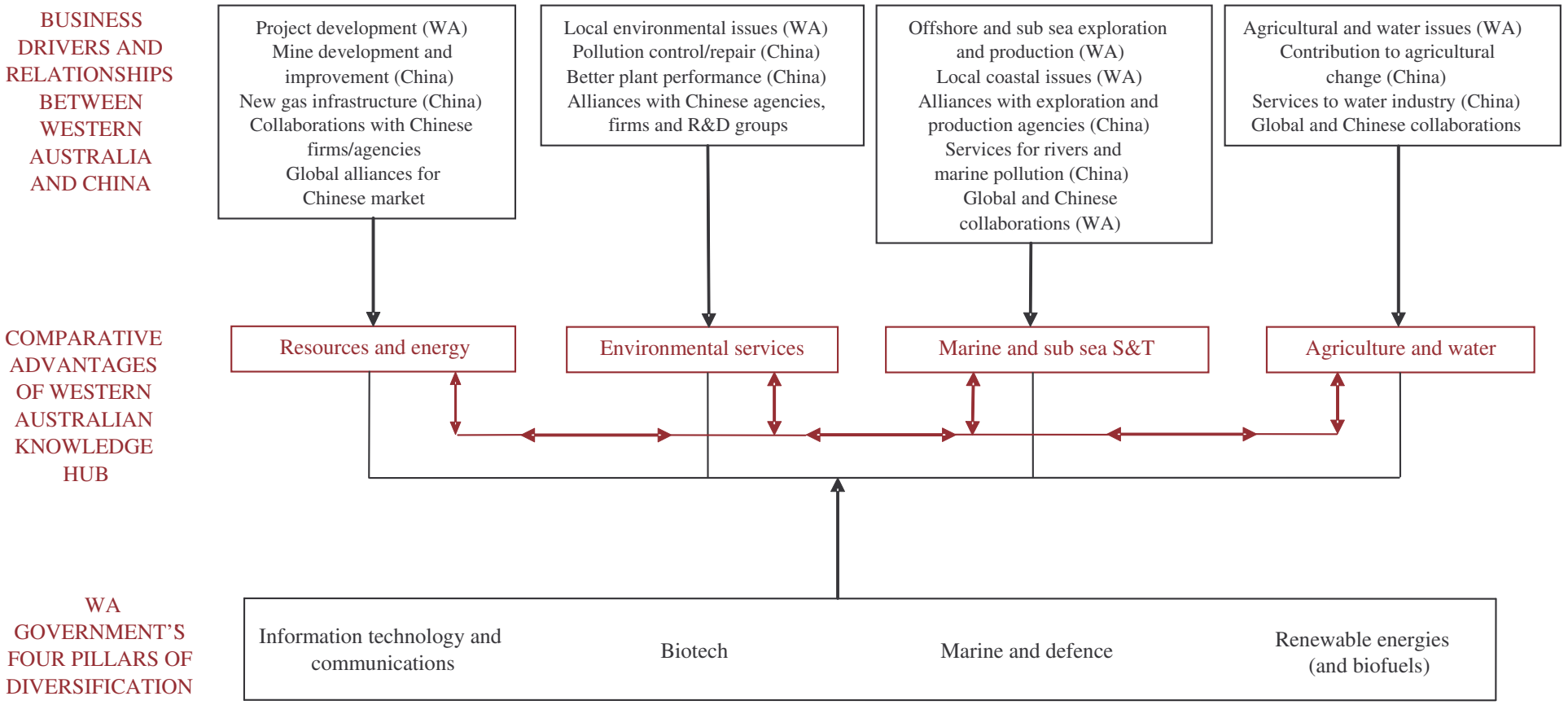
In terms of R&D there is strong evidence that both scale and excellence are being built in Western Australia. There has been a remarkable surge in business R&D in recent years, which is continuing as companies such as BHP Billiton, Chevron and others establish R&D centres in the State. Business R&D grew by only 4.6% per annum in Western Australia over 1992-93 and 2001-02, but between 2001-02 and 2004-05 it jumped by 33% per annum. Growth for the rest of Australia over the latter period was 8.8% per annum. As a share of GSP, business R&D increased from 0.56% in 2001-02 to 1.04% in 2004-05, while for the rest of Australia the increase was only from 0.88% to 0.94%. There is a real prospect that, in the context of effective programs and continued company support, the business R&D share in Western Australia could increase to over 2% within five years. This would be unprecedented within the Australian context. R&D in higher education in Western Australia also increased by 22.2% from 2002 to 2004, by comparison with 10.7% for the rest of Australia.

