

Building on the Western Australian Boom:

The Drivers and Shapers of India's

Economic Development in the 21st Century

February 2007





WESTERN AUSTRALIAN
TECHNOLOGY & INDUSTRY ADVISORY COUNCIL

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Economic Development in the 21st Century**

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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 (% per annum)	China (% per annum)	India (%)	China (%)
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.

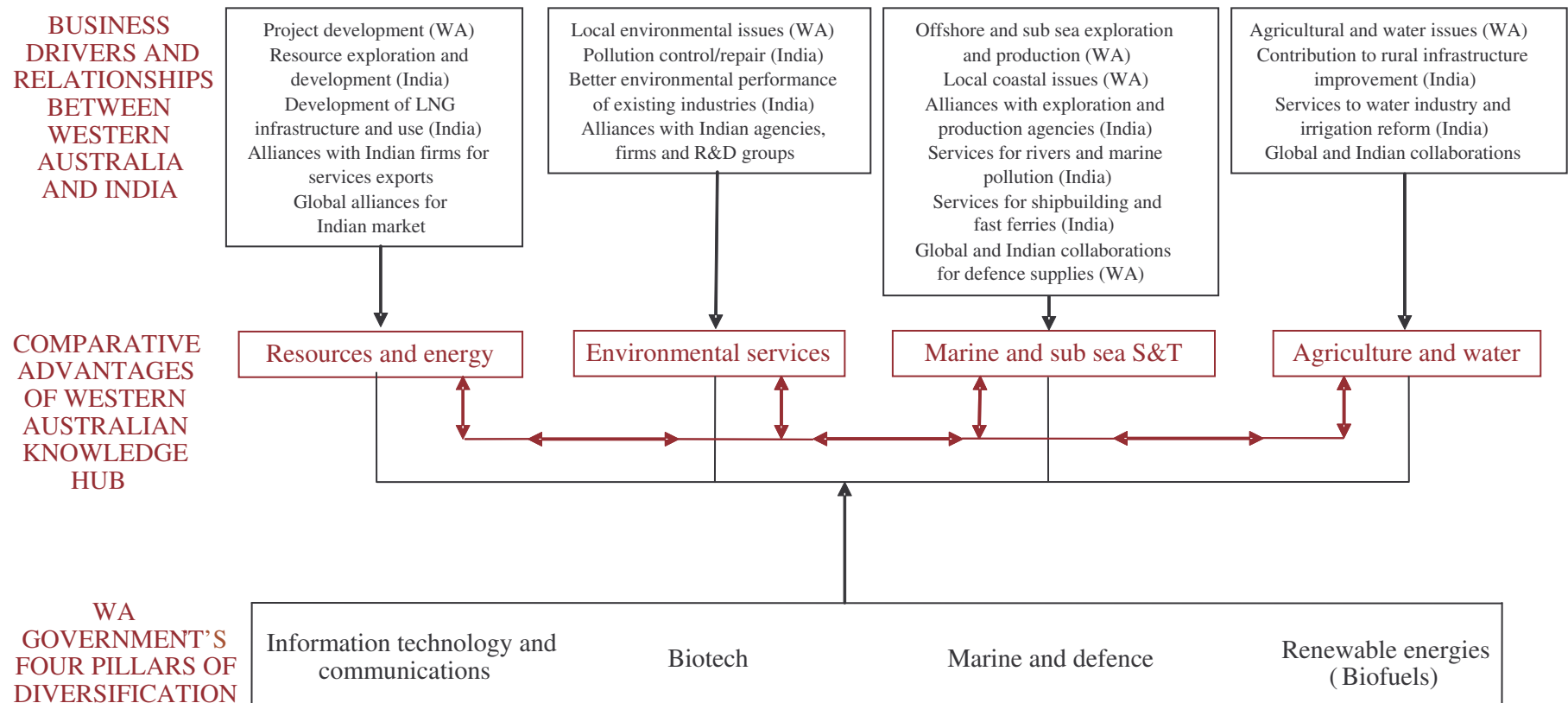
Thus a world leading cluster would be founded in part on emerging trends within Western Australia, including the 33% per annum rise in business R&D in the State between 2001-02 and 2004-05, an increasing trend for major companies to establish R&D centres in the State and rapid growth in R&D in the State's 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 billion 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 exist for Australian service providers in health 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 be 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 collaborations* 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.

Executive Summary

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.

1 Emerging India: Economic, Social and Geopolitical Dimensions¹

1.1 The New Economy

Between 1950-51 and 2004-05 India's economy grew at an annual average rate of 4.2% and per capita output grew at 2.1% per annum. Real output has increased more than nine times during this period, while real output per capita has increased by more than three times.

While the experts agree that India's economic growth performance over this period occurred in two distinct phases, there is disagreement about the precise demarcation of the two phases. According to one school, the first phase occurred from 1950-51 to 1979-80, when the GDP growth rate was 3.5% per annum, and the second phase was from 1980-81 to 2004-05, when the growth rate increased to 5.6%. This interpretation ascribes the acceleration of growth in the second period to expansionary fiscal policy, including liberal subsidies to agriculture during the period of the so-called green revolution.

The second school argues that the first phase lasted from 1950-51 to 1990-91, when GDP growth averaged 3.5% per annum, and the second stage lasted from 1991-92 to 2004-05, in which period average GDP annual growth accelerated to 6.0%. This interpretation stresses the role of economic liberalisation implemented in 1991 as the source of faster growth.

Whichever interpretation is accepted, it is clear that overall growth in the agricultural sector has been consistently low at around 2.0% per annum, except for the period of the green revolution in some parts of the country where growth was much higher. Productivity growth in agriculture has been low. Thanks to rapid growth of industry and especially of the services sector, agriculture now accounts to less than 20% of India's economy.

In spite of low growth and productivity, and together with the contribution of repatriations from Indians living abroad, the green revolution contributed to higher aggregate demand in rural India from the 1980s.

In contrast to China, where economic growth has been based on exports and capital expenditure, India's economic growth has been based on domestic consumption and the service sector. Furthermore whereas in China FDI has played a key role in financing investment, India's investment (gross capital formation at 30.1% of GDP in 2004-05) has been financed much more from domestic savings (29.1% of GDP in 2004-05) and from remittances from workers of Indian origin abroad. Nevertheless, public savings in India have been negative for many years.

1.1.1 Economic Growth

Regardless of the competing explanations of India's improving growth trajectory, growth in India had certainly moved to a higher level in the 1990s. 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.

¹ Further information on the matters discussed in this chapter can be found in Supporting Paper 1: Evolution of the Indian Economy and Supporting Paper 2: India: Growth with Equity.

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. This view is widely shared by private sector forecasters. For example, the Confederation of Indian Industry (CII) is anticipating that the new rates would also be sustained over the next decade and a half, and Goldman Sachs anticipate an average rate of growth of 6% per annum through to 2050 (Table 1.1). Supported by solid growth during the 1990s and the recent acceleration, India's share of world output (at PPP adjusted exchange rates) has risen to 5.9% in 2005 from 4.3% in 1990.

Table 1.1 India's economic growth, past and future prospects

Period	Average annual GDP growth rate (%)
1950s	3.9
1960s	3.7
1970s	3.2
1980s	5.7
1990s	5.7
2003-05	8.1
2000-2020 (CII)	8.0
2000-2050 (Goldman Sachs)	6.0

Source: Vicziany and Smyth (2006).

1.1.2 Business Dynamism

India's growth in the last two or three years has been underpinned by strong growth of the services sector. The share of the services sector in GDP increased from 42.8% in 1994 to 53.2% in 2005.

Indian firms are becoming global. Firms such as Reliance Industries, Tata Steel and Infosys, are among the most efficient in the world. A television manufacturer 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 (*The Age* 2006). Increasingly, Indian firms are also investing in their R&D capacity. In 2004, Indian pharmaceutical firms filed around 200 patents.

The following additional facts are important as indicators of India's new economic strength:

- India contributed nearly 20% of Asian domestic demand in 2000-05.
- India is the world's leading recipients of remittances from overseas, accounting for nearly 20% of global flows.
- India is the world's leading outsourcing destination 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%. As the figures in Table 1.2 indicate, 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.

Table 1.2 Changing pattern of India's service exports, per cent of total

Year	Travel	Transportation	Insurance	GNIE*	Software	Other [#]	Total
1970-71	16.8	49.7	5.5	13.7	0	14.4	100
1980-81	43.5	16.3	2.3	4.0	0	33.9	100
1990-91	32.0	21.6	2.4	0.3	0	43.7	100
1995-96	36.9	27.4	2.4	0.2	10.3	22.8	100
2000-01	21.5	12.6	1.7	4.0	39.0	21.2	100
2003-04	18.7	11.9	1.6	0.9	47.6	19.3	100
2004-05	14.1	10.4	2.0	0.7	37.4	35.4	100
2005-06	12.9	10.4	1.7	0.5	38.9	35.6	100

Note: * GNIE: Government not included elsewhere. # Other business and professional services.
Source: OECD (2006).

1.1.3 Macroeconomic Fundamentals

In light of these changes in the Indian economy, there is greater confidence now among the forecasters about the sustainability of the current high rates of growth of the Indian economy. The macroeconomic fundamentals are strong (Table 1.3), with the exception of the fiscal position. The recent growth rates have been achieved in spite of sluggish performance of India's agriculture and a mediocre performance of the manufacturing industry. If growth in these two sectors reaches the targets set for the 11th Five Year Plan, India could aspire to expect growth rates close to 10% per annum. A recent analysis carried out by the IMF reflects this optimism: *Looking ahead, it appears that the broad path of reform – although not the pace or details – is firmly established. And success begets success. India is now more than ever a focus for international investors, who are eager to take part in a new India* (Schiff 2006).

Table 1.3 India's macroeconomic fundamentals

	9 th Five Year Plan (1997-2002)	10 th Five Year Plan (2002-2007)	11 th Five Year Plan (2007-2012) Initial planning basis
GDP growth (%) of which:	5.5	7.0	8.5
Agriculture	2.0	1.8	3.9
Industry	4.6	8.0	9.9
Services	8.1	8.9	9.4
Domestic saving (% of GDP)	23.1	28.2	31.0
Domestic investment (% of GDP)	23.8	28.2	33.6
Current account balance	-0.7	0.7	-2.6
Fiscal deficit (% of GDP)	8.8	8.4	6.1
Foreign exchange reserves (\$US billion)	54.2	151.6	na
Rate of inflation (WPI %)	4.9	4.8	na

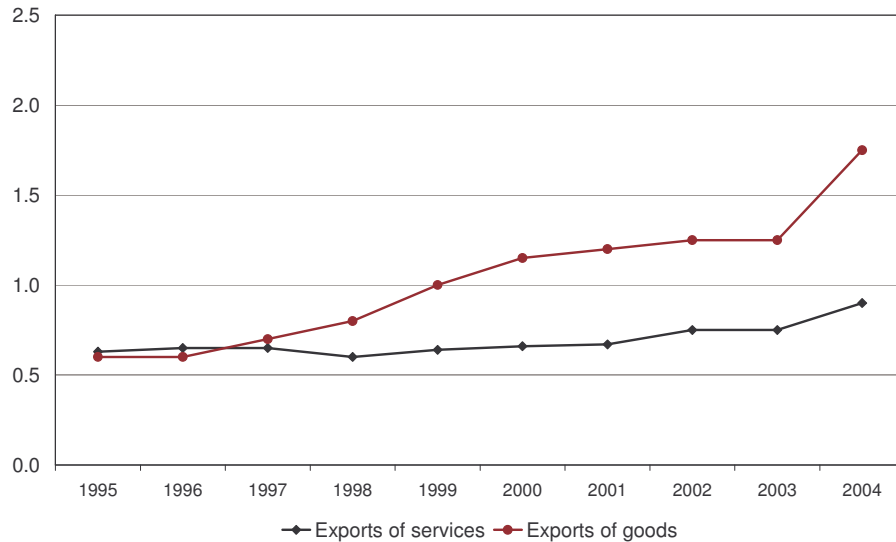
Source: Planning Commission (2006).

The initial planning targets adopted for the 11th Five Year Plan are shown in the right-hand column of Table 1.3.

1.1.4 Trade in Goods and Services

Figure 1.1 shows the accelerating rates of growth in India's service exports in contrast to exports of goods. Service exports grew strongly in 1998 and 1999, just before the collapse of the so-called tech boom in 2000. After registering somewhat flatter rates of growth in the intervening years, exports of services again took off sharply in 2003 and 2004.

Figure 1.1 India's exports of goods and services, percentage share of world exports



Source: OECD (2006, p. 9).

India's imports (including services) rose by 39% a year in the two years to 2004-05, supported by strong growth in investment and consumer demand. Exports grew by 37% a year during the same period, now increasingly including business services, engineering goods and pharmaceuticals. India's trade with China has been rising rapidly, enabling India to participate more in world production networks.

India's demographic dividend is well documented, as the country is estimated to add between 75 million to 110 million new entrants to the labour force over the next decade, with obvious growth potential for output and demand. An additional implication is that because working age people have a higher propensity to save, India's saving potential is likely to receive a boost from its demographic composition, further adding to the country's productive capacity. However, the country's continuing growth in population will also pose many difficulties.

1.1.5 The Economic Significance of the Indian Diaspora

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, the medical profession, academia and the IT industries. After the opening up of India's economy in the early 1990s, the Indian diaspora has become increasingly active and influential in shaping the country's export drive.

Several networking organisations have been established in recent years, such as the Indus Entrepreneur (TiE), the American Association of Physicians from India (AAPI), the American Asian Hotel Owners Association (AAHOA) and the American Asian Convenient Stores Association (AACSA). A recent study by the World Bank Institute highlighted the economic contribution of Indian diaspora when it noted: *Riding the wave of the 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).

One concrete example of the economic contribution of the Indian diaspora is to India's foreign exchange reserves, which have been growing steadily in recent years. From US\$5.8 billion in March 1991, India's foreign exchange reserves have grown to US\$151.6 billion at the end of March 2006. Together with rising exports, non-resident Indians (NRIs) have played a major role in this transformation. NRI outstanding deposits have increased from US\$13.7 billion in March 1991 to US\$35.2 billion in March 2006. It is worth recalling that India faced a foreign exchange crisis in December 1990, when its foreign exchange reserves had bottomed to a level that was sufficient to cover imports for only three weeks. Indeed, this crisis was the trigger for the economic liberalisation policies introduced in 1991 by the current Prime Minister, Dr Manmohan Singh, who was then Finance Minister of India. In contrast to those days, India's foreign exchange reserves at the end of March 2006 were sufficient for covering imports for 11.5 months.

1.1.6 Major Challenges

India's recent economic growth has been underpinned by the services sector, rather than by manufacturing. The ability of the services sector to generate new jobs has been quite low. In spite of its recognition as the leading sector in the world, India's IT services sector remains a small enclave and has not made a major direct impact on the country's employment situation.

The current employment elasticity of growth is such that GDP growth of 5% adds only 2.5% to new employment, and total employment in the enterprises (excluding crop production and plantation) grew by 2.5% per annum between economic census years of 1998 and 2005. Unless employment growth is raised substantially, the demographic dividend of a massive increase in the working-age population could turn into an equally big problem.

Indian planners are aware of this challenge and are targeting higher growth of manufacturing during the 11th Five Year Plan. The ability to achieve this target would depend upon the country's ability to upgrade and develop its rural and urban infrastructure, which currently acts as a major handicap for business and commerce.

In recognition of this bottleneck, the government is planning to raise investment in infrastructure by nearly 3-4% of GDP. The government's ability to finance this magnitude of investment is limited, however, by its weak fiscal position. India's fiscal deficit – central and state governments combined, stands around 8% of GDP and its public debt is more than 85% of GDP. Thus, the fiscal space for the public sector is extremely limited, making it urgent that the country succeeds in attracting a lot more foreign direct investment (FDI) than it has in the past. India's stock of FDI in 2003 stood at 5% of GDP, compared with 31% for Thailand and 35% for China. As far as FDI flow is concerned, China has in recent years received in a month the same magnitude of FDI as India has received in a year. But inward FDI to India has been increasing, and reached US\$8.5 billion in 2005-06.

A recent analysis by the IMF suggests that while sectoral restriction on FDI has played a role, India's FDI regime is not overly restrictive by international standards. Rather, the main hurdle has been the broader difficulties in doing business in India. The IMF study cites the following statistics in support. It takes 22 days to start a business in Korea and 41 days in China, but in India it takes 89 days. To enforce a contract takes 425 days in India, more than five times longer than in Korea and nearly double that in China (Schiff 2006, pp. 8-9).

In contrast to China, India's economic growth is based more heavily on domestic demand. In spite of the recent growth of exports from the IT and the IT-enabled services (ITES) sector, India's share of the world trade in goods and services is still quite low – at around 1.5% in 2005. This means that future growth is vulnerable to the various risks of the domestic markets. The foundation of India's solid growth is still not strong. India has had previous episodes of high rates of growth – the most recent one was in the 1990s. However, these episodes of high growth were not sustained and there is urgent need to ensure that the current phase of rapid growth is sustained. The Planning Commission has noted in this context that in recent years industries such as pharmaceuticals, auto components and more recently even textiles have also gained strength.

Looking ahead, the key challenges for India include: employment generation, raising the growth rates in agriculture and manufacturing, upgrading rural and urban infrastructure, controlling fiscal deficits and attracting much higher levels of FDI than in the past. Additionally, poverty alleviation, raising the skill base of the workforce and the provision of basic services, in particular education, health care and nourishment to the masses, also remain important for ensuring that fruits of economic growth are shared more widely and equally in the society than has been the case in the past.

According to the Planning Commission, education is the critical factor that will empower the poor to participate in the growth process and India's performance in this area has been disappointing.

Looking ahead, we need to move as rapidly as possible towards universalisation of secondary education which is an essential requirement in a knowledge driven world. In the matter of health also there are large gaps in the availability of health care and in related services such as maternal and child care, clean drinking water and access to basic sanitation facilities for the mass of our population especially the poor who do not have even minimum access.
(Planning Commission, 2006, p. 4)

1.2 Social Dimensions

1.2.1 Inequality and Poverty

India is a country of continental dimensions, with social and cultural diversity a feature of all spheres of activity and regions in the country. At the national level inequality in consumption expenditure (usually treated as a surrogate for income inequality), as captured by the Gini coefficient has declined in rural areas from 0.30 in 1983 to 0.26 in 1999-2000. In the case of urban areas, consumption inequality has increased from 0.33 to 0.34 during the same period. At the state level there is no uniform pattern observed.

At the national level, the number of the poor declined from about 323 million in 1983 to 260 million in 1999-2000. The decline has not been uniform either across states or across rural and urban areas. While the proportion of the poor in rural areas declined from 45.7% in 1983 to 27.1% in 1999-2000, the decline in urban areas has been from 40.8 to 23.6% during this period.

Among occupational groups the composition of the poor has been changing, with rural poverty increasingly concentrated in agricultural labour and artisan households, and urban poverty in casual labour households. The share of agricultural labour in the pool of the poor comprised 47% in 1999-2000, up from 41% in 1993-94. Casual labour households accounted for 32% of the urban poor in 1999-2000, increasing from 25% in 1993-94.

An important domestic political trend in India has seen the rise of new parties representing the socioeconomic interests of previously disadvantaged groups. Of these groups, India's untouchables (15% of the population) and tribals (some 12% of the population) are the most important. The untouchables or scheduled castes, in particular, have been on the move since the 1920s and 1930s. However, it was not until the 1990s that the first untouchable political party emerged with any force. The Bahujana Samaj Party, or BSP, is now the fourth largest political group at the central government level.

1.2.2 Population and the Demographic Dividend

India is the second most populous country in the world. It occupies nearly 2.5% of the global landmass but its population of 1064 million (2002) is about 16-17% of the world population. Naturally, it has a fairly high population density, though given the country's enormous diversity, the density varies greatly between regions.

India's population continues to rise and the country adds the equivalent of Australia's population to its population nearly every year. During the last five decades there has been a steep decline in the mortality rates and a relatively less steep but sustained decline in fertility rates.

The annual average growth rate in population has been declining since the Census of 1971; it was 2.26% in the 1970s, falling to 2.13 in the 1980s and further falling to 1.95% in the last decade to 2001. It is estimated that if current trends continue, India will have a population of 1162 million in 2010.

The structure of the population pyramid by age has been changing significantly across India. While 53.7% of the population in 1971 belonged to the 15-59 years age group, it increased to 55.6% in 1991, and further to 58.7 in 2001. In the next 10 years (to 2016), the working age population is projected to increase to 63.3%. Correspondingly, the share of children (aged up to 14 years) is projected to reduce to 27.7% in 2016 from 37.7% in 1991, and that of the aged (60 years and above) increase from 6.7% to about 9% during the same period.

As a result of the massive increase in the population of the 15-59 age group in recent decades, the country has had to meet the growing education and training needs of the burgeoning population, their employment in productive and prosperous sectors and other infrastructure needs. There is a growing segment of the greying population, a group benefiting from improved longevity. There are also opportunities that are associated with a growing workforce and their contributions to productivity and savings potential in the economy. This is the so-called demographic dividend of India.

