

Regional Economic Multipliers in Australia's Tropical Savannas

**Report for the Tropical Savannas CRC
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Executive summary

The research described in this report is a case study that comprised one, self-contained, investigation within a larger project: the Outback Livelihoods project, commissioned by the Tropical Savannas CRC (TS-CRC). The case study sought to generate estimates of economic multipliers associated with key industries across his important region, thus providing locally relevant data on economic conditions and industry interactions in Australia's north.

Covering an area of more than 1.9 million km² the tropical savannas stretches from roughly Townsville in the east to Broome in the west. Despite the fact that this region covers approximately 25% of Australia's mainland, it is home to only 3% of all Australians—a little more than 604,000¹ people. Most of the region is therefore sparsely populated and relatively little is known about the expenditure patterns of industries in the area.

It was, therefore, important to collect locally relevant data, because the economic structure of communities in the savannas is different to that of larger Australian communities. In the savannas, for example, the retail sector is the most substantial in terms of gross annual turnover. But the government, mining and agricultural sectors are the most important providers of employment in remote areas, and some industries that feature prominently within large urban centres (such as manufacturing and wholesale) are all but non-existent in remote parts of the savanna. Consequently, one also expects the industry interactions within these communities to be different to the industry interactions in large urban centres.

Rather than using a resource-intensive technique to estimate multipliers (such as compiling a computable general equilibrium model), researchers involved in this study used an established 'short-cut'; collecting survey data on the expenditure patterns of different organisations to estimate a range of locally relevant 'business-level multipliers'.

This required researchers to (a) develop and test an appropriate questionnaire; and (b) conduct a broad-scale survey of businesses and other organisations across a wide range of industries and regions. The sectors and groupings used in the survey follow the New Zealand Standard Industry Classification (ANZSIC) definitions—which are also used by many other economic modellers. Hence, the final multiplier estimates were able to be compared with other models (see page vi for the definition of terms).

The original intention had been to conduct the surveys in two phases: using telephone interviews (in a preliminary, tourism case study); and using email. However, administrative issues associated with the use of email for data gathering meant that Phase 2 could not be completed as planned. Consequently, researchers collected supplementary data in a postal survey (Phase 3).

In total, 978 organisations from 17 industry/enterprise sectors across most postcodes completed and returned the questionnaires. While the sample is imperfect (particularly given the low number of responses in the communications and electricity sectors) it can nevertheless be considered to be reasonably representative of organisations in the savannas and makes a significant contribution to the existing set of knowledge about industries and enterprises in northern Australia.

Most respondent organisations were relatively small—the median number of employees was generally fewer than 10, and those employees often worked part time and/or were members of the family that owned the organisation. The largest organisations (in terms of number of employees and gross annual turnover/budget) were those in mining and government.

Despite the fact that Aboriginal and Torres Strait Islanders (ATSI) comprise more than 25% of the population in the savannas, they were under-represented in the sample; fewer than 6% of respondent organisations were owned or operated by ATSI and only 14% of employees were ATSI.

The expenditure patterns of organisations located within the savannas seemed to differ somewhat to those of their wider Australian counterparts, as typified by the finding that many businesses within the savannas spent a larger share of revenue on labour than the 'average' Australian business within the same sector. This is particularly evident in the agricultural sector.

Across all respondents, the highest average percentage of revenues went towards wages and salaries (almost 20%). Respondent organisations also spent a relatively large share of total revenues within the retail sector (16.6% of all revenues); monies set aside for savings/profits (7.0% of total revenues) was the next big-ticket item. Expenditure in other sectors comprised less than 6% of all revenues—the smallest amounts, on average, going to the mining, personal, government, cultural and health sectors. While every sector was found to spend at least some revenue on wages and salaries, and on retail goods, few organisations spent a significant portion of revenues on their goods and services that were provided by the agricultural or mining sectors.

¹ Stoeckl and Stanley (2004)

Across all respondents, goods and services provided by the education sector were most likely to be ‘imported’ from outside the local postcode (or town, if the town contained more than one postcode). Other goods and services which were frequently imported from outside the local postcode included those provided by the wholesale, transport, retail, and manufacturing sectors, with less than 75% of total expenditure within each of these sectors being spent with locally based businesses. More than 90% of all expenditure in the mining, personal and cultural sectors was spent with locally based businesses.

After accounting for imports, the local (within postcode) household sector was found to receive the largest share of revenues, when expressed as a percentage of total organisational revenues—17% on average. The retail sector was the next largest recipient; with local retail traders receiving an average of 8% of organisational revenues. Financial flows to other local businesses were generally quite small.

Organisations within the government and health sectors had the strongest backward links. On average, more than 60% of their total revenues/budget were spent within their local communities (postcodes). Consequently, the largest business level multipliers were found to be those associated with those organisations (2.1 for health and 2.04 for government). By contrast, the lowest business level multipliers occurred within the accommodation and transport sectors (1.4 and 1.5).

One implication of this result is the important suggestion that an expansion of the health or government sector could do more to promote regional development than an equal expansion of the accommodation or transport sector. This is somewhat disheartening news to those interested in promoting regional development in an era when trends are to reduce, rather than increase, government expenditure.

Ultimately, decisions about how much governments should spend in rural areas must be made in the political arena, but it is worth emphasising an important point. The labour force will be more productive if it is healthy, well educated, and has access to land, capital, and public infrastructure. So increased expenditures on health, education and public infrastructure might not only create short-run benefits like those estimated here. They could also create long-term regional benefits by increasing productivity and alleviating rural poverty. Furthermore, these long-term productivity gains could help mitigate any medium term ‘crowding-out’ effects that might occur in response to an increase in government or private expenditure. For example, mining companies in rural and remote Australia are currently finding it difficult to recruit employees even though there is unemployment in many communities and mass unemployment in the Indigenous communities. More investment in education/training and health would allow the rural and remote unemployed to gain these jobs while simultaneously alleviating some of the labour shortage problems of rural employers.

Significantly, this research does not simply provide information about the size of multipliers so that readers can ‘judge’ or argue about the importance of different industries to regional development. It also provides information about factors that influence the size of regional multipliers. Instead of arguing about how best to ‘inject’ funds into a regional economy (in an attempt to provide what may only be a temporary stimulus), policy makers can use this information to think about ways to increase the size of regional multipliers, thereby creating sustained benefits that build upon the strengths of *existing* local industries.

This research indicates that much of the difference in the size of multipliers was attributable to the fact that different industries/sectors had different input requirements, and that only some inputs were widely available across the savannas. Organisations with relatively high business-level multipliers—those in the government and health sectors—used inputs that were prevalent throughout the savannas (inputs provided by households, retail, agriculture and, to a lesser extent, construction). In contrast, organisations with relatively low business-level multipliers—those in the accommodation and transport sectors—spend comparatively less on wages and retail goods and comparatively more within sectors that are not generally prevalent in remote areas (e.g. the cultural, wholesale, property, transport, manufacturing sectors).

This suggests that it may be possible to increase the size of local multipliers by encouraging the development of ‘support’ industries—the overall aim being to provide existing organisations with the *option* of purchasing goods and services locally.

Businesses that seek to earn money by supplying inputs to other businesses will only receive a portion of the total revenues received by those at the ‘top’ of the supply chain (government organisations, for example, spend only 15% of their budget within the construction sector). But a small portion of someone else’s revenues is still greater than a large portion of nothing. So the option of setting up a business that ‘supports’ an existing local enterprise may be preferable to the alternatives of (a) receiving no income at all, or (b) competing against existing businesses for scarce customers. Further, some individuals may like the option of running a part-time business and others may be able to provide inputs to multiple businesses, thereby receiving multiple portions.

Such a strategy will only work if existing organisations are both willing and able to purchase inputs from within their local area. Some of this will, necessarily, depend on how expensive local products are when compared to similar imports. But some of this will also depend upon the purchasing policies of local organisations. In other words, it may be possible to raise the size of local multipliers by encouraging existing organisations to source

required inputs locally, since this may help stimulate the development of new regional industries. It is, however, important to bear in mind that the key reason for using a ‘buy-local’ policy is to provide short-term support to emerging industries. Once local supply chains are fully operational, buy local policies may be neither necessary nor desirable.

Little can be done to force a change in the purchasing policies of private companies. In some cases, local or state/territory governments may be able to encourage ‘good neighbour’ policies, which involve increasing local purchases of inputs. Local governments might also wish to consider the presence or absence of ‘buy (or employ) local’ policies when assessing the merits of building applications. Similarly, those negotiating mining concessions may wish to give preferential treatment to enterprises with this type of policy, which is already done under many Indigenous Land Use Agreements (ILUAs). At the very least, agreements could give preferential treatment to enterprises that are not party to contractual arrangements which *require* them to import goods and services from outside the local area.

There may also be scope to reconsider government purchasing policies, most of which focus on the cost savings that can be had by competitive tendering. These policies may, unintentionally, favour large urban suppliers and may even require some government departments to import commonly purchased goods from outside the local area. A purchase-local policy (where possible) would no doubt raise the operating costs of some government departments—particularly those operating in remote areas. But if such a policy increased local employment, then it might also reduce the need for other government departments to provide regional income support. If the savings made via reduced income-support payments outweigh the extra costs of the buy-local policy then the net effect will be to reduce the taxpayer burden.

Of course, whether or not buy-local policies have the potential to create both regional and national economic benefits is an empirical question. As is almost always the case, there is unlikely to be a ‘one size fits all’ answer. Buy-local policies may create net benefits in some regions, but probably not in all, and further research may be necessary to identify promising regions in which to test such policies.

This leads into what is, perhaps, *the* most important message of our research: those who are interested in regional development should not just think about the (final) goods and services that are delivered to or produced within remote communities. They should also think about the inputs that are used to produce, or deliver, those goods and services. The development paths of rural and remote communities will be just as heavily influenced by decisions that are made regarding input usage as they are by decisions regarding outputs. Indeed, input use decisions may be *more* important; when organisations purchase inputs from a variety of different sectors within a rural community they promote industrial diversification. This will ultimately increase that community’s resilience, thereby ensuring that the development path is sustainable into the long run.

New Zealand Standard Industry Classification (ANZSIC) definitions

Retail Trade	e.g. petrol stations, supermarkets, butchers etc
Construction and trade services	e.g. building construction, trade services etc
Property and business services	e.g. cleaning services, accountants, lawyers etc
Finance and insurance	e.g. banks, insurance, finance etc
Agriculture, forestry and fishing	e.g. farming, horticulture, aquaculture, fishing etc
Accommodation, cafes and restaurants	e.g. hotels, cafes, restaurants, casinos, RSLs etc
Health and community services	e.g. childcare services, medical services, vets etc
Transport, travel and storage	e.g. air, road, rail or sea transport, warehousing
Cultural and recreational services	e.g. libraries, museums, radio and TV services etc
Personal and other services	e.g. households employing staff, religious organisations
Manufacturing	e.g. food and beverage manufacturing etc
Educational services	e.g. schools, adult/community colleges
Government administration and defence	e.g. public administration, justice etc
Wholesale trade	e.g. builder supplies wholesaling etc
Communication services	e.g. postal and courier services etc
Mining, quarries and related services	e.g. sand and gravel, coal mining etc
Electricity, gas and water supply	e.g. sewerage and drainage services etc

Abbreviations and acronyms		Industry/Sector	Abbreviation
ABS	Australian Bureau of Statistics	Accommodation, Cafes, Restaurants	Accommodation
ANZSIC	Australia & New Zealand Standard Industry Classification	Agriculture, Forestry and Fishing	Agriculture
ARIA	Accessibility/Remoteness Index of Australia	Communication Services	Communications
CD	Collection district	Construction and Trade Services	Construction
CDEP	Commonwealth Development Employment Project	Cultural and Recreational Services	Cultural
CGE	Computable general equilibrium	Educational Services	Education
CRC	Cooperative Research Centre	Electricity, Gas and Water Supply	Electricity
FT	Full-time	Finance and Insurance	Finance
GRIMP	Grit Impact Program	Government Administration & Defence	Government
GSP	Gross state product	Health and Community Services	Health
IO	Input-output	Manufacturing	Manufacturing
JCU	James Cook University	Mining, Quarries and Related Services	Mining
LGA	Local government area	Personal and Other Services	Personal
NATSEM	National Centre for Social and Economic Modeling	Property and Business Services	Property
NT	Northern Territory	Retail Trade	Retail
OL	Outback Livelihoods project	Transport, Travel and Storage	Transport
PT	Part time	Wholesale Trade	Wholesale
QLD	Queensland		
SAM	Social accounting matrix		
SD	Statistical Division		
SLA	Statistical Local Area		
TRYM	Treasury Macroeconomic Model		
TS	Tropical savanna(s)		
VRD	Victoria river district		
WA	Western Australia		

1 Introduction

1.1 Background

Covering an area of more than 1.9 million km² the tropical savannas stretches from roughly Townsville in the east to Broome in the west. Regions include the Kimberley, Darwin–Kakadu, the Victoria River District–Sturt, Arnhem Land, the Gulf Country (Gulf of Carpentaria), the Mitchell grasslands, Cape York Peninsula and north-east Queensland².