In terms of knowledge-based services, domestic firms provide a high level of services to resource and other projects within the State, but the level of identified exports of knowledge-based services from Western Australia remains relatively modest. Nevertheless exports of architectural, engineering and other technical services from Western Australia reached $198 million in 2005, 30% of the Australian total. However, overseas student enrolments have grown more slowly in Western Australia than in any other state over the last three years, partly because of a low share of the rapidly growing Chinese student market (4.3% share in 2005).

Building Scale and Excellence through the China Relationship

A major opportunity for building scale and excellence for a global knowledge hub in these areas lies in increased collaboration with China, as China emerges as a global power in science and technology with a growing thirst for knowledge in areas in which Western Australia has expertise. China's R&D priorities are closely aligned to the State's areas of expertise, and spending in these areas by both governments and firms in China is growing rapidly. Figure 1 spells out how a deepening relationship with China, at both commercial and government levels, could play a major role in developing the scale and excellence of the State's global knowledge hub.

Figure 1 Developing a global knowledge hub in Western Australia: China linkages



Many aspects of China's development, and of its response to the massive challenges that it faces, could be supported by expertise from Western Australia. Two of many possible examples illustrate the potential scale involved. First, China has a growing need for natural gas, as an efficient and relatively clean energy source for cities in the south of the country, far removed from China's main coal deposits. Western Australia could provide some of this gas from new fields, but the growth of the China market is constrained by technical and infrastructure issues at the Chinese end, as well as by domestic policy issues. The market for technical expertise and services in this area in China over the next decade will be very large. Second, China realises that it must address deep environmental problems in many areas arising from rapid growth. To do so, it has allocated US$175 billion of government funding over 2006-2010, and is placing great pressure on firms to improve their performance. The scale of the environmental issues to be addressed will almost certainly increase further as rapid development proceeds and the government becomes more committed to environmental audits. In both of these areas Western Australia has substantial expertise (created to meet its own needs), that could be the basis for large scale exports of knowledge-based services and technologies to China. Other areas in which stronger links with China might drive the development of a Western Australian knowledge hub are noted in Figure 5.1.

Building strong relationships with Chinese firms, government agencies and research institutions can also help to strengthen the quality and relevance of Western Australian R&D and education in these areas. China is moving rapidly from being a mere recipient of modern scientific knowledge to being a leading creator of knowledge on a very large scale. Mutual R&D collaborations, with shared R&D activities in both countries, are being recognised by many countries as highly valuable vehicles for increasing the scale, quality and relevance of local R&D. Similarly, high quality Chinese graduate students, and closer links with the institutions from which they come, could contribute greatly to academic life within Western Australia.

Policies for Building the Global Knowledge Hub

To realise the multi-billion dollar potential of this knowledge hub for Western Australia, three issues need to be addressed. There needs to be an *increased orientation* of private services firms, government agencies and universities to export markets, especially in China. Building stronger *relationships and collaboration*s, especially with Chinese firms and agencies, will be crucial. Finally, *building recognition of quality* is necessary if firms, agencies and individuals in other countries are to participate in knowledge activities in Western Australia. While this recognition is growing rapidly in some sectors, in others, such as higher education, a perception in some countries that the major knowledge centres in Australia are located in the eastern states may hinder the growth in high quality student enrolments in Western Australia.

