



OUTSOURCING, PRODUCER SERVICES AND SHIFTS IN THE GEOGRAPHY OF THE AUSTRALIAN MINING INDUSTRY

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ABSTRACT The mining industry is a major part of the regional economy of non-metropolitan Australia, providing in some cases the sole justification for settlement and development in some regions. This paper suggests that role is being changed rapidly as the production system of the industry changes to favour the outsourcing of services. Outsourcing has been analysed extensively in the study of producer services growth. There the argument for outsourcing rests on the need for flexibility and knowledge that need to be incorporated into production; that insight is used here to understand the recent past and likely long term future of the mining industry in non-metropolitan Australia. The analysis shows that outsourcing has grown rapidly in recent years, and that the location of the offices of the firms supplying these outsourced services are primarily located in Sydney and Perth. That shift has yet to be felt in big job loss in non metropolitan regions, as the needs of production still require large local employment in many cases. However it is possible that the outsourcing has reduced the number of knowledge intensive jobs in mining regions as the employees in these activities fly in to provide their services. The paper explores the consequences of that outcome on non-metropolitan regions generally.

1. INTRODUCTION

Mining is an integral part of the fabric of Australia - it has affected the economic, social, environmental and political make-up of the country in complex ways. That complexity created places like Ballarat, Bendigo, Broken Hill, Mount Isa and Kalgoorlie, and (with the growth of the coal and iron ore industries in the 1960's) a new wave of mining communities in northern Australia. These outcomes reflected the extent and nature of particular mineral deposits, mining methods and management, and the development of technology relating to metallurgy, mining and transport. The current research explores the idea that a new outcome is emerging, one that involves impacts on larger cities, as new dimensions in the structure and organisation of the industry have emerged.

A shift in the geographic impact of the industry has already been felt at the regional scale. New perspectives on mine exploration and operation have changed policies on the siting of towns alongside mining deposits. The adoption of fly in-fly out and commuting in the 1980's for example shifted the major population

impact away from the mine site (Lea, 1988). It was common practice overseas to commute quite long distances to mines (Brealey 1980). In Canada, for example, commuting was very common due to the remote locations of mine sites, and in Sweden, old single-industry towns near mine sites have been converted to commuting operations; the reasons for this approach include quality of life as well as site impact considerations (Veno and Dufty, 1985). If this phenomenon increases in importance in Australia, the impacts of the mining industry will continue to shift away from remote towns. This effect has been reported in the Bowen Basin. There many workers commute from the coast, and people who reside in company towns in this coal region often own homes on the coast or in major urban centres (Gibson, 1991). Hence, the impact of the mining industry is now shared between the remote mine sites and coastal centres. These new patterns provide a hint of the way that the production systems of the mining industry are changing, a hint that will be analysed in more detail below.

Further change at the regional scale could mean some of the smaller communities may well disappear. In fact, Rio Tinto recently announced that it will merge five mines in its Hamersley iron operation in the Pilbara and operate it as if it were a single mine. Management and high cost equipment will be shared between the sites. This decision will reduce the 2600-strong work force by 400 within two years (FitzGerald, 1997).

This paper looks beyond these regional shifts to explore a new form of the links between remote mining communities and capital cities. In the past the headquarter functions of mining companies have always been separate from remote production sites. The current research identifies that separation in a wider range of activities, and explores the consequences for the development of non-metropolitan Australia generally as outsourcing of a wide range of services to specialist companies calls for complex corporate linkages between firms usually made in metropolitan areas. This perspective suggests that understanding the next round of impact of the mining industry will depend upon an understanding of the corporations and their service firms - such analysis is the focus of the research reported here. The results show the new corporate organisation of technically sophisticated activity is the key factor shaping the geographic impact of the mining industry, which means some metropolitan areas may be the site of most new jobs created in that industry's immediate future.