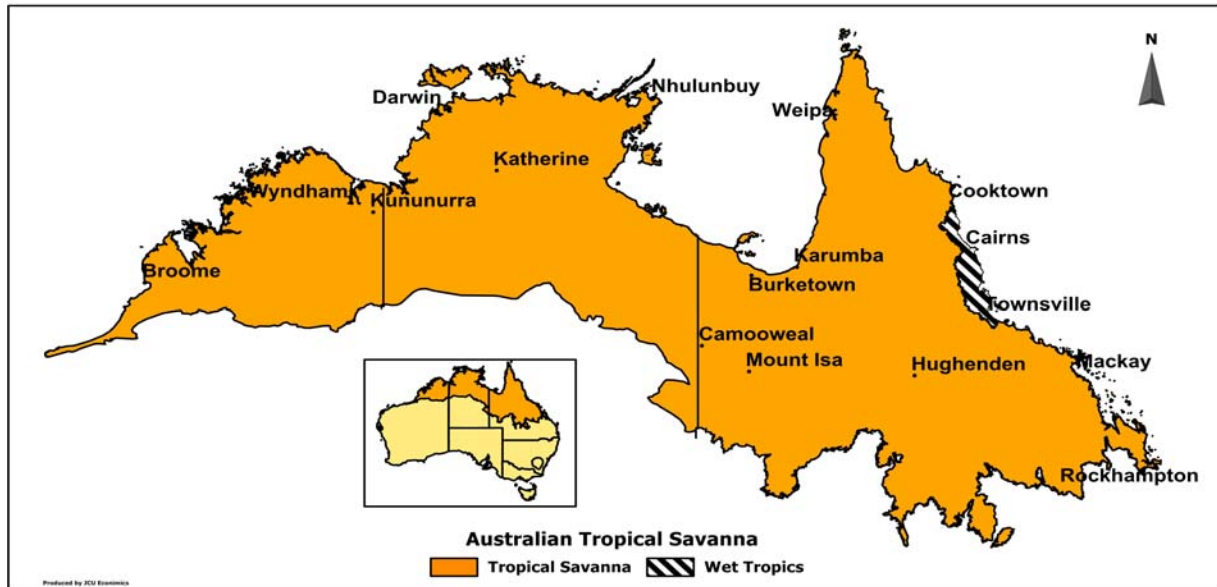


Figure 1: Australia's Tropical Savannas

Despite the fact that the region covers approximately 25% of Australia's mainland, it is home to only 3% of all Australians—a little more than 604,000³ people. Most of the TS region is therefore sparsely populated. Notwithstanding this small and sparsely distributed population, the region accounts for around 30% of the nation's exports and has contributed to more than one-third of Australia's export growth in the past 30 years (Greiner et al 2004). Evidently, there is much potential—and much interest—in the economic growth and development of northern Australia (Chapman et al, 1996; Land and Water Australia 2005).

As noted by Jackson and Murphy (2006) however, employment in the regionally based industries of agriculture and mining declined from 5.7% of the total workforce to 4.9% between 1991 and 2001. In contrast, employment in tourism-related fields increased from 5.8% to 7.3% of the workforce over that same period. Clearly, the economic structure of many communities within regional Australia is undergoing significant change and one cannot assume that the future pattern of economic growth and development will simply follow patterns of the past (even if one did think those patterns were desirable to follow).

Further, communities of the TS differ from communities in other parts of Australia in many ways, including, but not limited to, population density, population growth rates, remoteness, and ethnicity.

Most postcodes within the TS, for example, are geographically large and contain few people (Figure 2). Consequently, population densities in the TS are generally much lower than that of Australia as a whole (Figure 3). For the most part, there are fewer than 0.2 persons per km². Notable exceptions occur in and around the towns of Darwin, Katherine, the Atherton tablelands, and other communities along the southern coastal strip of the TS. Perhaps not surprisingly, most postcodes within the TS are classified as 'very remote', having an ARIA+ (Accessibility / Remoteness Index of Australia) of more than 10.434.

² Savanna Explorer: <www.savanna.org.au>

³ Stoeckl and Stanley (2004)

⁴ Specifically, the ARIA indexes are derived from measures of road distance between populated localities and service centres. These road distance measures are then used to generate a remoteness indicator between 0 (most accessible) and 15 (most remote). Any region with an ARIA+ greater than 10.43 is considered to be very remote. See GISCA (2006) for further information.

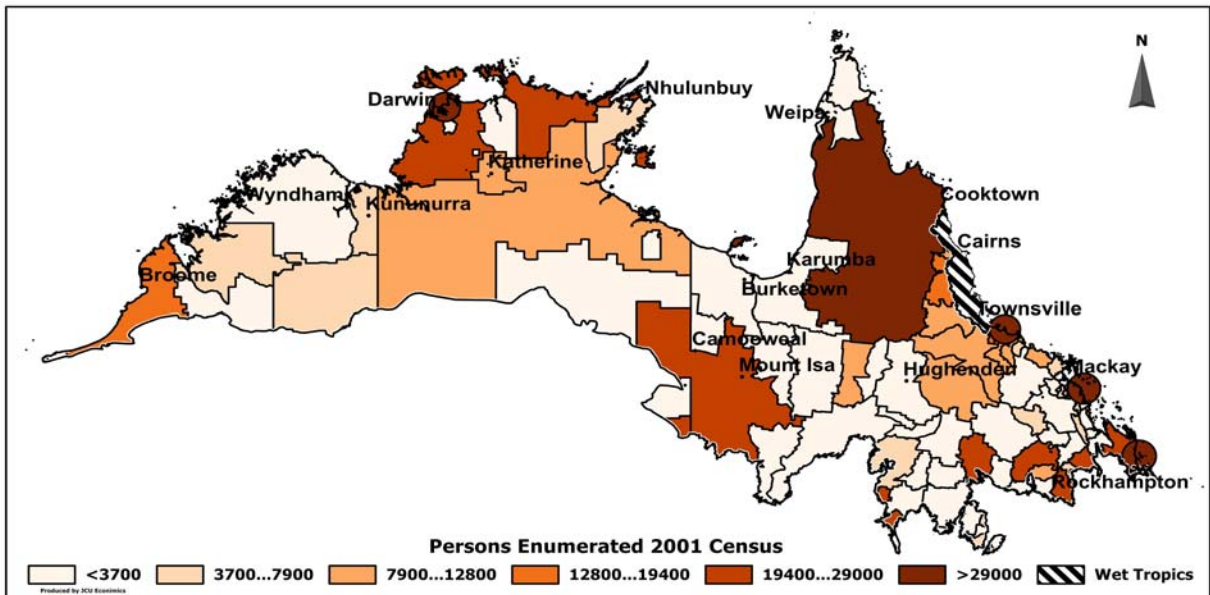


Figure 2: Population—enumerated persons by postcode

Data Source: ABS CDATA 2001

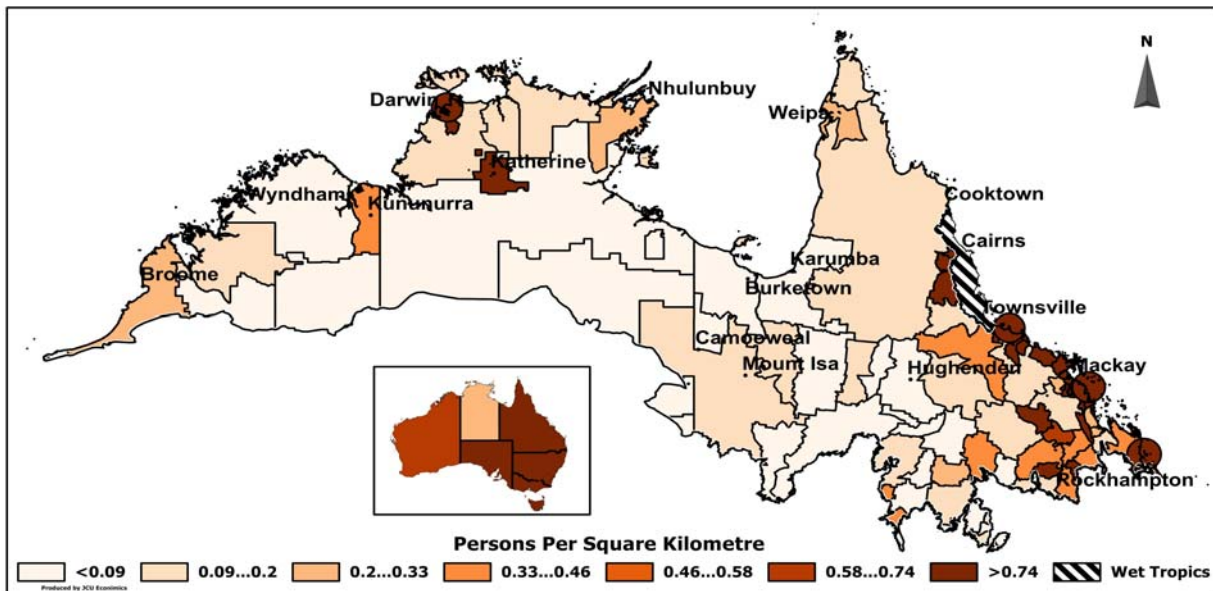


Figure 3: Persons per square kilometre—by postcode

Data Source: ABS CDATA 2001

Unlike many other Australian communities, a relatively large proportion of TS residents are of Aboriginal or Torres Strait Islander descent (ATSI). In the 2001 census, only 2.1 % of Australia’s population identified themselves as being of ATSI descent; yet as shown in Figure 4, ATSI people comprise more than 25% of the population of most postcodes across the TS.

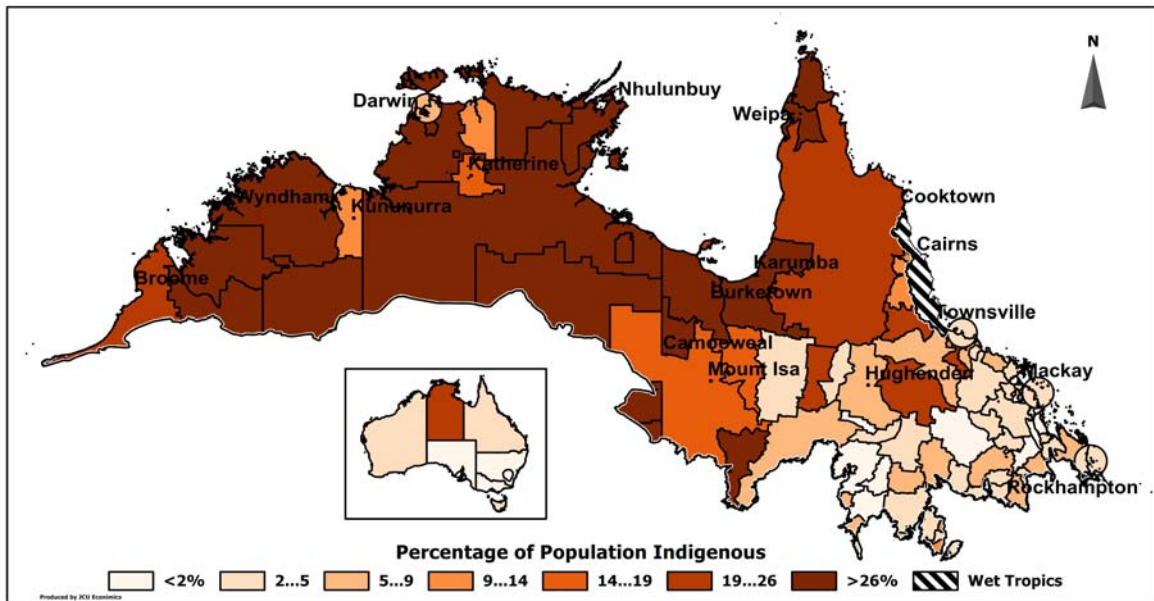


Figure 4: Percent of population ATSI—by postcode

Data Source: ABS CDATA 2001

The relatively high proportion of ATSI people in the TS may at least partially account for the relatively high population growth rates in these areas. The fertility rate of Indigenous people is higher than for non-Indigenous people (ABS, 2006a). And despite rumours of rural population decline across Australia as a whole, there are some areas within the TS region where populations have been rising relatively rapidly. This is particularly true of the north and western regions of the TS (Figure 5).

