



# Productivity of Australian cities

## Chapter 4

### Introduction

Cities are not merely concentrations of people but centres of economic activity. As such, economically, cities matter, as places of business, commerce and trade. They are centres of opportunity attracting people, business and investment from around the world. They are a nation's gateway to the world and the global economy. Cities have to operate efficiently to ensure that the market can operate to maximum capability.

Australia's major cities contribute nearly 80 per cent of the national Gross Domestic Product and employ nearly 75 per cent of its workforce (ABS 2006; Raskall 2010). They are the principal location for approximately 70 per cent of Australia's businesses, including nearly two-thirds of its small and medium-sized businesses, and nearly 80 per cent of large corporations (Parliament of Australia Library 2005).

However, aside from their relative economic size, major cities, more significantly, are the drivers of their national economies. The OECD Report on *Competitive Cities in the Global Economy* found that most metro-regions in the OECD have a higher per capita GDP, higher productivity and faster growth rates than their national average (OECD 2006). It has been estimated that major cities were responsible for some 84 per cent of Australia's economic growth in the 2003–2008 period (Raskall 2010), and 81 per cent of the employment growth in the 2001–2006 period (BITRE 2009). Even in a period of a resources boom in Australia, the major cities' share of the national economy increased.

The reason for this is that cities as economic entities add competitive value to the businesses located within them. Cities can provide benefits to business through connectivity, large-scale provision of factors such as skilled and specialised labour, and the capacity to attract such labour. There is an important two-way relationship between cities and the businesses located within them. Business competes nationally and internationally, but to be able to do so effectively requires assistance from cities in the form of skilled labour, connectivity, educational, cultural and social facilities, as well as efficient linkages of centres of activity through transport, freight systems and communications. To realise this potential, businesses in Australian cities need to be globally competitive—not merely in cost terms but also in terms of access to the benefits of innovation and skilled labour markets that cities can provide.

Through agglomeration economies—that is, the benefits that result from the clustering of activities—and flow-on effects on innovation and specialisation, cities achieve a productivity premium which is considerable. This may be enhanced through strategic management of skills development and investment in amenity in cities through integration of land-use, transport and infrastructure provision.

This chapter examines some indicators of factors affecting the productivity contribution of Australia’s major cities. While there are significant gaps in the provision of city output and productivity data, it provides an indication of how successfully Australian cities are contributing towards national and local productivity.

The productivity of our cities is affected by many factors, including efficiency of infrastructure, connectivity between businesses, people and their skills, ideas, goods and services, liveability and the well being of our community. This section focuses on two main principles that affect the productivity of cities:

- efficient use of infrastructure and resources
- building on the comparative advantages of cities.

## Summary indicators

Dimension	Indicators
Economic output/growth	Estimated city gross value added output City contribution to national economic output Estimated city economic growth City economic growth premium compared to national average
Productivity/innovation	Patent activity International regional productivity comparisons
Congestion/transport	Costs of congestion Port interface costs Growth in motorised travel
Service/Knowledge industries	Service sector growth Service sector exports Employment by occupation
Connectivity/Internet	Rate of Internet connection Regional connections
Concentration/Specialisation of economic activity	Employment by industry Location quotients by city

## Key findings

- Australia’s major cities contribute nearly 80 per cent of the national Gross Domestic Product and employ nearly 75 per cent of its workforce. They are the principal location for approximately 70 per cent of Australia’s businesses, including nearly two-thirds of its small and medium-sized businesses and nearly 80 per cent of large corporations.
- Major cities were responsible for some 84 per cent of Australia’s economic growth in the 2003–2008 period, and 81 per cent of the employment growth in the 2001–2006 period. Even in a period of a resources boom in Australia, the major cities’ share of the national economy increased.

- Bureau of Transport and Regional Economics (BTRE) estimated that the avoidable cost of road congestion for the Australian capitals was approximately \$9.4 billion for 2005. This is projected to rise to \$20.4 billion by 2020 according to base case projections.
- The freight task in Australia's eight capital cities is expected to grow by 70 per cent between the years 2003 and 2020.
- Australia's major cities continue to contribute positively to national productivity compared to the rest of Australia.
- Australian cities drive the services sector: In Australia, the services sector accounts for more than 75 per cent of economic activity, 85 per cent of employment and 20 per cent of exports. The service sector is the fastest-growing source of high-value jobs in the developed world, including Australia. Services contribute to an increasing share of GDP. The vast bulk of that activity occurs in our cities.

## Economic performance of Australian cities

### *Economic activity*

The economic dominance of the major cities is highlighted by the data presented on the relative share of economic activity. While national account equivalent data are unavailable at a city level, estimates based on relative labour productivity by industry and the industry–employment mix in particular cities suggest that 80 per cent of Australia's economic activity occurs in major cities and that they employ 72.8 per cent of total national employment (ABS 2006). These two figures are consistent with the productivity premium of city-based employment.