Another demographic revolution is taking place with female life expectancy expected to exceed that of males by three years by 2021. Longevity for Indian women will reach 70.7 years by the end of the first quarter of the 21st Century. This will have considerable consequences for the nature of the Indian market and society in general.

Apart from the 'feminisation' of the Indian population, another important trend will be ongoing urbanisation. By 2026, half of India's people will be living in towns and cities, and many of these cities will be amongst the biggest in the world. Urban corridors, similar to the ones that currently define parts of coastal China, are already in evidence and will continue to develop, resulting in Delhi and Mumbai having populations of about 30 million each. This will have profound effects on the nature of India's future markets and the kind of international economic relationships India will develop with the global economy, including Australia. In particular, the development of these cities will require massive investment in, and modernisation of, India's infrastructure, especially the energy infrastructure.

1.2.3 Employment, Unemployment and Skill Levels

As noted above, in 2002, the population of India was about 1064 million. Corresponding to that, the labour force in the country was estimated at 446 million and employment was 436 million. In the next two decades, there will be an enormous increase in the labour force due to the population increase projected and the increasing share of the working age population. Thus the Planning Commission estimates that India's labour force would rise to 545 million in 2012 and further to 613 million in 2020. The same government source estimates that while the present figure of unemployment is about 10 million persons, it will increase to 20 million in the year 2012 and then reduce back to about 10 million in 2020. Thus it is hoped that correspondingly large numbers of jobs will be created in the meantime to absorb the increased labour force – 88 million jobs from 2002 to 2012 and another 80 million or so until the year 2020. These scenarios imply a massive transformation of the Indian economy during the next fifteen years.

While the need for employment generation remains critical for India's planners, the recent historical record has not been good. For example, the overall rate of employment generation fell during the last 20 years from 2.14% per annum to 0.95% per annum. Furthermore, while employment growth in India's enterprises (excluding crop production and plantation) averaged at 2.5% per annum between 1998 and 2005, much of this growth occurred in rural enterprises (3.3% per annum) and the rate in urban enterprises was only 1.7%. Thus, economic growth in India has not automatically resulted in employment growth, as these trends in low employment generation coincided with the emergence of the Indian IT software sector.

The single most successful growth factor in India during the last 10 years has been the emergence of the IT software sector. However, this sector has not made much of an impact on India's rate of unemployment. At its best, however, this sector will generate about two million jobs. In the meantime, the annual demand for jobs by the new graduates from Indian universities continues to outstrip this by a huge margin. Thus, despite the dynamism of the sector and its strong export orientation, the IT services sector has not had significant impact on the overall employment trends in India. Not surprisingly, even the most optimistic analysts cannot but admit that in the coming decades *a significant worsening of India's employment situation seems inevitable*. Moreover, there is no sign that the backlog of unemployment can be solved or that rural employment can be generated to a sufficient degree to create a reasonable livelihood for people who do not have the minimum resources needed to migrate to India's cities.

At present more than 90% of the employed are engaged in informal sector activities which are outside the realm of social security benefits and many other institutional safeguards.

While employment is clearly more beneficial than being unemployed, many of the poor suffer from low paid jobs, or conversely, a large part of those who are employed are engaged in low productivity and low paid jobs. Furthermore, the education and skill profiles of the existing workforce in India are rather poor by international standards.

Another concern is that the employment elasticity of output in the organised sector has been very low at 0.066 in the 1990s, whereas it has been 0.213 for the unorganised sector, and that of the private corporate sector has been less than that at 0.133. Thus the classic pattern of shift in labour from agriculture to the organised sector does not seem to have much promise. As a matter of fact, this reflects the low productivity of agriculture and much of the rural industry in India, which sorely lacks infrastructure support. A major effort at productivity growth along with employment in the informal sector, including agriculture, is needed for both employment creation and poverty reduction in India.

Education levels of the labour force in India are poor: 44% of all workers in 1999-2000 are illiterate and another 22.7% had schooling up to the primary level. Middle school level education (including presumably dropouts at that level) was available to only about 33.2% of the labour force, with the percentage skewed heavily in favour of urban workers at 57.4% as against 25.4% of the rural workforce meeting these standards.

However, these figures relate to general education, which is valued highly in India. National Sample Survey figures show a dismal picture of the 'marketable skills' gained through vocational education and training. An overwhelming proportion of those surveyed show low or no skills attained. A 1993-94 survey found that around only 10% of the rural male labour force and about 20% of urban male workers had acquired some skills, with female workers in an inferior position. For the age group 20-24, an international comparison showed that while only about 5% of Indian workers had acquired vocational training (1993-94 survey with important sampling differences for international comparisons), the corresponding level was 96% for Korea (1998), 68% for UK (1998) and 64% for Australia (1998). These are large differences indeed, despite comparability issues. However, recent initiatives and data indicate a closing of these gaps and the 'marketable skills' correction is occurring in the sectors that are buoyant, such as the IT services sector.

1.3 Geopolitical Dimension²

In geopolitical terms, India is not merely a South Asian power but also a Southeast Asian power, based on its presence in Port Blair. That location makes India directly relevant to the emerging security architecture of the Asian region. Port Blair is directly southeast of Rangoon and is seen amongst Indian security specialists as a bulwark against rising Chinese influence in Myanmar, especially Chinese aid to the Burmese military and the construction of military infrastructure.

Port Blair's location could also give India 'control' of the entrance to the Straits of Malacca, with direct impacts on Thailand, Malaysia, Indonesia and Singapore. Trade via the Straits of Malacca suggests that whatever happens in that narrow water channel (965 km long x 2.5 km wide) has not merely regional but also global implications. About 50,000 cargo vessels pass through the Straits annually carrying critical supplies of oil, gas and chemicals in super-tankers to Asia. The trade via the Straits represents about one fifth of global trade by sea.

² Further information on the matters discussed in this section can be found in Supporting Paper 3: India: Geopolitical and Socio-political Dimensions.

The recent rise in oil prices has also highlighted potential fears about the security of the Straits of Malacca and discussions about alternative routes and energy strategies are back on the agenda. In May 2006, India and Japan signed a new defence agreement to protect the Straits of Malacca from pirates, smuggling, people trafficking and terrorism. Some of these alternative strategies raise wider security concerns. Thus, the US does not favour the strategy of piping oil and gas from Iran to India and China via the land route due to US sanctions against Iran.

One appealing alternative for India is to continue the process of converting from oil to gas use in Asia, and sourcing natural gas from Western Australia. The current two gas deals between Western Australian and Chinese parties (each worth US\$25 billion over the next 25 years) are especially important, given these changing security scenarios. At the same time, India needs to be convinced that sourcing gas from Australia is an economically viable option. At present, Indian encouragement to Australian engagement in the energy sector takes the form of leasing out prospecting rights in the Bay of Cambay. This has not been an appealing option for Australia. Rather Australia needs to persuade India to adopt the Chinese approach to energy diversification – namely the purchase of gas from Western Australia and investment in the exploitation of that resource.

The emergence of China and India as two major regional powers is also raising complex issues. Although the official Indian and Chinese position is that Asia is big enough for the region to tolerate the rise of two major powers, in reality it is not only India that is concerned about the rise of China. Japan too, is looking to India, for support in its claims against China in the East China Seas (India Defence 2005). This concern is based not only on calculations about real-politik but also on concerns about conflicting territorial claims that have remained unsolved in the post-colonial era. Although China has supported the regimes in Myanmar, Vietnam and Laos partly because it seeks regional endorsement to its one China policy on Taiwan, the capacity of China to win their loyalty in return has been interpreted as giving China wider regional influence. In particular, the provision of arms and communications technology for Myanmar to upgrade its Indian Ocean naval capacities, has caused concern.

The geopolitics of Asia is now shifting, not only because of the economic rise of China and India but also because of their acquiring advanced weapons systems that go beyond the limited capacities of the technologies that they had during the Cold War. Regionally and internationally, the critical issue that links India with its large and small neighbours is the question of energy politics.

India is likely to play a critical role as a US ally in providing a foothold for the US in South Asia, and from South Asia into Central Asia. This is best exemplified by the new agreement by which the US will export civilian nuclear technology to India; despite denials to the contrary, it is expected that India will no longer enthusiastically support the idea of a gas pipeline from southern Iran to India via Pakistan.

India's geo-strategic importance arises from two additional factors: first, its geographical proximity to central Asia and second, its enormous demand for energy. India has long been an importer of energy, and its current policy is to bolster this vulnerability by accelerating the uses of alternative fuels to petroleum (such as natural gas) and diversifying its sources of supply. The latter policy has found India as a joint venture partner with China and Malaysia in the exploitation of oil wells in the Sudan.

2 Twin Challenges: Agriculture and Manufacturing

2.1 Agriculture³

Although agriculture accounts for less than 20% of India's GDP, it still remains a major priority for economic policy, as more than 70% of India's population depends upon agriculture for income and the sector provides around 40% of total employment.

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 (Table 2.1). Rejuvenating the agricultural sector has become a priority for the government, for a number of reasons. The Planning Commission of India has acknowledged that deceleration in agriculture has contributed to rural distress in many parts of the country and has affected not only the small and marginal farmers, but also the middle and large farmers whose incomes have suffered from productivity stagnation in agriculture. 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 five-year period covered by the 10th Five Year Plan (2002-07).

The strategy of accelerated growth incorporating a near doubling of the rates of growth of agriculture can be expected to reduce poverty further especially if we can achieve steady expansion in schemes aimed at supporting incomes and welfare of the poorer sections, e.g. National Rural Employment Guarantee, Bharat Nirman, Sarva Shiksha Abhiyan, the Mid Day Meals Scheme and the National Rural Health Mission. It must be emphasised that rapid growth is important not only because it will generate income earning opportunities for the poor, it will also generate the growth in tax revenues needed to finance various anti poverty programmes. (Planning Commission 2006, p. 59)

Table 2.1 Growth rates of Indian agriculture, average annual growth rate, per cent

	Total crop output (Q)	Crop value productivity (Q/Area sown)
1961-62 to 1970-71	2.53	1.89
1971-72 to 1980-81	2.62	2.12
1981-82 to 1990-91	3.21	3.23
1991-92 to 2000-01	1.68	1.65

Source: Sidhu and Bhullar (2005).

Lower rates of growth in agriculture have been the cause for serious concerns on several accounts. Firstly, the well being of the rural population directly depends on the performance of this sector. Secondly, overall growth rates of the economy and of the demand for industrial products also depend upon the prosperity of agriculture. Indian planners are aware that failure of agriculture to grow at the projected 4% per annum would jeopardise the prospect of achieving the target rate for GDP growth set for the 11th Five Year Plan. Such an outcome would mean that, to compensate for lower performance of agriculture, growth in the industrial sector would need to be higher and exports would need to be growing at higher rates to absorb the additional industrial growth.

³ Further information on the matters discussed in this section can be found in Supporting Paper 4: India: Agriculture and Water.

The Planning Commission also notes in its Approach document (2006) that a strategy aiming at accelerating the growth rate of agriculture is crucial for reducing rural poverty. Accordingly, the central and state governments are now committed to doubling the current annual rate of growth in agriculture.

Diversification of agriculture is an important part of this strategy and is aimed at introducing new disease-resistant varieties of seeds for cash crops such as cotton, extending wheat farming into regions other than the traditional wheat growing areas of Punjab and Haryana, and providing incentives to farmers under the National Horticulture Mission for diversification into horticulture. Diversification of India's agriculture will require, in turn, major new investment in the upgrade and development of new rural infrastructure. The coverage of irrigation would need to be extended and the efficiency of irrigation schemes would need to be enhanced.

As horticultural products, particularly fruit, vegetables and flowers, need to reach their markets when they are fresh, it will be essential to improve access to adequate roads and transport facilities between villages (where production is) and cities (where markets are). Supply of cold storage facilities, refrigerated transport rolling stock will also have to be increased. As this sub sector is new to India's agriculture, R&D facilities will also need to be developed for supporting the major push for diversification.

The various dimensions of this transformation of India's agriculture offer considerable business opportunities for Western Australian firms and government agencies, such as the Department of Agriculture (for details, see Chapter 8).

2.1.1 Water and Irrigation

The Indian government is concerned about the water situation in the country, as it points towards a looming water crisis in the not too distant future. With around 1.1 billion people, India has 16% of the world's total population, 2.45% of the world's land resources, but only 4% of world's supply of fresh water. India's increasing population has added to the nation's problems in supplying safe drinking water.

Per capita water availability of 1700 m³ is deemed to be stress free whilst availability under 1000 m³ is classed as scarce. With the rising population in India per capita water availability since independence has dropped from around 5200 m³ in 1951 to 2200 m³ in 1991 and to 1820 m³ in 2001. Based on official population growth estimates, it is expected to fall further to 1340 m³ in 2025 and to 1140 m³ in 2050.

Urban supply of drinking water is infrequent and grossly inefficient, resulting in losses of 30 to 40% of water. Though the situation is considered to be better than in rural areas, the supply of safe drinking water in urban area is usually restricted to certain hours a day. Non-continuous water supply even in country's largest cities such as Delhi, Kolkata and Mumbai underlines the extent of the problem.

However, the largest consumer of fresh water in India is irrigation, which is the lifeline of the agriculture sector. Indian farmers rely on irrigation for both surface water and mining of ground water. Currently, wells and tube wells, the techniques for mining ground water, account for some 57% of total irrigated area in India. Their coverage is expected to increase to 70% in the next two decades. Both the economic and environmental impacts of this development are worrisome.

Growth in the use of tube wells is associated with rapid growth of highly subsidised electricity consumption by farmers. Power subsidies by state governments have ballooned from Rs46 billion in 1991 to Rs228 billion in 2001 and are threatening in most states the financial viability of the State Electricity Boards (SEBs) that are responsible for power supply.

The environmental consequences of rapid growth in ground water harvesting are also serious:

In several coastal areas, indiscriminate ground water mining, by both rural and urban dwellers, has resulted in seepage of sea water inland turning all ground water brackish. Coastal areas in Gujarat and Chennai are good examples of this man-made tragedy. In almost all districts of Andhra Pradesh, fluorosis has become endemic affecting large sections of the people (especially the physically weak who are mostly poor) and animals (over 12,000 villages were affected in 2003). The problem is also multiplying as the groundwater table recedes in more areas. Arsenic poisoning in West Bengal is another tragic consequence directly attributable to indiscriminate groundwater mining.

Irrigation in India is also highly inefficient. Loss of irrigation water ranges from 25 to 35% of water use. This is attributable to poor transportation methods used from source to destination, resulting in wasteful seepage, leakage and evaporation.

At present, only 43% of the total agriculturally usable area in India – around 192 million hectares – is under irrigation and the remaining 57% is dependent upon rainfall. While the scope of irrigation must be extended to enable diversification of India's agriculture, financial and environmental problems associated with irrigation must be addressed as a priority.

It is clear from the above discussion that agriculture will remain a priority sector for India's economy, not only because of its value for food security, but also for rural prosperity. It is also apparent that a major change of direction is currently under way in the agricultural sector, with more investment occurring in horticulture and the promotion of new exports, and in associated services, including irrigation, power generation and distribution, rural roads and the transportation of agricultural goods to urban markets.

Government policy is now encouraging private investment in the traditional areas of public ownership. In order to speed up research and development for optimal utilisation of water resources, and to ensure sustainable development, the government has invited research proposals.

To overcome the water shortage in remote islands, deserts and other inaccessible areas, the 10th Five Year Plan proposed to install 'solar stills' for water distillation. This simple device, generally made of glass over a formed metal sheet, distils water of impurities.

Rainwater harvesting is another area of priority for India. India's rain fed area is 63% of the country's total geographical area, but it contributes only around 45% of India's food production because most of the rainwater is allowed run off and go to waste. Experts argue that India could benefit on several fronts from effective techniques for rainwater harvesting.

These issues open potentially new opportunities for Western Australian firms, government agencies and academic institutions in respect of the following areas:

- dry area farming;
- rainwater harvesting;
- horticulture;
- plantations;

- machinery and equipment suitable for horticulture and plantations;
- training of personnel, especially for extension services in remote locations; and
- water and grain storage technologies.

2.2 Manufacturing

It has been noted in previous chapters that India's economy grew at around 8% per annum in 2004 and 2005, and many forecasts are for similar or higher growth rates to continue for the next few years. India's 11th Five Year Plan (2007-12) is being framed with growth targets of an average annual rate of growth of 8.5% during the plan period. To achieve this overall growth for the economy, sectoral targets for growth have been set for industry to grow at 10% per annum, with the manufacturing sector of industry growing at around 12% per annum. Agriculture is targeted to grow at 3.9% and the services sector at 9.4% per annum.

It would be a major challenge for the manufacturing industry to grow at an average rate of 12%, because in 2003 and 2004, when India's GDP grew at 8% each year, industrial production grew at 6.9% per annum and manufacturing production grew at 7.5% per annum. The Planning Commission of India is aware of the magnitude of the challenge and is predicating the higher growth targets on massive improvements, also planned for the 11th Plan, in infrastructure, skill formation and the growth in Special Economic Zones (SEZs). *The most critical short-term barriers to growth of the manufacturing sector are the absence of world-class infrastructure and shortage of skilled manpower. The 11th Plan will place special emphasis on infrastructure and skill formation...* (Planning Commission 2006, p. 23).

While infrastructure and skill formation are being enhanced, faster growth of manufacturing is also crucial in the meantime for India to be able to absorb its growing workforce, many of whom are low skilled. Labour intensive mass manufacturing based on relatively lower skill levels provides such an opportunity to expand employment in the industrial sector. It is recognised by the government of India that greater flexibility in labour laws would be the key to realise these expectations.

The Planning Commission has also recognised another constraint affecting the growth of labour intensive manufacturing. This is the Indian practice of reserving many of these labour intensive industries for the small-scale sector, locking modern large scale manufacturing out of this sector.

With reduced trade barriers to trade, and the negotiation of free trade agreements with our neighbours and with ASEAN, our domestic producers have to compete with imports even if they don't aim for export markets. They cannot do so if reservation limits their ability to modernise. The policy of progressive de-reservation of industries for small scale production has reduced the list of reserved industries from about 800 to 326. This policy should continue in the 11th Plan at an accelerated pace. (Planning Commission 2006 p. 24)

To what extent the Planning Commission's views, particularly on de-reservation of small scale industries and reforming labour laws, can get translated into government policy remains to be seen. The fact that the current government is a coalition of parties some of which are not equally enthusiastic about these reforms may jeopardise the prospects of faster growth of India's manufacturing.

Apart from the constraints noted above, there have been some quite exciting developments in some segments of India's manufacturing industry, which must give the planners confidence for achieving the higher growth targets. Some of these developments are noted below.

Manufacturing grew at a 7.5% annual average rate in real terms between 2000 and 2005, and in the financial year 2005-06 the growth rate increase to 9%. Growth in real manufacturing value added increased further in the April-June quarter of 2006 to 11.3%, relative to a year earlier, indicating further progress towards the 12% target.

There is also evidence that Indian manufacturing is becoming more efficient and competitive. Thus, for example, energy efficiency of the sector has improved. Between 2000-01 and 2005-06, manufacturing sales grew at a compound annual rate of 11.5% while energy costs increased by 7.3%, despite the hike in fuel prices. The fuel cost/sales ratio has also been reduced in chemicals and steel by 4.2 and 2.8% respectively. Similar reductions have been reported in working capital/sales ratios in most of the manufacturing firms, translating into estimated saving of US\$906 million a year.

According to the India Brand Equity Foundation (IBEF) innovation is now more widespread in Indian manufacturing than ever before. On a scale of 1-10, Indian manufactured goods quality could be 7, against Germany's 9. The lead time for new products has come down by as much as 50% in the past three years. According to the Fast Track Leadership survey of business professionals conducted in October 2005, India is likely to gain significant market share from the US in IT, automotive and Internet business sectors in the near future.

Manufacturing exports have risen from \$US 6 billion in 2000-01 to more than US\$22 billion in 2005-06. This corresponds to annual growth of 30% against a sales growth of 15%. As a result, the share of exports in sales has nearly doubled to 14.2%.

Indian manufacturers are enjoying average sales growth of 15% compared to 7% of their global peers, and are delivering gross profits averaging 16% compared to an 8% global average.

According to A. T. Kearney's latest FDI Confidence Index rankings, India has displaced the US to become the second-most attractive destination for FDI among manufacturing investors.

India is developing into a manufacturing hub for the world corporations wanting to leverage the sector's proven skills in product design, reconfiguration and customisation with creativity, assured quality and value addition. Be it industrial robot Gudel or auto giant BMW or Korean consumer goods giant LG, India has become a key manufacturing destination for an endless list of global players. (IBEF 2006)

This trend is likely to lead to a substantial increase in FDI into Indian manufacturing over the next few years.