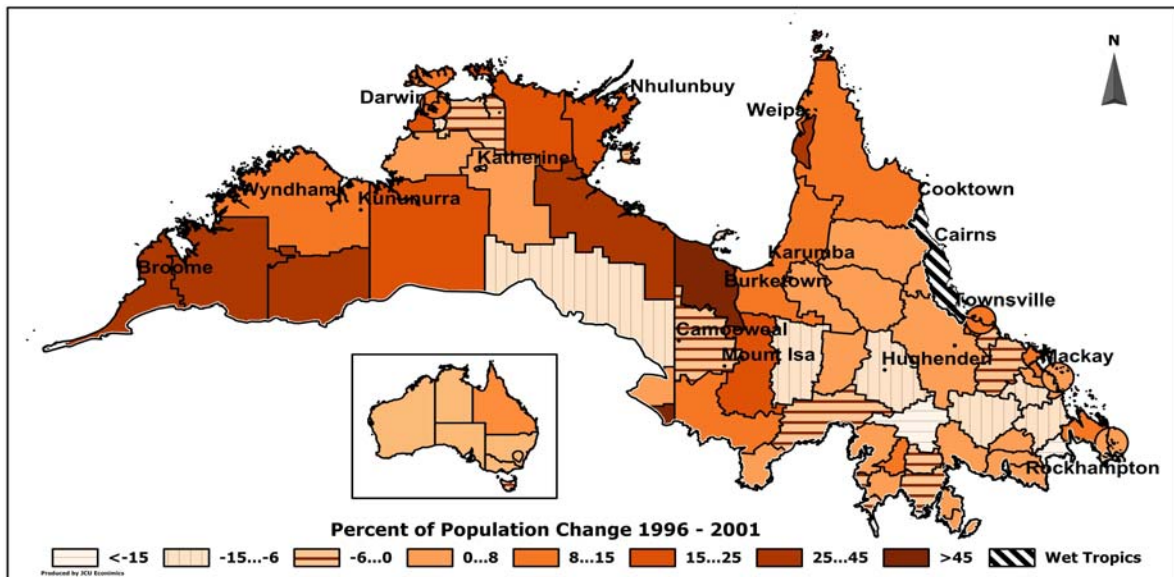


Figure 5: Percentage change in the number of persons enumerated between 1996–2001, by SLA Data Source: ABS CDATA 2001

The relatively high proportion of Indigenous persons within the TS may also partially explain the relatively low labour force participation rates since the Indigenous population of this area is known to have low participation rates (Commonwealth of Australia, 2005). As shown in Figure 6, in 2001, large parts of the Northern Territory, and parts of north-western Western Australia had labour force participation rates⁵ that were considerably less than other Australian state averages. In contrast, labour force participation rates in some parts of the TS (notably, those around Weipa and the inland areas near Mackay) were much higher than the average participation rates in other Australian states.

⁵ Measured as the percentage of population in the workforce.

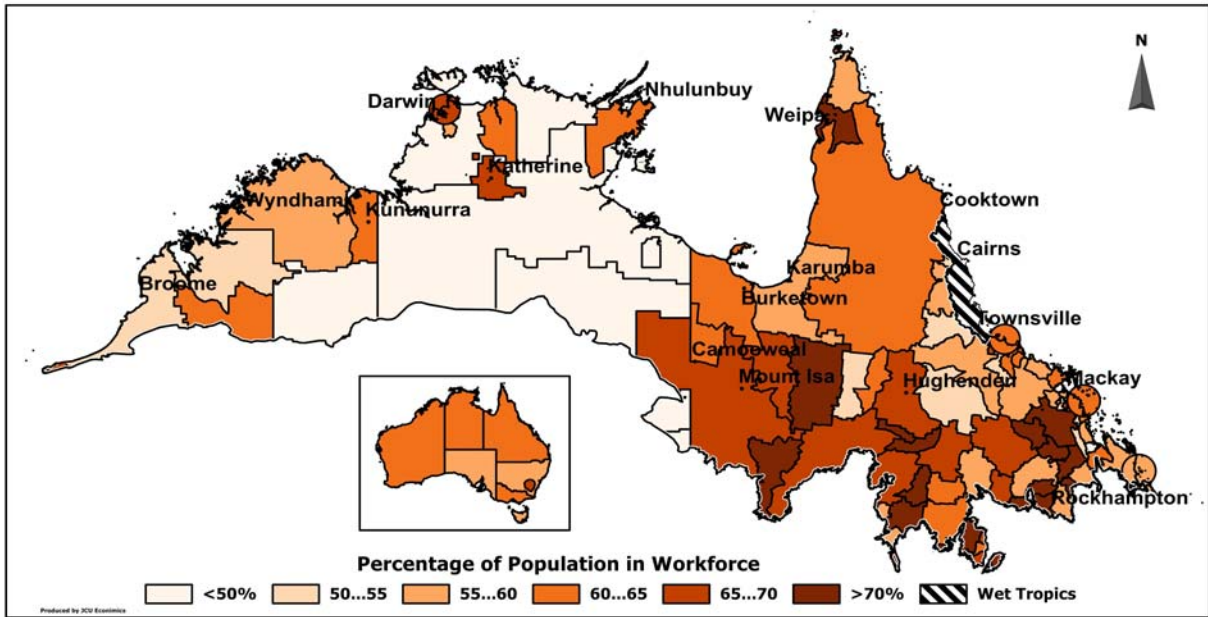


Figure 6: Percentage of population in workforce—by postcode Data Source: ABS CDATA 2001

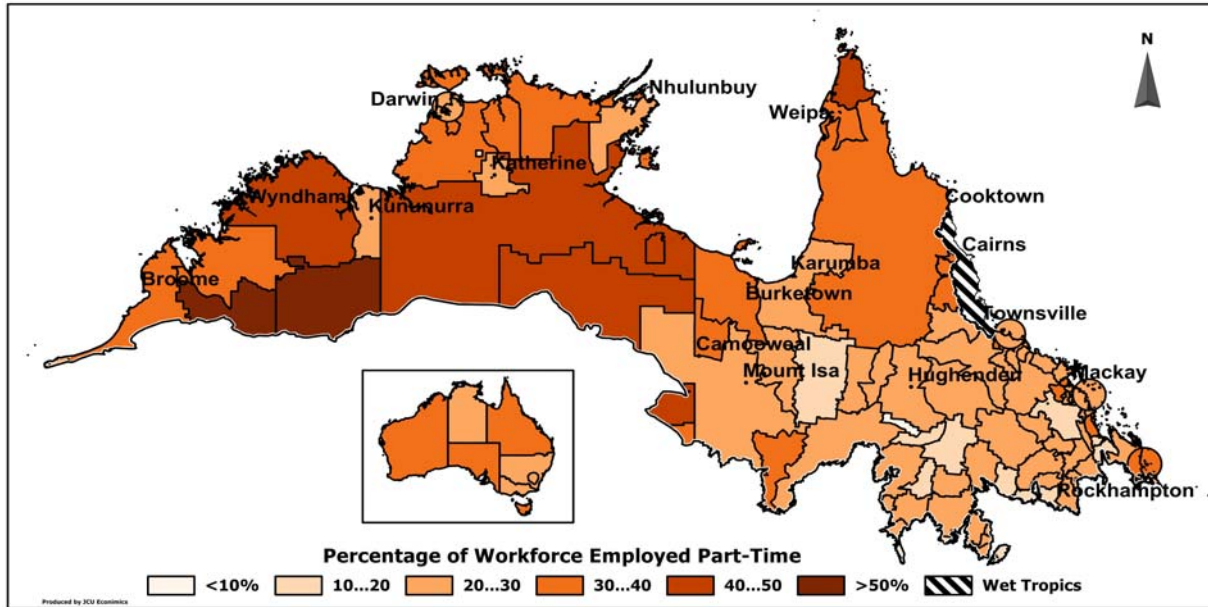


Figure 7: Percentage of workforce employed part-time—by postcode Data Source: ABS CDATA 2001

Interestingly, the 2001 Census data also indicates that many remote parts of the TS (particularly in Western Australia, the Northern Territory excluding Darwin, and Cape York Peninsula) had a relatively high percentage of the workforce employed part-time, compared to the Australian states. As can be seen in Figure 7 there were some postcodes within the TS region where more than 50% of the workforce is employed part-time.

While this contrasts with the Australian average of 30% of the workforce employed part-time and the NT average of 29% of the workforce employed part-time, it accords with findings of the Commonwealth of Australia (2005, p 11.13) who report that Indigenous persons living in ‘very remote’ and ‘remote’ parts of Australia are more likely to work part time than those in larger centres⁶ (these may be mainly CDEP workers who do not work a full 38-hour week).

It also seems that during 2001, remote workers of the TS region were less likely to be employed in ‘white-collar’ jobs (i.e. as professionals, para-professionals or managers) than their urban counterparts (Figure 8).

⁶ Approximately 62% of Indigenous persons living in ‘very remote’ areas are employed on a part-time basis. Approximately 40% of Indigenous persons living in ‘remote’ areas are employed on a part-time basis. The urban average of ATSI’s employed on a part-time basis is 26%.

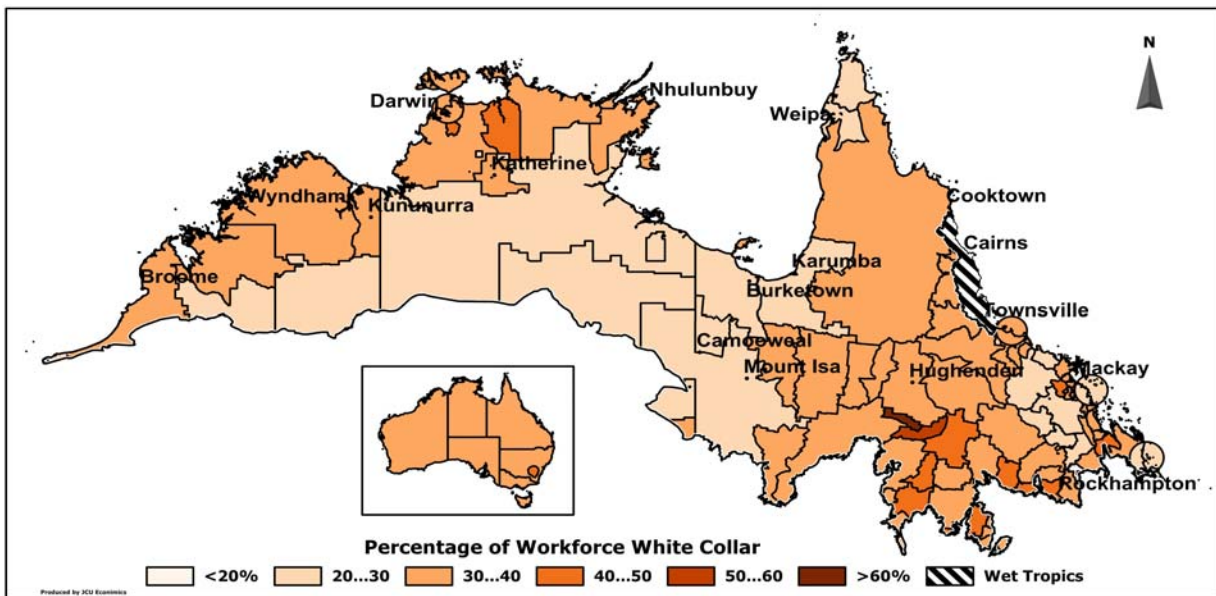


Figure 8: Percent of workforce in 'white collar' jobs—by postcode Data Source: ABS CDATA 2001

