

Shrinking Cities in Australia

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Abstract. Shrinkage is not a topic of much discussion in most OECD countries where the planning paradigm of growth has dominated the scene for many years. However, the debate has recently intensified in Germany, specially regarding its Eastern cities, posing new questions about the efficiency and sustainability of planning for urban growth in an era of substantial socio-demographic and environmental changes worldwide. While analysis of shrinking cities intensifies in North America, Western and Central Europe and parts of Asia, it is not yet a prominent national issue in Australia despite the critical impact that cities with shrinkage patterns have in regional Australia and in the development of resource intensive industries such as mining. This paper discusses some of the elements that throw light on the phenomenon of urban shrinkage and outlines shrinkage in Australia. Specifically shrinking of mining cities is discussed.

Introduction: the challenge of urban shrinkage

There is now general recognition that the dominant paradigm among planners and policy makers is planning for growth. The language of the planning paradigm is unabashedly tilted towards development, progress, expansion and management of growth. The underlying assumption is that all cities and towns can achieve growth but this is where the problem arises. While the economy is expanding rapidly and population growth continues then the scenario of growth for all may be possible but this is hardly the case for most countries. With perhaps the exception of countries experiencing hyper economic growth and continuing population expansion, the common experience for most nations is likely to have growth in some limited number of cities and very slow growth and/or shrinkage for the great majority. With the relentless march of globalization, intense competition between city regions of nations yields winners and losers. Within nations those centers that are part of the global city-region network are likely to gain over the other cities. The point is growth and shrinkage are two faces of the same coin of urban change. Focusing only on managing growth therefore ignores the issues confronting the majority of cities.

Shrinking cities share a similar background of steady population loss for a significant period but often intertwined with periods of slow growth during which they experience both the out-migration of capital and of human resources, a lack of endogenous growth, loss of entrepreneurship and low levels of innovation. The result is a powerless position of urban managers to scrutinise and negotiate settlement conditions with new business willing to relocate to these cities (Leo & Anderson, 2006). In addition, the boundaries of the 'city' are no longer meaningful as the phenomenon of city-regions is expanding to accommodate metropolitan change (Friedmann, 2006). Thus, we can find the CBD of a city shrinking while the metro area is growing; like in the cities of St Louis, Cleveland and Detroit which lost half of their population between 1950 and 1990 while their metro areas notably expanded (Rybczynski & Linneman, 1996). In practice this means that different strategies are needed for

different parts of the city-region which implies different planning approaches to infrastructure, taxation, land use regulations, transport and access to education and cultural facilities. For cities where shrinkage is wide spread, like Liverpool in the UK or Youngstown in the United States, the issue to consider is what is the wealth creation path for these cities, what conditions contribute to the loss of skilled, qualified and creative people and how urban managers are able to preserve city assets until the next wave of growth (if this happens). The rush to seduce global mobile capital might only produce 'illusory development' (Friedmann, 2006) not creating the sustainable path that shrinking cities want to achieve. Therefore, the role of government and planning authorities in shrinking cities is both critical and different from mainstream planning for growth. Alternative development paths such as attracting foreign capital or cultivating culture-led development are strategies that can work but not exclusively nor in isolation (Scott, 2006).

We know very little yet about the dynamics of development of shrinking cities but they need to be considered as places where innovative activity can be maximised, not constrained, by their changing development conditions. This paper discusses some of these conditions.

Key concepts for the study of shrinking cities

A series of key concepts can be applied to study of the drivers of urban shrinkage, its manifestation and strategies proposed. None of these concepts fully canvass the issues associated with urban growth and shrinkage and they are cast in the growth paradigm of seeking development for backward regions. For each locality parts of several conceptual frameworks may be more important than others.

The authors who proposed the *center-periphery model* used it to analyze both the national context and the international context (Friedmann et al. 1971). They are concerned about the centripetal forces created by a "growth pole" drawing into itself the innovations, investments and well-educated thus leaving the periphery less able to achieve development. Popular in the 1960s the growth centre strategies focused on promoting industrialization or the decentralization of industries in order for the periphery to have the opportunities to develop. The concept of development is biased towards economic growth and much attention is given to the backward areas of industrialized countries (e.g. Appalachian Commission in the United States) and the less industrialized regions of developing countries (e.g. growth centers in Venezuela). The key concern is the widening and often extreme imbalance between the economic development of the primate city (often the capital city) and the rest of the country. The recent announcement of the Chinese leadership about assistance to the less developed western region of China is a reflection of current concerns about the dominance of the coastal major cities in Chinese development.