Over half (53 per cent) of Australia's economic activity occurs in Sydney, Melbourne and Brisbane, and a further 15 per cent in Perth and Adelaide. Other medium-sized major cities (with between 250,000 and 1 million population) contribute 7 per cent, slightly larger than the economic activity generated in the smaller major cities with a population between 100,000 and 250,000 (Figure 4.1).

Figure 4.1 Major city contribution to economic output



Source: Estimates derived from ABS (2009) and ABS (2006).

While the major cities constitute a substantial proportion of the economic size of the Australian economy, they have constituted an even larger share of economic growth in the economy, as measured by Gross Value-Added.

Calculations based on a methodology analogous to the economic output measure show that in the five years from 2001 to 2006, the major cities contributed a total of 84 per cent to the growth of the national economy, with the capital cities contributing 75 per cent alone (Raskall 2010). This was accompanied by an 81 per cent share of the employment growth over this period. The difference again reflects the economic growth premium stemming from productivity gains within the major cities.

However, it must be stressed that these are estimates of Gross City Product and not measures calculated within the compilation of the National Accounts by the Australian Bureau of Statistics.

### *Decline in economic growth relative contribution*

There are indications that the major cities may be losing their edge in contributing to economic growth. Using a similar productivity-adjusted industry-employment mix to re-scale national growth in Value-Added by Industry for each city, estimates can be made of the likely difference in economic growth between the major cities and the national economic average.

Table 4.1 shows that over that 33-year period from 1976 to 2009 the major cities recorded economic growth that was, on average, 0.201 per cent greater than the national average. This was largely concentrated in the larger capital cities, which recorded a 'premium' of 0.212 per cent. Though not quite as large as the capital city contribution, regional cities have still recorded an above-national long-term growth of 0.114 per cent.

However, over the past decade, the contribution of the major cities has resulted in an average economic growth only 0.037 per cent more than the national average. For the capital cities this had fallen to 0.049 per cent; for the regional cities, it declined such that they averaged 0.054 per cent less than the national average.

**Table 4.1** Average city economic growth premium (per cent)

	1976–2009	2000–2009
Major cities	0.201	0.037
Capital cities	0.212	0.049
Regional cities	0.114	-0.054

Source: Estimates derived from ABS (2009) and ABS (2006)

This result may have occurred because of events in the past decade that have affected the industry specialisation of cities, such as the global downturn in the ICT industry in 2000–01 and the early impact of the recent global financial crisis. Other contributing factors may have included increased inefficiencies and productivity losses arising from an infrastructure backlog, transport congestion, and increased costs associated with the movement of freight, and the provision of services such as water, power and sewerage associated with the growth of cities. The resources boom may have seen increased relative non-city productivity.

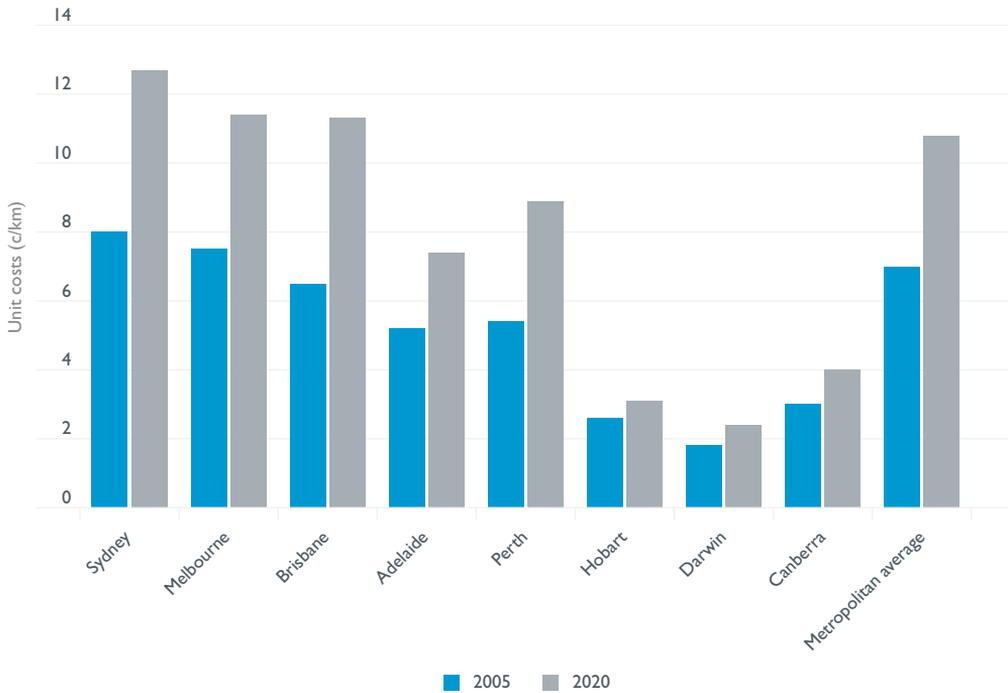
## Challenges to productivity

The productivity of our cities is affected by many factors, including: efficiency of infrastructure; connectivity between businesses, people, ideas, goods and services; and ‘liveability’ (discussed in Chapter 6).