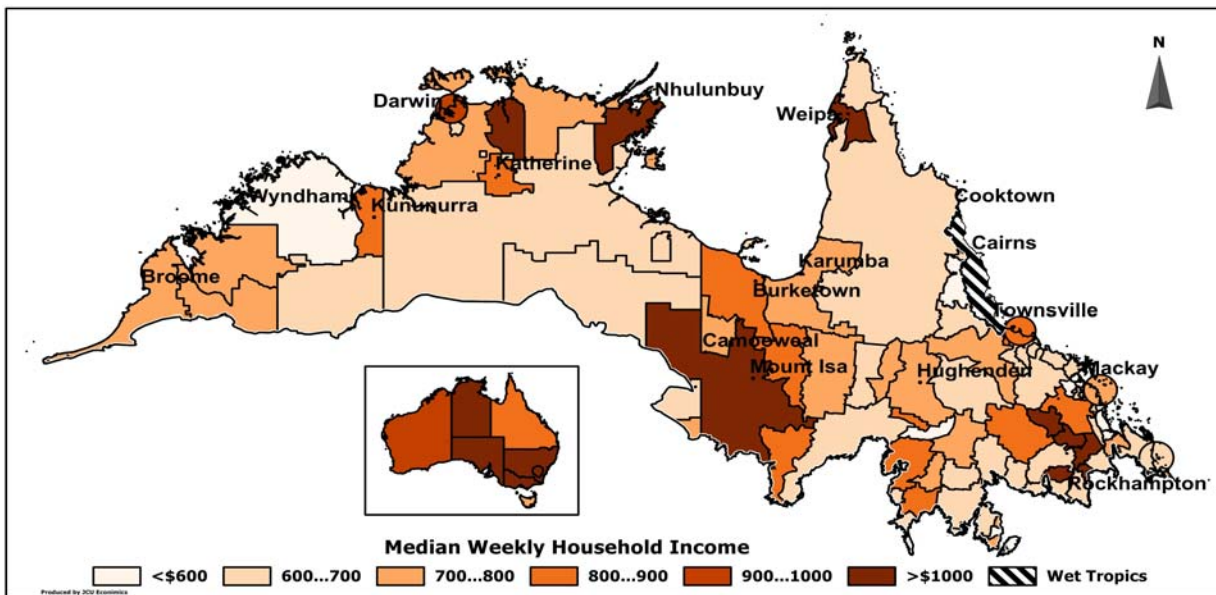


Figure 9: Median weekly household income—by postcode Data Source: ABS CDATA 2001

Given the relatively low labour force participation rates, the relatively high rates of part-time work and the prevalence of 'blue-collar' jobs in the remote parts of the TS, it is not surprising to also find that household incomes in these remote areas were generally less than those of Australia's southern states⁷ (Figure 9). Notable exceptions occur in and around some of the large mining communities (e.g. near Mackay/Rockhampton, Weipa, Mt Isa, Jabiru and Kununurra). To repeat a point made by Freebairn (2003), there are both advantaged, and disadvantaged Australians throughout the country.

1.2 Aims of research and structure of report

Given the above diversity, one expects there to be differences between the economic structure of communities in the TS and that of Australia as a whole. Those interested in making predictions about the path of economic development in the north, may not, therefore, be able to simply 'adopt' predictions derived from more populous parts of Australia. And since the economic structure of many communities within regional Australia is undergoing significant change one cannot assume that the future pattern of economic growth and development will simply follow patterns from the past.

Yet, "if regional development is to be associated with the improvement of economic and social prospects for people within a region, as opposed to simply optimising the size of gross regional product, then it is incumbent upon analysts and practitioners to construct regional development strategies around an elevated understanding of

⁷ A similar story is obtained if one examines the distribution of individual incomes across the TS.

local scale economic and social interactions” (Pritchard, 2005:91). And there is a clear need for “creative and innovative solutions to the complex economic development issues faced by remote Indigenous communities” (Altman, 2004).

Sadly, there is relatively little information detailing either economic or social interactions at a fine geographic scale across the entire TS: the region is “Land rich, and data poor” (Stoeckl and Stanley, 2005). In an attempt to alleviate at least part of this information deficit, the Tropical Savannas CRC commissioned the Outback Livelihoods (OL) project in 2005, which had following key objectives:

- To improve understanding of the cultural, social and economic issues affecting outback communities and their linkages with ecological issues.
- To provide products and processes to assist community discourse and decision making on alternative futures and investment priorities.
- To use the key insights from this understanding to better inform regional policy and processes in the three jurisdictions covered by the OL project
- To develop social and economic indicators of regional health and socio-economic resilience to complement existing ecological indicators.

The research described in this report relates to a case study that comprised one, self-contained, investigation within that larger OL project. Specifically, this case-study sought to generate estimates of economic multipliers associated with key sectors across the TS, thus contributing to each of the four key objectives of the ‘parent’ project by providing locally relevant data on economic conditions and industry interactions in Australia’s far north.

A key problem faced by researchers working on this project, is that there are many different ways of describing the importance of different industries within regional communities. And there are also many different ways of looking at the financial links between regional industries and of trying to estimate multipliers. But they do not always ‘tell the same story’.

Researchers can, for example, look at the contribution that each industry makes to gross regional product (similar in concept to examining output multipliers). Likewise, they can look at the income earned by workers in different industries (similar in concept to looking at income multipliers), or at the proportion of the total workforce employed in each industry (similar in concept to looking at employment multipliers). Or they can monitor the spending patterns of residents, or measure the time and effort devoted to different activities. Figure 10 shows the total, Australia-wide, income from each of the Australian and New Zealand Standard Industry Classification (ANZSIC) industry sectors. This clearly demonstrates that the manufacturing, wholesale and retail sectors were the three largest Australian industries in terms of income generated during 2003–04. But it was the property manufacturing and retail sectors which paid out the highest amounts in wages and salaries (Figure 11).

In short: different approaches to determining the ‘importance’ of an industry lead to different conclusions—and it is difficult to determine which approach is ‘best’.

Further, to the best of the author’s knowledge there are no publicly available data about the contribution that different industries make to gross regional product at a fine geographic scale across the entire TS⁸. Neither are there publicly available data on the income derived from different industries in remote communities across all of Australia’s savannas, or on the spending patterns, or preferred activities of the region’s residents. The ABS’s Household Expenditure Survey, for example, takes its sample from regions where there are more than 0.6 dwellings per square kilometre (ABS, 2005), thereby excluding most of the geographic area of the TS (see Figure 3). And there are no data relating to the size of multipliers in different industries for small communities across the entire TS.

So researchers were not able to rely on available data sources to determine the relative importance of different industries to communities of the TS or to estimate regionally relevant multipliers; other types of data had to be used. In this case study, researchers therefore used both secondary data and primary data collected from a survey of more than 900 organisations from each of the 17 different ANZSIC sectors in 127 different postcodes of the TS. This report presents and analyses some of that data, and is structured as follows:

The following sub-section discusses the range of methods commonly used to estimate regional multipliers and then outlines the approach taken in this study. This is an important section, since the approach taken here is subtly, but distinctly, different from that taken in many other regional studies, and an understanding of this approach is essential to a proper understanding of the results.

⁸ Although the National Centre for Social and Economic Modelling has been exploring methods of creating ‘synthetic’ databases which may, eventually, be capable of providing this type of information (See Lloyd and Harding, 2004; Taylor et al 2004; and Melhuish et al, 2002).

Section 2 focuses on the survey. It describes the way in which the survey instrument was developed and tested in a tourism case study (Section 2.2), before expanding the investigation to include a larger range of industries across the entire TS region (Section 2.3). It also presents some descriptive statistics on the structural characteristics of respondent organisations (Section 2.4).

Section 3 begins the formal analysis by attempting to determine the relative importance of different industries to communities within the TS. It does this in three ways: using ABS employment data; using survey data on respondent perceptions of the availability of different industries; and using survey data regarding the gross annual turnover of respondent organisations.

Section 4 focuses on the financial flows of organisations within the TS. It uses the survey data to describe the expenditure patterns of organisations from a variety of industries in the TS, and seeks to determine if the expenditure patterns of those organisations varies according to the remoteness of the organisation. It then uses that information to estimate regional business-level multipliers, and compares those estimates to others obtained by researchers for other regions.

The final section discusses some of the policy implications of this project’s findings and makes some concluding comments.

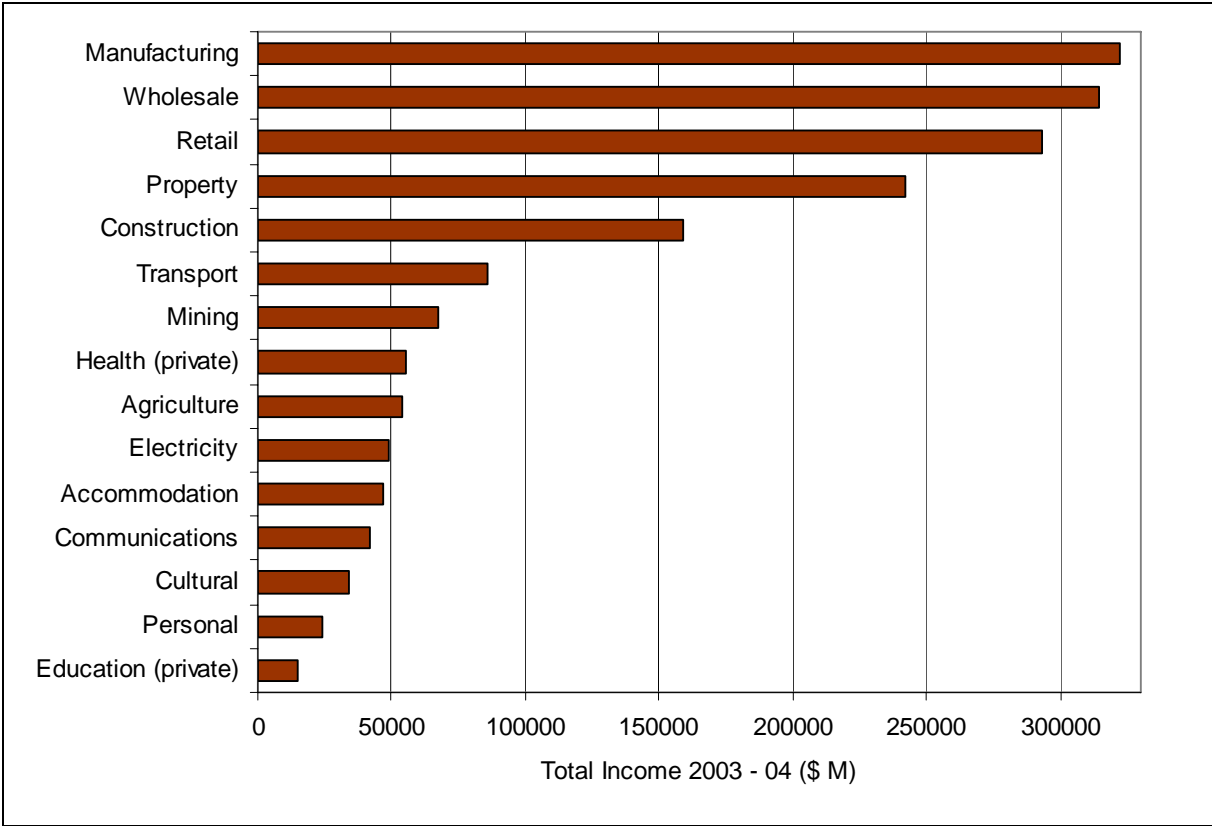


Figure 10: Total Income by industry, 2003–04 (\$m)