Beginning with the 1980s and into the 1990s industrialized countries faced competition from newly industrialized countries (NICs) such as the 4 Dragons of Asia (Hong Kong, Singapore, Taiwan and S.

Korea). The established industrialized economies began to experience *deindustrialization* in that their manufacturing centers, including many heavy industrial centers, became uncompetitive against the rapidly expanding export-oriented economies in Asia. The United Kingdom and the United States in particular focused on the brown fields of old industrial centers suffering from economic downturn. Deindustrialisation took place in the context of their economies shifting to the tertiary sector and the emergence of the knowledge economy that have very different demand for labor and locations. The rise of “silicon valley” first in California, followed closely by similar development in Massachusetts eventually spawned a number of others in other parts of the country. In the process some regions experienced significant growth while many others experienced significant shrinkage due chiefly to the differentials in the cost of land, labor and availability of other infrastructure including research oriented universities. Many of the strategies were initially still based on the industrialization model which spawned policies such as “enterprise zones” and industrial cluster analysis. As understanding of the fundamental economic changes became more sophisticated there is the focus on the “creative class” to attract those who are key to the new economy taking root in the new growth communities. Given that many of the necessary ingredients (universities, good climate...etc.) are not available in most locations, those communities by-passed by the blossoming of the new knowledge-intensive economy are left to fend for themselves. The likes of Detroit, Cleveland, Troy and St. Louis experienced vast population declines (Brachman, 2005; Downs, 1994).

As the study of deindustrialization gathers pace the attention of scholars were also drawn to the *global economic changes* due to the flow of capital leading to rapidly expanding export-oriented economies in Asia and the rise of global cities based on professional services chiefly banking, finance and insurance. In turn the Newly Industrialised Economies (NIE)s faced economic restrictions of their own as their competitive edge of low cost labour is lost to other emerging economies. The rise of global city regions which are centers of financial and related services (Los Angeles, New York, London, Singapore and others) changed not just their own regional economy but also the national economic space in which they are located (Sassen, 2002). More recently the shift is not only to financial services but also to those knowledge intensive industries such as bio-tech that are dependent on highly trained professionals and their support staff and the knowledge base available in universities or other research institutes. Inevitably the rise of global cities led to shifts in employment structures and new demand for offices and housing.

Time was when the key concerns were about population growth and how it might impede economic development. In the 1960s there was a great deal of discussion of population explosion and its limits to growth. At the beginning of the 21st century the reverse is the issue for an increasing number of countries. Mature industrial economies such as Japan, Germany and Switzerland are concerned about the absolute decline of population and what that means for their economy and urban areas. Regions of many other countries also struggle with declining population caused by out-migration of the young and able – a phenomenon particularly acute in economies that do not have the sustained economic growth to provide employment to its labor force (Romania in Eastern Europe is an

example). *Ageing population and a declining fertility rate* in mature industrial economies have led to depopulation of its urban neighborhood (for example, Dresden in Germany) and have prompted strategies to demolish urban housing in order to recreate open spaces and make the urban neighborhoods more attractive to the residents. A very different kind of gentrification, partly aided by public policies, is taking place by which the urban centers try to lure back residents who have moved to the suburbs. Abandoned neighborhoods are seen not only to be an urban blight associated with urban crime (Rybczynski & Linneman, 1996) but also associated with a significant deterioration of urban infrastructure that are being replicated elsewhere at great expense.

As we become more aware of the impacts of *climate change* it is obvious in places that have suffered prolonged drought, such as many parts of Australia, that climate changes have significant urban consequences. Regional cities whose economies are tied to agriculture suffered significant downturn as the drought persisted and businesses and services close and population moved. In many Australian regions the drought has been so prolonged (more than 7 years) and so drastic that some farms are being abandoned because farmers could no longer afford to continue. As small farms are sold to large conglomerates or taken over by banks due to loan defaults, the local economic structure began a downward spiral. Local businesses may be bypassed as large corporate farms have centralized purchasing to exploit economies of scale with the consequence of loss of local employment and spending flowing out of the region. While scientists are just beginning to fathom the impacts of climate changes there is little doubt the flow-on effects on other sectors such as tourism, rural industries are bound to be significant. These impacts will spill over to the urban settlements as population, in particular, the young and well educated, leave. At the same time, the wider economy will be impacted by soaring food prices due to rising cost of water and smaller supplies.