2. OUTSOURCING AND THE GEOGRAPHIC ORGANISATION OF PRODUCTION

An important part of the operation of modern industry is flexibility, which can be achieved by contracting out many stages of the production system (Coffey and Bailly, 1991). Flexibility may be especially relevant to the mining industry which requires specialised equipment and operators only at some times in their exploration and later production stages of activity; in addition it is possible that production may vary with fluctuations in world prices. The need for flexibility means that subcontractors are an attractive option. The adoption of a flexible

approach also calls for greater effort in the coordination and management of production as a whole (Coffey, 1992). Producer services provide this coordination through firms in transport, communication, management expertise and technical sectors.

The coordination of producer services leads to the formation of a 'complex' of corporate activities seen in the spatial clustering of head offices, financial institutions and related producer services firms in studies of New York, London and Tokyo by Sassen (1991). A similar perspective has emerged from studies of the localised technical linkages between small firms and establishments in knowledge intensive manufacturing activities which depend upon a 'milieu' made up of the firms themselves, their supporting services as well as some specialised infrastructure (Maillat, 1991). That environment stimulates the growth of what have been called 'industrial districts' (Camagni, 1991) which can play a dominant role in national and global activity within a sector. These complexes of services and industrial districts usually favour parts of metropolitan areas. If outsourcing of services is a part of the evolution of the mining industry it is possible that the coordination functions of these services may cluster in some metropolitan regions, rather than in locations of mining production.

Another important element in modern production is the knowledge. According to Drucker (1994a), knowledge has become *the* resource, not *a* resource. He suggests the traditional factors of production, such as land, labour and capital, are secondary to knowledge because they can be obtained if one has the necessary knowledge - without it, they cannot be utilised. In order for knowledge to be converted into performance, knowledge workers need to be employed, or be available through outsourcing arrangements with service firms. This facilitates team efforts to diagnose and solve problems as discussed by Drucker (1994b). In this way, firms can utilise knowledge for innovation to enhance their ability to embrace and implement new technologies. Analysis of the geography of knowledge by Florida and Feldman (1994) points to the importance of technical infrastructure in major metropolitan areas, so that knowledge-based services are likely to have a strong focus upon metropolitan regions.

These geographical perspectives are important to the modern mining industry, which uses a complex array of new geological exploration and geophysical production technologies relying on specialist knowledge to boost the chance of discovery and the quality of product produced. Just one example of such technology is satellite imaging and remote sensing - a tool which has greatly facilitated exploration ventures (<http://www.mineralswa.asn.au>). In addition it draws upon specialist computer software to evaluate and plan mining operations (*Australian Journal of Mining* 1996 and *Australian Mining* 1998), on advice to allocate and manage risk (Bristol, 1996 and Sydel, 1997a) and looks to specialists to improve waste management and reclamation (Gosling *et al*, 1997). In this situation, some previously specialised contractors have diversified their services to act as builders and operators, as Bram's (1997) report on the Roche company illustrates. Hence there are a range of services available to the mining industry that

span the initial site identification and assay task through to construction and operation. In all this activity the mining company can be at arms length as co-ordinator of the services rather than as provider in its own right.

The engineering services perspective is well illustrated using the example of Monadelphous Group Ltd, an engineering organisation that provides project management, construction, maintenance and support services to the Australian mining industry acting as a sub-contractor for maintenance, plant construction and shutdowns, project management and labour provision. The company has in excess of 800 employees in key mining and or processing sites across Australia. The head office is located in Perth, employing approximately 100 people, and there are seven branches throughout Australia - Perth, Kalgoorlie, Mount Magnet and Karratha in Western Australia, Darwin (Northern Territory), Gladstone (Queensland) and Roxby Downs (South Australia). These branches are each fully equipped with workshops, and plant and equipment resources, whilst the head office provides project management or engineering support required by clients. This dichotomy reflects the differences in the needs of production compared with those of management centres. Access to producer services and the knowledge of other companies in Perth may allow for a more effective operation of head office, while the needs of production are met in the non-metropolitan regions through the location of branches. The use of a central computer system connected to a main frame allows branches to access the knowledge and resources of the head office.