Source: ABS, 2007a

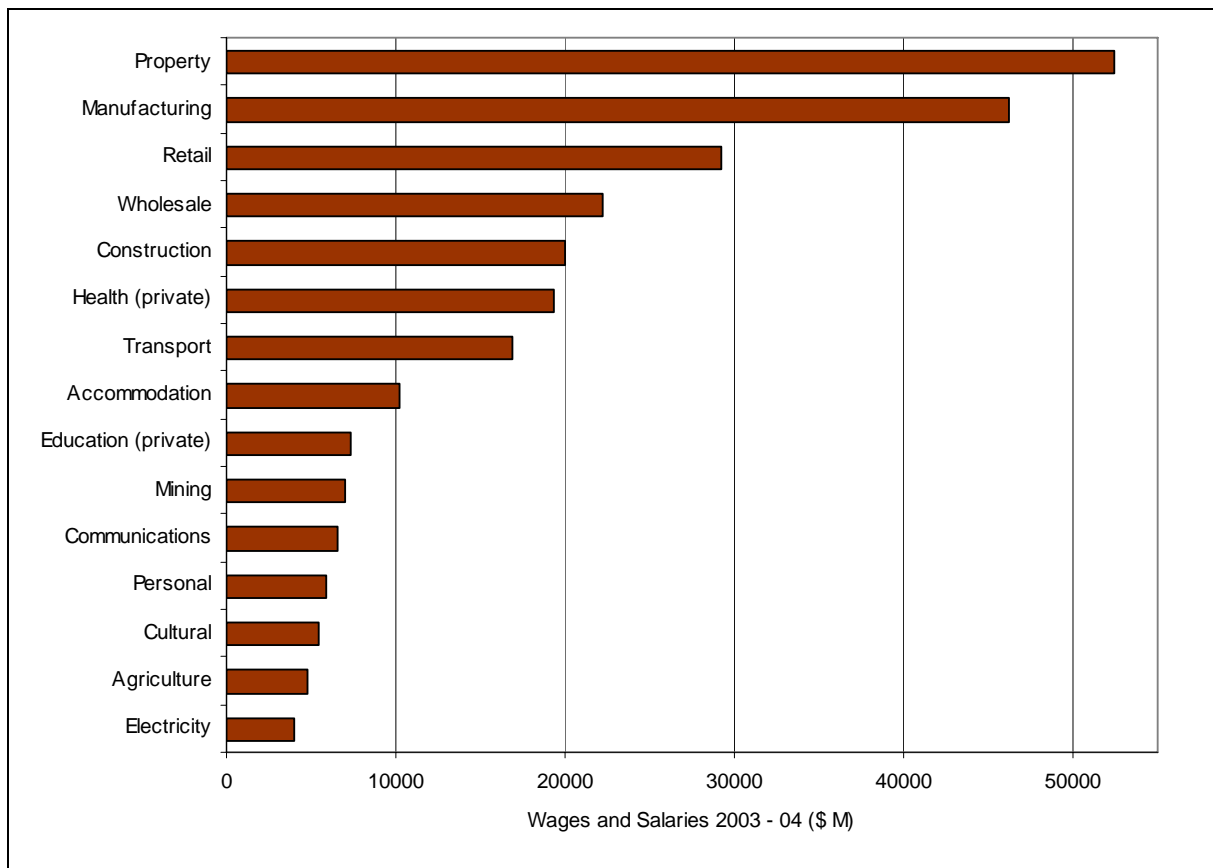


Figure 11: Wages and salaries by industry, 2003–04 (\$m)

Source: ABS, 2007a

1.3 Methodological issues: approaches to estimating multipliers

It has long been acknowledged that the total increase in expenditure for a region or country resulting from an initial increase in expenditure (ΔE) can be greater than just the initial ΔE . This is based on the idea of multipliers—a concept introduced by Kahn and made famous by Keynes (1936). At the risk of oversimplifying a well-understood phenomenon, the key point is that extra money that is ‘injected’ into an economy will, over time, work its way around the community in ever-diminishing circles. In some circumstances the extra expenditure will follow a geometric progression, so that it is possible to calculate the total change to regional income over the course of one year (ΔY) that follows from an initial injection of monies (ΔE), *ceteris paribus*, using Equation 1.

$$\Delta Y = \frac{1}{1 - \text{proportion of extra income re-spent within the local economy}} \times \Delta E$$

$$\Delta Y = \kappa \Delta E$$

Where: κ is the Keynesian multiplier

Equation 1

Over time, feedback effects will tend to moderate at least some of these effects. Thus, the magnitude of the ‘final’ change in income (ΔY) will not just depend upon the initial change in expenditure (ΔE) and upon the proportion of extra income that is re-spent within the local community, but will also depend upon the sector in which the initial spending occurs and upon the region and the time-span being considered.

Four different types of multipliers that are commonly estimated within the literature⁹ include:

1. The output multiplier, which is defined as the total value of production by all industries of the economy that is necessary to support a one dollar increase in the output of a particular industry (as per equation 1).
2. The employment multiplier, which measures the total change in employment resulting from an initial change in employment of an industry.
3. The income multiplier, which measures the total increase in income in the local economy resulting from a one dollar increase in income received by workers in the industry; and
4. Value-added multipliers, which provide an estimate of the additional value added to the final production that occurs in response to a change in economic activity.

Each of these multipliers is subtly different but a general observation holds for all: namely that the greater an industry's multiplier, the greater the regional economic impact of that industry's growth. Information about the size of an industry's multiplier is thus vitally important to those interested in targeting specific industries as a means of promoting regional economic growth.

Until recently, many applied regional studies used static input-output (IO) analysis to generate regional multiplier estimates (Rolfe et al 2003; Cegielski et al 2001). One of the significant advantages of this approach is that it provides a detailed picture of inter-industry links. Not only does this allow one to consider the total economic impact of a change in one part of the economy but it also allows for the identification of specific sectors within the economy that are likely to be most affected.

There are, however, several problems with the input-output technique. These include the substantial informational requirements needed to construct valid tables and the time-lags and costs associated with the collection and analysis of such material. Furthermore, input-output tables have been typically used to provide a 'snapshot' of a given economy at a specific and retrospective point in time, and require researchers to accept stringent assumptions about the structure of the economy – particularly if they wish to use IO tables to make predictions about the likely impact of future change(s).

Nowadays, more sophisticated versions of IO models (dynamic IO tables, social accounting matrices etc) are available and advances in information technology have made computable general equilibrium (CGE) models a viable, theoretically preferable and increasingly popular method of estimating regional multipliers (Dwyer et al 2005). The ability to specify relationships, add sophisticated twists, aggregate or disaggregate data and define appropriate assumptions gives CGE model developers significant flexibility. CGE models therefore have the potential to create a more realistic representation of an economy than do IO models. This increased modelling flexibility does, however, come at the cost of significantly greater data requirements and increased complexity. For example, the ORANI-NT model (based upon ORANI, a widely used Australian model developed by Peter Dixon in the 1970s) comprised more than 7983 variables in 3249 equations and the Monash model (which used ORANI as its base) took nine years to develop.

Figure 12 provides an indicative list of a range of applied models currently in use in Australia. For those living in the more densely populated parts of the TS the larger-scale models provide good quality information, however, it is important to note that none of the existing models provide data for the TS that are at a fine geographic scale. This is problematic since the statistical divisions in remote parts of Australia are typically geographically large (for example encompassing all of the Northern Territory) and the aggregated information produced from models using these boundaries will not always provide relevant information to those living in small communities.

⁹ Australian Bureau of Statistics 2006

Model name	Region	Type of model	General description
GRIMP (Grit Impact Program)	Australia	Input-output	An input-output model using cross sectional data by industrial sector. Can simulate impact on output (or employment or energy etc) of a change in final demand.
ORANI	Australia	Comparative static single region CGE	An applied general equilibrium model first developed in the 1970's. It has largely been superseded by the MONASH suite of CGE models.
ORANI-NT	Australia and the NT	Comparative static multi-region CGE	A comparative static multi-region model based on ORANI.
QGEM (Qld General Equilibrium Model)	Australia and Queensland	Comparative static multi-region CGE	A CGE model developed by Queensland Treasury to assess the impacts of policy changes and shocks. The QGEM-T model variation specifically looks at the tourism sector.
MMR (Murphy Model Regional)	Australia	Comparative static multi-region CGE	MMR is a CGE model of the Australian economy used for regional policy analysis. It can be used to examine the effects of a policy on a specific state or region.
MONASH	Australia	Dynamic multi-region CGE	A dynamic computable general equilibrium (CGE) model of the Australian economy designed for forecasting and for policy analysis. MONASH is a development of the ORANI model, providing greater forecasting opportunities due to a more detailed specification of inter-temporal relationships and enhanced use of up-to-date data.
MMRF-GREEN	Australia	Dynamic multi-region CGE	A dynamic CGE model of Australia's states and territories. Has been used to forecast energy usage and to analyse greenhouse issues.
TERM (The Enormous Regional Model)	Australia	Multi-region CGE	A bottom-up CGE model of Australia which can treat specific regions as separate economies. Can handle greater numbers of regions or sectors, in comparison to its predecessor MMRF-GREEN. The original version is a static model, however a dynamic model is being developed.

Figure 12: Overview of applied models (non-exhaustive list)

To make the point more explicit, note that the North West statistical division of Queensland has fewer than 40,000 estimated residents—more than two-thirds of which live in Mount Isa (OESR, 2005). Economic data that is produced at this regional scale is therefore heavily influenced by the industries of that town. This is not a problem if one wishes to gain information about Mt Isa, but those living in other parts of the statistical division (for example, Burketown with an estimated population of 500) may find that data produced for the entire statistical division is largely irrelevant to their area.

In Australia most of the input-output tables that are available for small regions have been constructed in a 'top-down' fashion. That is, statisticians have compiled IO tables for larger regions (e.g. Queensland) and then 'amended' or 'de-composed' these tables into smaller regional tables. Among other things, the amendments that are made are intended to reflect different regional industry compositions and levels of regional trade—however they become less and less accurate as the scale decreases.

The other option is to build IO or CGE models from the 'bottom up'. Yet it is extremely costly—in terms of both time and money—to collect enough data to build (or create) a transactions table (used in IO analysis) from local data and it is difficult to develop good-quality regional CGE models (which rely on IO tables for calibration). In short, the theoretically desirable approach to estimating regional multipliers (that is, developing a region-specific CGE model) is frequently impractical. It is therefore rare to find IO tables available at a fine geographic scale (e.g. some are available for Statistical Divisions, but few are available for Local Government Areas). It is rarer still to find CGE models for small regional economies.

Consequently, researchers interested in the assessing regional impact of change are frequently forced to use shortcuts and approximations such as:

1. *Using ad hoc tourism multipliers like those first introduced by Archer*¹⁰ (1971, 1976, 1977). Here, only specific sectors of an economy are considered, rather than the entire set.
2. *Drawing inferences about one region using data/information from another region.* Baaijens et al. (1998) for example, used meta-analysis to consider factors influencing the magnitude of regional tourist income multipliers that were estimated in a cross-section of research studies. And Chang (2001) estimated input-output tables for 114 regions and then used information from the IO tables to generate 'look-up tables' for regional tourism multipliers.
3. *Creating 'synthetic' data sets* (closely related to point 2). The National Centre for Social and Economic Modelling (NATSEM) recently developed a method of creating synthetic data for small areas (Melhuish et al, 2002). The method essentially looks for data matches on similar variables from different surveys. When a match is found, data from one survey is combined with data from the other survey, creating a 'synthetic observation'.
4. *Collecting data at an aggregate level and 'scaling down'.* There is no simple, linear relationship between the size of a region and the size of its multiplier. The spatial relationships depend, *inter alia*, on the spatial distribution of industry and economic linkages between such industries (McCann and DeWhurst, 1998). Consequently, one cannot simply take an existing model and scale it down—other techniques must be used. One of the more popular approaches is to use regional and national sectoral employment figures to calculate location quotients (simple, cross-industry and other variants) that can be used to adapt existing input-output coefficients which apply to a larger region to suit a smaller region within it (Flegg & Webber 1997; Tohmo 2004). Harris and Liu (1998) demonstrated an alternative process by which one can generate a 'hybrid' local IO table, using local survey data to tailor/alter larger-scale tables to regional conditions.
5. Collecting enough regional data to estimate an expenditure function from which one can calculate a Keynesian multiplier (for example, Scottish Executive 2005b).
6. Collecting expenditure data from regional businesses, to estimate business expenditure multipliers (Stoeckl, 2007b).

This research project uses an adaptation of the last method: taking expenditure data from regional businesses to estimate business-level (output) multipliers for a range of different industries across Australia's tropical savannas.

Specifically, the researchers conducted a large survey whereby a range of different businesses and other organisations across the region were asked, *inter alia*, to provide information on the:

1. proportion of total revenues spent on a range of different inputs – j : ($R_{j=1 \dots n}$); and
2. proportion of expenditure on each input that purchased from within the local region ($\theta_{j=1 \dots n}$).

This information was used to estimate the proportion of each organisation's revenue that was spent on local inputs ($E_j = R_j \times \theta_j$), and these were added together to produce an estimate of the proportion of total revenue each business/organisation spends within their local area ($\rho_i = \sum E_j$):

$$\rho_i = \sum_{j=1}^n R_j \theta_j$$

Equation 2

These estimates of ρ_i , were then used to calculate the multiplier associated with each *individual* business (M_i) – hereafter referred to as the 'raw' business-level-multiplier:

$$M_i = \frac{1}{1 - \rho_i}$$

Equation 3

¹⁰ cited in Egan and Nield (2003).

Operationally, if one wished to use these raw business-level-multipliers to estimate regional multipliers, then one would need to accept all the assumptions attending traditional IO analysis, namely that:

1. All firms within an industry use the same technology regardless of their scale and location.
2. Technology does not change, and all inputs are used in fixed proportions.
3. The industries exhibit constant returns to scale.
4. All prices are constant.
5. There are no input constraints (i.e. all firms within all industries are able to access required inputs).