This very brief discussion of key underlying causes of urban shrinkage shows that in specific communities a combination of centripetal forces, industrial restructuring, global competition, ageing population and climate changes might be the main causes of shrinkage. Specific locations would have different combinations of different significance assigned to the various factors at different time periods.. The specific case of Australia is dealt with in the next section.

Demographic Change in Australia and Patterns of Shrinkage

Australia has a current population of 20.6 million (ABS, Population Clock 6/7/06). Of this population 76.9 percent are Australian born and 23.1 percent are foreign born. The fertility rate is low (1.76) which combined with increase in deaths from an ageing population will result in negative natural increase rate by the mid 2030sⁱ. Up to 70 percent of Australian land is arid and semi-arid; consequently, people concentrate in the coastal cities. Population growth in Australia significantly increased following the discovery of gold in 1851 and in the period immediately following World War II.

Australia is one of the world's most urbanised countries: over 85 percent of the Australian population lives in urban areas that hug the coastal zone of an arid continent. The seven capital cities of

Australia, in particular Perth, Melbourne, Sydney and Brisbane are the growth areas of Australia benefiting variously from internal and international migration. The growth of Australian capital cities is largely based on availability of employment, metropolitan vitality and perceived opportunities.

The coastal areas of Australia, especially the mid and north-east coastal zones are experiencing significant internal migration from those who are escaping from the less pleasant climate of the southern states. While many of these individuals are seeking retirement living, there are significant numbers who seek life-style changes or they are seeking availability of diverse economic opportunities in areas of high urban growth. Consequently, coastal towns and cities, especially the region extending from Brisbane to the coast is one of the fastest growing urban regions of Australia. In many respects the continuing growth of the major cities such as Sydney, Melbourne, Brisbane and Perth exemplifies the centripetal forces at work in the urban system of Australia where the major centers continue to grow at the expense of the rural regions, towns and cities without the pleasant climate and availability of diverse economic opportunities. Rapid growth bring with it severe urban issues and with the severe drought for the past several years, the Brisbane region is experiencing strict water restrictionsⁱⁱ bringing home the message about climate change and urban impacts.

As the coastal and major coastal cities continue to dominate the Australian urban system another process at work is the consolidation of the major regional towns. These regional towns grow at the expense of smaller towns in their region. Some 245 local government areas (LGA) lost population in the 2001 census and the expectation is that this process is continuing.ⁱⁱⁱ This process is partly driven by the shrinkage of smaller towns due to changes in the agriculture economy, the out-migration of population especially the young and educated now exacerbated by the drought and the need for consolidation to gain economies of scale (Martinez-Fernandez & Wu, 2007).

A series of processes impact demographic change in Australia¹:

- Capital city growth - Australia's capital cities are growing because of their real and perceived advantages in terms of employment and accessibility to services and amenities;
- Coastal growth – The intense movement of people to temperate and semi-tropical coastal towns in the states of New South Wales and Queensland reflects the 'glamour of the coast'. More than 1.3 million people have moved to the corridor of north eastern coastal strip of Australia since 1980 (Wahlquist, 1999).
- Urbanisation within regions –Chiefly inland "sponge" cities are benefiting from new residents moving in from their outlying towns. Dubbo in the state of NSW, Horsham in the state of Victoria and Narrogin in Western Australia are examples of this movement.

¹ See also the work of Hugo, G.J., 1986. *Australia's Changing Population: Trends and Implications*, Oxford University Press, Melbourne.; and University of Sydney's Planning Research Centre 2005, Meeting the Sea Change Challenge - A Practical Models of Local & Regional Planning for Large Communities. Report for National Seachange Taskforce March 2005