Knowledge and flexibility are important to the mining industry as it operates in a very fluid financial context, witnessed by the sudden impact of Reserve Bank gold sales on gold prices and, in turn, on mine viability in many cases. It also faces international markets for almost all of its output, and increasingly operates through multinational financial and management linkages. Finally, it deals with multifaceted Government regulatory arrangements spanning environmental controls on production and post-mine reclamation, and land rights negotiations. For these reasons the mining industry naturally looks for specialist advice, and outsourcing is the way it obtains this advice. If the geographic clustering that has been found in other services applies to these services, it is possible a cluster of mining related services may develop, creating an 'industrial district' or 'milieu' in one or two cities, which will direct the employment impact of the mining industry away from its traditional remote area focus.

A case study of the location of Western Mining Company offices in Western Australia provides an indication that a new geography may indeed be emerging as the use of outside services, and the importance attached to capital city locations, are both accorded higher priority in a mining company's operation. Ralph's (1997) study shows how the Western Mining Company developed large administrative and technical facilities in Kalgoorlie close to their gold mine activity, beginning in 1930, and expanded that after 1967 associated with nickel exploration and mining in the nearby Kambalda region. About this time a small Perth office also expanded as the company became engaged in a greater variety of mineral activity through out Western Australia, and eventually this office took on all the administrative and

later the technical activity that had been located in Kalgoorlie, finally acting as the Australian headquarters of the Exploration Division. In the most recent development, Western Mining has actually sold its Kalgoorlie buildings:

...as it was resolved that the drilling section and some of the laboratory functions could be outsourced...Western Mining Corporation's presence in Kalgoorlie diminished although the amount of work generated for contract services in the region increased (Ralph, 1997: p. 79).

This case study illustrates that over time the strength of the link between mine site and mining company administration has weakened, so that Western Mining could administer its Kalgoorlie facilities from Perth, some 600 kilometres away. In part that shift was due to improvements in telecommunications and transport technology, but a significant factor was also the need to have a capital city location, especially as outsourcing became more common.

3. OUTSOURCING IN THE AUSTRALIAN MINING INDUSTRY

The scale of outsourcing in terms of expenditure in the mining industry is indicated in the data displayed in Figure 1. To put that information in context it is important to understand that in 1992-93 the value of outsourced services was \$2,437 Million. That shows the share of total purchases by mining companies that has been outsourced has increased by the order of 5 over the years shown; in particular it shows that change in the past decade has been very rapid. It is clear that mining companies are increasingly looking beyond internal sources for the supply of important services.

An employment measure of outsourcing in mining can be seen in the size of the category *Services to Mining* in the census. As indicated in Table 1, this sector has been expanding rapidly while the industry employment has been relatively stable. In simple terms the 'service' component of the industry accounts for 17 per cent of total employment in 1996, up from 11 per cent in 1981. This shift in focus of the industry has led to some debate about the actual definition of the 'mining industry'. The Australian Bureau of Statistics show that the Labour Force Survey (which allows self definition by individuals on the classification of the industry) produces an employment estimate of around 90,000 people, a number that has been steady since 1990; the direct count of Mining Industry employment carried out by the Australian Bureau of Statistics indicates employment is currently around 58,000, while the Census definition in 1996 shown in Table 1 (which includes services) was 86,117. The Australian Bureau of Statistics believes the gaps in the estimates is due to contracting, and this difference was sufficient to justify 'investigations to determine the extent of contract employment in the mining industry' (Australian Bureau of Statistics, 1996: p. 86).