Furthermore, since these raw business-level-multipliers are *not* analytically equivalent to those generated using IO analysis or CGE models (the ‘ κ ’ in Equation 1) one would *also* have to accept another assumption, (unique to this particular methodological approach) that:

6. The expenditure patterns of all industries and households within the region of enquiry are the same as those of the industry receiving the first injection of funds.

It is unlikely that this later assumption will hold, so attempts to draw inferences about the size of a *regional* multiplier from the raw business-level multiplier estimates are likely to generate misleading information. This is because the raw business-level multiplier formula of Equation 3 assumes that the spending of *all* sectors within a postcode are identical to that of the sector which experiences the initial increase in income. This will upwardly bias estimates for sectors that spend more than average within their local economy, and downwardly bias estimates of sectors that spend less than average within their local economies.

Clearly, the best way to correct this is to build a general equilibrium model. As mentioned earlier, however, this is not a practical solution—but it is possible to correct for at least some bias by removing the assumption that the spending patterns of all organisations are exactly equivalent to that of the industry receiving the initial injection of funds. Although, in theory, this could have been done in several ways, the approach taken here was to assume that the expenditure patterns of organisations that supply inputs to the ‘original’ organisation follow that of the regional average.

Specifically, the approach taken here is to assume that when the revenue of just one organisation (*i*) changes, the total, combined, changes to the revenues of all organisations will equal:

1. the initial change affecting organisation *i* = ΔE_i

PLUS

2. the extra money which organisation *i* subsequently spends with other ‘local’ organisations = $\rho_i \Delta E_i$

PLUS

3. the extra money which the local organisations who receive some of $\rho_i \Delta E_i$ subsequently spend with other local organisations = $\rho_i \Delta E_i \times \bar{\rho} \times 1/(1 - \bar{\rho})$

Where: $\bar{\rho}$ = ‘average’ proportion of total revenues which organisations spend within their local area.

Which means that one can calculate an *adjusted* business-level-multiplier for each organisation (M^A):

$$M^A_i = 1 + \rho_i + \rho_i \times \bar{\rho} \times 1/(1 - \bar{\rho})$$

Equation 4

The key problem here, however, is that the ‘correct’ $\bar{\rho}$ for use within this formula, is a locally relevant weighted average; one that places most weight on the expenditure patterns of sectors that are most prevalent (i.e. responsible for most spending). Yet in this instance there was simply not enough locally relevant data to calculate it. Researchers thus chose to estimate several different *adjusted* business-level multiplier estimates, each using different estimates of $\bar{\rho}$ that reflect (but do not precisely measure) locally relevant spending behaviours.

Overall, the methodological approach used in this paper offers itself as a cost-effective (albeit imperfect) alternative to the theoretically more correct full-model approaches. Despite the fact that the multiplier estimates generated from this approach are not the same as those estimated in more complex models, they provide very useful information about the way in which expenditure patterns vary across organisations—information that allows one to draw inferences about the way in which regional multipliers vary across industries in northern Australia.

Further the micro-level data collected with this methodological approach provides researchers with some detailed information about factors influencing the size of multipliers in regional Australia, about which there has been relatively little previous empirical work (certainly at such a large scale). And this information is vital to those interested in promoting regional economic development in the tropical savanna region.

2 The Survey

2.1 Development of the survey instrument: tourism case study

Much of the preliminary developmental work for this research was done during 2005–06 in a project funded by James Cook University (JCU).¹¹ Because this project used the methodology developed by the preliminary research project (and also some of the data that was collected during it), it is relevant here.

The first step of the tourism investigation involved developing (and piloting) a questionnaire. The questionnaire comprised two main parts. The first sought background information about the respondent's organisation, the second sought information about the proportion of total expenditures on goods and services and about where they were purchased (locally or elsewhere).

More specifically, respondents were first asked to provide a list of major 'expenditure items'. They were then asked to estimate the proportion of total business expenses going to each item (R_i), and the proportion of expenditure on each item that was going to other local businesses (θ_i). These separate pieces of information were combined using Equation 2 to estimate the proportion of total expenses going to other local businesses (ρ_i) and raw business-level-multipliers were calculated.

Researchers used the *Yellow Pages 2005 SENSIS* website to collect contact details for all tourism enterprises listed under the headings of 'accommodation', 'tours' and 'attractions and activities' (hereafter termed 'other') for all of the Northern Territory, the Douglas Shire, Townsville and outback Queensland. In total, across all four regions, this list comprised 699 enterprises, all of which were targeted for surveying between the 21 May and 28 October, 2005. Of the 699 contacted, 429 completed the survey and 270 declined to participate (producing a response rate of 61%).

A priori, one expects business expenditure patterns to vary between regions, because businesses operating in different regions will have access to different input markets. A key problem facing researchers on this project, however, was that there is no definitive way in which to measure *the* size and/or nature of local markets. A proxy had to suffice. To that end, the Accessibility/Remoteness Index of Australia Plus (ARIA+) measure was used. Although not without its critics¹², ARIA+ is the standard measure of remoteness endorsed by the ABS. Values are derived from the road distance measurements between various localities and different sized 'service centres'. They range from 0 (high accessibility) to 15 (high remoteness). Most significant to this analysis, is that separate ARIA+ measures were available at the postcode level. This allowed for the matching of survey data (which included a question about the postcode of each business) with ARIA+ measures. Researchers were thus able to categorise businesses according to the remoteness of their postcode, using the ABS's classification system:

- 'Inner Regional' (ARIA+ score of 0.2 to ≤ 2.4)
- 'Outer Regional' (ARIA+ score of > 2.4 to ≤ 5.92)
- 'Remote' (ARIA+ score of > 5.92 to ≤ 10.53): or
- 'Very remote' (ARIA+ score > 10.53)

In this preliminary case-study, mean values of ρ were compared across the type of enterprise and remoteness. The differences in expenditure patterns (ρ) between regions with different levels of remoteness were all statistically significant, as were the differences between the expenditure patterns of accommodation businesses and tour operators¹³.

2.2 Expansion of study to include other sectors and regions

Only some of the data collected during the preliminary tourism case study were relevant to the Outback Livelihoods (OL) multiplier case study. This was because some of the regions included in the earlier study (e.g. the southern parts of outback Queensland) lay outside the TS region. After omitting organisations located outside the savannas, data from 266 businesses across two different industries (accommodation and transport) were identified as relevant to the OL multiplier case study.

Despite the fact that this preliminary study developed and established the credibility of the methodological approach it did not, by itself, provide information about a broad enough range of industries across a large enough

¹¹ Understanding regional development through tourism, JCU. A two-part project with two Principal Researchers: Natalie Stoeckl and Gianna Moscardo. Natalie Stoeckl led the investigation described here.

¹² For example, see Griffith 2002.

¹³ For more detailed information on this part of the project see: Stoeckl and Lanphier (2005), Stoeckl (2007a), and Stoeckl (2007b).

geographic scale to suit the purposes of the multiplier case study. It was therefore important to expand the scale of the investigation, collecting information from more organisations in the tropical savannas. Details are given below.

2.2.1 Identification of the ‘population’ of organisations

A database detailing the names and addresses of business, government and non-government organisations throughout Australia was purchased from Media M Group¹⁴. In the first instance 38,406 separate organisations were identified as having a postcode with boundaries that sat either wholly or partially within the savannas. These were classified into 18 industry sectors: the 17 defined in the Australia and New Zealand Standard Industry Classification (ANZSIC) codes plus one more for organisations that were easily identifiable as focusing on Indigenous issues. Some organisations were then removed from the list since they had been listed more than once or had addresses which were clearly incorrect and/or were not physically located in the target regions (despite having a postal address within the savannas).

The remaining 28,758 organisations¹⁵ were then categorised according to the level of remoteness of their postcode, as was done in the tourism case study (see Table 3). Businesses in either the accommodation or transport sectors that were located in postcodes included in the preliminary tourism case study were then removed, so as to avoid contacting them a second time. This left 27,892 eligible organisations from which to draw the sample.

2.2.2 Sample selection and conduct of the survey

Since it was not feasible to collect data from all 27,892 organisations, researchers had to decide on a sampling method. In doing so, researchers were cognizant of two key issues:

1. there is a significant data/research gap relating to organisations operating in remote parts of Australia; and
2. the overall aim of the project was to explore the expenditure links between different types of industries.

It was therefore decided to collect data from organisations in every industry, and to place emphasis on organisations in the remoter parts of the savannas (specifically those located in ‘very remote’, ‘remote’ and ‘outer regional’ areas). Recognising that response rates as low as 10% are not uncommon in other research, researchers decided to try to contact 200 organisations in each industry/remoteness category.

In some cases this meant that every organisation in a particular industry/remoteness category was targeted. This was the case where there were fewer than 200 organisations in a given industry in a given level of remoteness, (as in the communications industry, where there were only 31 organisations listed in the very remote parts of the TS). In cases where the database identified more than 200 organisations in a particular industry and region, organisations were selected at random for inclusion in the sample (e.g. the database listed 4371 retail organisations in the ‘inner regional’ parts of the TS, so every twentieth organisation was targeted).

In the first instance, researchers conducted web searches to find the email address of organisations that were to be included in the sample. If it was possible to find an email address the organisation was sent an electronic copy of the survey (with a covering message). Following the guidelines of Dilman (2000) organisations were sent four reminders. If the organisation had not returned a completed survey after the fourth reminder they were removed from the email list.

Between August 3 and September 18, 2006, a total of 1960 surveys were sent out by email in four different batches. In total, 304 of the email addresses proved to be incorrect, so that only 1656 emails actually reached their intended recipients. At that time administrators at JCU asked that all email activity cease, pending legal advice as to whether the surveys could potentially be viewed as spam¹⁶. From that point onwards, all potential respondents were contacted by mail.

To avoid sending postal surveys to organisations that had already been contacted by email, new target lists were drawn up. Wherever possible, organisations were only selected if they had not already been contacted. Since it is more expensive to conduct a postal survey than an email survey, it was necessary to lower the original target of 200 per industry/remoteness category to just 50. This meant that in some cases every organisation in a particular industry and remoteness category was targeted, as previously discussed. In other instances, organisations were selected randomly to be included in the sample of 50 organisations per industry and remoteness category. Again, Dilman’s (2000) method was followed. In the first instance, those targeted for inclusion in the postal survey

¹⁴ See <www.dame.com.au/> for further information.

¹⁵ This is approximately 1.5% of the 2,265,562 businesses that were registered in Australia in 2003-04 (ABS, 2007).

¹⁶ Researchers were subsequently informed that the emails were NOT spam—but by that time, it was too late to resume that particular methodological approach.

(2489 organisations) were sent an introductory letter¹⁷. They were then sent a copy of the questionnaire¹⁸, a reminder letter¹⁹, and a replacement questionnaire²⁰. A copy of the questionnaire is available in Appendix A.

As is usual in the case of postal surveys, many were returned with incorrect addresses. The problem here, however, was that the incorrect addresses occurred disproportionately in some industries. For example, a much higher proportion of surveys sent to those in agriculture were returned with incorrect addresses than organisations in the business services sector. Hence there were few responses from this group. A second batch of 1712 surveys was therefore sent out between December 1 and 3, 2006, targeting industry/remoteness categories that had provided few responses to either the email or the first postal survey. In total, researchers mailed out 4201 questionnaires, in two different batches, although 1047 were returned with incorrect addresses. Therefore only 3154 questionnaires reached their intended recipients.

Table 1: Total number of organisations (a) listed in database, and (b) sent questionnaire—by industry and remoteness

ANZSIC Industry		Remoteness				Total
		Inner Regional	Outer Regional	Remote	Very Remote	
Accommodation	Contacts as % population	11.5	7.2	26.4	24.3	14.5
	Total contacts	7	90	92	126	315
	Email contacts	7	66	12	85	170
	Postal contacts		24	80	41	145
	No. in database	61	1247	348	519	2175
Agriculture	Contacts as % population	0.0	7.4	13.3	15.7	12.6
	Total contacts	0	69	137	221	427
	Email contacts		31	16	19	66
	Postal contacts		38	121	202	361
	No. in database	12	937	1033	1404	3386
Communication	Contacts as % population	0.0	84.9	58.8	103.2	84.0
	Total contacts	0	79	10	32	121
	Email contacts		34	7	21	62
	Postal contacts		45	3	11	59
	No. in database	3	93	17	31	144
Construction	Contacts as % population	4.8	6.0	20.8	39.3	12.3
	Total contacts	8	149	100	182	439
	Email contacts	8	83	8	68	167
	Postal contacts		66	92	114	272
	No. in database	165	2473	480	463	3581
Cultural	Contacts as % population	4.3	7.6	40.3	68.3	24.4
	Total contacts	2	55	83	153	293
	Email contacts	2	7	10	47	66
	Postal contacts		48	73	106	227
	No. in database	46	725	206	224	1201
Education	Contacts as % population	13.8	38.2	67.1	65.4	49.3
	Total contacts	4	172	102	134	412
	Email contacts	4	119	57	68	248
	Postal contacts		53	45	66	164
	No. in database	29	450	152	205	836

¹⁷ Introductory letter sent September 28 and 29, 2006.