By way of creating a more favourable business climate for investment in manufacturing and service sector, the government of India enacted a law in February 2006 for the establishment of special economic zones (SEZs). The demand for setting up new SEZs has been exceptionally strong. The government-appointed board of approval (consisting of sectoral senior government officials) has already given in-principle approval to 267 applications for setting up new SEZs. Of those approved so far, 181 applications are for setting up multi-product SEZs, 37 for information technology or information technology enabled services (ITES), 21 for textiles and apparel, 6 for engineering and related operations, 10 for pharmaceutical and biotech industries, 5 for energy, 3 for minerals, and 3 for the automobiles industry.

Most of the proposed SEZs are to be located in south and west of India. The states of Gujarat and Maharashtra (Western India) have 143 proposals and Andhra Pradesh and Karnataka (South India) have 115 proposals. In the north, Haryana has 4 proposals for SEZs.

The issue of SEZs has already become a source of controversy, due to opposition from several sources to conversion of agricultural land into industrial and residential land. However, as reported in *The Australian* (2006), the Prime Minister Dr Manmohan Singh has said recently: *Special economic zones have come to stay*. Dr Singh's defence of SEZs comes days after Congress Leader Mrs Sonia Gandhi had warned that farmers needed better protection from abuses of the compulsory land acquisition provisions of the new SEZ legislation. The Prime Minister has defended the legislation by saying: *There are certain aspects such as the use of prime agricultural land which must be addressed, but in some cases such as Punjab where there is no vacant land, that may be the only way* (*The Australian*, 2006).

3 Energy and Infrastructure

3.1 Energy

3.1.1 India's Energy Requirements

Under pressure from India's growing population, and rapid urbanisation, India's energy consumption is increasing rapidly, more than doubling from 240 million tonnes of oil equivalent (mtoe) in 1980 to 573 mtoe in 2004 (IEA 2006). Higher energy consumption in the industrial, transportation and residential sectors drove India's energy consumption at a faster rate even than China's over most of that period, although India's energy use is much lower than that of China and has not grown as rapidly since 2001. Accordingly, meeting rising energy demand remains a most important challenge for India's economy. Underperformance of the energy sector has been recognised for quite some time in India's Five Year Plans as a crucial constraint on the country's growth performance, but progress in improving the efficiency and competitiveness of the sector has been slow.

India's per capita energy consumption, at 0.53 tonnes of oil equivalent per capita in 2004, is well below most of the rest of Asia and is one of the lowest in the world. It is less than half that in China and less than 10% of Australia's energy use per head. However, given the scale of India's population, its total national energy use is one of the highest in the world by 2004, being higher than that of Japan and approaching that of Russia.

The Indian Government's targeted rates of growth for the economy are in the 8% to 10% per annum band for the next 25 years. To achieve these growth targets, India needs to increase its primary energy supply by 3 to 4 times and its electricity generation capacity by 5 to 6 times their 2003-04 levels (Planning Commission 2005). The vision of India's energy strategy is to reliably meet the demand for energy services of all sectors of the economy with safe, clean and convenient energy at the least cost. This vision requires in turn substantial improvements in India's energy use efficiency, diversification of supply sources, development of requisite infrastructure for imported coal oil and gas for prompt deliveries at user destinations, and development of technologies for achieving economic viability and environmentally sustainability.

3.1.2 Key Features

The key features of India's energy scene are:

- rapidly growing energy demand;
- heavy dependence on coal and oil;
- rapidly growing energy deficit;
- large and increasing energy import bill;
- limited reliance on alternative energy sources; and
- strategies for diversification of energy sources.

Coal, gas, oil, hydroelectricity and nuclear power are the main sources of primary energy. India relies more heavily on coal as the source of energy than the world average, and its reliance on gas and nuclear energy is much lower than average (Table 3.1). India's total proven reserves of natural gas were estimated at 927 billion cubic metres at the end of fiscal year 2004. The total annual gas production in India was about 32 billion cubic metres. At this rate, India's gas reserves are likely to last for around 30 years. The comparable prospect for India's oil supplies is that proven oil reserves would be exhausted 10 years earlier than gas reserves.

As most of India's major oil and gas fields are entering a declining phase, concerns about long-term supply of energy are mounting. Acceleration of economic growth in recent years has heightened these concerns by raising sharply the demand for energy. According to the *India Hydrocarbon Vision 2025* report (Government of India 2000), the demand for natural gas is expected to grow sharply in the future because of its environmental friendliness and cost competitiveness.

The demand for natural gas normally emanates from industries like power, fertiliser, sponge iron, and glass and ceramics. Due to the shortage of gas reserves, however, India's gas is currently supplied to fertiliser and power sectors only. The Expert Committee on Integrated Energy Policy (the Parikh Committee), notes in this context that if India can access cheap natural gas overseas under long-term (25-30 years) arrangements, it should consider setting up captive fertiliser and/or gas liquefaction facilities in such countries (Planning Commission 2005).

The same committee also notes that nuclear energy theoretically offers the most potent means to long-term energy security. India has vast thorium resources which could, if harnessed in an economically viable manner, help India to become truly energy independent beyond 2050. India has approached Australia to become a supplier of uranium to India and the Australian Government is considering that request, in the light of its policy of not providing uranium to countries that have not signed the Nuclear Non-proliferation Treaty and of the recent agreement between the USA and India concerning the provision of nuclear technology.

Renewable energy is also an important part of India's long-term vision for energy self-sufficiency. The Expert Committee on Integrated Energy Policy argues: *With a concerted push and a 40-fold increase in their contribution to primary energy, renewables may account for only 5% to 6% of India's energy mix by 2031-32. While this figure appears small, the distributed nature of renewables can provide many socio-economic benefits* (Planning Commission 2005, p. xxiii).

Table 3.1 Components of primary energy consumption, 2005, % of total energy consumption

Source of energy	World	India
Hydroelectric	6.3	5.2
Nuclear	6.5	1.4
Coal	25.5	55.8
Gas	24.3	7.8
Oil	37.5	30.0
Total	100.0	100.0

Source: Gas Authority of India Ltd (GAIL) (2005).

Despite large reserves of coal, India's coal supplies are generally not of high quality, due to high ash content and low caloric value. India's supply of metallurgical coal is rather low and over 65% of the demand is met from imports.

India depends heavily on imports to meet its rapidly growing demand for petroleum products. Current estimates suggest that the level of self-sufficiency is likely to decline to about 30% over the next few years. The Government of India is responding to the situation by providing incentives for exploration activity, both within and beyond India's borders. The Indian corporation ONGC Videsh Ltd has invested in recent years in exploration activity in the Sudan, Vietnam, Myanmar and Russia.

India's proposals to enter into long-term supply contracts with Iran appear to have run into strong US opposition on the grounds of the latter's anti-terrorist policy. In 2005, India had contracted with Iran to buy eight million tons of LNG from 2005 to 2030. However, the status of this deal is *ambiguous, as the US has indicated its unwavering opposition to any contracts that bring Iran into the normal arena of global commerce* (Viciziani and Smyth 2006). India also had plans for a gas pipeline from Iran's gas fields to India via Pakistan, but these are also subject to the same pressures from the US.

Petronet LNG (an Indian company) has signed a gas purchase contract with Ras Gas of Qatar for importing 5 mmtpa of LNG at Dahej (in Gujarat) and 2.5 mmtpa at Kochi (in Kerala). Apart from Petronet, a number of other companies have shown interest in developing LNG import terminals in the country. The list of these companies includes British Gas, Sea King infrastructure, UNOCAL, Shell, TOTAL, Al Manhal and Reliance.

3.1.3 Electricity

Although India has the fifth largest electricity generation capacity in the world, its per capita consumption of electricity is still very low and is less than half of China's per capita consumption. Large gaps still remain in rural electrification, which is an important goal of the government for both economic and social reasons. The revival of high growth rates of India's agriculture is a high priority at present, and this would require adequate supply of power without outages or interruptions for irrigation. High rates of industrial growth are also predicated on rising levels of income in rural areas, which would support higher aggregate demand for industrial goods, such as televisions sets, refrigerators, telephones and other household gadgets, most of which run on electricity. At present only about 70% of India's 587,000 villages have been electrified. The percentage of rural households with electricity connections is even lower, ranging from 10.3% in Tamil Nadu to 54.7% in Himachal Pradesh. Currently, India has a severe shortage of power supply, ranging from average energy shortfall of 7% to peak period shortfall of 12%.

Thus, additional generation of capacity has been a priority of the government for some time. The 10th Five Year Plan (2002-03 to 2006-07) had a target of additional capacity generation of 41,110 MW, but it is now accepted that only about 31,290 MW, or 76% of planned additional capacity, would be generated by the end of the Plan.

The Government estimates are that over 90,000 MW of new generation capacity is required in the next seven years, and a corresponding investment is required in transmission and distribution networks. Thus, investment of nearly US\$200 billion is required over a seven-year horizon to upgrade India's power sector. Given the constraints on expanding public investment, increasing reliance must be placed on public private partnerships for bridging the investment gap. Accordingly, private sector participation is being encouraged, especially in power generation and distribution. The private sector already has distribution licences for several cities and many large generation projects have been planned in the private sector.

The majority of generation, transmission and distribution facilities are with either central public sector units (CPSUs) or with State Electricity Boards (SEBs). According to the Planning Commission of India, the greatest weakness in the power sector is on the distribution side, which is entirely the domain of the states. The performance of SEBs has been particularly poor and their Aggregate Technical and Commercial (AT&C) losses have been high, because well over 40% of energy pumped into distribution system is lost, not billed, wrongly billed or payments are not collected. This state of affairs has not only rendered the SEBs unable to invest, but has also discouraged private investors from entering the field.

The government of India has identified several areas in which further efficiency gains can be made. Power costs should be reduced from the current high of 8-10 cents/unit by a combination of lower AT&C losses, increased generation efficiencies and added low cost generating capacity. The key reforms under way in the power sector include:

- unbundling of vertically integrated State Electricity Boards;
- open access to transmission and distribution networks;
- distribution circles to be privatised; and
- tariff reforms to be undertaken by regulatory authorities.

The bulk of India's electricity (around 56% of the installed generation capacity) is generated from coal-fired plants, followed by 25% from hydroelectric power, 10% gas based, 3% from nuclear energy and 5% from renewable sources.

The government is keen to create a competitive power sector and is encouraging private investment into the sector. FDI up to 100% is permitted in power generation, transmission and distribution. By way of incentives, an income tax holiday is offered for a block of 10 years in the first 15 years of operation and import duties on capital goods for mega power projects (above 1,000 MW generation capacity) would be waived.

Opportunities in power generation exist for coal-based plants at pithead or coastal locations (imported coal) and natural gas/CNG based turbines at load centres or near gas terminals. The government has also identified hydroelectric power potential of 150,000 MW that is still untapped. There is also need for renovation, modernisation, up-rating and life extension of old thermal and hydro power plants. The scope of bio-fuels, including extraction of ethanol from agricultural waste, using reported advances in technology would also be explored.

In respect of power distribution, opportunities exist through bidding for the privatisation of distribution in 13 states that have unbundled or corporatised their State Electricity Boards. More states are likely to follow this lead in the coming years. Similar opportunities exist in transmission network ventures – an additional 60,000 kilometre circuit of transmission network is expected to be operational by 2012. The 11th Plan is also expected to establish an energy R&D system to develop relevant technology and energy sources to enhance energy security and efficiency in the long run.

3.1.4 Coal Based Methane (CBM)

In the US, there is considerable production of CBM, which is sourced from coal of bituminous and sub-bituminous quality. India has coal reserves of around 200 billion tonnes that are believed to contain around 800 billion cubic metres of methane. The Ministry of Coal had awarded three contracts for exploration of CBM, but the progress has not been good because the companies perceived that contract terms were not as attractive as those offered for oil exploration (GAIL 2005). Since then a number of new contracts have been awarded in which Reliance Industries, Indian Oil Corporation, Essar Oil and Great Eastern Energy Corporation are involved.

3.2 Infrastructure⁴

Infrastructure will continue to occupy the 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.

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.

The pressures for infrastructure on India's infrastructure come from a variety of sources, including the following:

- rapid expansion of trade;
- new priority for higher growth of manufacturing;
- rapid pace of urbanisation;
- revival and diversification of agriculture; and
- a commitment to improve the condition of the rural economy.

These pressures are manifesting themselves in serious bottlenecks in moving people and goods across the country, and in substandard access to power, drinking water and sanitation for a 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 document (2006) 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.

3.2.1 Transport

The key priorities in the transport sector are the augmentation of the capacity of the transport network, better inter-modal complementarities, and improved connectivity of rural and remote areas into the mainstream economy.

India inherited a good railway network from the British at the time of independence and, with subsequent extensions, the network has served the country well for carrying passenger traffic. But the freight-carrying capacity of the railway network is quite inadequate. Freight trains have no fixed timetable and their movement is subject to priority use of rail track by passenger trains. The result is that freight trains are extremely slow and there is no predictability in their movement. The government is now proposing to develop parallel railway tracks designated exclusively for freight trains, which will strictly run on a published timetable.

The volume of traffic on India's roads continues to outpace the development of new roads. The inefficiency of freight-carrying railways has also shifted a greater freight carrying burden on India's roads.

⁴ Further information on the matters discussed in this section can be found in Supporting Paper 5: Infrastructure in India.

Under the National Highway Development Programme, the government of India is planning to upgrade the 5846 kilometre Golden Quadrilateral connecting Delhi, Mumbai, Chennai and Kolkata, as well as the 7300 kilometre North-South East-West Corridor. The program also includes extending some 10,000 kilometres of national highways to four lanes and an additional 20,000 kilometres of highways to two lanes, and upgrading other regional highways in the Northeast.

Vast amounts of resources will be needed to complete these programs, and the government is inviting private sector involvement by way of BOT type arrangements for road construction, maintenance and tolling.

India's foreign trade projections are to double the country's share of global exports in the next five years, and 95% of these exports by volume are expected to be channelled through the maritime route. Freight traffic is estimated to reach 877 million tonnes by 2011-12 and containerised cargo is expected to grow at 15.5% over the next seven years.

The Committee on Infrastructure has recommended total investment of US\$13.5 billion over the next seven years on major ports under the National Maritime Development Programme. Public-private sector partnerships are considered to be the way to implement this program. Government policy permits 100% FDI under an automatic approval route for port development projects and 100% income tax exemption is available for 10 years. Already, international investors such as Maersk, P&O Ports, Dubai Ports International, PSA Singapore and the Adani Group are involved in several of India's major ports.

3.2.2 Telecommunications

The telecommunications industry in India has been growing at an average annual rate of 25% for the past five years, and the wireless segment has grown at 85% per annum during the same period. At the same time, the market share of private sector firms has been rising from 10% in 2000 to 57% in 2005. Firms such as Nokia, Vodafone, Alcatel, LG, Ericsson and Elcoteq are already doing business in India, taking advantage of the government's policy of permitting 100% FDI in telecom equipment manufacturing and 74 to 100% FDI in various telecom services.

India is also experiencing a major constraint in respect of available radio spectrum, which has been described by the Planning Commission as one of the scarcest resources. Keeping in view the government's commitment of 'broadband for all', the issue of spectrum access needs to be resolved as a priority.

It is clear from this discussion that huge new investment opportunities are opening up in relation to India's infrastructure industries for external manufacturers, construction firms, suppliers, financial institutions and technical agencies.

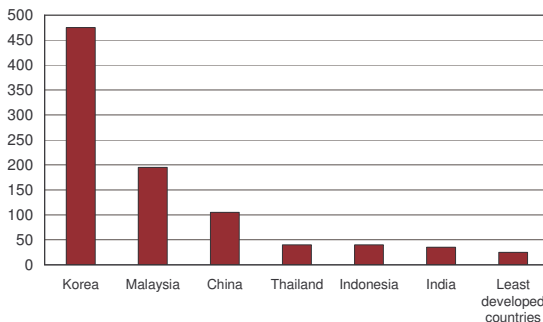
3.2.3 Urban Infrastructure

The pace of urbanisation in India has been gaining momentum over the past 50 years and, together with growth of population, has put additional strain on the already stretched urban infrastructure in Indian cities. In terms of availability of urban infrastructure, India's cities and towns present a grim picture. About one-fifth of the urban population lives in squatter settlements, with little access to basic services. Although 90% of the urban population has access to safe drinking water, there are difficulties because of frequent and lengthy interruptions to the water supply every day. City roads are inadequate for meeting traffic needs, and public transport networks are both inefficient and financially running at losses.

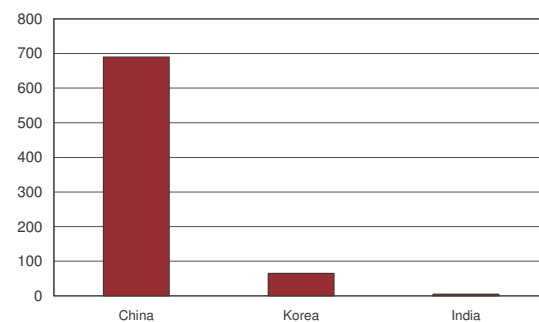
A number of cities have involved the private sector in the provision of urban services, including bus transport, sanitation, garbage collection, street lighting, water supply, collection of local taxes, maintenance of parks and gardens, and market development. In Indore (Madhya Pradesh), a public-private sector partnership has not only successfully solved the city's bus transport problem, but also made it highly profitable, because enhanced punctuality of new and clean buses have resulted in huge increase in commuter patronage and revenue (for more details, see Supporting Paper 5). The Indore case has become a model as many other cities are now studying it to solve their transport problems.

Figure 3.1 Measures of infrastructure access

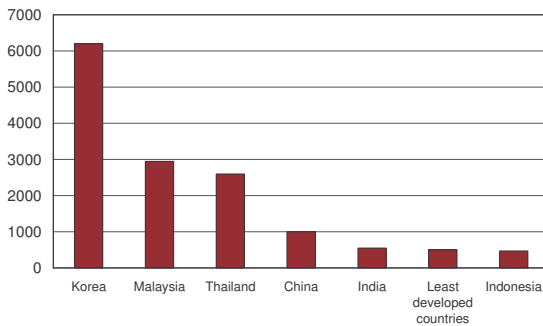
A. Telephone mainlines, per 1000 inhabitants



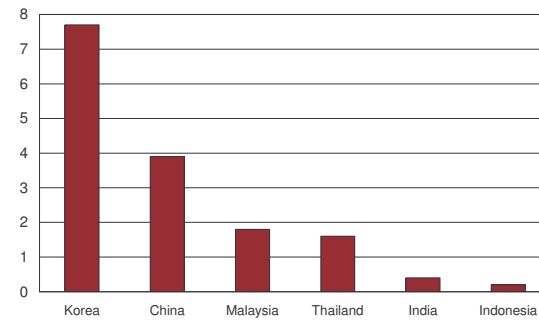
B. Roads, goods transported, billions tons - km



C. Electricity production, kwh per capita



D. Air transport freight, billion tons - km



Source: Schiff (2006, p. 5).

A booming economy and the huge middle class in India's cities and towns also offer new opportunities for domestic and foreign investors. Global companies are targeting investment in India in hotels, shopping malls, healthcare, housing, IT parks and integrated townships. Leading UAE-based firms, such as Emaar Properties, Al Ghurair Group, ETA Star, KM Properties and Dubai Properties have announced major plans for investment in the country. In December 2005, Emaar announced India's largest foreign direct investment in real estate for projects with a capital outlay of US\$4.0 billion.

Beyond the construction industry, democratic decentralisation of local government bodies is creating a need for training of personnel in governance and financial management in India's cities and towns. Opportunities should be explored for providing specifically designed courses for such training to be delivered either in Western Australia or in India, in association with local universities or other training institutions.

3.2.4 Rural Infrastructure

The government of India launched a program called Bharat Nirman in 2005. Bharat Nirman is a time-bound business plan for augmentation of rural infrastructure spanning over 2005-2009. Investment is proposed in the areas of irrigation, rural roads, rural housing, rural water supply, rural electrification and rural telecommunication connectivity. Specific targets set under each of these areas include the creation of 10 million hectares of additional irrigation capacity, connecting all habitations with a population above 1000 (66,802) with all weather roads (500 population in hilly/tribal areas), construction of 6 million rural houses for the poor, provision of potable drinking water to all uncovered habitations (55,067), provision of electricity to all non-connected villages (125,000) and to 23 million households below the poverty line, and connecting all remaining villages with public telephones.

3.2.5 Retail Market

India is very active in developing a hyper-market and supermarket sector. These are being developed locally and in partnership with international supermarket chains.

As noted in Supporting Paper 11, retail spending in India is worth an estimated US\$258 billion and is estimated to grow to US\$415 billion within four years. Although most of the retail activity takes place in family-owned small shops, the latest trend in India is for building mega stores – such as Hyper City, built on the outskirts of Mumbai, which averages 25,000 customers at weekends and 12,000 on a weekday, outstripping the customer numbers of Wal-Mart in the US.