Two specific programs could contribute greatly to achieving these objectives and to building the knowledge hub. Firstly, a program is required to support private firms embarking on knowledge-based collaborations with China, and to encourage universities and government agencies to enter into such relationships. This could provide funding, on a competitive basis, to joint R&D activities in China and Western Australia, to local companies developing products in conjunction with Chinese partners, to government agencies embarking on research or development activities with their Chinese counterparts, to shared R&D and teaching activities and so on. If such a program were of significant scale, say $80-100 million over five years, it would also signal the Government's intention to create a more export-oriented culture in knowledge-based services in Western Australia. Similar programs have been implemented in relation to China by other governments around the world, with some signs of success.

Secondly, a central part of the knowledge hub would be a growing level of internationally engaged, high quality activity in post-secondary education in Western Australia. To increase the involvement of high quality Chinese postgraduate students in the State's universities, the Government could offer a PhD program for leading graduates from China. Such a program, perhaps reaching a total stock of students of about 100 by the third year at a cost of $3-4 million per annum, would attract good students emanating from China's leading universities. If widely advertised within China it could help to build recognition of the State as a knowledge base and as a student destination. Preference could be given to students embedded in a broader collaborative relationship.

The Scale of the Knowledge Hub

In the scope of this report it has not been possible to explore fully this potential to create a global knowledge hub in Western Australia, nor to analyse in detail the policies required to develop it. But it is, in our view, a major opportunity and a realistic possibility. In quantitative terms it might involve, by 2012, outcomes such as the following: a level of business expenditure on R&D in excess of 2% of GSP; exports of knowledge intensive business services in excess of $1 billion per annum; over 5,000 Chinese students, many of the highest quality, studying in the State's universities; and a wide array of international collaborations with Chinese and other firms, agencies and research and educational institutions. Such outcomes would be unprecedented within the Australian context, and would have a major impact on Western Australia, but are achievable. For example, there is a very real prospect that, in the context of effective programs and continued company support, the objective of business R&D at 2% of GSP in Western Australia by 2012 could be achieved.

For practical purposes the report proposes a knowledge hub that can deliver to both Chinese and Indian markets by respecting their differences and unique characteristics. The proposed knowledge hub also forms a framework for any future markets that Western Australia wishes to engage.

It is recommended that the opportunity to create a knowledge hub, and the policies necessary to achieve it, be the subject of a further detailed study.

Other Opportunities for Western Australia

Our analysis in the body of the report suggests a number of other opportunities for Western Australia in the light of the continuing emergence of China. These are noted briefly below.

Tourism

In 2005, there were 31 million outbound tourists from China worldwide, an increase of 20% per annum since 1998. The World Tourism Organization forecasts that the number will rise to 100 million by 2020 (a growth rate of 10% per annum) and this may well prove conservative. The number of Chinese tourists visiting Australia, although only about 1% of the global total, has been growing more rapidly than that total, and Chinese tourists stay longer and spend more on average than other tourists to Australia. In spite of its unique and varied attractions, Western Australia received only 5% of Chinese visitor nights in 2003 and only 4.3% of all Chinese visitors in 2005-06.

There is clearly scope for the State to attract a much larger share of a large and rapidly growing number of Chinese tourists in the years ahead. For example, if 2% of China's tourists visited Australia by 2020 and 10% of those came to Western Australia, the number of Chinese tourists visiting the State would increase twelvefold by 2020, relative to the current level.

While further investment in facilities would undoubtedly be required, the major requirement would seem to be much greater recognition within China of the State and its attractions.

Renewable Energy

Given the continued growth of energy use based on fossil fuels in China and other countries, there is little doubt that global concerns about climate change and renewable energy sources will deepen in coming years. Western Australia has a number of avenues to pursue further development of renewable energy, and considerable expertise in this area. One particular matter being widely debated at the present time is the possibility of increased production and use within Australia of ethanol or biodiesel, and the tax and/or subsidy arrangements that might be appropriate for this case. Our assessment is that high energy demand from China, India and other countries is likely to mean relatively high oil prices for the long-term, although high prices will in due course both moderate demand and increase the supply of oil from both conventional and non-conventional sources. Western Australia has the potential to produce a large volume of ethanol fuel from wheat, both for domestic use and possibly for export, and some potential for biodiesel production. Our analysis suggests that under the full excise tax exemption, the production of ethanol from wheat is commercially viable even at long run oil prices below US$50 per bbl, but that viability declines markedly as the tax exemption is withdrawn. Detailed attention to this and a range of other renewable energy products and services is clearly in the State's interest in the emerging world context.