- Small town shrinkage –in the dryland wheat belt, 205 rural communities^{iv} lost population from 1976 to 1997, Seventy of them suffered significant losses of up to 20 percent (Wahlquist, 1999). In 1999 alone, 245 Local Government Areas (LGAs)^v lost population (ABS, 1999). In many cases, these emigrants moved to nearby ‘sponge towns.’
- Youth migration – Among young people, there is a significant movement out of regional Australia into the big cities. This movement does not appear to be motivated by concerns for jobs. In towns like Narrabri or Kalgoorlie-Boulder, there is a shortage of skilled labor even as youth migration continues. Up to 22 percent of Australian business owners in regional Australia are actively looking for staff overseas. The problem is particulate acute in mining centres in Western Australia (BRW, 2006: 60-61).
- Fluctuation of mineral markets – Mining and related manufacturing centres in regional and rural Australia experiment cycles of growth and decline as prices in international markets vary or due to changes in demand, corporate management of global mining assets.
- Climate change - The effects of the worst draught in Australian history is influencing mobility of farmers, who in some cases are abandoning the land with devastating consequences for Australian rural settlements and the sustainability of rural industries.
- Policy change to government services – The reduction of of government services and jobs in regional Australia is encouraging the mobility of individuals searching for employment and better accessibility to services. Nearly 20,000 jobs were cut in the public sector between 1986 and 1996 in regional areas of the state of NSW alone (Wahlquist, 1999).

Examples of shrinkage are more common in areas outside the major cities, inner regional cities and outer regional cities^{vi}. However, some suburban areas of bigger cities have also experienced shrinkage. Three patterns of shrinkage can be identified:

- Urban shrinkage is characterized by long-term population and/or economic decline of large cities or parts of a large cities or metropolitan area. It includes suburbanisation change or doughnut effects. Examples of urban shrinkage are found in each Australian capital city and predominate in the middle suburbs surrounding the inner city (ABS, 1999, 2006c);
- Rural shrinkage is characterized by long-term population and/or economic decline of smaller towns or a cluster of small towns in a rural region. All states but the Australian Capital Territory (ACT) have shrinking towns in their rural areas. Most towns are small agriculture or cattle based communities, some with large farms suffering the effects of the prolonged drought. Australia is now in its worse draught condition on record with low or no rainfall since 1999. Some larger towns that have been particularly hard hit, such as Goulbourn in NSW or Peterborough in South-Australia, are regional centres and the trade base for primary industry products, education and social life. Consequently, the impact of climate change is the greatest factor in their development right now;
- Industrial centre decline is characterized by long-term population and/or economic decline of small- and medium-sized cities servicing a mining site, a system of mining sites, mining

settlements or a manufacturing industry . Many of these towns experience periods of growth and shrinkage depending on international mineral and manufacturing markets.

In summary the Australian urban system is experiencing the multiple impacts of globalization within which the capital cities of Sydney and Melbourne continue to dominate, the shifts of population due to demographic changes and the impacts of climate change to both the regional agricultural economy and the coastal zones. The processes of urban and rural shrinkage are similar to those found in other developed countries (Oswalt 2006a,b; 2007) while industrial centre shrinkage presents some differentiation due to the special geographic characteristics of Australia. This type of shrinkage is discussed next in more detail.

Mining Centres Shrinkage

The dynamics of mining centres shrinkage are poorly understood and not often discussed. Although most industrial centres share many of the characteristics observed in rural areas, such as remoteness, semi-arid lands, and water shortages, industrial centres have distinctive, quite unique features such as a rich firm innovation system which deserve to be discussed in more detail. Three cities will be discussed: Broken Hill, Whyalla and Mt Isa. These cities were chosen because an analysis of aggregated data for each of the Census periods 1976-2001 and the most recent data for 2005 shows that they suffered the most severe population losses. These three cities are found in remote areas of the states of New South Wales, South Australia and Queensland and are historical mining centres. Thus, the cities can well represent the 'typical' shrinking industrial city in Australia. Broken Hill and Mt Isa are towns dominated by mining activities while Whyalla is a manufacturing steelworks centre. The shrinkage these cities experienced over the years is not homogeneous. All of them experienced periods of growth combined with periods of shrinkage mainly driven by changes in the resources industry or by price fluctuations in international mineral markets. The paradox for these towns is that while their growth is limited by their remote location and the resulting gaps in services and transportation infrastructure, the impact of the internationalisation of markets, new technologies and knowledge migration can be even greater than experienced by the capital cities.

A distinctive characteristic shared by the three cities is the dominance of the local economy by one corporation. Broken Hill and Whyalla shared the distinction of being the location of the iconic mining company in Australia: The Broken Hill Proprietary Company Limited (BHP), now BHP Billiton after its merger with the South African company, Billiton. The city of Mt Isa has been the base of the Mt Isa Mines (MIM) company for many years, until the facilities were acquired by the Swiss operator 'Xstrata' in 2003. It is this parallel development path of these cities with the business cycle of their host corporations that differentiate them from other rural or urban shrinking cities and what also places them into the category of 'corporate cities'. The parallel development with the hosted organisation can be seen in the history of the cities and its fluctuations in terms of population, employment and economic activity. The result is a cultural footprint, quite unique, of corporate cities that could share

more similarities with other corporate cities around the globe (many hosting the same multinational corporation) than with other types of shrinking cities in Australia.