Major global retail players currently looking at India and considering opportunities to enter the market include Tesco, Wal-Mart and Ikea but all are being held at arm's length by the government of India, which intends to give local players a leading edge in competing for market share. At present, Indian law does not allow foreign direct investment in the retail sector, except for single-brand stores such as Nike, Adidas and Gap which operate in major Indian cities. But foreign investors are keen and waiting for the opportunity when legal restriction on foreign investment is relaxed.

Customer service and training programs are in demand and opportunities exist for Western Australian companies to provide a range of training programs especially in customer service training, supply chain and cold storage supply chain systems and logistical management. Last year, Shopper's Stop awarded a two-year customer service training program to a Sydney TAFE. A number of foreign companies have signed franchise agreements with Indian retailers. Planet Retail (a privately owned family company) is planning an aggressive rollout of Debenhams, Next and Marks & Spencer stores across India.

4 Key Service Sectors: Education and Health⁵

4.1 Recent Trends in Education in India

India has made major strides in higher and technical education and public expenditure on education as a proportion of GDP has increased significantly in the last few decades. The development of education and health has been part of India's national goals as well as of the Millennium Development Goals. India is now committed to the goal of universal elementary education and the eradication of illiteracy.

The massive increase in technical education in India in recent decades has helped in the growth of a major segment of India's services sector in global trade and there is a strong potential for further growth in the years to come.

The literacy rate has increased from 18.3% in 1951 (then defined for population aged five years and above), to 43.6% in 1981 and 65.2% in 2001. The literacy rate has also increased in rural areas from 36% in 1981 to 59% in 2001, at a more rapid pace but from a lower base than in urban areas, where the increase has been from 67 to 80% during the same period.

The government of India recently introduced the *Sarva Shiksha Abhiyan* (a program for universal elementary education) for making free and compulsory education accessible to all children 6-14 years of age. The recently introduced 93rd Constitutional amendment has made the right to free and compulsory education for children in age group of 6-14 years a fundamental right.

Education in India is the concurrent responsibility of both state governments and the central government in the federal structure and many initiatives have been taken at both levels to improve the situation. There are large interstate differences in literacy rates, ranging from 90% in Kerala to less than 50% in Bihar in 2001. There are also wide differences in standards and achievements among regions within states, between social groups and between males and females, although these differences are narrowing. A visible improvement has taken place in the 1990s and particularly so in the states that were educationally backward.

Total enrolment in higher education (degree level and above) increased from 4.925 million in 1990-91 to 8.4 million in 2000-01 and to 9.517 million in 2002-03. Over the period of 12 years the increase was of the order of 93%.

Enrolments in engineering, technology and architecture have also increased significantly – by 118% over the 12-year period from 1990-91 and the gender gap has narrowed perceptibly.

Enrolments in the information technology sector of higher education have been growing strongly in recent years. In 2003 a total of 230869 students were enrolled in 'approved degree colleges', of which 109246 were in electronics and communications engineering, 74229 were in computer science and engineering and 47394 were in IT.

The growth in vocational education is also considerable and total registrations increased by 57% in the polytechnic institutions and by 67% in the 'technical, industrial, arts and crafts' in the 12 years.

⁵ Further information on the matters discussed in this chapter can be found in Supporting Paper 6: Education and Health in India.

4.1.1 Australian Trade in Higher Education

Between 1994 and 2004, the number of international students undertaking courses in Australian higher education institutions increased at an average annual rate of 15%, from 35290 to 151798. Education is Australia's fourth largest export, earning \$3.4 billion in fees from international students enrolled in Australian institutions.

Australia's enrolments of foreign students constitute the largest share of international students to total enrolments in higher education of any OECD country. In 2004, fee revenue earned from international students enrolled in Australia's higher education accounted for 70% of total fee revenue of these institutions.

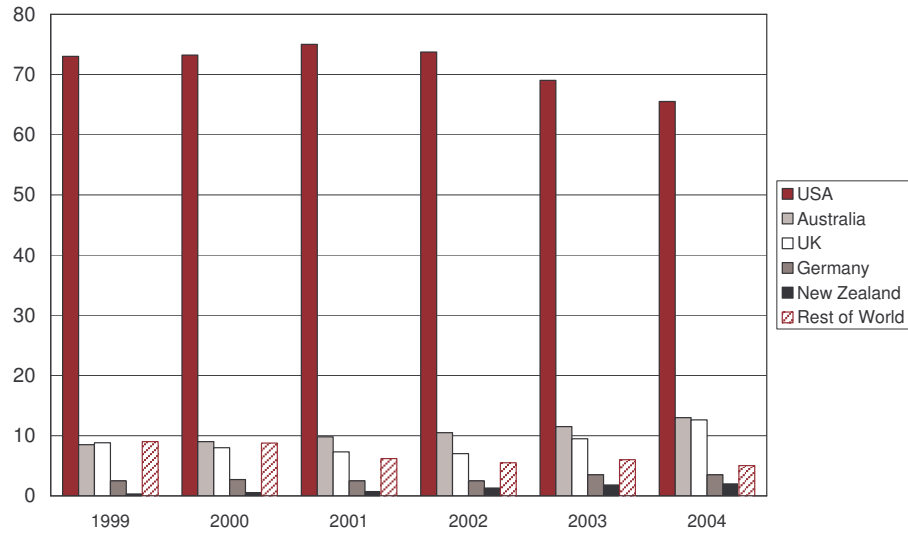
Australian educational institutions are currently engaged in the following types of jointly-operated international education programs:

- **Twinning programs:** Involving linkages between Australian and an overseas-based educational institution. The partner institution in a foreign country generally conducts the initial semester of any course and the Australian institution delivers the final stage or stages.
- **Branch campuses:** Studying at an overseas branch campus for the entire course, students are awarded an Australian degree.
- **Credit transfer program:** These allow a student enrolled in an overseas university to transfer their course credits to an Australian institution.
- **Accreditation programs:** The Australian institution designs the curriculum and its assessment, but leaves the overseas provider to teach the course without further Australian input. Students are not granted Australian degrees.
- **Distance education:** Students are taught by correspondence, including Internet-based learning, and do not reside at or near the campus of the instructing institution.

4.1.2 Overseas Students in Australia and Western Australia: The Indian Connection

It was noted above that the Indian economy has been growing robustly for a number of years. The scope 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 their attention in a spectacular 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 Australia. There is thus scope for exploring this possibility further for Western Australia.

The outflows of students from India in recent years have been both high and increasing rapidly. The English speaking countries have a great advantage and in this respect Australia has managed to corner a sizeable part of this market. Figure 4.1 shows that while the USA remains the top destination for Indian students, its domination is flattening out for a number of reasons and its proportion of the total students is declining. The United Kingdom, which had a sizable part of the total, continues to attract a large number of students, but it is now trailing behind Australia. This trend reversal is quite significant, and Australia now ranks second in attracting Indian students in higher education.

Figure 4.1 Percentage of Indian students studying in foreign universities

Source: UNESCO Institute of Statistics.

Looking at the opportunities for Australia as the host country, the situation looks attractive. Not only has Australia become a destination of choice for Indians going abroad, India has emerged as the source country of great importance for Australia too. This is because the number of students coming from India as a proportion of total number of students studying overseas is increasing rapidly and India has been the fastest growing source country recently; it has overtaken South Korea now, and accounts for about 8% of these students. This is a great opportunity for Australia as a country. As stated earlier, higher and vocational education is attracting a lot of these students and this pie is growing at a healthy rate as seen from the data in Tables 4.1-4.3.

Table 4.1 Student enrolments in Australia from top 10 source countries, 2002 to 2005

Country	2002	2003	2004	2005	% change 2004 to 2005
China	47816	58458	68895	81184	17.8
India	11342	14332	20716	27661	33.5
South Korea	18607	22085	23673	26259	10.9
Total	273552	304326	322230	344815	7.0

Note: The total includes other countries for which data not presented.
Source: AEI (2005).

Table 4.2 Overseas student enrolments in Australia by state/territory

	2002	2003	2004	2005	% change 2004 to 2005
New South Wales	109526	118074	124871	135035	8.1
Victoria	74152	83907	88758	94335	6.3
Queensland	43469	49397	53148	55859	5.1
Western Australia	26982	29927	30316	31215	3.0
Australia	273552	304326	322230	344815	7.0

Notes: The total for Australia includes other state/territory data not presented here.
Source: AEI (2005).

Table 4.3 Overseas student enrolments in Australia by state/territory and major sector, higher education

	2002	2003	2004	2005	% change 2004 to 2005
Higher education					
New South Wales	40672	47141	53492	59082	10.5
Victoria	36252	43260	47935	51070	6.5
Queensland	18575	20482	22356	23773	6.3
Western Australia	11392	13074	13893	14474	4.2
Australia	116236	135683	151304	163930	8.3
Vocational education					
New South Wales	27131	28722	29588	33395	12.9
Victoria	12898	12851	13311	16556	24.4
Queensland	5544	6047	6456	7042	9.1
Western Australia	5983	6335	6200	6398	3.2
Australia	53933	56496	58020	66086	13.9

Notes: The total for Australia includes other state/territory data not presented here.
Source: AEI (2005).

However, the growth of students in higher and vocational studies is not uniform across Australian regions and states. New South Wales, Victoria and Queensland take the biggest slices of this market. Western Australia follows behind them in the total number, in higher education and in vocational education. Moreover, the growth rate for Western Australia has been lower than these states. This needs to be changed for Western Australia to gain a larger share of this market.

The prospect of winning students from the other better performing states in Australia may appear more difficult than it is. This is because it is possible to devise a set of policies to attract students from India directly, as its demand for higher and technical education is growing tremendously. It is possible to do so from those students that do not make it to the top ranking institutions of learning in India without compromising domestic standards. As the market is large and growing fast, it should be possible for Western Australia to increase its enrolments at a faster rate than the other states. As stated earlier, Indian students wish to go to English speaking countries if they get the chance to have good education, followed by training and possibly jobs. There is a market that Western Australia could tap into more effectively than at present.

4.2 Health

Despite India's emergence as a rising economy in recent years, its healthcare scenario paints a picture that in many ways is worse than in less developed countries. India ranks 118 in the 191 World Health Organization member states in overall health performance.

Communicable and infectious diseases in India cause premature death of 2.5 million children and an equal number of adults annually. India accounts for around 5.5 million HIV/AIDS sufferers, the largest number in any country (South Africa with 5.3 million ranks second). India is also home to one-third of the global tuberculosis cases.

Lack of sanitation, poor hygiene and lack of access to drinking water add to the disease burden especially in rural areas. This exposes the disadvantaged groups the most, as they lack awareness of the probable outcomes of the risks. The poor in India face water-related, soil transmitted illnesses like acute diarrhoea, worm infestations and digestive tract infections. Once virtually eradicated, malaria is returning in some parts of India, and the poor are the most exposed due to lack of sanitation and protection from disease-infested water catchments. Thus, for example, tribal groups accounted for around 75% of malarial deaths in the State of Andhra Pradesh in 2001.

Over time, while the impact of infectious and communicable diseases has declined, diseases related to lifestyle and increased longevity, such as cardiovascular diseases, diabetes, cancer, and others have been on the rise. The incidence of AIDS has added a new dimension to this transition profile.

As healthcare is a state level responsibility in India, considerable variations across states exist in the morbidity profiles, incidence of infant and child mortality, maternal mortality and malnutrition incidence. Some states like Andhra Pradesh, Karnataka, Kerala, Tamil Nadu, Gujarat and Maharashtra and several areas in the northeast are relatively more affected by these diseases.

Prime Minister Singh acknowledged the poor health condition of India's masses in a recent speech: *The slow improvement in the health status of our people has been a matter of great concern. We have paid inadequate attention to public health.*

The most commonly used measure is life expectancy at birth. Figures in Table 4.4 show that life expectancy in India increased from 50.3 years in 1970-75 to 63.1 years in 2000-05. While this is considerable improvement, it has not improved India's standing among the countries shown in Table 4.4. Thus, even in 2000-05, life expectancy in India was lower than that in China in 1970-75. Indeed, while India ranked sixth in 1970-75 among the 12 countries shown in this comparison, its rank had slipped to seventh in 2000-05 in respect of life expectancy. In relation to infant mortality, India ranked ninth in both periods shown in Table 4.4, in spite of the considerable improvement made during the 33 years to 2003. Thus, major challenges remain to improve India's health status, even in comparison to other less developed countries.

Table 4.4 Cross country comparison of health outcomes

	Life expectancy (years)		Infant mortality rate (per 1,000 live births)	
	1970-75	2000-05	1970	2003
Banladesh	45.2	62.6	145	46
Bhutan	41.5	62.7	156	70
China	63.2	71.5	85	30
India	50.3	63.1	127	63
Indonesia	49.2	66.5	104	31
Myanmar	49.2	60.1	122	76
Nepal	44.0	61.4	165	61
Pakistan	51.9	62.9	120	81
Philippines	58.1	70.2	60	27
Sri Lanka	63.1	73.9	65	13
Thailand	61.0	69.7	74	23
Vietnam	50.3	70.4	55	19

Source: UNDP (2006, pp. 251-252).

Past improvements in India's health performance were made possible primarily by improved infrastructure (rural health care centres) for health care delivery in rural areas. However, significant problems have now been reported in this respect, as thousands of these rural health centres are suffering from lack of qualified staff and medicines.

As noted above, India has made significant progress in reducing poverty over the last few decades and has managed to reduce the proportion of its population living below the poverty line from 46% in 1985 to 36% in 1995, and to about 26% in 2005. However, with around 280-300 million of its people still living on less than US\$1 a day, India is still home to the largest number of people in that category.

The level of public spending plays a major role in health care affordability, especially as the poor have no means of their own to purchase health care in the market. Only around 3-5% of the population is estimated to have private health insurance; employees of central or state governments as well as their families are covered for medical expenses. The absence of a universal health program in India means that over 85% of the population pay their medical bills by out-of-pocket expenditure.

The Singh government has initiated health programs specially targeted to improve health care in rural India. The government's *National Rural Employment Guarantee Act 2005* (Ministry of Law and Justice 2005) is aimed at improving the plight of the rural population, which accounts for some 72% of India's population. When fully implemented it:

...will provide a legal guarantee for at least 100 days of employment to begin with on asset-creating public works programmes every year at minimum wages for at least one able-bodied person in every rural, urban poor and lower middle-class household. (Government of India 2004, p. 3)

In its Common Minimum Programme (Government of India 2004) the Singh government pledged to raise the level of public spending on health from 0.9% to 2-3% of GDP; that is still below the level of many countries with a comparable level of economic development. It should be noted however that in India, the central government contributes to 15% of public health expenditure and the remaining 85% of this spending is borne by the health budget of states. Table 4.5 shows that in 1990, India's public spending on health was less than 1% of its GDP and, according to various government sources, it was at the same level in 2003. In the same period less developed nations like Bangladesh and Bhutan more than doubled their public expenditure on health as a share of GDP. In 2001, India's level of public spending as a share of its GDP was the third lowest, after Indonesia and Myanmar.

Table 4.5 Cross-country comparisons of commitment to health care

	GDP per capita	Public expenditure on health (% of GDP)		Physicians (per 100,000 people)
	2002	1990	2001	
Bangladesh	351	0.7	1.5	23
Bhutan	695	1.7	3.6	5
China	989	0.9	0.9	164
India	487	0.9	0.9	51
Indonesia	817	0.6	0.6	268
Myanmar	n/a	1.0	0.4	30
Nepal	230	0.8	1.5	5
Pakistan	408	1.1	1.0	66
Philippines	975	1.5	1.5	116
Sri Lanka	873	1.5	1.8	43
Thailand	2,060	0.9	2.1	30
Vietnam	436	0.9	1.5	53

Source: UNDP (2005, pp. 185-186, 203-204).

The National Nutrition Monitoring Bureau (NNMB) data show that the incidence of malnutrition among children, even though slowly declining, was still alarmingly high during the late 1990s and their incidence is much higher than that of income poverty. About half of the children and slightly more than a third of adults were undernourished in 2000-01. The proportion of malnourished children (1-5 years) declined from 62.5% in 1975-79 to 47.7% in 2000-01. Malnutrition levels in some parts of the country (e.g. Madhya Pradesh and Orissa) showed little improvement and remained similar to levels in the early 1970s.

To promote innovation in health care, the government has initiated programs to set up special economic zones (SEZs) in which manufacturing firms in specific industries are granted excise exemptions and/or tax holidays for a set period of usually 10 years. Acknowledging the pharmaceutical industry's contribution to India's economy and health, the government in August 2006, announced plans to establish at least 25 pharma parks across the country via the public-private partnership route. The Rs10,000 million (US\$2.2 billion) commitment could be included in the 11th Five Year Plan (2007-2012). The establishment of the Health Trust of India (HTI) is also proposed under the NRHM. The HTI would operate as a knowledge institution to be a repository of innovation – research, documentation and health related information systems.

The government has also approved setting up of biotech SEZs. One such biotech specific SEZ at Thane near Mumbai will spread across 72 acres of land and will employ over 2000 people. The Tamil Nadu government plans to set up a National Institute of Biotechnology (NIBT) and a National Institute of Plant Biology (NIPB). In collaboration with the Indian Institute of Technology – Kharagpur, one of the country's premier institutes, the State of West Bengal has announced plans to build a biotech park that will include a nanotechnology unit and also an advanced level IT unit to enable researchers to implement bio-informatics and chip-level projects.

4.2.1 Opportunities for Western Australia

India's healthcare industry employs over 4 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. This will present many opportunities for Western Australian firms and agencies, some examples of which are noted below.

A joint study by the Confederation of Indian Industry and McKinsey shows that at the current pace of growth, medical tourism, currently pegged at US\$350 million, has the potential to grow into a US\$2 billion industry by 2012.

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 exist for Australian service providers in health care architectural services, aged care services, online medical training services, and medical products that are transportable and assist in rural medical care.

5 Defence and Related Industries⁶

The official policy of the government of India is for India to provide 70% of its own defence supplies by 2010. The role of the private sector in defence supplies is not only acknowledged but also encouraged. To develop linkages with the private sector the Department of Defence has collaborated with the Confederation of Indian Industries (CII) and the Federation of the Indian Chambers of Commerce and Industries (FICCI) in publicising the specific needs of India's defence procurement.

In the past, military supplies in India have been marred by lack of coordination, extraordinary delays in meeting schedules, high costs and cost inflations, and a general inability to keep up with technological developments abroad. As the technology has become more sophisticated, the costs of production have escalated, making it harder for India to catch up. A report by the CIA in 2002 pointed out that, whereas India had narrowly based capabilities for delivering military goods in an efficient and timely manner, China had a much broader base of competences. As a proof of this generalisation one can cite the impressive technological and production achievements of India's nuclear and missile technologies – these narrowly based attainments stand in dramatic contrast to the generalised failings in other parts of India's defence system.

While acknowledging the successes – namely the development of the Prithvi and Agni missiles and the appropriate missile systems – the 2002 CIA report cited the following dramatic examples, amongst others, of India's failings in defence production.

- The much-admired Garden Reach Shipbuilders took 12 years to build the ship *The Brahmaputra*. The CIA thought that even the 'cash strapped Russians' could have done this in about four years.
- The much-touted Arjun tank did not come on stream until 2002, some 17 years after it was scheduled to go into service.
- The ability of Indian tanks appears to be well behind those of Pakistan.

5.1 The Structure of India's Defence Industries

The key components of the structure of the Indian defence industries are the 39 ordnance factories that fall under the control of the Ordnance Factories Organisation, eight Public Sector Undertakings, which also produce for the civilian sector, and the R&D establishment that has linkages to universities and private research centres and engineering institutes. A detailed account of the output, exports and efficiency reforms in these components can be found in the Supporting Paper 8 (India's Defence Industries), and on the Ministry of Defence website. The ordnance factories manufacture supplies for defence and related services including the paramilitary, police, Ministry of Home Affairs, Civil Trade and foreign buyers.

5.2 Privatisation and the Role of CII and FICCI

The privatisation of Indian military production began with the general liberalisation of the Indian economy in 1991 that allowed private firms to bid for contracts involving assemblies and components. In 1993, the Confederation of Indian Industries (CII) set up a National Committee on Defence to act as a liaison body between the Defence Ministry and the various sections of the defence industry – both public and private.

⁶ Further information on the matters discussed in this chapter can be found in Supporting Paper 8: India's Defence Industries.

This Committee continues today and amongst other things, organises Defence Industry Missions that travel internationally meeting relevant suppliers and innovators. Its taskforces collect data, liaise with the Defence Ministry and through public seminars organised by CII publicise the specific areas in which defence procurement through the private sector is needed. The FICCI is a relative latecomer to the defence industry seminars, but the Indian Government works comfortably with both the FICCI and CII. In 2005, the FICCI organised two seminars in New Delhi.

India's privatisation policy in defence procurement continues to be driven by the country's heavy import reliance (see Box 5.1). 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 Kelkar Committee on Defence Procurements was set up to investigate the structure of the industry and report on reform strategies. The Committee made 40 recommendations of which 21 were accepted without demur and a further five accepted after revisions by an expert committee.