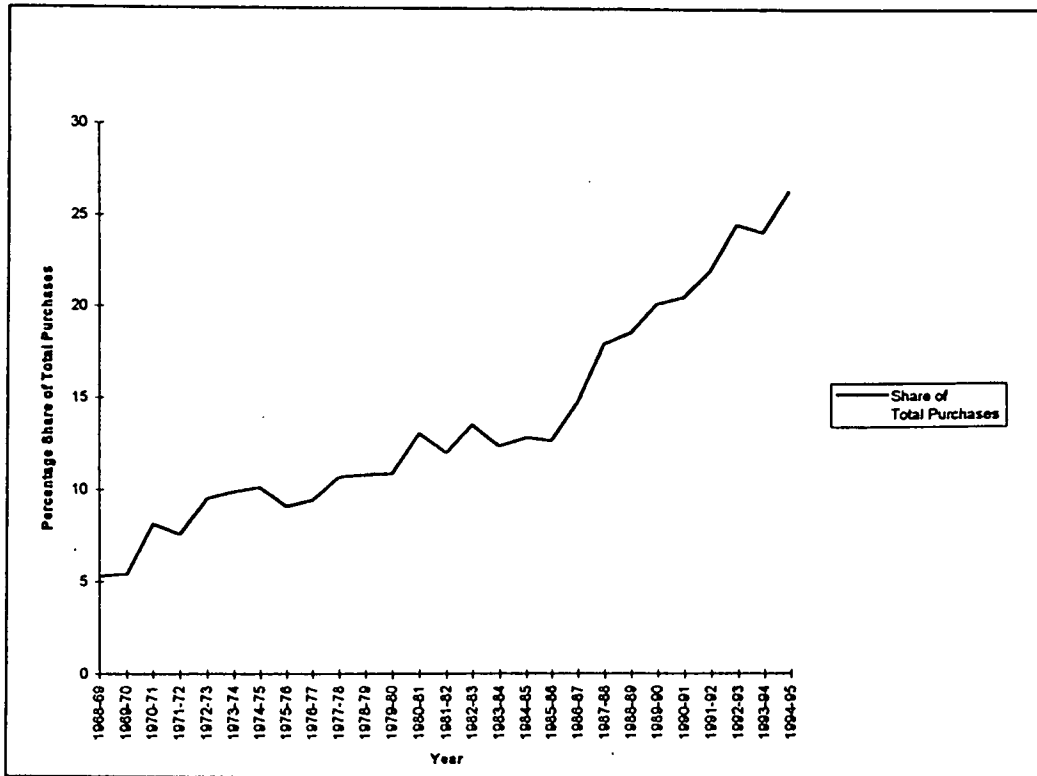


Figure 1. Money Spent on Commission Work, Contracting and Subcontracting 1968-1995

Source: ABS Catalogues 8402.0 and 8412.0, Various Issues

Table 1: Employment in Services to Mining - 1981 and 1996

Employment in:	1981	1991	1996
Services to Mining	9,886	12,289	14,946
Total Mining Industry	88,903	86,607	86,117
Share of Employment in Services to Mining (%)	11	14	17

Source: Census data, 1981, 1991 and 1996.

The fact that the definition of the industry itself is open to question is stark evidence of the way that outsourcing of services has re-shaped the structure and organisation of the sector. From another perspective the scale of the change has also been recognised. This is in industrial relations negotiations where Sydell (1997b) suggests the new scale of contracting has begun to change the positions that unions take in negotiations. That reshaping reflects the technological and

flexibility elements discussed earlier, and has produced a very different industry. The central question now is whether that new industry has begun to produce a new geography of employment and firm location as well.

4. THE LOCATION OF SERVICES WITHIN THE MINING INDUSTRY

For the purposes of the research, a distinction will be made only in terms of metropolitan and non-metropolitan regions. Capital cities (classified as statistical divisions by the Australian Bureau of Statistics) are considered to be metropolitan, and all other statistical divisions within each state are classed as non-metropolitan. That is a crude distinction as much of non-metropolitan Australia (and in particular much of its population and economic development) has little to do with the mining industry. It also does not do justice to the special local role of places like Kalgoorlie, Port Augusta, Broken Hill, and Karatha, which often act as bases for the operation of service companies. In the initial stages of the project thought was given to identifying a *mining industry zone* as a part of the non-metropolitan category, reflecting the physical location of resources. That proved to be a difficult proposition, and to make a start on the project the simple two group approach was used. The simple structure was used as this is a first step in this project, and the two way distinction quickly focuses attention on the economically and demographically large and the small parts in the nation; it also provides a link to on-going discussion concerning the vitality of the non-metropolitan part of the nation. It is likely that the analysis reported below will be explored for individual settlements in a next stage of the work.