Whyalla is a city on the western shores of Upper Spencer Gulf in South Australia, some 400 kilometres from the State capital, Adelaide. The Broken Hill Proprietary Company Limited (BHP)^{vii} began to build a steelworks, harbour and blast furnace in 1915. At the outbreak of World War II the Australian Navy asked BHP to build shipyards next to the blast furnace site and the first ship was built in 1941. This development marked the rapid development of the town with the establishment of the first local government in 1945. The end of the war that year brought changes again into the town and ships were now made for commercial purposes. In 1958 BHP decided to build an integrated steelworks in Whyalla and for nearly two decades the city experienced exponential growth. By the 1970s Whyalla would reach more than 30,000 people; about 7,000 people were working for BHP. However, due to the ship-building slump in the late 1970s, the Whyalla shipyards closed down in 1978. Population since have declined to around 21,000 in 2005 (Whyalla City Council, 2006). The current operator of Whyalla steelworks is OneSteel^{viii}, the facility is the engine room of OneSteel's business, producing approximately 1.2 million tonnes of raw steel each year. These products service the construction and rail transport industries, with Whyalla Steelworks being the only manufacturer of rails in Australia (OneSteel, 2003).

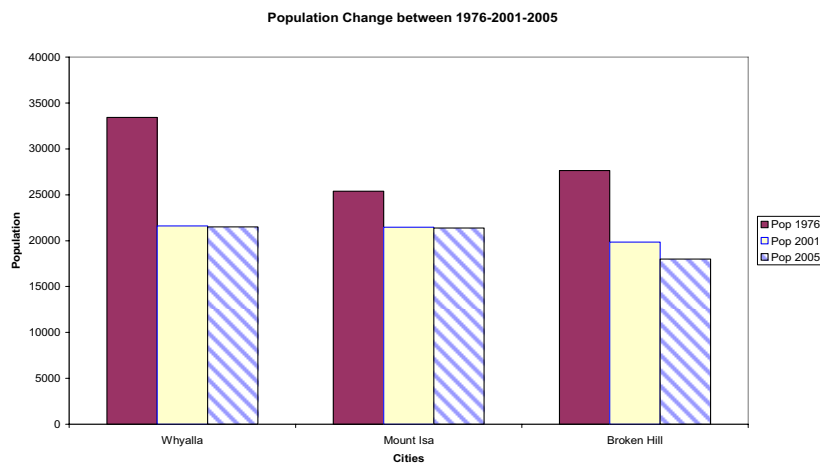
Broken Hill is the largest regional centre in the western parts of the state of New South Wales; 1,100 kilometres west of Sydney and 500 kilometres northwest from Adelaide. Broken Hill is the Australia's longest-settled mining city, called over time variously as the 'Oasis of the West', 'Silver City' and the 'Capital of the Outback'. Mining has been the main industry since the foundation of the town in 1883; the famous BHP company (Broken Hill Proprietary) was founded in 1885 and it was the main mining operator until 1939. At its peak in 1952, the mining industry employed 6,500 people, with more than 30,000 people living in the city. Since then Broken Hill mines have been operated by 14 different mining companies and population have steadily declined to an estimated 18,000 people in 2005 (Broken Hill City Council, 2006). Employment in the mining industry has declined from 51.26 percent in 1954 to 7.57 percent in 2001 with less than 500 miners in the town now. Broken Hill had once the world's richest deposits of lead, zinc and silver; currently mining still yields around two million tonnes annually and a new mining company (Perilya) is operating the once predicted 'mined out' sites; so there are some indications about a return of Broken Hill as a profitable mining centre but a much reduced sized one (BRW, 2006:68).