**Box 5.1 The role of foreign suppliers and technology transfer in
India's defence supplies**

Russia

A larger quantity of the SU-30 long-range bombers and about 100 Main Battle Tanks will be imported directly in addition to a refurbished Soviet aircraft carrier, MiG-29s and Smersh MRLBLs (CIA 2002). In 2006 Russia also agreed to sell India a further three stealth warships and 28 cruise missiles (*India Defence*, 2006). India announced that, in future, these and other navy boats will be built in India, but no details about technology transfer arrangements have been made public.

Israel

In 2001-2002 Indian purchases of Israeli defence equipment included \$1 billion Phalcon deal; \$280 million for naval surface to air missiles from Israel Aircraft Industries; \$300 million unmanned aerial vehicles or drones; and \$250 million Green Pine radar system. Collaboration in R&D and joint production of Israel's advanced Merkava tank for both the Indian and Israel armies is still under discussion.

UK

The mooted purchase of Hawk advanced jet trainer aircraft from BAE SYSTEMS.

France

Purchase of Mirage 2000 fighter planes.

South Africa

Purchase of small arms and rifle sales (Chaube 2005).

Bulgaria

Purchase of AK-47 assault rifles to be imported and Bulgaria has an establish track record in upgrading all kinds of Soviet hardware (*The Tribune* 2000).

Japan

In May 2006, the Indian Defence Minister visited Japan and indicated that the Indian Government would welcome the involvement of Japanese firms in India's defence sector (*Spacewar* 2006).

In particular, the Kelkar Committee recommended, and the Indian Government announced, a new defence privatisation policy that required private sector companies who imported defence technologies to be manufacturers of at least 30% of the machine or product that they sold to the Indian Government. The exact proportion of domestic production could vary and would be 'decided on a case by case basis'. By September 2005, some three months after the submission of the Kelkar report, the Indian Government had given out 23 licenses to private Indian manufacturers with options to buy, or buy and make, or make defence goods.

5.3 Privatisation and Foreign Investment

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. The Ministry of Defence together with the Department of Industrial Policy and Promotion (DIPP) have drawn up guidelines to be followed in allocating licenses and contracts (for details, see Supporting Paper 8).

5.4 Privatisation and Foreign Investment in Security Technology

In late June 2005, the Indian Minister for Defence visited the US on a specific mission to encourage American business to take an interest in India's defence industries. On this occasion, the Minister identified a number of areas for defence business collaboration that reflected changing Indian and US perceptions of security after 9/11 and the new unpredictable developments in methods used by insurgents in Afghanistan and Iraq. On his list was collaboration for devices to handle improvised explosive devices (IEDs). Such devices, including roadside bombs, are technologically crude but have inflicted significant casualties in Iraq and Afghanistan. Hence, the race is on to develop devices for detecting roadside bombs. In addition to anti-IED equipment, the Minister noted the need for other non-lethal technologies such as counter-terrorism equipment; surveillance, communication and sensors for border control; and cyber security.

The benefits to foreign collaborators in India's defence industries include low human resource costs, excellent engineering and world-class software specialists. The Minister also noted that despite the 26% limit on foreign equity, the government of India could make exceptions to this rule in individual cases such as the new 50:50 joint venture between Snecma Motors and HAL for the manufacture of aircraft engine spare parts.

5.5 Opportunities for Western Australia

The key questions for Western Australia are: will Western Australian firms and technologies be competitive and if so in which areas? The following recommendations are given as a way of finding answers to these questions.

Accordingly, the Western Australian Government should:

- collect disaggregated defence data about foreign shipments of defence equipment to India via the Australian Embassy in various countries, such as Israel and the US, and from other sources;
- send representatives to participate in CII's and FICCI's defence industries seminar and conferences;

- participate in the Defence Acquisition Management Courses run by CII;
- invite the CII National Committee on Defence to replicate the Indian seminars in Perth as a way of informing the local business community about specific opportunities in India's defence industries for exporters and technology, and IT experts with relevant goods, services and experience;
- use the occasion of joint naval, military and airlock exercises to develop insights into India's defence procurement needs, policies and strategies;
- study, and evaluate for opportunities, the reports and proceedings of the CII National Committee on Defence; and
- track the changing information that appears on the CII Defence website, including documents related to Defence Procurement Procedures.

6 India's Cultural Industries⁷

Following the classification developed at the First World Culturelink Conference in Zagreb in 1995, the following 10 categories (divided into 16 sectors and 54 sub-sectors) are used in this report for conceptualising cultural industries:

1. Heritage and Museums
2. Literature and Libraries
3. Music
4. Performing Arts
5. Visual Arts and Museums
6. Film and Video
7. Radio and Television
8. Community and Government Culture-Leisure Activities
9. Sport, Recreation and Safety
10. Natural Environment

In 2005 UNESCO held a conference in India at Nagaur, near Jodhpur (Rajasthan) to consider the role for a focused national agenda to promote cultural industries and to spread wealth creation more widely. The Jodhpur Consensus that emerged from this conference stressed that the cultural industries were *agents of dynamic economic growth and prosperity, and tools for innovation, wealth creation and poverty alleviation*.

India's cultural industries are as varied as the country's 5000-year-old culture. However there is now a realisation in India that not enough has been done to promote these industries for employment, exports, leisure and general socioeconomic diversification. During the last few years this has been acknowledged, and a number of meetings have been held to address the question of how India might benefit by developing 'cultural industries' in a more strategic manner. This discussion is of relevance to Australia, which has a large tourism industry – one indicator of the success of our own cultural industries. The opportunities for Australians in India, therefore, appear to be extensive and the timing of our involvement relevant to the ongoing debate in India. However, as with other chapters in this study, the potential for Western Australia needs to be defined against the competition from other stakeholders which, in the case of cultural industries, include the US, European, Israeli and Japanese governments and foundations.

Given the vastness of India's 5000-year-old cultural heritage, it would be impossible to review contemporary aspects of all ten categories in this report. Accordingly, this report focuses primarily on the first category, 'Heritage and Museums'. The rationale for this is elaborated in Supporting Paper 9.

⁷ Further information on the matters discussed in this chapter can be found in Supporting Paper 9: India's Cultural Industries.

Problems with India's Cultural Bureaucracy

6.1.1 Poor Security for Cultural Objects

Indian cultural industries capture the tension between state control and privatisation. The need to maintain state control over heritage sites and the key national and regional museums is best exemplified by Interpol's growing concern that Indian artefacts are entering global theft and smuggling rings at alarming rates. These rates reflect existing levels of bureaucratic corruption and links between bureaucrats and private entrepreneurs connected to global art rackets.

6.1.2 Lack of Financial Investment

The Indus Civilisation is one of the great civilisations of the world, and a contemporary of Mesopotamia. Yet the sites of the Indus Civilisation in India and Pakistan are far less well known than any other ancient civilisation. Data about the financial investment in cultural heritage and museums in India does not exist, but one indicator is the level of investment in promoting conservation, research and exhibitions on the Indus Civilisation (3000 to 1500 BC).

Total Indian expenditure on the Indus Civilisation sites and related activities does not exceed \$400,000 per annum. In contrast, Mexico spends about \$120 million on Mayan and related civilisations and earns about \$2.4 billion from tourism alone.

6.1.3 Lack of Inter-country Collaboration

Some of India's cultural achievements and heritage are linked with sites in other South Asian countries. In particular, this applies to the heritage of the Indus Civilisation, which spanned the Indus River now in Pakistan and spread into northern India into what is today's Gujarat state. The development of cultural industries pertaining to the Indus would therefore benefit enormously by inter-country collaboration and involvement of a neutral, foreign partner could well prove an asset in this. This collaboration could occur at many levels ranging from joint research to joint tours.

6.1.4 Lack of a Coordinating Organisation

India's cultural industries are a vastly varied and dispersed group that has no unified representation or authority or lobby group to look after the 'industry's' general interests. In Australia, the Australia Council and also various state departments project the cultural industries. In the UK it is more centralised with the Arts Council.

There is urgent need for many activities to be undertaken: collecting and collating data, analysing data, benchmarking against other cultural industries in other countries, advocating for protection of intellectual property, marketing and promotion, investing, developing partnerships, expanding capacities and exports, and finally paying attention to the wages and conditions of the performers and artisans employed in cultural industries.

6.1.5 Lack of Professional Courses/Training for Arts Management

The lack of arts/museum management courses has been identified as a major weakness in preparing India to take advantage of the rapidly expanding global tourist trade. The major museums of India run their own training programs but they are of short duration and take only a limited number of candidates.

Typically, these do not address questions of arts management or administration. The universities clearly have a role to play, but few universities have appropriate courses. There are many courses on culture, history, archaeology, etc., but virtually none are concerned with arts management. Two exceptions are the Master of Science in Museology at the University of Kolkata and a unit in the Arts Degree at the H.R. College of Commerce, Mumbai.

Similarly, museum training is very limited both at the National Museum in New Delhi and throughout India. The National Museum runs a single training workshop each year for a couple of weeks starting on the 17 February. A maximum number of 25 trainees are taken and all of them must come from recognised museums in other parts of India.

This is clearly an area for future collaboration between Indian and Western Australian universities.

6.1.6 Commercial Needs of the National Museum

The National Museum in New Delhi is one of the largest and most important museum collections in Asia and possibly in the world – it has some 200,000 objects covering some 5,000 years of Indian history. It is a government of India organisation reporting to the Ministry of Culture. As such, it gets bogged down in a great deal of bureaucratic red tape, including, for example, complex tenders for the disposal of broken furniture.

6.1.7 Opportunities for Creating New Jobs

In conclusion, the opportunities for the right kind of commercialisation of the National Museum (and most other Indian museums) are enormous and require attention to:

- the production of a wide range of merchandise including reproductions, posters, postcards and other souvenirs;
- the opening of bookshops and souvenir shops;
- opening of restaurants and coffee shops;
- opening of adjunct facilities such as cinema houses and convention centres; and
- training programs for all the above plus curatorial needs.

6.2 Linking Western Australia and Indian Cultural Industries/Tourism

It is interesting to note the case of the Western Australian Maritime Museum at Victoria Quay in Fremantle. As its website notes⁸, this is the first 'Museum of the Indian Ocean' anywhere in the world with unique importance not only to Western Australia but also to the nations of the Indian Ocean including India. The Shipwreck Gallery, in particular the reconstructed Dutch East India Company ship 'Batavia', is of enormous interest to Indian cultural tourists.

However, as long as information about this extraordinary Maritime Museum remains locked into Australian shores, it cannot develop its full potential. That potential, with the many new jobs it can create in India and Australia, could be unlocked by means of developing a companion museum in India, say Goa, famous for its Portuguese settlements, and the introduction of long distance maritime-cultural tours by luxury boats that could ply the old historical sea routes of the Indian Ocean – Fremantle to Malacca to Goa, for example.

⁸ <http://www.museum.wa.gov.au/maritime/>.

St Francis Xavier spent much time travelling in India, Southeast Asia and especially in Malacca – the story of the voyages of his corpse alone link all these locations together. It is said that when the body eventually reached Goa in 1554, a year and a half after his death, his body was found to be ‘fresh’.

Beyond Maritime Archaeology there is a large need to develop science museums in India – existing museums are poorly managed and are not designed to interact with Indian schools and colleges. This was recognised recently by the establishment of a Training Program on Enrichment of Science Communication in Museums. The program is a joint initiative of the Smithsonian Institution (USA) and the National Council of Science Museums in Kolkata. The Smithsonian will provide additional training for Indian curators and directors, building on an earlier program by which the Birla Institute of Technology and Science (Pilani) established a training program for staff in science museums. The Smithsonian exchange will involve scientists, museum curators and designers visiting each other in order to improve the methods used in India to create new teaching and pedagogical texts for distribution through the science museum.

6.3 Linking Indian and Western Australian History and Heritage

In May 2006 a major conference bringing together Indian and Israeli cultural heritage and museum specialists was held in Cochin, India to discuss ways of cooperating on the promotion of Jewish heritage and ways of sharing ideas about cultural heritage management (Indo-Israel Workshop 2006). The conference generated a list of synagogues in India (a total of 23 scattered between Kerala, Kolkata, Maharashtra and Ahmadabad) and involved the following representatives: Archaeological Survey of India, State Archaeology Departments, community representatives, the University of Kerala and Israeli delegates.

This Indian-Israeli collaboration could provide a model for Indian-Western Australian cultural and museum heritage exchanges on themes that link the two potential partners, for example:

- British imperialism in India and Western Australia;
- Indian migration to Western Australia;
- Indian convicts sent to Western Australia;
- shared cultural values and industries, e.g. gold and gold mining;
- indigenous traditions and indigenous cultural heritage (India has an impressive collection of rock art and Dr Kapila Vatsyayan has for years promoted the idea of bringing Australian and indigenous Indian heritage together within a comparative framework⁹); and
- traditional and modern methods of water management and irrigation (the great traditional cities of India were based on irrigation systems, e.g. Vijayanagara).

6.4 Adopting the British Council's 'Creative Future' Model

The British Council model was created in 2006 and the first beneficiaries will take up their appointments in 2007. The program is called ‘Creative Future’ and involves a partnership with the Indian Institute of Management Bangalore, the Creative Industries Development Agency (UK), leading UK experts and the Commonwealth Business Council. The program is being organised through the ‘Creative Future School’ that has another program of business training for creative artists.

⁹ Personal conversations between Professor Vicziany and Dr Kapila Vatsyayan since 1996.

As part of the program twenty young persons (aged 18 to 35) from the creative arts will be trained in 2006 by the best British and Indian experts in how to develop a business from a cultural idea. By November 2006, three of these will be selected to travel to London and work directly with leading industry players for a period of two months. On returning to India they will be asked to give public reports about their experiences and one of the three will be declared the winner of the 2007 prize for 'India's Creative Future'.

The British Council has other programs and initiatives to promote business and cultural collaborations between the UK and India, including the Charles Wallace India Trust Scholarships.

6.5 Opportunities for Western Australia

These initiatives should be reviewed by the Western Australian Government in consultation with its local cultural specialists. The Government and its representatives could become familiar with the emerging opportunities in the cultural industries of India by:

- Meeting and engaging in face-to-face discussions with the leading policy players identified in this chapter and in Supporting Paper 9, with a view to assisting with the development of a cultural industries policy.
- Participating in seminars, conferences and briefings organised by the groups identified in this paper.
- Exploring the idea of replicating the British Council model for training young Indian cultural specialists to commercialise their cultural talents – such a training program organised by Western Australia would ensure a direct linkage between Indian and Australian business opportunities in these areas.
- Closely following tenders put out by the relevant government departments in India.
- Exploring ways in which the creation of museum and heritage databases and electronic surveillance of sites and artefacts can help reduce theft of national heritage – despite India's global leadership of customised software, electronic control of her museum and cultural heritage has hardly started. Reliable databases, inventories and surveillance technology are especially important for smaller, regional museums and heritage sites where public scrutiny is also low.
- Holding industry-state government briefings to explore relevance of the case studies provided in this paper.
- Using the study of Indian heritage and museum cultural industries as a model for studies of other aspects of India's cultural industries.

7 India and Western Australia: Past and Present¹⁰

7.1 Western Australia's Trade with India

India today is Western Australia's fourth largest trading partner, having jumped from eleventh place in the past three years. In 2005, total Western Australian exports to India amounted to \$3.2 billion, accounting for nearly 46% of Australia's exports to India in that year. Five years ago, in 2000, the State's exports to India were \$0.13 billion, then accounting for 7.4% of all Australian exports to India.

It is also noteworthy that reported Western Australian exports to India consist virtually entirely of processed gold, which has now become Australia's foremost export to India, superseding coal. This accounts for the extraordinary jump in Western Australia's trade with India in recent years. Exports of gold accounted for nearly 95% of total exports in 2004 and more than 92% in 2005 (See Table 7.1). The need and scope for diversification are glaring features of this trade relationship.

However, the export trade statistics for Western Australia to India do not include diamonds, where 94% of Rio Tinto Argyle diamonds from Western Australia are exported to India via Belgium. Belgium is India's second largest trading partner, after the US, for imported goods, partly for this reason.

Table 7.1 Western Australia-India trade 2000-05

	2000	2001	2002	2003	2004	2005
WA exports to India (\$m)	134.9	274	411.1	1306.9	3029.8	3234.6
WA imports from India (\$m)	44.2	50.6	82.7	88.2	159.8	111.6
Trade surplus (\$m)	90.7	223.4	328.4	1218.7	2870	3123
Memorandum						
Gold in WA exports (\$m)	7.1	166.2	247.1	1152.6	2869.6	2989
Share of gold in total exports (%)	5.3	60.6	60.1	88.2	94.7	92.4

At present, trade between Western Australia and India is very one-sided. While the State's exports to India amounted to more than \$3 billion in 2005, in contrast, Western Australia's imports from India were only \$112 million – less than 4% of the State's exports. As a result, Western Australia had a massive trade surplus of \$3.1 billion in 2005, on top of a trade surplus of \$2.9 billion in 2004 (Table 7.1).

Western Australia's supply of gold and affordable Argyle diamonds has enabled India to create a 'mass' diamond jewellery export market of some US\$8 billion. Today, India's jewellery manufacturing industry is the country's leading export earner.

Given the diamond and gold supply chain with Western Australia, there exists an opportunity for Western Australian jewellery designers to 'piggy back' on India's jewellery manufacturing sector and to be part of the value adding component of India's number one export.

¹⁰ Further information on the matters discussed in this chapter can be found in Supporting Paper 11: Western Australia and India: Recent and Current Economic Links.

Toward this end, in November 2005, a Memorandum of Understanding was signed between the government of Western Australia and India's Gem and Jewellery Export and Promotion Council to help the State's jewellery designers to promote their services to Indian manufacturers.

It is also worth noting that the pattern of Western Australian imports from India have been rather erratic over the past five years. In 2001, imports increased by 14% over the previous year, followed by a greater increase of 63.5% in 2002. In 2003, however, imports from India rose by only 6.6%, followed by another massive rise of 81% in 2004, only to be followed by a 30% fall in 2005. These figures indicate that a stable base is yet to be developed for the State's two-way trade with India. In total Australian imports from India, Western Australia's share has risen from 6.2% in 2000 to 9.2% in 2005. Much of this growth has occurred in the past three years, 2003-2005.

Although Australia has done very little to promote its capability and industries to the Indian market in the past, Western Australia is well positioned both climatically (Western Australia enjoys five climatic zones) and geographically (a two and a half hour time difference and eight hour flight time from Perth to Mumbai). Further, with its advanced complementary service sectors and commodity industry, the State could improve its participation in, and share of, India's growing prosperity and development.

Since 1996, the government of Western Australia through the Department of Industry and Resources has operated two offices in India, in Mumbai on the West Coast and Chennai (satellite office) on the East Coast. In addition to trade, the mandate of the offices is to attract investment to Western Australia and to recruit Indian students for the State's education institutions.

7.2 Mining

Australian mining companies have to date met with limited success in India. Major players such as Rio Tinto (its India office reports to its Perth office) and BHP Billiton have operated offices in India for some 10 years – both are yet to commence mining operations in the country.

On the other hand, some smaller Australian exploration and mining companies have been more successful. One such is Deccan Gold, an exploration and mining company which is currently operating in Karnataka. The Chairman of Deccan Gold, Mr Charles Devenish, relocated himself from Perth to Delhi five years ago to oversee his company's investment and float on the Mumbai stock market.

Another small Western Australian gold and diamond exploration company involved in a partnership with an Indian mining company, has spent the last five years facing constant delays and a confusing array of court challenges over its mining lease in the newly created State of Chattisgarh. The lengthy delays and mounting costs have not been good publicity in helping the government of India to attract foreign investors in this sector.

With over 2326 private and 292 public operating mines in the country, minerals form 16% of India's exports. Coal India is India's biggest mining company. It is also government owned and lacks modern infrastructure and technical investment. The process of privatisation in this industry, and the opportunities that it is creating, has been outlined in Chapter 3. Several Western Australian mining IT software companies have established themselves in the market and are doing well.

7.3 Oil and Gas

India ranks sixth in the world in terms of petroleum demand and by 2010, the demand will drive the country to fourth position behind the United States, China and Japan. In recent years the strategy pursued by the government of India has been to expand exploration interests beyond its domestic waters and into oil and gas fields of Myanmar, Africa and Central Asia. However, the major thrust still lies in searching for hydrocarbons in onshore and offshore blocks in India. Recent gas finds in the Bay of Bengal are making oil majors take notice of the potential in prospective domestic basins.

The Indian oil and gas sector is better organised than its mining counterpart, probably because the industry's main players are publicly listed companies (even though Oil and Natural Gas Corporation (ONGC) is formerly a government entity it operates as a private company) and at arms length from government interference in operational management of the companies. The main players are Indian Oil Corporation, Oil India Limited, Gas Authority of India Limited, ONGC, Reliance, Bharat Petroleum and Hindustan Petroleum are the main players. The industry is estimated to be worth \$94 billion.