### *Road congestion*

Road congestion is one important area where efficiency of infrastructure affects productivity in Australia’s cities. It is clear that the number of passenger and freight trips is increasing faster than transport network capacity. The Bureau of Transport and Regional Economics (BTRE) estimated that the avoidable cost of congestion for the Australian capitals was approximately \$9.4 billion for 2005. This is projected to rise to \$20.4 billion by 2020 according to base case projections (BTRE 2007). As demonstrated in Figure 4.2, this aggregate cost of avoidable congestion has been translated into an average cost per kilometre travelled. Urban road congestion also has a social cost through, for example, reducing the amount of time available for families to spend together. It has a great impact on city residents’ quality of life.

Figure 4.2 Average unit costs of congestion for Australian capital cities



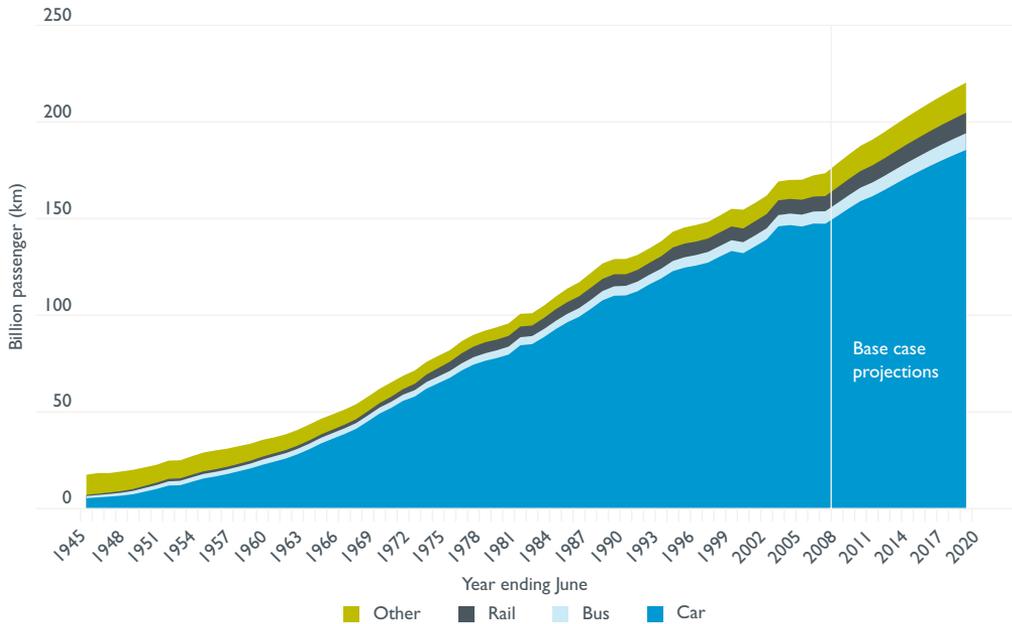
Source: BTRE 2007

Australia’s urban transport system is largely based on motorised vehicles, which represent roughly 90 per cent of passenger transport (BITRE 2008) and about 80 per cent of total transport in Australian cities (ABS 2008a).

The increase in the use of different modes of motorised travel in Australia’s capital cities since 1945 is illustrated in Figure 4.3.

Urban car use has grown almost thirty-fold since 1950 when it began to replace rail as the main mode of passenger transportation. The levels of car dependency in Australian cities have increased at a rate faster than population growth, creating traffic congestion problems, particularly in the larger capitals of Sydney and Melbourne and in Brisbane and Perth where infrastructure and public transport provision have not kept pace with growth rates. In addition, the heavy reliance on private vehicles makes Australia’s urban transport system structurally vulnerable to increasing oil prices (Dodson & Sipe 2008).