Mt Isa is the largest inland city in terms of population in northern Australia. Founded in 1923 after the discovery of copper-silver-lead-zinc ore, Mt Isa has been dubbed the 'Oasis in the Outback' and, in short, it is know as 'The Isa'. The local Council was established in 1963 covering an area of 43,310 square kilometres and an estimated population of 15,192 (Kirkman, 1998). City status was proclaimed on 30th May 1968 and population growth in the area continued until the 1980s passing the 30,000 mark (Mt Isa Council, 1998). Mount Isa Mines (MIM) was the only mine operating in town from

1924 to 2003 when Xstrata, a Swiss based mining group, bought MIM. Mt Isa has continued losing population since the 1980s mainly due to various collapses of the metal markets; in 2006 population counts are 21,371 and the prediction to 2011 is of 21,240 people (MITEZ, 2006). Mt Isa has become a regional centre part of the MITEZ region which comprises nine Local Government Areas in Northern and North-West Queensland and extends from Mt Isa in the west to the city of Townsville by the sea; covering an area of 271,732 square kilometres. Employment at the mine has declined from the peak of 63.59 percent in 1954 to 9.73 percent by 2001; employment in services has become more important (18.73%).

For all three cities population peaked between the second half of the 1960s to the second half of the 1970s—chiefly due to the establishment of mining activities. Since then there were periods of growth but shrinkage have continuous until today (See Figure 2) resulting in these cities ageing at a faster pace than the Australian average (>65 – 13.1% in 2006). In Whyalla, the 20-45 age group has declined consistently while there is an increase of elderly population. In Broken Hill there is a decline in all age groups but the 65 and over group which constitutes 18 percent of the population. Mt Isa has the up- to-45 age group declining and the up to 65 and over age group increasing. Although it has declined in the last few years, unemployment rate is still higher than the national average. At the same time migrant population has increased.

Figure 1: Population decline 1976-2001-2005



Source: ABS Census data, (1976, 1981, 1983, 1991, 1996, 2001, 2005 counts)

In the three cities there is a steep decline of mining and manufacturing that results in a decline of Knowledge Intensive Business Services (KIBS) but more recently these services are increasing. KIBS include firms from finance, insurance, property, business and communications and mining technology sectors. Notably, both manufacturing and services sectors are increasing their use of knowledge-intensive services and research into KIBS has clearly established the position of these organisations as co-producers of knowledge in the modern economy and as facilitators of innovation processes

(Martinez-Fernandez and Miles, 2006; OECD 2006). In particular, mining technology services (MTS) have a significant role in the innovation of the mining industry in Australia, influencing its transformation into the knowledge economy (Martinez-Fernandez, 2005). This is also a particularity of the 'corporate city' which is not found in rural areas and although KIBS cluster in financial centres of capital cities, their influence in city development is of a different nature if compared with industrial shrinking cities.

In summary, what characterises shrinking industrial centres is the corporatisation of the city economy, exacerbating the interdependence of population movements, mineral exploration and heavy industry. This dependence on the main industry operating in town produces a parallel development between workforce fluctuations and population fluctuations. Thus, in these towns, strategies of the main company can, to a great extent, determine future developments of the town as well as having a great impact on urban management plans. Therefore, people living in these towns have very different 'realities' from people living in other cities where the economy is either much more complex or not dependent on one large dominant economic sector. Climate conditions, knowledge, education and health services, as well as transportation links are important factors but it is the parallel developments with the private sector operators (often a single corporation) that constitute the distinctive features of these cities. Embedded here is also the clustering of specialised KIBS in these cities, a 'second corporatisation', that goes almost unnoticed by the city authorities.

The question here is whether 'shrinking' is a problem that needs to be solved or an opportunity to create a different development path for the future of these cities. In cities dominated by a single firm, the fortunes of the city rise and fall with the fortunes of the corporation. There is nothing new about the fact that profitable firms spur local growth, for example through linkages between global players and local small- and medium-sized enterprises. However, a largely unexplored path is linked to local "innovation milieus" that tie firms to their locations and that serve to increase the profitability of capital investment. The literature on Regional Innovation Systems (RIS) has signalled the enormous implications of knowledge networks and flow-on economic development (Cooke, 1999, 2001; Braczyk et al 2001; Martinez-Fernandez, Potts et al, 2005). The study of this phenomenon as associated to mining cities in Australia is largely unexplored. A short discussion is provided next.

Some thoughts about Australian Shrinking Mining Cities

Closely tied to the rise of global capital is one sector that has always experienced boom and bust -- the mining industries. Global mining conglomerates are usually high tech oriented in its methods of extraction and refining and are skilled in the development of mining towns that tend to have a distinct culture very much tied to the culture of the company that dominate their economy. The key issue for mining towns is what would take the place of the mining activities once the resource is exhausted or is no longer considered economical to exploit. Furthermore the likelihood of an environmental legacy

that requires expensive remediation often confronts the community (Martinez-Fernandez & Wu, 2007).