Despite the presence of significant local companies and refineries (25 in number), India imports 72% of its oil requirements, mainly from the Middle East. Recently, with the construction of offshore terminals, there exist opportunities for Australian LNG exports to enter the market. Woodside, Shell Australia and BHP Billiton are monitoring these opportunities.

Cairn Energy PLC, arrived in India 1994 and established a presence in Chennai, through its Cairns Australia operations, looking for exploration permits in the Bay of Bengal and as subcontractors. Indeed, the first work opportunity for Clough was as a subcontractor to Cairn Energy in its Bay of Bengal project.

Today, Cairn Energy, the parent company, is the most successful of the foreign exploration investors in India's oil and gas industry, through recent significant onshore gas finds in Rajasthan. The company has invested around US\$2 billion in the last 10 years. Cairn Energy generates more than 60% of its revenue from oil and gas fields in India and the percentage is likely to go up once the Rajasthan fields are commissioned.

British Gas, British Petroleum and Shell are now being followed by US majors, such as Halliburton and Chevron, which are also expressing an interest in exploration in India now that the government has extended a welcoming attitude to foreign investment.

Last year, Shell Australia sent a one-off consignment of LNG to the Shell/Reliance LNG offshore terminal in Gujarat. Also currently under construction is an LNG terminal in Mangalore, Karnataka.

Clough has set up an office in Mumbai where it employs more than 40 local Indian engineers. The company operates as a service provider consultancy to the industry as well as offshoring some of its Australian design work to its India office. Clough also undertakes offshore services to major Indian companies. There are a growing number of riggers and other service providers such as Sea-Tech – a Western Australian company working in India through its Dubai based operations.

7.4 Education and Training

Currently 27000 students from India study in Australia, of which only a small proportion study in Western Australia. The State's higher education providers have been focused on the ESL market and students from traditional markets in South East Asia as well as China,

Vietnam and now even further afield from Russia, and are lagging behind their Eastern seaboard counterparts in addressing the Indian market.

In 2002, the consortium of universities decided to discontinue direct funding of an education recruitment officer attached to the Western Australian Trade Office in India, as it was not considered to be a high enough priority. The position was retained by the Trade Office and funded by the Department of Industry and Resources, as it was considered to be a priority market by the State Government. That position continues today.

With Australia and especially Western Australia's skilled shortage, the Indian market needs to be given greater attention and funding by Western Australian education institutions.

7.5 Construction and Building Materials

India's rapid urbanisation provides additional opportunities for Western Australian firms to participate in the booming markets for building material and construction. Some idea of these opportunities can be gained from the case of Mumbai, which is today one of the world's most expensive real estate markets. To find affordable housing or apartments that are less than 15 years old demands a premium price. Suburbs such as South Mumbai and Bandra compare with costs in New York and London, and the demand is huge.

Another trend is the development of 'estate' living urban areas on the outskirts of the city. These contain public spaces for landscaping and internal modern road access. Developers and architects seek modern designs and building materials (but always with an eye for 'value for money').

7.6 Indian Investment in Western Australia

To date, the lion's share of Indian investment in Australia has come to Western Australia. In the last five years some \$800 million dollars have been invested in value adding industries in the Western Australian resources sector.

Major Indian companies such as the Oswal Group and Birla Group have invested in the establishment of an ammonia fertilizer facility on the Burrup Peninsular and in the development of the Nifty Copper Mine near Telfar. In addition, ONGC with its Canadian offshore company has invested in an exploration field off the North West Shelf.

It is anticipated that India will ramp up its interest to purchase LNG from Western Australia, and this in turn will contribute to further investment in Western Australia's resources sector.

8 Future Opportunities and Policy Options

It has been argued in this report that India's economic growth appears to have taken off in recent years and that the economy is likely to continue growing around 8% per annum or above for the foreseeable future. The current growth is based upon rapid growth of the services sector, with IT and IT-enabled services leading the way, with increasing activity in a number of manufacturing sectors, such as pharmaceuticals, automobiles and textiles, and in business and professional services. Many challenges need to be addressed to secure such continuing growth – for example, in agriculture, in infrastructure and in addressing the deep levels of poverty and illiteracy that remain – but a solid reform process is underway, with widespread popular support. These developments will be supported by the massive new investment that is planned for rural and urban infrastructure over the 11th Five Year Plan, and by increasing levels of foreign direct investment in India.

It has also been argued that India's economic growth has far reaching implications for Western Australia in the 21st Century. India's economic transformation presents expanding opportunities for private sector investment, including from Western Australian companies, academic institutions and government departments, in the multitude of sectors and industries of India.

The Western Australian Government has identified four pillars for the State's diversification beyond the resources boom – biotechnology, ITC technologies, marine and defence technologies and renewable energies. A central argument of this report is that 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.

The arguments advanced earlier for this conclusion, and the policy suggestions made to achieve it, will not be repeated in this chapter. Rather, drawing on the discussion in the body of the report, we will review key areas in which developments in India seem to have special relevance for Western Australia, noting as appropriate their relevance to the global knowledge hub and other opportunities for the State that might be considered further.

8.1 Resources and Energy

8.1.1 Oil and Natural Gas

As noted above, India relies excessively on coal and oil for its energy production. It was also noted that the Indian Government has been seeking to diversify the sources of its energy imports. India's vision has been to pipe gas from Iran through Pakistan to India and on sell a part of the gas to China's Western Provinces. The project remains at discussion level to date, with the US doing all it can to dissuade both Pakistan and India from participation in the project. In this context, an appealing option for India would be to source natural gas from Western Australia. India needs to be convinced that sourcing gas from Australia is an economically viable option. At present, Indian encouragement to Australian engagement in the energy sector takes the form of leasing out prospecting rights in the Bay of Cambay.

This has not been an appealing option for Australia. Rather Australia needs to persuade India to adopt the Chinese approach to energy diversification – namely the purchase of gas from Western Australia and investment in the exploitation of that resource. The current two gas deals between Western Australian and Chinese parties (each worth US\$25 billion over the next 25 years) could serve as models for India-Western Australia contracts.

To meet its spiralling demand for fossil fuels, India is also investing heavily in oil fields abroad. India's state-owned oil firms already have stakes in oil and gas fields in Russia, Sudan, Iraq, Libya, Egypt, Qatar, Ivory Coast, Australia, Vietnam and Myanmar. GAIL (India) Limited (the marketing arm for the Oil and Natural Gas Corporation of India (ONGC)) has an interest in acquiring LNG from Australia but has not met with success to date, as most of Australia's LNG is already committed. ONGC was involved in offshore exploration on the NW Shelf with a Canadian partner. However, the field did not prove to be lucrative and the joint venture has since ended. ONGC has, however, continued to express an interest in further exploration in the North West of Australia.

8.1.2 Mining and Resources

The resources sector is an area where Western Australia does not have to 'sell' itself to India. Indian Government agencies and private sector companies are well aware of Western Australia's mining and oil and gas industries and capabilities. It is this sector that has attracted the bulk of India's investment in Western Australia – just under one billion dollars.

Promotion of the State's mining sector expertise is a key focus area being pushed by the Western Australian Trade Office in India and the Department of Industry and Resources to promote trade opportunities and bilateral relations between governments at Federal and state levels. India has an estimated 85 billion tonnes of mineral reserves to be exploited. It is the world's largest producer of mica; third largest producer of coal and lignite; and ranks among the top producers of iron ore, bauxite, manganese ore and aluminium. Over 1.1 million people are employed in India's mining industry.

India's oil fields on the west coast close to the Middle East and Pakistan raise security related issues. There is an opportunity for patrol boats and security based products to participate in the Indian oil and gas industry. There is also a need for drilling rigs and supply boats, and for related expertise. The influx of foreign oil and gas companies has also seen a lifting of safety standards to international requirements. A major fire on an ONGC offshore rig in 2005 has reinforced the need to improve safety-training standards, providing further opportunities for Western Australian service providers.

India welcomes joint ventures between foreign and domestic partners to mobilise finance and technology and to secure access to global markets. However, to date inroads by foreign companies into India's mining exploration sector have been slow and fraught with difficulties, even for global players such as Rio Tinto and BHP Billiton. Potential areas for exploration ventures include gold, diamond, copper, lead, zinc, nickel, cobalt, molybdenum, lithium, tin, tungsten, silver, platinum group of metals and other rare metals, chromites and manganese ore, fertiliser minerals, and coal based methane.

Western Australia has developed substantial expertise in Native Title Legislation and administration of the Act. Sharing of such information and approaches between governments could be considered good relationship building and a generator for other opportunities.

The Western Australian Department of Industry and Resources (DoIR) is currently looking at commercialising its online tenement lodgement system and database. It could readily extend its current Memorandum of Understanding with the government of India to include matters relating to Native Title on request from the government of India.

DoIR has also signed a Memorandum of Understanding with the government of India to share information on mine rehabilitation work undertaken in the respective countries. The first part of the program involved a delegation from Western Australia visiting the mining states of Orissa and Goa. DoIR has since invited a delegation from India's Federal Department of Mines and from its mining states to participate in an exchange program with a focus on mine rehabilitation.

Opportunities in India also exist for setting up manufacturing units for value adding to mining products and for future discoveries of sub-surface deposits with the application of modern techniques such as gold tailing in Karnataka.

8.1.3 Electricity

Opportunities in power generation exist for coal-based plants at pithead or coastal locations (imported coal) and natural gas/CNG based turbines at load centres or near gas terminals. The government has also identified hydroelectric power potential of 150,000 MW that is still untapped. There is also need for renovation, modernisation, up-rating and life extension of old thermal and hydro power plants. The scope for bio-fuels, including extraction of ethanol from agricultural waste using recent advances in technology, should also be explored.

In respect of power distribution, opportunities exist through bidding for the privatisation of distribution in thirteen states that have unbundled or corporatised their State Electricity Boards. More states are likely to follow this lead in the coming years. Similar opportunities exist in transmission network ventures – additional 60,000-circuit kilometres of transmission network is expected to be operational by 2012. The 11th Plan is also expected to establish an energy R&D system to develop relevant technology and energy sources to enhance energy security and efficiency in the long run. Close links here could be particularly relevant for developing Western Australia's knowledge hub.

8.2 Environmental Management and Infrastructure

Given the high priority for upgrading and augmentation of India's infrastructure sectors during the 11th Plan discussed in Chapter 3, major new opportunities will arise for private sector firms, including foreign firms, to participate in road construction, maintenance and tolling, construction of bridges and ports and the development of fast ferry services in India.

With a population of over one billion people and an economic growth at 8% per annum, the impact of both growth and population pressure on India's environment and, consequently, on the Indian people is immense. Thus India's economic growth is, and will increasingly be, accompanied by a heavy environmental cost. The cities of Delhi, Mumbai and Chennai are three of the world's 10 most polluted cities.

With a burgeoning population, access to clean water is a matter of increasing concern and urgency. India, unlike China, has put minimum funding into development of adequate dams (aside from the Assam Dam project that has many detractors) and in upgrading of water and sewerage systems in its major cities.

Mumbai, with a population of 17 million and the financial centre of India, is composed of seven islands located on the mangrove coastline of the Arabian Sea. More than any other city it has an option to develop a comprehensive fast ferry system linked to the industrial and business districts of the city. The Tata Group has expressed an interest in developing or at least researching the possibility of a water ferry system. Western Australia's shipbuilding industry could have a role to play in the development of a water transport system and infrastructure.

Other environmental management systems needed in India's development concern air and water treatment technology; waste water and sewerage treatment; waste disposal systems; speciality air conditioning systems; filters and scrubbers for factories; speciality chemicals as well as consultancy services.

A number of cities have involved the private sector in the provision of urban services, including bus transport, sanitation, garbage collection, street lighting, water supply, collection of local taxes, maintenance of parks and gardens, and market development. In Indore (Madhya Pradesh) this public-private sector partnership has not only successfully solved the city's bus transport problem, but has also made it highly profitable, because enhanced punctuality of new and clean buses has resulted in a huge increase in commuter patronage and revenue (for more details, see Supporting Paper 3). The Indore case has become a model, as many other cities are now studying it to solve their transport problems.

8.3 Defence Industries

There is considerable scope for productive partnerships and collaborations in India's defence industries, in which 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 be explored in relation to shipbuilding, construction and delivery of patrol boats and ferries for metropolitan centres such as Mumbai, which consists of several islands and where the market for ferry services appears ready for development.

It would be appropriate for Western Australia to identify which firms and technologies might be competitive in the Indian defence market, and in which areas. Some suggestions about how this task might be approached are provided in Chapter 5.

8.4 Agriculture and Water

As noted above, growth in Indian agriculture has slowed over the past decade and reversing this trend is a high priority for the current government. More than 75% of India's population is employed in the agri-food sector. Agriculture is highly subsidised and protected – agricultural income is exempt from income tax in all states and farmers receive free, or heavily subsidised, water and electricity in many states. The central platform of the government of India's reform package is to make its agri-food sector more productive and focused on export earnings. Higher growth in this sector will help to increase employment opportunities for the expanding workforce, increase tax revenues and reduce the fiscal burden of subsidies for central and state governments, and raise the level of domestic demand for industrial products.

Agriculture will remain a priority sector for India's economy, not only because of its value for food security, but also for rural prosperity. It is also apparent that there will be a change of direction in the agricultural sector, with more investment occurring in horticulture and the promotion of new exports, and in associated services, including irrigation, power generation and distribution, rural roads and transportation of agricultural goods to urban markets.

The government policy is now encouraging private investments in the traditional areas of public ownership, with the exception of defence and national security. In order to speed up research and development for optimal utilisation of water resources, and to ensure sustainable development, the government has invited research proposals.

Rainwater harvesting is another area where India has so far failed to fully capitalise on rainfall. The rain fed area that is 63% of the India's total geographical area contributes to 45% of its food because of the rainfall being erratic and inadequate, whilst 37% of the irrigated area accounts for 55% of India's total food production. India would benefit on many fronts from effective rainwater harvesting.

These trends should open new opportunities for Western Australia in respect of the following:

- dry area farming;
- rainwater harvesting;
- horticulture;
- plantations;
- machinery and equipment suitable for horticulture and plantations;
- training of personnel, especially for extension services in remote locations; and
- storage technologies for grain and other produce.

8.4.1 Agri-food Sector

It is estimated that currently some 30% of India's grain crop is lost through either poor storage and handling or misappropriation of grains. Management of storage and handling of India's grain production lies with the Food Corporation of India (FICI), a government agency that is considered by many to be inefficient and inept. Opportunities need to be explored for private sector investment and or consultancy services for raising the efficiency of grain storage and handling facilities in India. Over the years Bulk West (formerly CBH) has tried on a number of occasions to enter the Indian market. A number of tenders for bulk storage facilities have been issued, however, each time the tender does not proceed to appointment. Today, Bulk West keeps a watching brief only on the market opportunity.

Larger corporations such as the Essar group operate large mechanised and computerised farms on the outskirts of Mumbai. Essar is a large exporter of roses and several high value vegetable items. Snow peas from its farms are exported to Western Australia during the counter-growing season in Western Australia.

Several Western Australian wine consultants, along with consultants from Europe, have been successful in selling their services to help develop India's nascent wine industry, which is predominantly white wine production. Indian middle class consumers are developing a taste for wine. The Indian palate prefers fruitier white wine. Wine also provides an acceptable alternative to hard liquor for women.

The Department of Agriculture has been very proactive in creating niche opportunities for Western Australian apple and stone fruit growers in India. Interest in the apple market grew from their participation in an AusAID project to help a northern Indian state revive its apple crop, which had been decimated by blight. During the two years life span of the project, Western Australia's Department of Agriculture horticulturalists assessed the export opportunity for apples to India. The project has been a success story and a good example of a clinical and well-researched approach into a market. The apple market is considered an opportunity for Australian suppliers. Another is the stone fruit market.

Western Australia's Department of Agriculture is proactive in working the Indian market to develop sales opportunities for the State's producers. In promoting its wider agriculture services it could act as a facilitator for domestic agriculture consultants. Indian farmers suffer from a number of similar problems as their Australian counterparts such as water salinity, erosion, sandy soils and the need to harvest and conserve water. An inroad into the market may be for the Department to enter into a Memorandum of Understanding with several Indian state governments, such as Maharashtra, Rajasthan, Punjab, Haryana, Karnataka and Tamil Nadu.

In 2004, the Western Australian Trade Office in conjunction with the Department of Agriculture completed a comprehensive study and report on India's supermarket industry and opportunities for Western Australian companies. Among the report's findings is the existence of a market for health foods and sugar free processed foods – India has the highest number of diabetics in the world.

Opportunities were also identified in confectionary products, packaged ingredients, vacuum packed foods and a range of sauces as major opportunities. An essential requirement to interest importers is that the food has a shelf life beyond six months.

There are also opportunities for powdered milk, butter oil and cheese products as well as jams, cereals and snack foods. Local products that have already found their way onto India's supermarket shelves include Wescobee Honey and Harvey Fresh.

8.5 IT and IT Enabled Services

India's IT sector is universally recognised for its quality and low cost. Today it is the fourth largest IT market in the Asia Pacific providing employment to more than one million IT graduates. The industry is also the showcase sector for modern business management practices. Following the global IT industry meltdown in 2002, many Indian Nationals working in the US on green cards returned home to India. They in turn set up IT companies mainly in South India, in Bangalore and Chennai. They brought with them US business principles and practices of flatter business models and incentive schemes.

In the past two or three years, India's ITES firms have been rapidly expanding their global presence, by way of partnerships with, and acquisitions of, overseas competitors. This market for ITES is set to expand rapidly in the next few years. With business R&D rising rapidly in recent years, Western Australian firms have developed capabilities in diverse fields and should be able to forge mutually beneficial partnerships with Indian firms.

IT security services and systems also provide a market opportunity for Western Australian companies who specialise in this field. Today the push on the part of Indian IT companies is to move into the value added high end of the market in research and development (R&D).

Western Australian financial service provider, Repcol is Australia's biggest employer of Indian nationals in India. Repcol has a backroom office facility in Bangalore and employs a staff of 1000. Repcol recently expanded its debt collection services to include US and UK debtors (see Appendix A for details).

DoIR has in the past coordinated information and communication technology missions to China and Malaysia. DoIR has also facilitated cluster development of mining ICT and electronics, secured Commonwealth funding for providing telecommunication services to the Ngaanyatjarra Lands, and was involved in Western Australian submissions to the Commonwealth Government on private sector management of radio spectrum and the development of wireless broadband access. With this background, DoIR should be able to take the lead for exploring specific opportunities for investment and partnership with Indian firms or government agencies in upgrading India's infrastructure.

8.6 Education and Training

8.6.1 Western Australian and Indian Overseas Students

With its world-class universities, Western Australia should be able to attract a much larger share of the large and rapidly growing market for foreign education in India. Indian students are attracted to overseas universities in the English language countries – the USA, Canada, UK and Australia. At present, by far the largest share of these coming to Australia goes to New South Wales, Victoria or Queensland. Western Australia can increase its share of this lucrative market in part by targeting bright students in India who initially want to join the top Indian institutions such as the All-India Institute of Medical Sciences (AIIMS), Indian Institutes of Technology (IITs), Indian Institutes of Management (IIMs) and several other 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 is very tough and is getting tougher every year. Thus, there are large numbers of very able Indian students who cannot get admission into these institutions and are in search of good overseas alternatives. Consistent with the objective of developing a knowledge hub in the state, this is the segment of the Indian market that Western Australian universities need to target.

8.6.2 Other Training Opportunities

Beyond the university education courses, opportunities also exist to tap into India's need for training courses of various kinds. For example, democratic decentralisation of local government bodies has created a need for training of personnel in governance and financial management in India's cities and towns. Opportunities should be explored for providing specifically designated courses for such training to be delivered either in Western Australia or in India, in association with local universities or other training institutions.

It is understood that training courses in India are classified by the Australian Government as Category 4 courses, which makes it difficult for potential students to obtain visas. Given the huge potential size of the training needs in India, the Western Australian Government should explore the possibilities of either getting these courses upgraded to Category 3, or develop alternative approaches to provide training education on site in India. At present, there is some doubt about the economic viability of such an approach, as the provision of training in India is not considered to be profitable. This aspect needs to be further explored, however, taking a longer-term view – over 5-10, for example. There must also be considerable spillover benefits of a presence of Western Australian educators in India, which should be broadly helpful for the State's higher education institutions and other industrial and technical opportunities.

8.7 Health Care

The Indian health scenario offers a number of opportunities for Western Australian pharmaceutical and/or healthcare companies. First and foremost the target market for the Western Australian businesses would be the 300-350 million strong middle class that closely follows the western lifestyle. Hence, longevity and other lifestyle enhancing supplements including health and fitness areas would be of interest. Health and fitness studios are becoming popular, particularly in urban centres and there is enormous potential for Western Australian firms.

The large number of potential patients provides the perfect opportunity for expansion of firms with benefits of economies of scale. These firms could supply medicines for the yet unmet needs in the infectious, and communicable and non-communicable diseases. However, the price and affordability of these medicines to the millions of poor Indians who would be the target market could be an issue.