Figure 4.3 Motorised travel in Australia’s capital cities



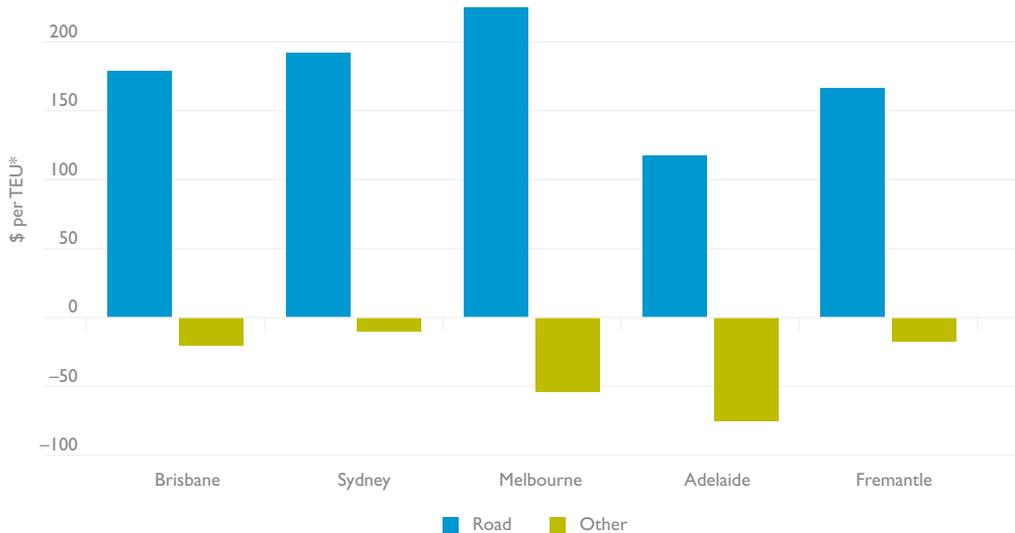
Source: BITRE 2008

### Freight

The freight task in Australia’s eight capital cities is expected to grow by 70 per cent between the years 2003 and 2020 (BTRE 2007). Increasing congestion on urban roads means that as freight continues to compete with other traffic, productivity declines. This is particularly important for the productivity of businesses.

Increases in international freight costs can be attributed to increasing costs in landside freight. Portside costs including stevedoring, customs and port charges have decreased in real terms since 1996 (BITRE 1996–2009). At the same time, the cost of transporting freight to Australia’s major ports has increased mainly due to congestion. Figure 4.4 demonstrates this change since 1996.

**Figure 4.4 BITRE port interface costs: change in \$ per TEU\*, imports, 1996–2008**



\* Twenty-foot Equivalent Unit, the standard unit for measuring shipping container volume

Source: Bureau of Infrastructure Transport and Regional Economics (BITRE) 1996–2009 Waterline. Issues 8–45

## International productivity comparisons

After a decade of strong growth in international terms, since the late 1990s Australia’s relative productivity growth performance has deteriorated.

Productivity measures the efficiency with which labour and capital are combined to produce goods and services, and thus implicitly captures the effects of technological advances, organisational changes, new processes and the movement of factors of production. It reflects the diffusion and transmission of new information and communication technologies, as well as new products.

While much attention, operationally, is assigned to labour productivity—the output per hour worked—because of its connection to standards of living, of particular relevance here is the more technical concept of ‘multi-factor’ productivity, which reflects the interaction of labour and capital. It is this latter component that has shown a decline in the past decade to less than half the long-term average rate of growth, and substantially below many of Australia’s competitive trading partners.

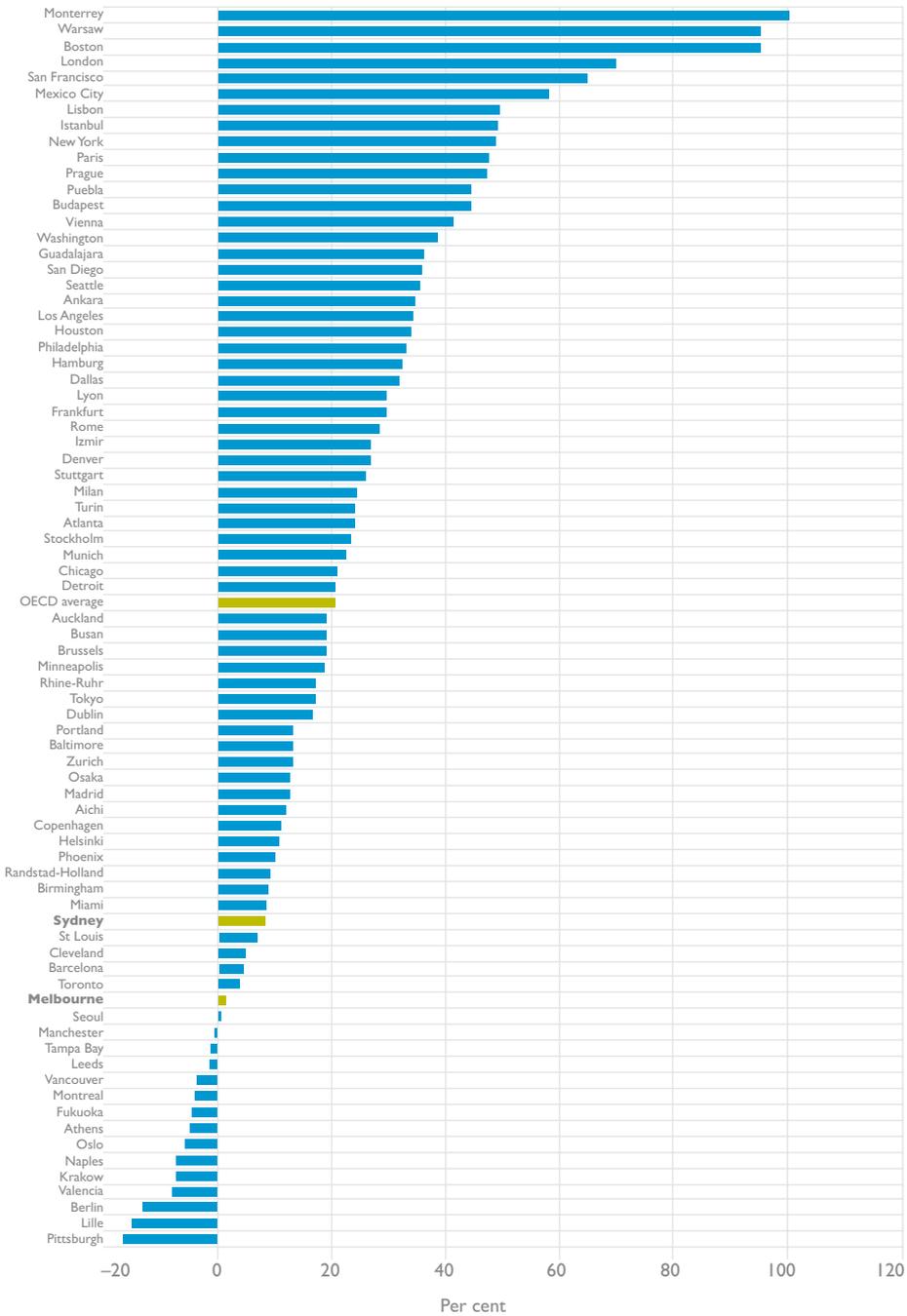
Attention is generally directed towards industry-sector productivity and business dynamics. Regionally-based industries such as mining, agriculture, electricity, gas and water industries are argued to have played a strong role in recent slowing of Australia’s productivity growth rate (Productivity Commission 2009). However, if cities impart productivity benefits to businesses in the market through externalities (that is, impacts on a business of economic activity they are not directly involved in) and agglomeration economies, then equally when those cities do not function as efficiently, they have the potential to also reduce or even detract from overall national productivity performance. Unfortunately, datasets measuring productivity and ‘multi-