To establish a broad context for the research, data on the location of employment in the mining industry in metropolitan and non-metropolitan Australia was assembled for the period 1971 to 1996 (Kershaw, 1997). The first 10 years of this period saw rapid growth in employment in the industry, which then remained relatively stable until a fall in jobs occurred following 1991. The data in Table 2 show that the proportion of national mining employment in metropolitan areas has increased from 20 per cent in 1971 to 22 per cent in 1991, and decreased in non-metropolitan regions. To put this in context, Table 3 shows that the proportion of the total population living in non-metropolitan and metropolitan regions has not changed between 1971 and 1991. When these figures are compared with employment in the mining industry, it is apparent that the location of mining employment is very different to the pattern of settlement in Australia, and that non-metropolitan locations are still the most important sites for activity within the overall industry. That outcome is not surprising as the location of mineral reserves are naturally a significant pull on the location of mining and processing activity. However, the data does show that location of employment in the mining industry is in fact shifting, albeit slowly, towards metropolitan regions. To understand the impact of outsourcing it was necessary to go beyond the simple employment data and look at the location of the key firms, as their office and central facilities would indicate the location patterns that were emerging in the new industry.

Table 2. Location of Employment in the Australian Mining Industry - 1971 to 1996

Year	1971		1981		1991		1996		
	Region	Employees	% share	Employees	% share	Employees	% share	Employees	% share
Metropolitan		11217	15	16539	18	16388	19	16154	19
Non-Metropolitan		64806	85	72464	82	70219	81	69913	81

Source: Census data, 1971, 1981, 1991.

Table 3. Location of National Population - 1971 to 1996

Year	1971		1981		1991		1996		
	Region	Population	% Share	Population	% Share	Population	% Share	Population	% Share
Metropolitan		8052891	63	9237038	63	10601517	63	11233055	63
Non-Metropolitan		4702747	37	5337450	37	6249023	37	6659368	37

Source: Census data, 1971, 1981, 1991.

To gain insight on the location of services, data were assembled from a directory of the mining industry. The data for 1993 was used for the purposes of the study as it fell between the 1991 and 1996 census; there was not enough resources or time to carry out an analysis of another year. The analysis of the directory showed in 1993 there were 646 companies involved in the provision of 87 different services to the Australian mining industry (Jobson's Mining Year Book, 1993). It was not possible to find the employment of each of these services, so that the subsequent discussion is based simply upon the number of offices as displayed in the directory.

The location of those organisations that had Australian offices were then classified into metropolitan and non metropolitan categories. The results of that analysis, displayed in Table 4, shows that service companies strongly favour metropolitan areas as a location for their offices: over three quarters of all offices counted as either a head office or a regional office were in metropolitan areas. For head offices, the metropolitan area is paramount: 84 per cent of head offices of mining service companies are in metropolitan areas. This illustrates that mining service companies favour locations that can offer the corporate networks and related facilities available in the big cities even though they are dealing with resources in remote areas. For regional offices it would be expected that non-metropolitan sites would be more important as these offices would be more involved in the day-to-day dealing with resources and aspects of the mining process. However, only 28% of the branch offices have elected to locate in non-metropolitan areas, even less than the share of the nation's population that live in those parts. A state-by-state analysis of this information (Kershaw, 1997) indicates that non-metropolitan location is more important in Queensland and Western

Table 4. Location of Mining Industry Services, 1993.

Region	No. Head Offices	% Share of National Total	No. Branch Offices	% Share of National Total	Total Offices	% Share of all Offices
Metropolitan	544	84.2	644	72.1	1188	77.2
Non-Metropolitan	102	15.8	248	28.0	350	22.8
Total	646	100.0	892	100.0	1538	100.0

Source: Jobson's Mining Year Book, 1993.

Australia, largely because of the remote location of the resources in those two states. However even there the majority of regional offices are also located in the metropolitan areas, presumably dealing with their remote area responsibilities on a fly in- fly out basis. In overview, this part of the industry also favours the larger cities, consistent with the case study reported on Western Mining Corporation earlier.