¹⁸ Questionnaire sent October 10 to 12, 2006.

¹⁹ Reminder letter sent November 03, 2006.

²⁰ Replacement questionnaire sent November 28, 2006.

Table 1: Total number of organisations (a) listed in database, and (b) sent questionnaire – by industry and remoteness (Cont.)

ANZSIC Industry		Remoteness				Total
		Inner Regional	Outer Regional	Remote	Very Remote	
Electricity	Contacts as % population	0.0	68.9	77.8	78.9	71.6
	Total contacts	0	31	7	15	53
	Email contacts		11	3	5	19
	Postal contacts		20	4	10	34
	No. in database	1	45	9	19	74
Finance	Contacts as % population	0.0	32.1	60.3	86.5	39.7
	Total contacts	0	111	35	32	178
	Email contacts	0	45	3	10	58
	Postal contacts	0	66	32	22	120
	No. in database	0	346	58	37	448
Government	Contacts as % population	14.3	29.8	48.9	53.4	41.5
	Total contacts	1	70	44	102	217
	Email contacts	1	27	11	46	85
	Postal contacts		43	33	56	132
	No. in database	7	235	90	191	523
Health	Contacts as % population	0.0	5.6	25.0	28.8	11.8
	Total contacts	0	63	57	78	198
	Email contacts				9	9
	Postal contacts		63	57	69	189
	No. in database	60	1125	228	271	1684
Indigenous	Contacts as % population	0.0	54.1	58.8	53.5	53.8
	Total contacts	0.0	33	20	136	189
	Email contacts		13	8	61	82
	Postal contacts		20	12	75	107
	No. in database	2	61	34	254	351
Manufacturing	Contacts as % population	0.0	10.6	56.3	56.6	23.3
	Total contacts	0	64	67	81	212
	Email contacts		2		6	8
	Postal contacts		62	67	75	204
	No. in database	44	603	119	143	909
Mining	Contacts as % population	0.0	55.5	48.8	64.0	53.8%
	Total contacts	0	61	41	32	134
	Email contacts		1	6	7	14
	Postal contacts		60	35	25	120
	No. in database	5	110	84	50	249
Personal	Contacts as % population	0.0	7.1	47.7	51.9	20.7
	Total contacts	0	54	83	110	247
	Email contacts				9	9
	Postal contacts		54	83	101	238
	No. in database	47	761	174	212	1194

Table 1: Total number of organisations (a) listed in database, and (b) sent questionnaire – by industry and remoteness (Cont.)

ANZSIC Industry		Remoteness				Total
		Inner Regional	Outer Regional	Remote	Very Remote	
Property	Contacts as % population	3.0	9.7	30.9	32.9	14.6
	Total contacts	4	252	128	137	521
	Email contacts	4	177	30	63	274
	Postal contacts		75	98	74	247
	No. in database	135	2595	414	417	3561
Retail	Contacts as % population	1.7	2.5	13.4	16.0	6.2
	Total contacts	6	111	123	181	421
	Email contacts	6	45	7	91	149
	Postal contacts		66	116	90	272
	No. in database	353	4371	919	1131	6774
Transport	Contacts as % population	0.0	5.3	33.0	41.6	19.2
	Total contacts	0	42	67	163	272
	Email contacts		22	2	121	145
	Postal contacts		20	65	42	127
	No. in database	32	791	203	392	1418
Wholesale	Contacts as % population	27.3	69.3	77.8	81.3	69.6
	Total contacts	3	131	14	26	174
	Email contacts	3	31	1	3	38
	Postal contacts		100	13	23	136
	No. in database	11	189	18	32	250
Total	Contacts as % population	3.4	9.5	26.4	32.4	16.7
	Total contacts	35	1637	1210	1941	4823
	Email contacts	35	714	181	739	1669
	Postal contacts		923	1029	1202	3154
	No. in database	1020	17157	4586	5995	28,758

Altogether researchers made contact with 4810 organisations across the savannas (either by email or mail), approximately 16.7% of those listed in the database. Detailed information on the number of questionnaires that were sent to organisations in each industry/remoteness category is provided in Table 1, which clearly shows the way in which the sample selection process was biased in favour of some sectors and some regions. For example, we sent questionnaires to almost all organisations in the communications, electricity, and wholesale industries. In other sectors we targeted a much lower percentage of the total (e.g. 15% or less of those listed in the accommodation, agriculture, construction, health, property and retail industries were surveyed). Similarly, questionnaires were sent to more than 30% of all organisations in the very remote parts of the TS, but to only 9.5% and 3.4%, respectively, of organisations in inner and outer regional areas.

2.2.3 Responses and response rates

In total, 202 completed surveys were received by email, giving an overall response rate of more than 12.2%²¹ from this component of the survey process. Importantly, reminder emails were found to have a significant impact on response rates. This indicates that the overall response rate may have been higher if email surveying had been permitted to continue. Of the 4213 surveys that were sent out by post, 1047 were returned because of an incorrect address or because the organisation was no longer in operation. Regrettably, time constraints prevented researchers from being able to follow Dillman's (2000) procedure in the second batch of postal surveys. Organisations targeted for inclusion in the second batch were sent only one copy of the questionnaire with no preliminary or reminder letters. As was the case with the email surveys, failure to adhere to Dillman's methodology had a significant and adverse effect upon response rates (see Table 2).

²¹ Calculated as 202 responses from a possible 1656.

Table 2: Response rates to different postal surveys

Postal Batch	Number of questionnaires sent out	Number of incorrect addresses	Number of valid responses	Response rate (% of correctly addressed questionnaires)
First	2489	640	427	23.09
Second	1712	407	83	6.36
Total	4201	1047	510	16.17

In total, 510 postal survey forms were returned complete, giving an overall response rate to the postal surveys of 16.2%. Two of the completed surveys were removed from the data set because they had been completed by organisations located outside the survey region. Table 3 provides a detailed breakdown of the total number of valid (operational) businesses identified in the database (including all tourism businesses), the total number of organisations that researchers were able to contact via email or mail (i.e. removing bad addresses) and the total number of completed email or postal surveys received for each category of industry and remoteness. Overall, responses were obtained from 14.5% of those contacted by post or email. By industry, the highest response rates (as a percentage of those contacted) were obtained from organisations in the health (36.7%), Indigenous associations (25.4%), construction (20.27%) and finance (19.66%) sectors. The lowest response rates were in the communications, wholesale and manufacturing sectors (with only 4.96%, 5.75% and 7.08% respectively).

As regards the representativeness of the sample, responses were received from more than 2% of listed organisations. However, close to one-quarter of all organisations listed in the database were no longer in operation²². Therefore the sample may represent closer to 3% of the population of *operational* businesses²³. In some sectors, the representativeness of the sample is relatively good (for example, it accounts for 7.8%, 7.2%, 6.8% and 6.1% of organisations listed in the database in the government, electricity, mining and finance industries). However, our sample includes responses from fewer than 2% of those in the retail, property, agricultural and manufacturing sectors. Consequently data pertaining to these industries should be treated with caution—if only because the sample may not adequately reflect the population as a whole.

Table 3: Responses and response rate for email and postal survey—by industry and remoteness

Industry		Remoteness				Total
		Inner regional	Outer regional	Remote	Very remote	
Accommodation	Responses	4	10	17	22	53
	% of those sent survey	57.14	11.11	18.48	17.46	16.83
	% of those in database	6.56	0.80	4.89	4.24	2.44
Agriculture	Responses		10	20	24	54
	% of those sent survey		14.49	14.60	10.86	12.65
	% of those in database		1.07	1.94	1.71	1.59
Communications	Responses		1	2	3	6
	% of those sent survey		1.27	20.00	9.38	4.96
	% of those in database		1.08	11.76	9.68	4.17
Construction	Responses	2	27	24	36	89
	% of those sent survey	25.00	18.12	24.00	19.78	20.27
	% of those in database	1.21	1.09	5.00	7.78	2.49
Cultural	Responses		10	6	10	26
	% of those sent survey		18.18	7.23	6.54	8.87
	% of those in database		1.38	2.91	4.46	2.16
Education	Responses		17	9	16	42
	% of those sent survey		9.88	8.82	11.94	10.19
	% of those in database		3.78	5.92	7.80	5.02

²² 1047 of the 4213 postal addresses were for organisations no longer in operation.

²³ Calculated as 631 from 75% of the 28758 organisations listed.

Table 3: Responses and response rate for email and postal survey—by industry and remoteness (cont.)

Industry		Remoteness				Total
		Inner regional	Outer regional	Remote	Very remote	
Electricity	Responses		1	2	2	5
	% of those sent survey		3.23	28.57	13.33	9.43
	% of those in database		2.22	22.22	10.53	6.76
Finance	Responses		21	7	7	35
	% of those sent survey		18.92	20.00	21.88	19.66
	% of those in database		6.07	12.07	18.92	7.81
Government	Responses	2	12	5	12	31
	% of those sent survey	200.00	17.14	11.36	11.76	14.29
	% of those in database	28.57	5.11	5.56	6.28	5.93
Health	Responses	1	24	20	29	74
	% of those sent survey		38.10	35.09	37.18	37.37
	% of those in database	1.67	2.13	8.77	10.70	4.39
Indigenous	Responses		10	13	25	48
	% of those sent survey		30.30	65.00	18.38	25.40
	% of those in database		16.39	38.24	9.84	13.68
Manufacturing	Responses		5	6	4	15
	% of those sent survey		7.81	8.96	4.94	7.08
	% of those in database		0.83	5.04	2.80	1.65
Mining	Responses	1	3	8	6	18
	% of those sent survey		4.92	19.51	18.75	14.88
	% of those in database	20.00	2.73	9.52	12.00	7.23
Personal	Responses	1	12	7	14	34
	% of those sent survey		22.22	8.43	12.73	13.77
	% of those in database	2.13	1.58	4.02	6.60	2.85
Property	Responses	1	25	7	12	45
	% of those sent survey	25.00	9.92	5.47	8.76	8.64
	% of those in database	0.74	0.96	1.69	2.88	1.26
Retail	Responses	1	16	30	20	67
	% of those sent survey	16.67	14.41	24.39	11.05	15.91
	% of those in database	0.28	0.37	3.26	1.77	0.99
Transport	Responses		9	13	19	41
	% of those sent survey		21.43	19.40	11.66	15.07
	% of those in database		1.14	6.40	4.85	2.89
Wholesale	Responses		8	1	1	10
	% of those sent survey		6.11	7.14	3.85	5.75
	% of those in database		4.23	5.56	3.13	4.00
Total	Responses	13	212	186	238	697
	% of those sent survey	37.14	12.95	15.37	12.26	14.49
	% of those in database	1.27	1.24	4.06	3.97	2.42

2.3 Respondent organisations

In total, 978 organisations completed and returned questionnaires (266 from the tourism case study, 202 from the email surveying and 510 from the postal surveying). As shown in Figure 13, respondents were scattered across the entire tropical savanna region.

Although responses were not received from every postcode, completed questionnaires were returned from organisations in each of ANZSIC’s 17 different industry/sectors across regions of varying degrees of remoteness (Table 4). Thus, while we acknowledge that the sample is imperfect (particularly given the low number of responses in the communications and electricity industries) it can nevertheless be considered to be reasonably representative of many parts of the TS region and makes a significant addition to the existing set of knowledge about industries in northern Australia.