factor' productivity are not available at an Australian city level, where cities are treated as a discrete economic entity in order to measure this.

In 2006, the OECD undertook a study on competitive cities in the global economy, and estimated the output and productivity of the largest 78 metro-regions in the OECD (OECD 2006). This included Sydney and Melbourne. The study revealed that most cities have higher economic growth, foreign investment and productivity than the rest of the country they are located within.

Figure 4.5 shows the ranking of these metro-regions by productivity premium over the rest of the nation.

Figure 4.5 Productivity differences, metro-regions, 2002



Source: OECD 2006.

Both Sydney and Melbourne, while positive in national productivity contribution, ranked below the OECD average. Out of the 78 cities examined, they ranked 58th and 63rd respectively. These results should be interpreted with caution as the estimates for Sydney and Melbourne

use State productivity estimates rather than city-specific productivity estimates, which are then compared to city-specific productivity estimates for cities in other countries.

## Innovation

In 2007–08, 39.1 per cent of Australian businesses reported implementing an innovation. This represented a 7 per cent increase from the year 2006–07. Of the types of innovation implemented, 21.9 per cent of businesses reported introducing new goods and services, 17.6 per cent implemented new operational processes, 19.0 per cent implemented new organisational/managerial processes, and 14.6 per cent implemented new marketing methods (DIISR 2009).

Innovation through the generation of ideas and transmission of new technologies can underpin productivity gains. Because these can occur through connectivity and collaboration, innovation can have a specific location impact.

In the absence of comparable statistics, one indicator of capacity to create knowledge and innovation is patent activity. The OECD provides a snapshot of the latest internationally comparable data on patents. Among OECD countries, inventive activities are the most highly concentrated in certain regions in Australia, which is second only to Canada on a geographic concentration index (OECD 2008). For the purposes of the OECD database, regions are defined at an Australian state level, although the primacy of the capital city in most states makes those cities the most likely source of origin. Most of the regions selected overseas are based on urban conurbations.

For 2008, New South Wales ranked 39th and Victoria 59th among patenting regions worldwide (OECD 2008). While these regions ranked lowly in terms of patents related to information technology, both ranked in the top 40 for biotechnology. Of particular note is New South Wales' third ranking in patents relating to renewable energy technology for the period 2003–2005, behind Denmark and Tokyo.

Evidence provided by the Australian Local Government Association–National Economics *State of the Regions 2007–08* report suggests that over the past decade, 75 per cent of all Australian patents were sourced in capital cities. In particular, 85 per cent of high-tech and information technology patents came from the capital cities. Over 80 per cent of innovative start-ups were located in these cities (National Economics 2008).

## The increasing knowledge sector economies of Australian cities

A city's competitive advantage also relates to its capacity to concentrate research and development activities and generate innovation (OECD 2006). Cities that build and retain their human capital will be the strongest, most resilient and competitive.