The distribution of these offices among the cities of Australia is not even, and provides more insight into their location choices. To interpret that pattern it is important to understand the basic geography of mining industry production within Australia. For the purposes of comparison it would be good to have this information for metropolitan and non- metropolitan areas, but that is not available. Information on state production is available and shows that Western Australia and Queensland dominate the production of this industry, largely as they contain the industry's main resources. That production structure is not simply reflected in the pattern of location displayed in Table 5. The significance of Perth does reflect the production role of Western Australia, but the prominence of Sydney suggests forces other than production influence the location of these services. The distribution of branches is different to that of the head offices, as can be seen in the third and fourth columns of Table 5. Sydney and Melbourne are not as important in the location of branch offices as Perth and Brisbane which together account 31 per cent of the branch offices counted here. Adelaide is also much more important for branch offices than for head offices.

The distinction between the head office and branch office location has long been recognised in the analysis of corporations, as it reflects differences in the location of power, leadership, and innovation. In the current case it shows that many mining service corporations base their offices in major cities and put branch offices closer to their mining industry customers. The preference for major metropolitan areas shows the clustering found in the provision of services like finance and banking is also significant in technical services like those included in this research.

Table 5. Location of Mining Industry Services in Australian Metropolitan Areas 1993.

Region	No. Head Offices	% Share of National Total	No. Branch Offices	% Share of National Total	Total Offices	% Share of all Offices
Sydney	197	30.5	107	12.0	304	19.8
Melbourne	124	19.2	117	13.1	241	15.7
Brisbane	42	6.5	133	14.9	175	11.3
Perth	147	22.8	148	16.7	295	19.2
Adelaide	28	4.3	97	10.8	125	8.2
Hobart	1	0.2	16	1.8	17	1.1
Darwin	2	0.3	19	2.1	21	1.3
Canberra	3	0.4	7	0.7	10	0.6
Total	544	84.2	644	72.1	1188	77.2

Source: Jobson's Mining Year Book, 1993.

The pattern of location shown in the table has a number of implications. At first glance it appears to be a response to size of place. Sydney as Australia's global city provides a diverse commercial milieu for contact between the various parts of this industry and a broad array of other services, reinforced by a frequent air service to the rest of the country, a characteristic shown to be relevant for the location of producer services generally by O'Connor and Edgington (1991). Hence, notwithstanding the fact that there are few prominent mining industry production sites close to Sydney, the commercial milieu of the global city acts as a powerful attraction for the head offices of services. Melbourne, the nation's second largest city is also a prominent place for the location of the head offices of mining industry service companies. That may relate closely to the long term role it has had as a headquarter location for large mining companies within Australia over a considerable period. Melbourne too is not located close to the modern mining industry of Australia, but that does not act as a limit on the location of the offices of these service companies. The role of these two cities confirms the notions that producer services favour the larger cities in a country.

However, in another sense the location pattern does show a response to the location of production facilities. Perth (with good access to the mining resources of western Australia) is a more important location for mining industry services than Melbourne for example, even though Melbourne is several times larger than Perth in terms of population. That suggests some of the services do need to be close to the resources (many of which are in Western Australia) but still require a site within a metropolitan area. Perth can meet both needs. Its large number of both head offices and branches of service companies may in fact create another 'milieu' for mining companies and service firms, linked by their specialised connections in exploration and production. Their proximity to one another increases the ability of success of each individual firm to operate in the industry as knowledge and resources can be easily shared to the benefit of the industry as a whole. However it

is important to note that Perth is one of the main locations of branch offices, showing that for many firms the head office functions still favour major city locations.

Over time, the consolidation of the service sector in Sydney and Perth will probably strengthen not only due to advantages within those cities, but also because many of the companies studied here will become more global in their reach. That is likely as Australian mining companies themselves participate in competition for mineral resources around the world (Gold, 1997). Perth based service companies in particular are well placed to participate in this new trend as they have a shorter flying time to Asian locations where Australian participation in resource development is common. In this way globalisation could strengthen the local concentration effect detected here.