Firms could also provide healthcare services at competitive prices in metro cities as well as in rural India. However, lack of basic infrastructure such as clean water and power supply especially in rural areas, could hinder healthcare.

Interested companies must not be put off by the notion of poverty and the large number of poor in India, but view it as an opportunity. The large number of children suffering malnutrition and the large number of adults with chronic energy deficiency is predominantly among the poor. It offers opportunities for Western Australian firms to supply nutrient supplements to the under-nourished community segment in India. These could be supplied directly to authorities in affected areas by negotiating with the appropriate state governments.

Under the new landscape, a large number of pharmaceutical multinational corporations have shifted or are in the process of shifting their R&D, manufacturing and/or other operations to India. This strategy is considered to reduce costs significantly and provide direct access to the Indian market. Western Australian companies would be able to take full advantage of the so-called 'India factor'. These include the availability of a highly qualified English speaking workforce in India, most of whom are prepared to relocate and are ready to work for a third or less of the cost of hiring someone with the same level of skills, qualifications and experience in Australia.

It is envisaged that by tapping into India's huge and growing market, participating companies would experience a rapid growth as the country goes through various development stages.

The Western Australian Government's Department of Health has experience in providing health care services in remote communities and should also explore possibilities of joint ventures with Indian partners for doing the same in India, as in many states, rural and remote communities are not served well at present in terms of access to education and health 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).

In collaboration with Commonwealth and the other state and territory governments, Western Australia has embraced the *Healthy Horizons* Framework developed in 1999 to improve the health of Australians living in rural and remote areas. The aim of the Framework is to provide direction for the development of strategies and allocation of resources for rural and remote areas, and to provide guidance for communities and organisations for action to improve their health and well-being.

As such, the Western Australian 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. Strategies have been developed to support action across the State in the areas of healthy ageing, suicide prevention, childhood nutrition, mental health, diabetes, chronic disease, and falls prevention.

It is now widely accepted that health care models that work well in metropolitan areas may not be easily applied in rural settings. Accordingly, mechanisms have been developed to support involvement of communities in developing appropriate solutions and service models that are best suited to their needs and circumstances.

The Western Australian Department of Health's *New Vision for Community Health Services for the Future* (Western Australian Health 2000) provides a strategy to support practical, attainable health services at a community level that are based on the needs of the people as identified by them. Health Services have been encouraged to re-orient their organisational models and structures to reflect the need for community health management to be closely positioned with the community, and is accessible and responsive to the health needs of the community. The six Western Australian Regional Aboriginal Health Plans,¹¹ developed in a community-based, community-driven process, have increased Aboriginal involvement and cooperation with local health services and a high level of ownership at the local level. Collaboration is also promoted with private sector, NGOs and other professional bodies including the University Departments of Rural Health.

A multitude of programs exist for addressing issues of access and equity in rural and remote communities, such as the fly-in/fly-out services in Western Australia – which use air charter services to bring regular health specialist services to remote communities – and the Equity, Responsiveness and Access program in South Australia.

Telehealth services have been shown to improve access to care, promote greater integration of remote health services and improve support for staff in rural and remote areas, and Western Australia has been active in the area of telehealth for expanding the number of services in rural and remote areas as well as innovative applications of the technology.

8.8 Tourism and Cultural Industries

8.8.1 Tourism

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 a relaxing holiday combined with shopping on the way. With backing and research from Western Australian Tourism, packages of this type are worthwhile exploring.

Bollywood productions like to include foreign city sequences for their song and dance routines. The possibilities of packaging potential Swan River locations for consideration by Bollywood need to be explored. Accessing Bollywood productions is a cost effective way of making inroads into the tourism market. The Western Australian Government should become thoroughly familiar with the emerging opportunities in the cultural industries of India by developing collaborations with Indian museums and galleries for cultural tours and exhibitions.

¹¹ See <http://www.aboriginal.health.wa.gov.au/htm/publications/default.htm>.

To date, there has been little interest on the part of Western Australian Tourism (lack of funds is also a contributing factor) to promote Perth and Western Australia as a destination for Indian tourists and Bollywood production houses. The focus to date appears to have been on promoting the cities of Sydney, Melbourne and Brisbane/Gold Coast by Australian Tourism and Qantas.

However, consideration needs to be given in packaging tourism promotional material. The typical Indian tourist is not greatly interested in lying on a beach in the sun. He/she is more interested in sightseeing and shopping. Also worth exploring is the linkage to Gondwanaland (the theory of Australia's North West joined to South India) as is sport development tourism opportunities and food and wine tourism.

8.8.2 Cultural Industries

The Western Australian Government should become thoroughly familiar with the emerging opportunities in the cultural industries of India by:

- Meeting and engaging in face-to-face discussions with the leading policy players identified in this paper with a view to assisting with the development of a cultural industries policy.
- Participating in seminars, conferences and briefings organised by the groups identified in this paper.
- Exploring the idea of replicating the British Council model for training young Indian cultural specialists to commercialise their cultural talents – such a training program organised by Western Australia would ensure a direct linkage between Indian and Australian business opportunities in these areas.
- Closely following tenders put out by the relevant government departments e.g. the Global Tender for the development of the Buddhist tourist circuit in Uttar Pradesh (Ministry of Tourism 2005).
- Exploring ways in which the creation of museum and heritage databases and electronic surveillance of sites and artefacts can help reduce theft of national heritage – despite India's global leadership of customised software, electronic control of her museum and cultural heritage has hardly started. Reliable databases, inventories and surveillance technology are especially important for smaller, regional museums and heritage sites where public scrutiny is also low.
- Holding industry-state government briefings to explore relevance of the case studies provided in this paper.
- Using this study of Indian heritage and museum cultural industries as a model for studies of other aspects of India's cultural industries.

8.9 Construction and Building Materials

Western Australia's building design and materials industry is second to none in the world. Through formation of alliances with local architectural firms and local manufacturers, there is an opportunity to access this growing market. Areas of interest include: flatpack kitchen and cabinet fitouts; household paints; treated timber; flooring systems; powder coated window and door fittings; landscaping and architectural and town planning design services.

In 2010, New Delhi will host the Commonwealth Games. AusTrade has a strategic marketing plan to promote Australian sporting services that covers venue development and maintenance; accommodation design as well as sports training services.

Global companies are targeting investment in India in hotels, shopping malls, healthcare, housing, IT parks and integrated townships. Leading UAE-based firms, such as Emaar Properties, Al Ghurair Group, ETA Star, KM Properties and Dubai Properties have announced major plans for investment in the country. In December 2005, Emaar announced India's largest foreign direct investment in real estate for projects with a capital outlay of US\$4.0 billion.

8.10 Retail Market Development

Retail spending in India is worth an estimated US\$258 billion; 97% of which is spent in small family-run shops with only about 500 square feet of retail space. With the economy growing at 8% per year, retail spending is set to grow to US\$415 billion within four years – offering what the management consultancy, AT Kearney, has called the *world's most attractive market for mass merchant and food retailers*.

India is very active in developing a hyper-market and supermarket sector. These are being developed locally and in partnership with international supermarket chains. The latest of these developments is Hyper City built on the outskirts of Mumbai. The store averages 25000 customers at weekends and 12000 on a weekday. The rate is said to outstrip Wal-Mart in the US.

From an Australian perspective, Dick Smith Electronics (a subsidiary of Woolworths Australia) has formed an alliance with TATA's retail arm to operate in India. The alliance is a valuable one for Dick Smith as the TATA group of companies is among the top five corporations in India.

The retail market potential is enormous. The result is that Indian retailers, such as Hyper City, are expanding rapidly, opening more stores and experimenting with new formats, in a race to establish themselves prior to multinational competitors being allowed a free hand.

Customer service and training programs are in demand and there exists an opportunity for Western Australian companies to provide a range of training programs especially in customer service training and supply chain and cold storage supply chain systems and logistical management. Last year, Shopper's Stop awarded a two-year customer service training program to Sydney TAFE.

A number of foreign companies have signed franchise agreements with Indian retailers. Planet Retail (a privately owned family company), is planning an aggressive rollout of Debenhams, Next and Marks & Spencer stores across India.

8.11 Conclusion

A vast array of new opportunities is emerging for international firms and agencies from India's rapid development, and will continue to emerge in future years. Western Australia needs to position itself to take full advantage of such opportunities. The development of appropriate new capabilities both in private sector firms and government agencies needs to be an integral part of the strategy for developing a knowledge hub in the State and for taking advantage of the many other opportunities.

In terms of specific policies, other than those to develop the knowledge hub, several options could be explored. The establishment of a Western Australian Future Fund (with public and private financing) appears to be an attractive vehicle for not only establishing a designated source of funds for innovative projects, but also for laying a foundation for the Government's and business community's long-term commitment to economic diversification through a knowledge hub in the State.

Exploratory missions to Indian states should be considered with two important objectives: firstly, to develop the right image of Western Australia in India, and secondly to explore opportunities for partnerships with business firms and government agencies. Putting in place certain symbolic gestures, such as the sister-state or sister-city relationships in India may be useful for on-going regular contacts and exchanges. Consideration could be given to the adoption of certain villages, towns, schools or hospitals for technical cooperation and personnel exchanges.

It appears to be crucial that reorientation of public sector departments should be managed over the next three to five years, so as to develop a 'whole of government' approach to make all senior personnel more proactive in exploring, learning about, and promoting professional contacts and business opportunities between Western Australia and India. Similar reorientation of academic institutions to target Indian students would be extremely rewarding, given how far Western Australian academic institutions have fallen behind in the game when it comes to tapping into Indian and Chinese education markets. The establishment of more courses on Indian history, culture, economy and society would also appear to be a natural response at this stage of the situation.

Bibliography

- Australian Education International (AEI) 2005, *Market Indicator Data*, Canberra.
- Chaube, K. (2005), 'Indian Army Rifle deal worth multi-billion South African Rand – Who made the money? South Africa and India probe', *ndiadaily.com*, available at: <http://www.indiadaily.com/editorial/3002.asp>, accessed 9 July 2006.
- CIA 2002, 'India Defence Industry: Domestic Production and Imports the Future Balance', available at: www.nti.org/e_research/official_docs/cia/111501CIA.pdf, accessed July 2006.
- Dahlman, C. and Utz, A. 2004, *India and the Knowledge Economy: Leveraging Strengths and Opportunities*, World Bank, Washington DC.
- Department of Foreign Affairs and Trade (DFAT) 2005, *Education Without Borders: International Trade in Education*, Department of Foreign Affairs and Trade, Canberra.
- Gas Authority of India Limited (GAIL) 2005, 'Indian Energy Industry', New Delhi, available at: <http://gail.nic.in/energyzone/energy.htm>, accessed October 2006.
- Government of India 2004, *National Common Minimum Programme of the Government of India*, New Delhi, May, available at: <http://pmindia.nic.in/cmp.pdf>, accessed October 2006.
- Government of India, Group of Ministers (GOM) 2000, *India Hydrocarbon Vision 2025: Report of the Sub-Group on Restructuring of Oil Industry, Including Disinvestment, Role of Government and Regulatory Structures*, New Delhi.
- India Brand Equity Foundation (IBEF) 2006, 'Manufacturing', 1 February, available at: <http://www.ibef.org/economy/manufacturing.aspx>, accessed September 2006.
- India Defence 2005, 'Japan eyeing ties with India to check China', 31 December, available at: <http://www.india-defence.com/reports/1108>, accessed 10 June 2006.
- International Energy Association (IEA) 2006, *World Energy Statistics and Balances*, online database, Paris, available at: <http://data.iea.org/ieastore/statslisting.asp>.
- International Finance Corporation (IFC) 2006, *Doing Business 2007: How to Reform*, Washington DC, available at: www.ifc.org/publications, accessed October 2006.
- Ministry of Law and Justice 2005, *National Rural Employment Guarantee Act 2005*, Government of India, New Delhi, available at: <http://rural.nic.in/>
- Ministry of Tourism 2005, 'Global Tender', No. 1(10)/05-OECF, New Delhi, 25 November, available at: www.incredibleindia.org/tender_251105.pdf, accessed October 2006.
- National Association of Software and Services Companies (NASSCOM) 2006a, *Strategic Review 2006*, New Delhi, available at: <http://www.nasscom.in/Nasscom/templates/NormalPage.aspx?id=2538>, accessed October 2006.
- National Association of Software and Services Companies (NASSCOM) 2006b, *Globalization of Engineering Services: The Next Frontier for India*, New Delhi, available at: <http://www.nasscom.in/Nasscom/templates/LandingPage.aspx?id=4946>.

Bibliography

- Organisation for Economic Cooperation and Development (OECD) 2006, *National Accounts and Economic Statistics: Services*, STD/NAES/TASS/SERV(2006)9, Paris.
- Planning Commission (PC) 2005, *Integrated Energy Policy: Report of the Expert Committee*, New Delhi, August, available at:
http://planningcommission.nic.in/reports/genrep/rep_intengy.pdf, accessed 20 October 2006.
- Planning Commission (PC) 2006, *Towards Faster and More Inclusive Growth: An Approach to the 11th Five Year Plan*, 14 June, Government of India, New Delhi.
- Schiff, J. 2006, 'Opening its doors: India's emergence on the global stage', in C. Purfield and J. Schiff (eds), *India Goes Global*, International Monetary Foundation, Washington DC.
- Sidhu, R. S. and A. S. Bhullar 2005, "Patterns and Determinants of Agricultural Growth in the Two Punjabs" *Economic and Political Weekly*, 31 December 2006, pp. 5520-27.
- Spacewar 2006, 'India Defence Minister to visit Japan, China to discuss military ties', 22 May, available at:
http://www.spacewar.com/reports/India_defence_minister_to_visit_Japan_China_to_discuss_military_ties.html, accessed 29 July 2006.
- The Age* 2006, 'Cashed-up Indian companies on a global takeover spree', 2 October.
- The Australian* 2006, 'India's PM vows to push reforms', 10 October, available at:
<http://www.theaustralian.news.com.au/story/0,20867,20552027-36375,00.html>, accessed October 2006.
- The Tribune* (2000), 'Bulgarian defence team arrives', 30 October,
<http://www.tribuneindia.com/2000/20001030/nation.htm> accessed 8 July 2006.
- UNDP 2005, *Human Development Report 2004*, United Nations Development Program, New York.
- UNDP 2006, *Human Development Report 2005*, United Nations Development Program, New York.
- Vicziany, M. and Smyth, R. 2006, 'India an emerging economic power: Energy and the role of the state and private sectors', forthcoming in M. Vicziany and R. Smyth (eds), *Business in Asia: The Re-emergence of the Asian Economies*, Monash Asia Institute, Melbourne.
- Western Australian Health 2000, *New Vision for Community Health Services for the Future*, Health Department of Western Australia, Perth, available at:
http://www.health.wa.gov.au/publications/new_vision.cfm, accessed September 2006.

A Case Study: Repcol Limited

What began as a small debt recovery operation located in Subiaco, Western Australia, in 1973 is today an international operation with offices in Perth, Brisbane and Bangalore employing in total a staff of 700.

Repol Ltd is one of Australia's largest debt collection agencies and a major force in the receivables management industry. The company is listed on the Australian Stock Exchange and has an annual turnover of \$39.3 million.

Mr John Wreford, Managing Director, Repcol Ltd, attributes a significant part of the company's success and growth to its ability to embrace Business Process Outsourcing (BPO) opportunities provided in Bangalore, India.

We have the flexibility to represent organisations from small business to government departments and multinational corporations. Our centres on the east and west coasts of Australia and in Bangalore, India give us global capabilities.

Repol's services include:

- debt purchasing;
- repossessions process serving;
- insurance investigations;
- litigation support;
- credit reporting; and
- credit consulting.

The company's decision to establish a BPO operations offshore was driven by high staff turnover in Australia that was increasingly becoming less skilled and qualified for the remuneration that was offered. This factor was impeding the company's sustainability and growth prospects.

With major clients to service such as GE, Repcol looked offshore to find a solution to the problem. With previous work experience with recruiting Indian programming staff and then basing them in Singapore, Mr Wreford explored opportunities to establish an outsourcing facility in India.

Consultation with allied international clients with BPO operations in India was sought in the decision making process. Several cities including, Bangalore, Hyderabad and Chennai were assessed against Repcol's criteria that included:

- access to an international airport;
- proximity to Perth;
- traditional market for foreign investment and business practices;
- favourable political environment; and
- benign climate suitable for expatriates.

In January 2003, Repcol established its BPO operations in Bangalore and set about the task of employing and training suitable staff. It was not an easy process and there followed several false starts in terms of how Repcol went about recruiting staff.

Finding suitable staff in India can be an issue. A factor that comes into play and one not readily appreciated in an Australian working environment, is the hierarchical and caste structure that still today dominates the general work environment. Major effort and energy has been expended by Repcol into transforming the office environment into one that recognises and rewards merit.

Of all the cities in India, Bangalore with its plethora of multinational companies as well as US educated and trained executives of leading Indian IT companies, is perhaps the most advanced city in adopting modern business practices and flatter management structures. However, even in Bangalore, training needs to be constantly addressed and monitored.

Some of the recruitment and employment issues that confronted Repcol's offshore establishment in India included:

- isolation – no other SME company like Repcol existed in India;
- Indian staff had no previous experience in dealing with Australians;
- staff had no notion of Australian suburbs or the kind of indebtedness that Australians incur;
- staff were not experienced or familiar in talking to Australians on the telephone; and
- the amount of training for staff had to be increased.

At the same time, demand for Repcol's services grew, especially from multinational companies that have been the mainstay in fostering the company's growth and development.

Repcol moved forward and put in place a business model that included a large training component to meet its customer demands.

A feature of Repcol's success in developing and growing its Indian operations was the appointment of an Indian National, Australian educated (Curtin University Graduate) to manage the company's operations in Bangalore.

When asked why Repcol elected to establish its BPO operation in India, Mr Wreford responded:

Indian business culture and corporate law are quite similar to ours. India is a relatively safe location for doing business depending on which Indian state you are in. We wanted to go to a location where there had been quite a long history of direct foreign investment. As a relatively small company we sought to shield ourselves behind large foreign companies that had sorted out many of the issues relating to direct foreign investment some time ago.

The State of Karnataka has had a long history of direct foreign investment and a population of 53 million. Bangalore, the capital city, had a population of about 6 million when we arrived and it now has a population of about 8 million. We believe that the Karnataka State Government understands the benefits flowing from direct foreign investment. Bangalore also seems to have a plentiful supply of youthful people with good skills applicable to our industry sector.

There was no particular reason for being in South India. Some people suggest that North Indian accents are better than South Indian accents; however that is a matter of contention. The flight time to Southern India from Australia is shorter, and this was a significant consideration in our decision to set up in Southern India.

In finding a suitable office space for Repcol in Bangalore, the company made a conscious decision not to locate its premises within the confines of one of the many technology parks in the city. One of the reasons for keeping out of a tech park environment was that there existed a better chance to develop a Repcol 'culture'. It was felt that within a tech park location where there are many companies, there is a high level of staff turnover due to inter staff contact that invariably leads to discussion about salaries and conditions among the various company employees.

Another reason for locating outside a park environment was the tendency for these parks to be located on the outskirts of the city complex, therefore making travel arduous especially in a city like Bangalore where infrastructure has not been able to keep abreast with population increase and demand from international companies locating in the city.

Wreford maintains that since establishing his company's BPO operations in India three years ago, it has only now become more socially acceptable to talk about outsourcing in Australian business circles:

Smaller businesses are now engaging with the offshore BPO market. The Indian BPO players are reaching out into the West in their own right. They were not doing that before. They largely thought that if they built it - the West would come. The model doesn't quite work like that. They have been becoming increasingly sophisticated and confident about taking their own offerings into the west and/or acquiring western businesses to provide furnace feed or demand for their services back into India without necessarily being competitively screwed down by the West.

So companies like ICICI One Source have bought different kinds of companies in the US and they are now beginning to back office those entities themselves. They have worked out that in order to maximise profit, in terms of the labour divide between east and west, rather than get screwed down by western companies seeking to maximise profit - they actually buy the front end and then hollow out the business which allows them to keep the enhanced profit within their own organisations.

So that the Indian capitalist and other sources of domestic capital in India can derive that benefit, they are getting much cleverer at what they are doing. This means that most western companies that don't embrace the process themselves, will eventually face the threat of Indian service suppliers (in almost every service sector coming out of India) taking them on in their own domestic markets. Whereas the western companies' ability to compete in the Indian market is extremely limited unless they can meet Indian price points, or have some other unique selling proposition or advantage.

Repcol does not intend to confine its business model to India. However, it views India as the heart of its business in terms of skills to operate in other jurisdictions. Opportunities in the Philippines, Japan, Ghana and South America are currently being explored.

Wreford considers that it is more difficult today for companies to enter India's BPO sector because the market has moved on. He maintains that Australia has been slow in catching up with other developed countries who entered the market earlier. Less than 10 percent of Australian companies utilise BPO facilities. He attributes this to the very conservative nature of Australia's business community.