Australian cities drive the growth in the services sector. The services sector is the broad description for a group of industries, that include for example electricity, gas, water and waste services, construction, wholesale and retail trade, accommodation and food services, transport, information media and telecommunications, finance and insurance, real estate, professionals,

scientific and technical, public administration, education and health care, arts and recreation services, and other services.

In Australia, the services sector accounts for more than 75 per cent of economic activity, 85 per cent of employment and 20 per cent of exports (Business Council of Australia 2007). The service sector is the fastest-growing source of high-value jobs in the developed world, including Australia. Services contribute to an increasing share of GDP (ABS 2008b). The vast bulk of that activity occurs in our cities.

Knowledge-based industry is fuelling the growth of Australia's major cities. Figure 4.6 demonstrates a shift towards knowledge-based employment sectors in Australian cities. Since 1996, there has been an increase in the proportion of professionals throughout Australia. This is most concentrated in the capital cities. Managers have also increased their proportionate share in cities, while the proportionate share of managers in the rest of Australia has declined (largely due to a decline in the number of farm managers). This has occurred as the proportions of machinery operators and drivers, sales workers and clerical and administrative workers have declined in Australian cities.

**Figure 4.6** Change in proportionate share of occupational sectors, 1996–2006



Source: ABS 2006.

### *Case study: Australian companies lead the world in property, design and construction*

Australian individuals and companies are increasingly locating throughout the Asia-Pacific region, Europe and the United States, and are leading and innovating in property development, urban design, building construction, property investment and finance.

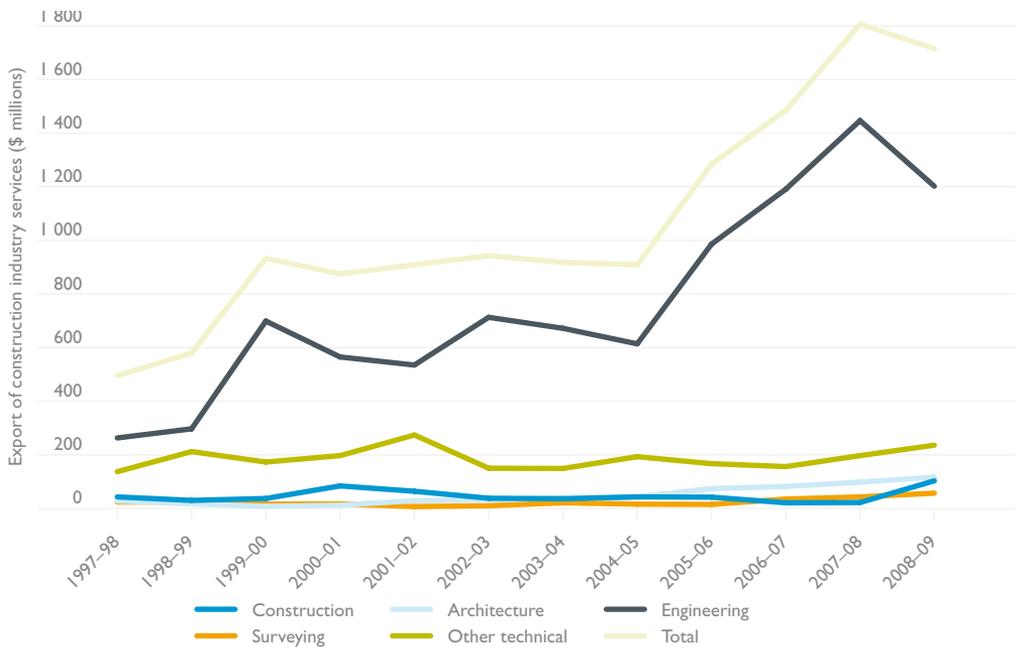
For example, Australia has one of the most sophisticated property markets in the world and, with 70 per cent of core property securitised through listed and wholesale trusts (Australian

Stock Exchange 2009) it has the most securitised property market. Australia has the second largest Real Estate Investment Trust (REIT) market in the world after the United States. Australian A-REITs, formerly known as listed property trusts, comprised 13.7 per cent of the global real estate market in June 2006 compared to Japan (6 per cent), the rest of Asia (3 per cent) and France (3.3 per cent) (de Francesco 2006).

Likewise Australian property, construction, engineering and design companies such as Westfield, Macquarie, Lend Lease, Multiplex and Snowy Mountains Engineering Corporation (SMEC) have expanded across the global stage.

Figure 4.7 shows the growth in exports of Australian construction industry services from 1997–98 to 2007–08 (DFAT 2009). Construction industry services are Australia’s fourth largest services export industry after education, tourism and financial / insurance (DFAT 2008).

**Figure 4.7 Exports of Australian construction industry services, 1997–2008**



Source: ABS 2010.