This information indicates that the services provided to the mining industry have some special geographic features. First, their head offices are in metropolitan areas even though their actual activity is non-metropolitan. Second, Sydney is a prominent centre for activity even though it has only a small part of the Australian mining industry. Third, Perth is very prominent as a location as it is located in Western Australia which has diverse mining activity. It is likely that these dimensions of these services may in the long run contribute to a change in the original geography of work in the mining industry, which was in the past primarily anchored to non-metropolitan resource sites. To identify the real impact of these activities it is necessary to know more about the employment involved. Without that at hand, the analysis can report that the service side of the industry has a very different pattern of location to that of production. It is the scale of this difference that lies at the heart of the argument that a new pattern of activity is emerging in this industry.

5. CONCLUSIONS

The use of outsourcing has been growing rapidly in the Australian mining industry. The services that meet the demand have made locational decisions that favour metropolitan rather than non-metropolitan sites. Furthermore that selection involves two cities primarily, one providing a global context, the other offering a base within a resource-rich part of the nation. These outcomes have two implications. The first is that the mix of job opportunities in some parts of non-metropolitan areas, traditionally very dependant on work in the mining industry, may tend to become more narrowly circumscribed, as many of the jobs, especially those involving complex tasks, will be provided by firms hiring labour in capital city locations, perhaps operating in remote locations on a fly in-fly out basis. That means the era of the 'mining town', which has long been a key feature of the character of settlement in non-metropolitan Australia, has a declining future. That change will compound any effects that might be felt from the slowly declining agricultural and pastoral sectors in the remote parts of Australia. Hence the shift toward outsourcing has implications for the community development and economic prospects of non-metropolitan communities, especially where mining

towns have been important local service points for surrounding areas. To be precise about these local impacts the research will need to explore production and service jobs in a number of locations which could take as a starting point Maxwell and Wilson's (1993) analysis of employment in mining towns. A case study methodology of mine operations and service use could be used to follow the issue in more detail.

The shift to outsourced services has another implication. It means that the efficiency and capability of the mining industry is more dependent on the efficiency and capacity of the broader urban and regional infrastructure spread around the country - the air network, telecommunications system and the road network - rather than the infrastructure of the local or regional community in which the mining is based. In this way the mining industry needs to be seen as a national rather than a regional or local industry as perhaps it was seen in the past. That perspective means it could be valuable to analyse the availability of the enabling national infrastructure of air and telecommunications to the long term future of this industry. A quick glance at the national airline network for example shows that the mining centres of the northern part of the nation are obviously key nodes in its structure, and connections to Perth and Brisbane are prominent. In effect the network may simply be the result of the importance of ties between remote sites and metropolitan offices. The shift to outsourcing may require improved facilities and capacity at regional airports. It is possible that the mining industry itself may have to be involved in some of these infrastructure upgrades; alternatively the linkages may be made by private services not requiring large public infrastructure. Here too the local impacts of the industry will be different to what they have been in the past.

In overview, this research shows that outsourcing of services in the mining industry, an example of the development of producer service activity, has contributed to the broader re-shaping of the Australian settlement system. As has been common with producer service location, this activity has become concentrated, has contributed to the contrast between metropolitan and non-metropolitan areas, and has some special local effects, especially in Sydney and Perth. Hence, although the mining industry probably will not retain the impact it once had on remote settlement in Australia, it will continue to reshape and redefine the fortunes of the nation's coastal metropolitan areas. A final consideration could be that the outcomes detected here may be felt in other industries. As knowledge and flexibility become a more significant part of the management and operation of other non-metropolitan activities like agriculture and tourism, so the shift in service jobs toward metropolitan locations could be intensified. As an example, Parsons (1997) research on the fruit and vegetable industry showed that national buyers (based in the capital cities) were exerting a more significant influence on the production and management of local vegetable growing communities. Although the day-to-day production jobs remain anchored by the resource (as they are in the mining industry) higher level activities associated with agronomy, storage and transport are more and more provided by firms in metropolitan

locations. If that outcome is a major trend, the consequences for the provision of a broad range of job opportunities in non-metropolitan communities could be serious.

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