One of the more distinctive features of the Australian urban system is the prominence of a number of cities and towns that are creatures of its strong mineral and extraction sector. The export of coal, oil and gas and iron ore is staples of the mining sector. In 2005-06 due to the boom in the resource sector the contribution of the Mining sector to the total value of Australian exports was 37.6% a significant jump from the 32.4% of the previous year (Australian Yearbook 2006 ABS Table 16.11).

It is in this context of their importance to the Australian economy that Australian mining towns are of significant interest to a study of urban growth and shrinkage. Given the nature of mining and the location of the resource, many mining towns are in remote, semi-arid location where shortage of water is a constant concern. Fluctuation of world mineral and resource prices have an over-riding impact on the viability and prosperity of the mining towns. These towns are likely to be one-company towns in that the dominant economic force is based on one corporate entity which employs the great majority of the labor force. Significantly a number of these towns are created by the corporations due to the necessity of exploiting the mineral or resource. To the extent that many mining cities are creatures of the same corporation they have very similar features and culture to the other mining towns established or dominated by the same corporation in other parts of the world.

The case of Mt Isa exemplifies a unique characteristic of mining centers in Australia: they constitute hubs of knowledge intensity where internal and external experts prepare innovative solutions tailored to specific problems in the mine site. Despite cyclical reduction of population and employment, technological innovation remains high in Mt Isa; first drove by the MIM Corporation, and now by Xstrata. Xstrata's global strategy of exploiting technological innovations have secured patents of the 'ISA Smelt', one of the most advanced technologies world-wide, which have been sold or licensed to Chinese, South American and US firms. MIM's "copper extractor" technology was similarly exploited. Another area of strong innovation are the hundreds of mining technology services (MTS) provided by fly-in/fly-out companies of one of the most innovative industry sectors in Australia (Martinez-Fernandez 2005). Knowledge travels through these MTS companies flying from one mine site to the next bringing the latest technological applications and a wealth of interconnections in the Australian mining 'innovation milieu'. MTS companies are highly dependent on the integration of knowledge they learn from each contract, as the application of new solutions is frequently based on their previous experiences and so the interactions between MTS firms and the mining company has a first class level of innovativeness from which mining cities could benefit. However, there are little signs of knowledge transfer from the mine site into the city. This is not surprising as the strategies and skills needed for the transfer of knowledge into the city businesses and organizations would be very different to those used for managing urban growth. More often than not mining companies constitute mobile investment that 'flies-in and fly-out' of the city searching for opportunities elsewhere and so it is more in the hands of urban managers to look for the opportunity to capture a share of the

technological and organizational knowledge operating in the mine site. This, indeed, calls for a different way to manage the relationship between local governments and corporations.

It could be argued that a key conceptual framework for explaining shrinkage in mining cities is the impact of globalization in the corporatization of city economies. Population loss is evident with the decline of mining activities but, perhaps, this decline would be less evident if the knowledge intensive activities undertaken by mining corporations in the industrial site were more connected to other business and organizations in the city. The corporations (and its mines) grow from making use of global knowledge networks while the cities 'shrink' because they are isolated from the truly global knowledge and the impact of that knowledge in other business and organizations in the cities. These cities only receive part of the impact that is more 'place-dependent' while the global knowledge where the corporation is located is 'foot-lose'. In the end, when corporations move on either because the resource is exhausted or no longer economically viable to exploit, and with them the financial bases of the city, it is the environmental and unused infrastructure legacy what stays. The more skilled and talented would generally also move on leaving the city with a vastly diminished financial and knowledge base. The lack of strategic planning tools for managing change and adapt to a new development path of shrinkage may result in further rapid shrinkage and an increase of socio-economic inequality.

Concluding Remarks

The paper has discussed factors impacting shrinkage in Australia and a typology of shrinking cities. In particular, the paper argues that mining cities shrinkage is partly due to the disconnection of the knowledge intensive activities undertaken by corporations in the industrial site that are not embedded in the cities where they are located. The corporations grow from making use of global knowledge networks while the cities 'shrink' because they are isolated from the global knowledge and the impact of that knowledge in other business and organisations in the cities. Mining cities only receive part of the impact that is more 'place-dependent' while the global knowledge where the corporation is embedded is 'foot-lose'. The paper raises the following issues:

First, processes of shrinkage are interrelated to processes of growth; they are not isolated forces but complementary as shrinkage in regional centres are closely related to processes of urbanisation and suburbanisation in large metropolitan areas. The demand for services in health, education, environment, housing and entertainment are all key factors for people settlement. Shrinking cities can experience a shortage of skills due to the flight of population but employment alone is not enough to stop migration, especially of the youth who want to move to cities that offer greater variety of opportunities and life styles.