The consequence for Australian Business is that it will not be globally competitive unless it blends competitive domestic with competitive international. Other people are integrating services into manufactured goods and tradable services. The Australian labour model is very expensive in terms of global markets. This means that they will ultimately become uncompetitive all other things being equal.

There needs to be a fundamental commitment to not being just a domestic Australian business. This commitment has to flow from the top. I think for a lot of Australian businesses that is just too hard.

There are a lot of prejudices in the community that people are loath to confront. Some Australian businesses, particularly at the retail level, would be loath to have that kind of public disapproval that was targeted us. But given that we are debt collectors anyway no one likes us what ever we do. It is often said that in the process of change vested interests first seek to ridicule, then destroy and then eventually accept.

He maintains that the best BPO models are those where the consumer of the services is largely indifferent to where the outcomes or solutions come from and how that service is delivered is opaque to them.

He offers the following advice to Western Australian companies considering establishing a BPO operations in India:

- understand fully the Indian approach to work and the social context in which they operate as this can impact on your company's productivity;
- be as mobile as possible – developing and owning infrastructure can be very expensive;
- avoid the mega-cities such as Mumbai, Delhi, Kolkata;
- spend time to find the “right” local people to work for you;
- be careful with whom you do business; and
- be alert for ‘scams’.

When asked what he would do differently in establishing a BPO operations in India, Wreford said that from the outset he would spend more time on training. He has noted that Indian qualifications are not as “applied” as one would expect in Australia so more attention is required to provide practical training during the induction process.

And what of the future?

John Wreford believes that unless Australians embrace the changes that are occurring in the world, then we will struggle to be competitive. He also notes:

No one seems to make the connection that an aging demographic in Australia may need BPO. With an aging demographic there isn't going to be enough people to provide services to us all. Our tax base will be too narrow to fund the existing service levels that we have come to expect and demand. Offshore BPO service provision may be one of the solutions to this problem.

(Quotations from Fay Davidson, School of Information Systems, Curtin University interview with John Wreford, 14 November 2005).

B Steering Committee and Consultation Team

The membership of the Technology & Industry Advisory Council (TIAC) Steering Committee for this project is listed below:

Mr Rob Meecham	Director Business Development, Challenger TAFE <i>Joint Chair of Steering Committee (TIAC Member)</i>
Mr David Singleton	CEO and Managing Director, Clough Limited <i>Joint Chair of Steering Committee (TIAC Member)</i>
Ms Sharon Brown	Strategic Business Manager, AlphaWest Services Pty Ltd <i>(TIAC Member)</i>
Ms Wendy Newman	Principal Consultant, Quintessence Consulting <i>(TIAC Member)</i>
Professor Lance Twomey	<i>formerly</i> Vice Chancellor, Curtin University of Technology <i>(TIAC Member)</i>
Ms Karen Hall	General Manager, Trade and Services, State Development Strategies, Department of Industry and Resources (DoIR)
Ms Sally Mansfield	State Director, Department of Foreign Affairs and Trade

The Steering Committee was assisted in its task by the Centre for Strategic Economic Studies (CSES), University of Victoria:

Professor Peter Sheehan	Director
Professor Bhajan Grewal	Professional Fellow
Mr Prabodh Malhotra	Research Scholar
Mrs Margarita Kumnick	Research Information Coordinator

Also assisting the Centre for Strategic Economic Studies were:

Professor Shovan Ray	Professional Fellow, Indira Gandhi Institute of Development Research, Mumbai
Professor Marika Vicziany	Director, Monash Asia Institute, Melbourne
Ms Sonia Grincer	Regional Director, Western Australian Trade Office, India, 2001-2006

TIAC Executive Staff:

Mr Earl White	Executive Officer
Ms Deanna Fleming	Senior Policy Adviser
Ms Shelley Rush	Executive Assistant

C Western Australian Technology & Industry Advisory Council

Background

The Western Australian Technology & 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 1978-83, and the Science, Industry and Technology Council (SITCO) 1983-87.

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.

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.

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.

Functions of the 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.

- (b) Carry out, collaborate in or produce research, studies or investigations on any matter relating to the objects of this Act, including matters relating to the:
 - (i) role of industry, science and technology in the policies of Government;
 - (ii) social and economic impact of industrial and technological change;
 - (iii) employment and training needs and opportunities relating to industrial, scientific and technological activities in the State;
 - (iv) adequacy of, priorities among and coordination of, scientific, industrial and technological activities in the State;
 - (v) methods of stimulating desirable industrial and technological advances in the State;
 - (vi) application of industrial, scientific and technological advances to the services of the Government; and
 - (vii) promotion of public awareness and understanding of development in industry, science and technology.

The Ministerial advice takes the form of reports and discussion papers which undergo a public consultation phase before submission to the Minister.

Participation on State Advisory and Funding Committees and Councils

Council has accepted invitations for representation and participated in:

- (a) The Federal Government's Commonwealth, State and Territory Advisory Council on Innovation;
- (b) The Federal Government's Innovation Festival Committee;
- (c) The Ministerial Education Export Advisory Committee;
- (d) The Centres of Excellence State Funding Advisory Committee of the Office of Science and Innovation.

Promotion and Public Awareness Raising Activities

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

- (a) The 2020 Breakfast Seminars, commenced in 1990, are short, economic development focussed, information dissemination events.
- (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) Talent Search Organisation.

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.

Present Membership

Mr John Thompson
TIAC Chairman

Ms Sharon Brown
Strategic Business Manager
AlphaWest Services Pty Ltd

Dr Jim Limerick
Director General
Department of Industry and Resources

Mr Rob Meecham
Director of the Business Development Unit
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Quintessence Consultancy

Mr Graeme Rowley AM
Executive Director Operations
Fortescue Metals Group Limited

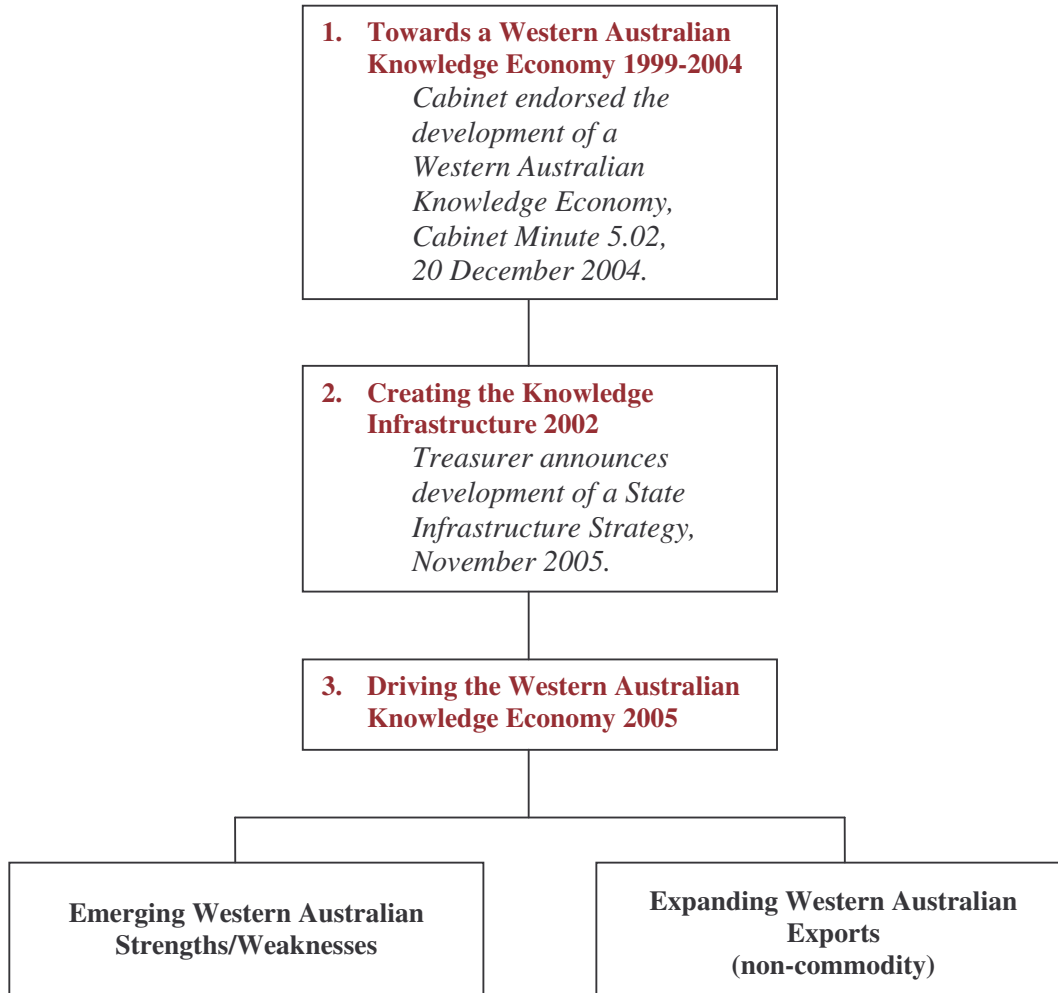
Mr David Singleton
CEO and Managing Director
Clough Limited

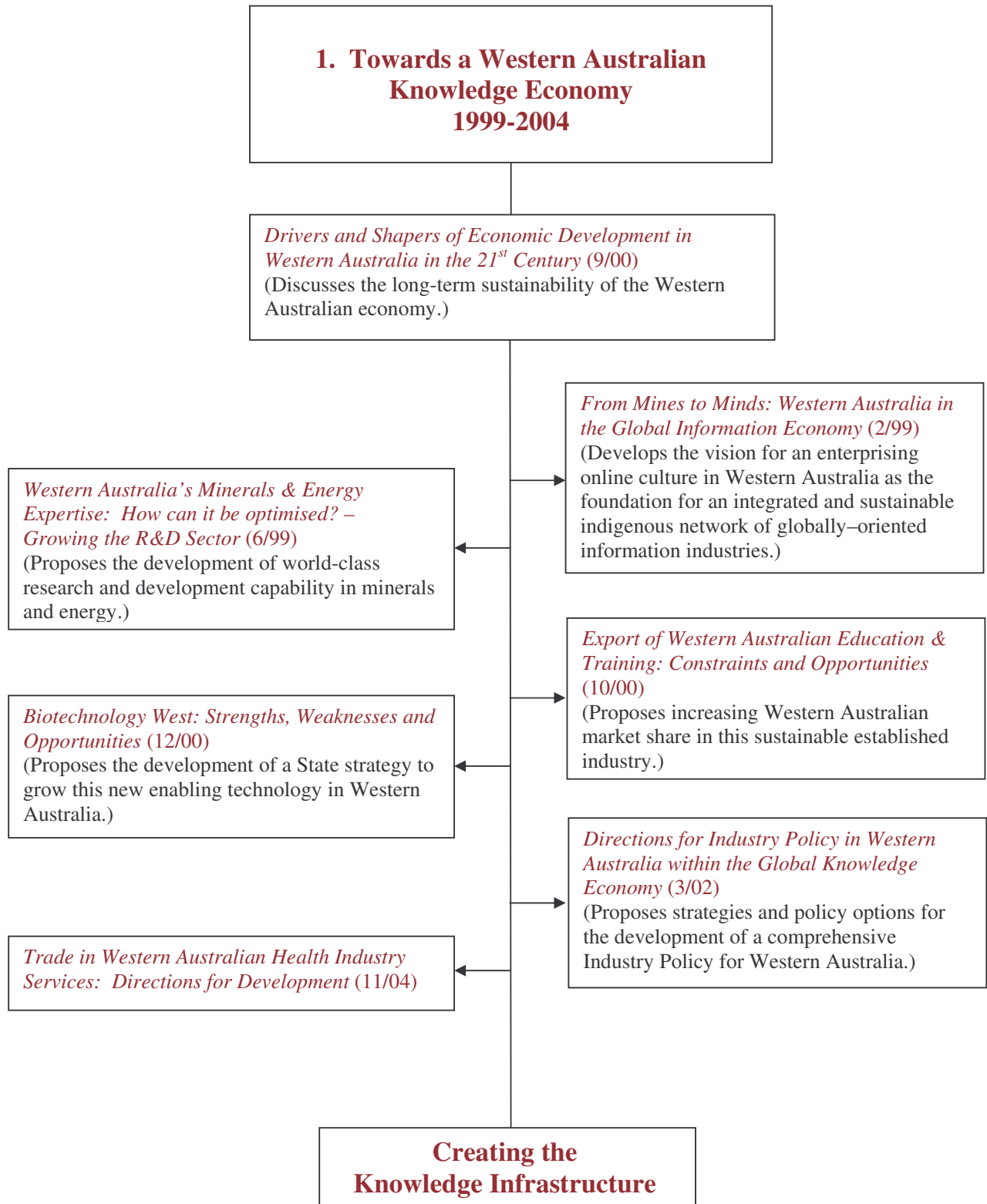
Ms Vivienne Snowden
Executive Consultant
Snowden

Professor Lance Twomey
formerly Vice Chancellor
Curtin University of Technology

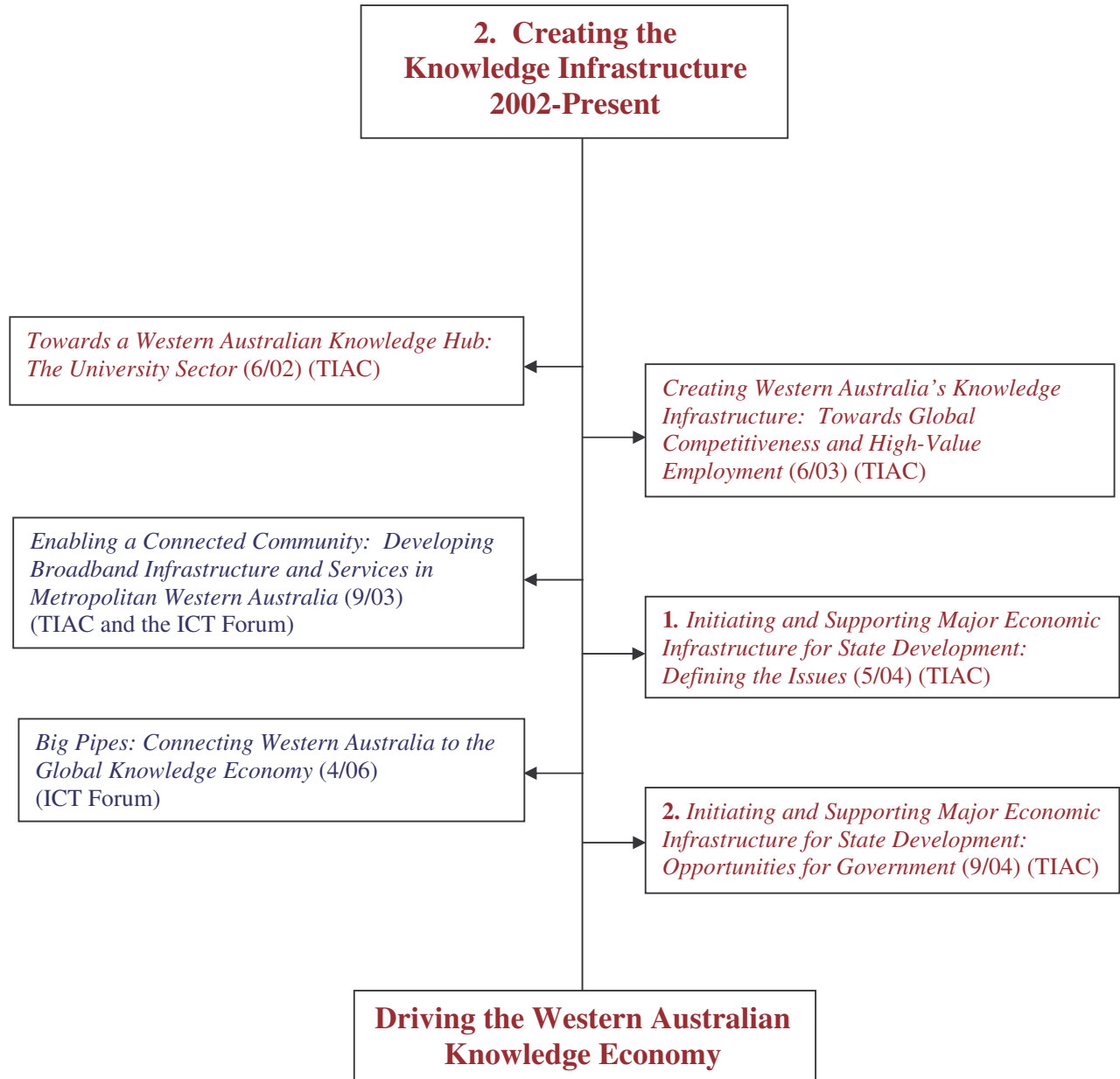
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A diagrammatic summary of TIAC's series of reports under the theme, Towards a Western Australian Knowledge Economy, and details of subsequent themes, Creating the Knowledge Infrastructure 2002, and Driving the Knowledge Economy 2005, are provided on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

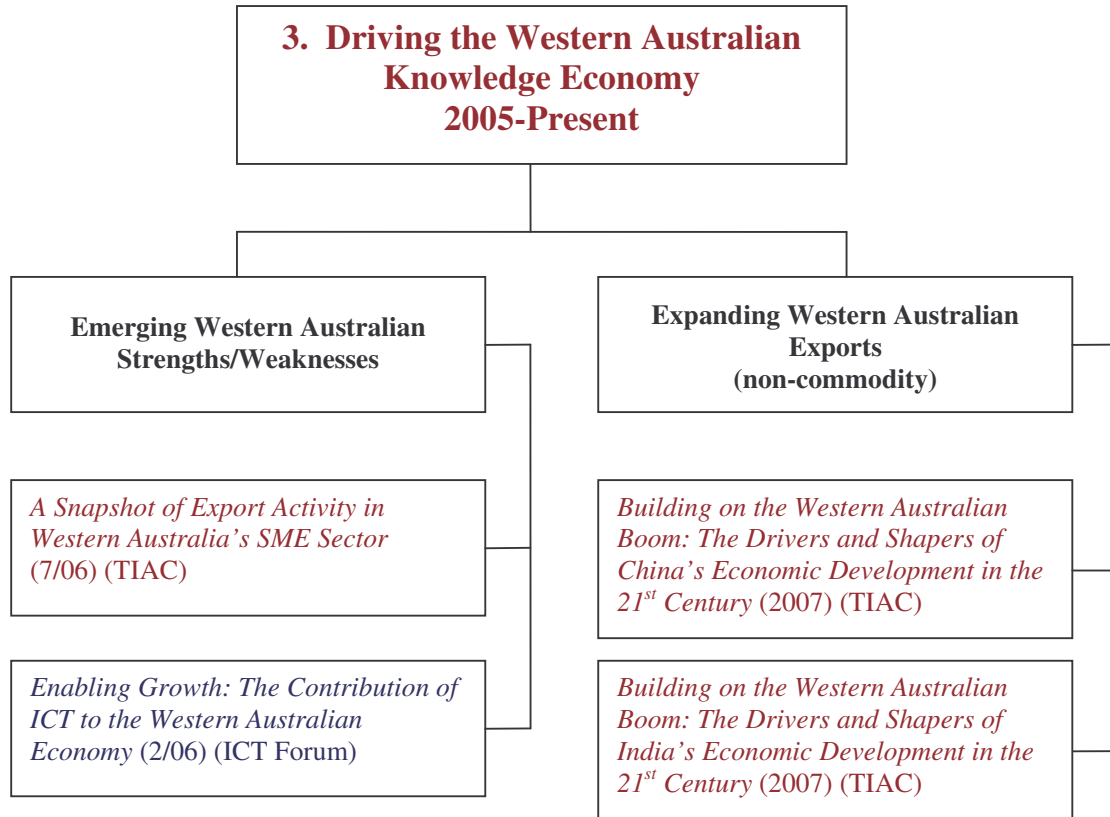




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New Challenges & Opportunities	July 1988
Technology Parks	July 1988
Intelligent Buildings: What role for the WA Government?	Sept 1988
US State Government Policies Designed to Encourage the Commercialisation of New Ideas: Some Recommendations for WA	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
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The Case for a New Branch of Manufacturing to Provide <u>Smart</u> Equipment for the Mining Industry	Mar 1990
The Export Debate	May 1990
Tomorrow's People in Science & Technology	Mar 1991
Bentley Technology Precinct: An Exploratory Study	Sept 1992
The Western Australian Technology School of the Future: A Feasibility Study	Oct 1992
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Telecommuting 2000: Making the Future Work for Western Australia	Dec 1992
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Research & Development: Role of the State Government in attracting External Funding	May 1998

Publications of TIAC 1988-2007 (Cont'd)

Publication Title	Date
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? – <i>Growing the R&D Sector</i>	Jun 1999
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Drivers and Shapers of Economic Development in Western Australia in the 21 st Century	Sept 2000
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