Value Added Industries

There has long been debate about why Australia, and states such as Western Australia in particular, cannot add more value to resource exports before they are shipped overseas. Some notable investments have been undertaken to this end in Western Australia, for example in the HiSmelt process and in fertilizer production on the Burrup peninsula, and a number of fertilizer and ammonia nitrate projects are on the drawing boards. However, if China is to move up the industrial value chain while getting serious about controlling energy use, there is a case to be made for more processing of resource imports before they come to China. This option will become more attractive if, as seems inevitable, there is a substantial increase over time in the value of the RMB. Whether such value adding activities could or should take place in Western Australia is another matter, but this issue is one that will demand continued policy attention as the global situation develops.

Human and Government Services

As outlined in the body of the report, strenuous efforts are being made in China to shift its development strategy to one that places much greater emphasis on the service sector, and especially on health. China currently spends a very low proportion of its budget on health services, and faces complex problems of improving health services, both in urban areas and in remote rural regions. China also has an extremely complex governance system within which to deliver these changes, and there are significant disparities within and among the four levels of sub-national governments, and the level of services varies enormously between regions, provinces, counties and townships. Over the next few decades there will be a vast and growing market within China for expert services related to these challenges. Many of them have been addressed over a long period of time in Western Australia, so that local firms and public sector institutions should be well positioned to compete for this business.

National and State Strategic Policy Issues

The centrality of China, and the new world order of which it is a key part, to the future prosperity of Australia, and especially Western Australia, raises a number of broader issues that need to be addressed at both state and national levels.

Firstly, the social and cultural prerequisites within the Australian, and the Western Australian, communities for dealing effectively with a world in which China is a dominant player need to be addressed. This covers such matters as Chinese history, language and cultural studies in schools, much more extensive programs in these areas in the universities and more general programs to share information and to create awareness.

Secondly, using the emergence of China in an effective way to promote local growth will depend above all on the development of long-term relationships, networks and linkages at many levels between Western Australia and China. Given the resource relationship, the State has a head start in this matter, but the extension and deepening of these relationships should be a high priority of the State Government.

Thirdly, attention needs to be given to some of the strategic issues in developing closer relationships with Chinese firms and agencies. These include the possible use of direct investment by Chinese agencies as a mechanism for controlling the use of resources and of curtailing the operation of markets, and of the unique and complex issues involved in doing business in a rapidly growing, increasingly market oriented economy governed by the Chinese Communist Party in a way that can be heavily bureaucratic. China is changing rapidly in many relevant respects, but these issues remain important for firms and governments dealing with China.

Finally, the initial impact of China's emergence as a global economic power on Western Australia is quite different from its impact on the south eastern states of Australia. For the former, it is driving the resources boom, leading to a strong trading surplus and an increased concentration of global knowledge resources in Western Australia. For the latter, the impact is initially felt mainly through greatly increased competition in manufacturing, as indicated by a trading deficit on elaborately transformed manufactures of $71 billion in 2005, and increased pressure on knowledge resources as the manufacturing base erodes. Both regions need to develop considered strategic responses to the challenges and opportunities that they face. However, these increasingly divergent paths mean major problems for key national institutions – those concerned with matters ranging from immigration and monetary policy to wage, price and exchange rate determination and fiscal equalisation – in producing outcomes that meet the needs of the whole of Australia.