## *State of the Regions report*

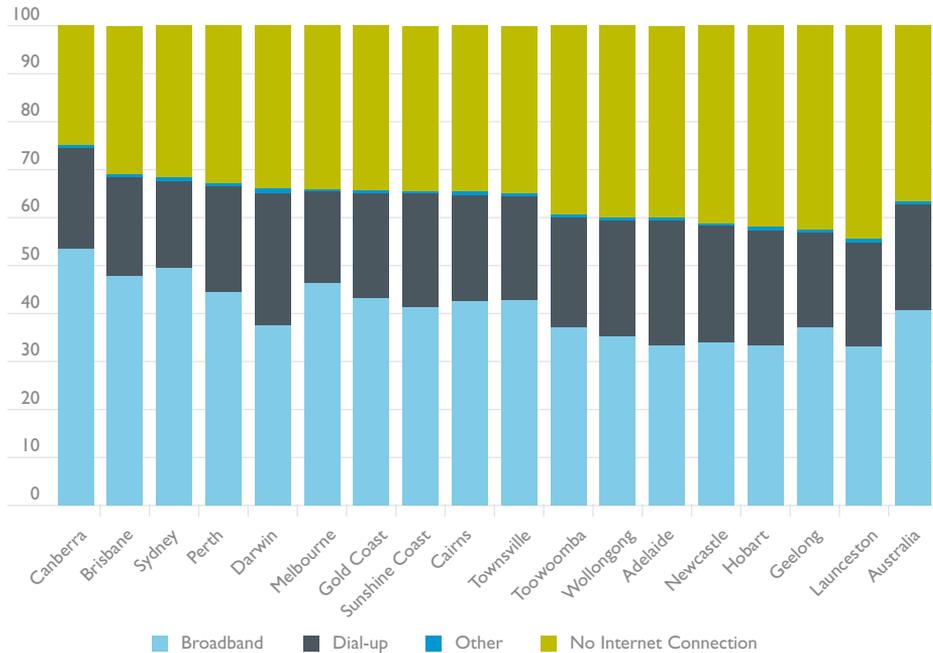
The 2007–08 State of the Regions report (National Economics 2008) utilises cross-sectional data across defined regions compiled over a decade to demonstrate these propositions:

- High-income economies, apart from those with a unique and extensive natural resource base, now depend on sustained innovation as the core driver of long-term economic growth.
- The capacity to innovate depends on knowledge and networks at a regional level.
- There is a good correlation between the economic success of a region measured by non-mining gross regional product per person employed and patent activity, and similarly between high-tech business start-ups and patents per capita.
- Regions with high productivity have high household incomes and low unemployment rates.
- Low-productivity regions are rapidly ageing in population, while high-productivity regions are ageing relatively slowly.
- Successful knowledge-based regions have a high concentration of highly skilled knowledge workers, who tend to migrate to regions with scale and diversity of social and community infrastructure and cultural and lifestyle choices.
- Regional centres that have contributed strongly to the improved economic performance of a rural regional group have had high employment growth relative to population growth.

## Communications connectivity

While connectivity is one of the principal drivers of city productivity, it does not relate solely to transport and movement systems. Households in Australia's major cities have better access to the Internet than the rest of Australia. Figure 4.8 demonstrates that levels of Internet subscription differ among the major cities. Canberra clearly has the highest percentage of households with Internet connections overall.

Figure 4.8 Household Internet connections



Source: ABS 2006.

Aside from personal connections, the Internet enables businesses to market directly to the national and global economy and to cluster, in a virtual sense, around whichever Australian or global research-based institution serves their sector best. Thus firms in the knowledge economy can obtain significant productivity benefits through their capability to use the communications network as their virtual economic cluster.

For other businesses, communications technology can rapidly improve process and management efficiency through computer-based software innovation applications. In certain circumstances this has enabled organisations to separate the component functional divisions of their organisation into different locations with communication linkages. This has freed the organisations to take advantage of the optimum location for each of these divisions, rather than a compromised location for the entire organisation.

However, paradoxically, for some parts of organisations, particularly those with a strategic function, globalisation has brought an increased need for 'face-to-face' contact, to be aware of, and engaged in, spatially based and location-specific knowledge networks.

## Regional connections

Just as the major cities connect Australia to the global economy, the prosperity of smaller regional areas of each state and the major cities are also connected.

While these rural and small urban areas supply food, energy and other essential items to the cities, the major cities also act as the regions' biggest customers, market the regions to the

rest of Australia and the world, provide important specialised labour, research and advisory services, provide important distribution infrastructure facilities—seaports, airports, and land-based transport interchanges—and, through gains in trade, help advance the regional standard of living. In reality, it is not ‘the city or the bush’, but ‘the city and the bush’.

As an illustration, in 2003, the Committee for Sydney commissioned research (Committee for Sydney 2003) to examine the extent of this mutual interdependence. Using its position as Australia’s major airport hub (with approximately half of international passengers and a quarter of domestic passengers starting or ending their journey at Sydney airport), Sydney (like the other major cities) acts as a gateway to regional NSW. From Sydney, visitors travel to all points of the compass in regional NSW, making 12 million trips annually (including 3 million international visitors). The study estimated that tourists from Sydney injected \$5.4 billion into the regional NSW economies, directly creating 111,000 jobs and 63,000 flow-on jobs (Committee for Sydney 2003).