Second, shrinking mining cities constitute a special case of corporate city with a disconnected Regional Innovation System (RIS) due to the largely 'fly-in – fly-out' population and the mobility of

capital and jobs. Mining cities for instance are 'skills-hubs' or 'innovation-intensive' areas that largely remain locked in the mine site. There is an intellectual isolation from the businesses community in the city. While mining companies might be good corporate citizens participating in community projects, this participation is usually confined to its role as a donor or capital provider. There is a 'vacuum of knowledge' in regards to the transfer of knowledge and innovation processes from the main industry to other business/organisations in the city. Technologies, organisational management techniques and a vibrant knowledge economy in the mining site usually stop at the gates of the mine. As a consequence Regional Innovation Systems in these cities are weak, and knowledge-circulation from scientists and knowledge workers stops at the gate of the mine and little, if any, innovation transfer takes place. Although city councils in these cities are well aware of the need for public-private partnerships for funding public projects, they are less aware of the need for urban management instruments oriented to capture and transfer knowledge and innovative performance.

Third, the study of shrinking cities and of the innovative strategies and alternatives to the current planning paradigm of growth is difficult to generalise on 'best practices' as solutions are linked to the history and national economic context of the place. Nevertheless, the development of indicators to look at shrinking cities across different countries offer an opportunity to extract common themes that suggest the need for a shift in current planning paradigms for city growth and competitiveness. Planning in shrinking cities also needs to embrace the public in a vigorous manner; residents who feel their hope for a better life is declining leave for better conditions elsewhere. Community engagement provides an opportunity for these residents to participate in the design of their future in the town, therefore providing some control about their own destiny and perhaps better solutions.

Finally, policy makers in shrinking cities should look at ways to increase the connectivity of their Regional Innovation System (RIS). Specifically, the mining site or main manufacturing industry should be seen as a critical intellectual asset for the development of knowledge networks across the city and region, together with any research and education institution, scientists, industry associations, KIBS, community and government organisations. The aim of the development of this network is to facilitate the flow of knowledge among different stakeholders in the city, the connection to other international networks through its more international participants and ultimately to enrich the regional innovation system. These are the seeds for developing learning environments to hold innovation, creativity and vitality; all key factors to keep a place competitive.

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ⁱ answers.com, 2006 [25/07/06]

ⁱⁱ Dam level at a below 20% of capacity and prospects of severe water restrictions

ⁱⁱⁱ Australian Bureau of Statistics (ABS) (2006c) *Regional Population Growth, 3218.0 2004-05*. ABS, Canberra.

^{iv} Rural areas include towns with a population in the range 200 to 999 persons (ABS, 2001e).

^v The LGA is a spatial unit which represents the whole, undivided geographical area of responsibility of either an incorporated Local Government Council, or an incorporated CGC of sufficient size and statistical significance in the Northern Territory (ABS, 2001e).

^{vi} Remote Zones include CD ARIA Plus score > 5.92 (ABS 2001e)

^{vii} BHP started its history in Broken Hill, NSW and was incorporated in 1885 as a global natural resources company. BHP explores, develops, produces and markets iron ore, coal, copper, oil and gas, diamonds, silver, lead, zinc and other minerals. It has been a well know leader of flat steel products. The company merged with Billiton Plc in June 2001. It employs some 37,000 employees in ore than 100 operations in about 25 countries. It has the headquarters in Melbourne, Australia. www.bhpbilliton.com (accessed 20/07/06)

^{viii} In October 2002 OneSteel was listed on the Australian stock exchange as a spin off from BHP Limited. OneSteel is a manufacturer of steel long products and a distributor of metals. It manufactures and distributes anything from 'structural, rail, rod, merchant bar, cold finished bar, chrome plated bar, reinforcing, wire, tube, pipes, fittings, valves and actuation'. The company has 200 operating locations (distributions and manufacturing facilities) throughout Australia and New Zealand. OneSteel has an annual turnover of \$3 billion, over 30,000 customers, hundreds of sites across Australia, as well as in New Zealand and Canada and around 7,000 employees (Martinez-Fernandez and Bjorkli, 2003).