Publications of TIAC 1988-2007

Publication Title	Date
Support for West Australian Software Industry	July 1988
New Challenges & Opportunities	July 1988
Technology Parks	July 1988
Intelligent Buildings: What role for the WA Government?	Sept 1988
US State Government Policies Designed to Encourage the Commercialisation of New Ideas: Some Recommendations for WA	Sept 1988
WA Software Industry (Second Report)	Oct 1988
An Industrial Science Policy for Western Australia: Some Seed Ideas	Oct 1988
Towards a West Australian Science Policy for the 1990's	Nov 1988
Inquiry into Venture Capital in Western Australia	March 1989
The Case for a New Branch of Manufacturing to Provide Smart Equipment for the Mining Industry	March 1990
The Export Debate	May 1990
Tomorrow's People in Science & Technology	March 1991
Bentley Technology Precinct: An Exploratory Study	Sept 1992
The Western Australian Technology School of the Future: A Feasibility Study	Oct 1992
Capturing Opportunities in Asia with Western Australian Science & Technology	Nov 1992
Telecommuting 2000: Making the Future Work for Western Australia	Dec 1992
Telework 2000: Making the Future Work for Western Australia	July 1993
R&D and the State's Economic Development: What is the best fit?	April 1994
Medical Research Infrastructure Funding in Western Australia	April 1995
Towards an Information Infrastructure Policy for Western Australia – the Business Aspect	Feb 1996
Financing Options for Regional Infrastructure in Western Australia	Nov 1996
Telecommunications Deregulation – Is Western Australia Prepared?	Dec 1996
Western Australia's Minerals and Energy Expertise: How can it be optimised? – Defining the Issues – A Background Paper	Sept 1997

Publications of TIAC 1988-2007 (Cont'd)

Publication Title	Date
Research & Development: Role of the State Government in attracting External Funding	May 1998
From Mines to Minds: Western Australia in the Global Information Economy	Feb 1999
Western Australia's Minerals and Energy Expertise: How can it be optimised? – *Growing the R&D Sector*	June 1999
Technology, Skills and the Changing Nature of Work	April 2000
Drivers and Shapers of Economic Development in Western Australia in the 21st Century	Sept 2000
Export of Western Australian Education and Training: Constraints and Opportunities	Oct 2000
Biotechnology West: Strengths, Weaknesses and Opportunities	Dec 2000
Directions for Industry Policy in Western Australia within the Global Knowledge Economy	Mar 2002
The Organisation of Knowledge: Optimising the Role of Universities in a Western Australian Knowledge Hub	Jun 2002
Creating Western Australia's Knowledge Infrastructure: Towards Global Competitiveness and High-Value Employment	Jun 2003
Enabling a Connected Community: Developing Broadband Infrastructure and Services in Metropolitan Western Australia	Sept 2003
Initiating and Supporting Major Economic Infrastructure for State Development: Defining the Issues	May 2004
Initiating and Supporting Major Economic Infrastructure for State Development: Opportunities for Government	Sept 2004
Trade in Western Australian Health Industry Services: Directions for Development	Nov 2004
A Snapshot of Export Activity in Western Australia's SME Sector	July 2006
Building on the Western Australian Boom: The Drivers and Shapers of India's Economic Development in the 21st Century	Feb 2007
Building on the Western Australian Boom: The Drivers and Shapers of China's Economic Development in the 21st Century	Feb 2007

Publications of the ICT Forum 2003-2007

Publication Title	Date
Enabling a Connected Community: Developing Broadband Infrastructure and Services in Metropolitan Western Australia	Sept 2003
Enabling Growth: The Contribution of ICT to the Western Australian Economy	Feb 2006
Big Pipes: Connecting Western Australia to the Global Knowledge Economy	April 2006

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Our ref: IO5/2981
Your ref:
Contact: Patrick Taylor 9260 6646
Date: 12 January 2006

Dear Mr White

TIAC/ICT FORUM CODE OF CONDUCT AND GOVERNANCE

Thank you for your letter regarding the above subject matter dated 10 November 2005.

I congratulate you on completing a five yearly review of your Code of Conduct and am pleased to note that the TIAC and ICT Forum now have a common code of conduct.

Should my Office be of any assistance in the future, please do not hesitate to contact Patrick Taylor, Senior Consultant on 9260 6646, or taylorp@opssc.wa.gov.au.

Lastly, please accept my best wishes for the new year of 2006.

Yours sincerely

Maxine Murray
Commissioner for
Public Sector Standards

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