Similarly, the study found that Sydney is regional NSW’s biggest customer, buying over \$2.4 billion of agricultural produce. This has been estimated to involve 28,000 jobs in supplying the Sydney market and 17,600 flow-on jobs in regional NSW.

All up, through just these two industry sectors, Sydney underpinned approximately 220,000 jobs in regional NSW, which was equivalent to approximately 20 per cent of the regional workforce in NSW.

In the supply-chain of competitiveness, regional NSW depends on Sydney for a globally competitive business cost structures and efficient transport infrastructure to compete globally, through Sydney ports, air and sea. In 2003, this directly benefited around \$13 billion of exports, of which over \$7 billion was non-agricultural. These exports would have contributed another 35,000 direct jobs in regional NSW.

In just this limited illustration, a major city in one state contributes to the maintenance of approximately one-quarter of non-metropolitan jobs. Similar results, possibly higher, would appear in respect of other major cities depending upon the particular circumstances of the respective state.

## Concentration and specialisation of economic activity

The above discussion suggests strongly that, through the concepts of relative productivity, agglomeration economies, clusters and innovation, ‘place’ matters in economic outcome.

Economic activities, once located, tend to benefit from specialisation, productivity advantages and agglomeration economies to develop into broader clusters of similar or related activities.

The result is that economic events or policies that affect particular industries will have a different impact in different parts of the nation. This, in turn, can impact differently on community residents in uneven pattern across the nation. Economic action has a location or ‘place’ outcome.

At the broadest level, based on relative industry sector employment share, the largest cities—Sydney, Melbourne, Brisbane and Perth—are dominated by finance and business services, followed by the retail and manufacturing industries.

For the other cities, particularly the non-metropolitan regional cities, retail is the dominant sector; the exceptions being Canberra and Darwin where government employment dominates.

Industry sectors dominant within the major cities include finance, information communication technology and wholesale trade as well as some manufacturing industries.

Similarly, among occupation sectors the major cities dominate in professional and managerial occupations.

Depending on their functional role and location, even at a broad employment scale, specialisations become apparent—for example, manufacturing is significant in Geelong, Adelaide and Wollongong; health and community services are prominent in Newcastle, Adelaide, Toowoomba and Launceston. The 'sea change' cities of Gold Coast, Sunshine Coast and Cairns have significant construction industries.

Perth has clearly become Australia's mining industry 'capital'. Between 2001 and 2006, mining employment in Australia increased by 31,716. In Perth alone, employment in mining increased by 67 per cent to a total of 17,690. Over this period, 7,139 or 22.5 per cent of the Australian increase occurred in Perth (ABS 2006).

Tables 4.2 and 4.3 show the major specialisation of particular industries in each city as reflected in its 'location quotient' or specialisation index.

A high location quotient shows that a particular city has more than its share of a particular economic or industry activity. The location quotient determines which industries make the city economy unique and form its economic export base. This diversity and specialisation is important because it can increase the opportunity for complementary linkages between cities to maximise comparative advantage.

Even within the major cities, particular areas of the city can reflect an industry specialisation based on the location qualities and accessibility of each area.

**Table 4.2** Capital city specialisations: top 3 industries by employment location quotient

Sydney	Internet Publishing + Broadcasting	Financial Services	Air Transport
Melbourne	Transport Manufacturing	Polymer/Rubber Manufacturing	Telecommunications
Brisbane	Petroleum/Coal Product Manufacturing	Rail Transport	Transport Support Services
Perth	Oil and Gas	Non-Metallic Mineral Mining	Gas Supply
Adelaide	Transport Manufacturing	Oil and Gas	Mechanical + Equipment Manufacturing
Hobart	Aquaculture	Forestry	Electricity Supply
Canberra	Public Administration	Library + Information	Heritage Activities
Darwin	Defence	Water Transport	Gambling Activities

Source: ABS 2006.

**Table 4.3 Regional city specialisations: top 3 industries by employment location quotient**

Newcastle	Metal Manufacturing	Coal Mining	Electricity Supply
Wollongong	Metal Manufacturing	Coal Mining	Tertiary Education
Geelong	Petroleum/Coal Product Manufacturing	Textile, Clothing Manufacturing	Metal Manufacturing
Gold Coast	Gambling Activities	Financial Services	Accommodation
Sunshine Coast	Accommodation	Real Estate Services	Fishing
Townsville	Defence	Rail Transport	Electricity Supply
Cairns	Air Transport	Accommodation	Fishing
Toowoomba	Food Product Manufacturing	Motor Vehicle Wholesale + Retail	Tertiary education
Launceston	Forestry	Wood Product Manufacturing	Metal Manufacturing

Source: ABS 2006.

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