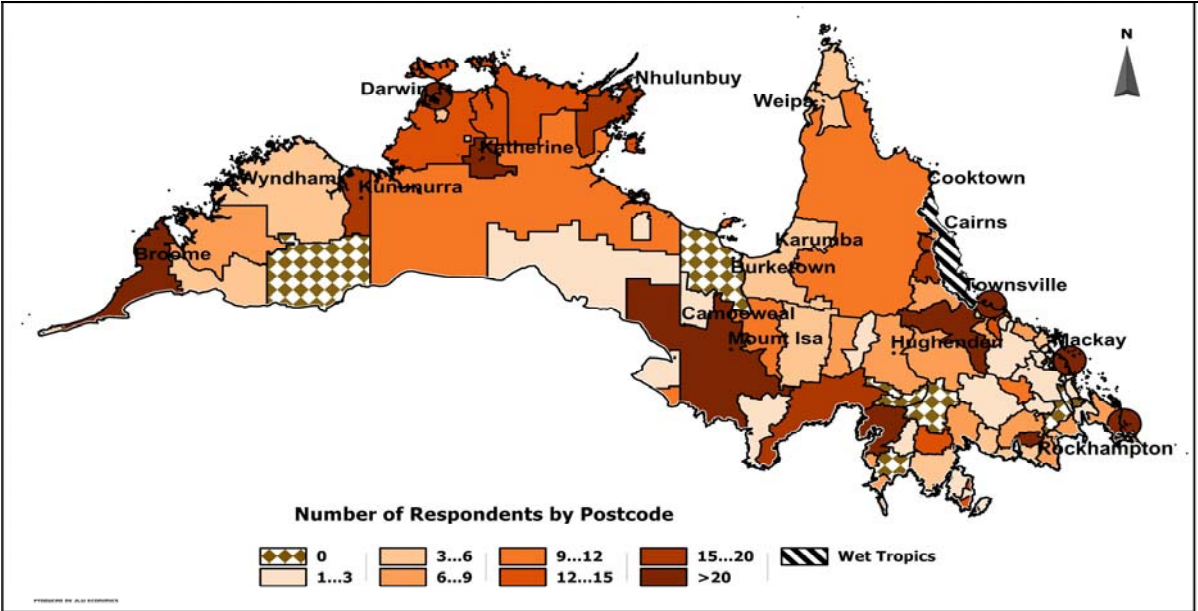


Figure 13: Number of respondents—by postcode

Table 4: Total number of respondents by industry and remoteness

ANZSIC Industry	Remoteness					Total across all regions
	Inner Regional	Outer Regional	Remote	Very Remote	Missing	
Accommodation	2	112	51	77	2	244
Agriculture		10	20	24	3	57
Communications		1	2	3		6
Construction	1	30	24	36		91
Cultural		13	6	14	2	35
Education		18	11	17		46
Electricity		1	2	2		5
Finance		22	8	6		36
Government	1	14	6	19	1	41
Health	1	26	23	37	1	88
Manufacturing		5	6	4		15
Mining		4	9	6		19
Personal		14	9	12		35
Property		30	6	12		48
Retail		18	33	20		71
Transport		68	29	24		121
Wholesale		8	1	1		10
Missing		1	2	4	1	8
Total across all industries	5	395	248	318	10	976

2.3.1 Size of organisations

As shown in Figure 14, most respondent organisations were relatively small. The median number of employees within most industry/remoteness categories was less than 10, with many sectors having a median number of employees of less than five. Only 1.03% of respondent organisations (11 out of 963) had more than 200 employees—compared to 1.2% of non-government organisations in other areas of Australia (ABS, 2007). Not surprisingly, the largest organisations were in the mining and government sectors, employing, on average 120 and 56 people respectively. The smallest organisations were those in communications, although responses were received from only six organisations in that sector, and should, therefore, be treated with caution.

There did not appear to be a simple relationship between the size of an organisation and its remoteness. The average number of employees in organisations in the personal sector, for example, was larger in very remote areas than in outer regional areas, whereas the average size of organisations in the government sector appeared to be smaller in the remoter parts than in the inner regional areas. Post-hoc tests of the differences in the average number of employees across regions of remoteness found the differences to be statistically insignificant, and the size of organisations did not appear to vary systematically across space (Figure 15).

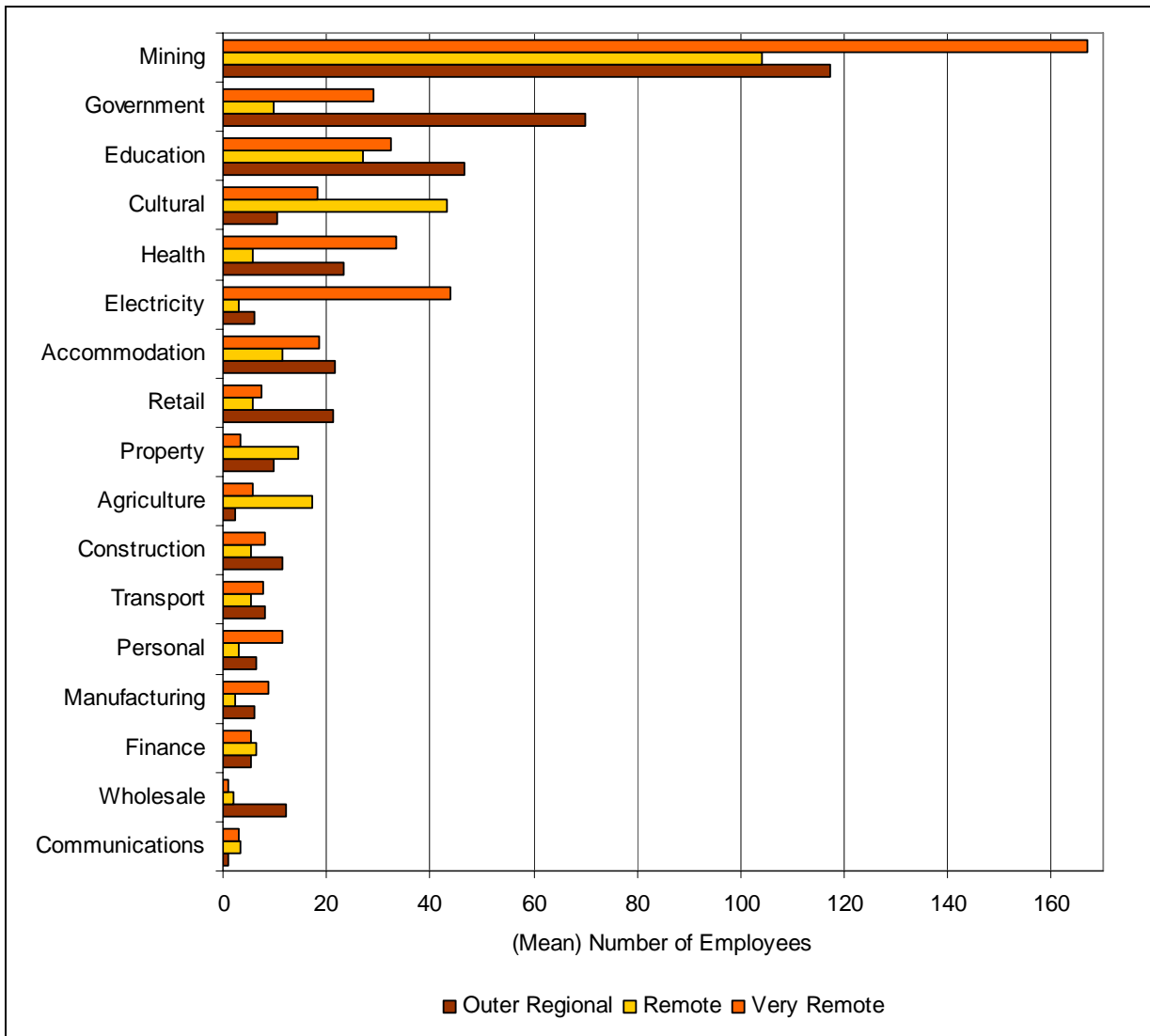


Figure 14: Mean number of employees—by industry and remoteness

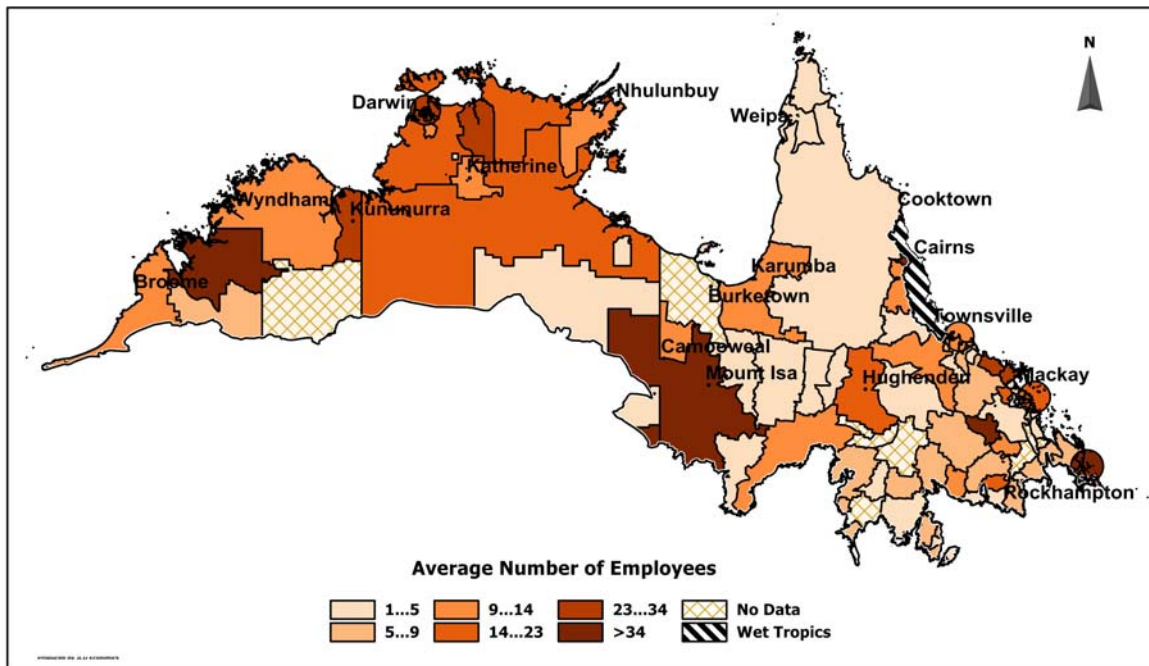


Figure 15: Map of average number of employees—by postcode

2.3.2 Average gross annual turnover (operational budget)

The email and postal surveys asked respondent organisations to give an indication of the annual gross turnover (or budget) of their operation, as per the following question:

What is your annual gross turnover (or budget)? For organisations with multiple sites (e.g. branch offices, franchises etc) please only consider your specific location.

- LESS THAN \$10,000 PER YEAR
- \$10,000 TO \$500,000 PER YEAR
- \$500,001 TO \$1 MILLION DOLLARS PER YEAR
- BETWEEN \$1 AND \$5 MILLION DOLLARS PER YEAR
- MORE THAN \$5 MILLION DOLLARS PER YEAR

Responses were coded using the mid-point of each range (i.e. \$5000; \$255,000; \$750,000; and \$3 million), except for the highest category, which was coded as \$5m (giving an unambiguous downward bias in this category).

As shown in Table 5, the mean annual gross turnover across all respondent organisations was approximately \$1.2m. However, there was considerable variation in mean annual gross turnover across regions and across industry type. Not surprisingly, the largest average annual turnovers (or operating budgets) occurred in the mining, wholesale, government and electricity gas and water supply sectors (\$2.8m, \$2.6m, \$2.5m and \$2.3m respectively). The smallest turnovers occurred in the personal (\$219,000), communications (\$316,000), and cultural (\$548,000) sectors.

There does not appear to be any simple relationship between remoteness and gross annual turnover. Neither did does there appear to be a systematic relationship between average gross operating budget and postcode (Figure 16)—although postcodes with a significant mining and/or government sector presence are shown to have relatively high operating budgets.

Table 5: Average gross annual turnover—by remoteness and industry (\$000)²⁴

ANZSIC Industry	Remoteness				Average across all regions
	Inner Regional	Outer Regional	Remote	Very Remote	
Accommodation		859	1036	1305	1114
Agriculture		579	1536	629	920
Communications					316
Construction		1285	920	753	957
Cultural		786	130	527	548
Education		520	1479	894	900
Electricity					2302
Finance		1239	2652	1065	1466
Government		3323	1402	2,022	2465
Health		1328	288	1263	1044
Manufacturing			403		1190
Mining			2752		2852
Personal		199	224	230	219
Property		1082	1065	530	909
Retail		1714	1037	1318	1261
Transport		2501	829	1270	1366
Wholesale		2958			2572
Average across all industries	1711	1289	1047	1123	1167

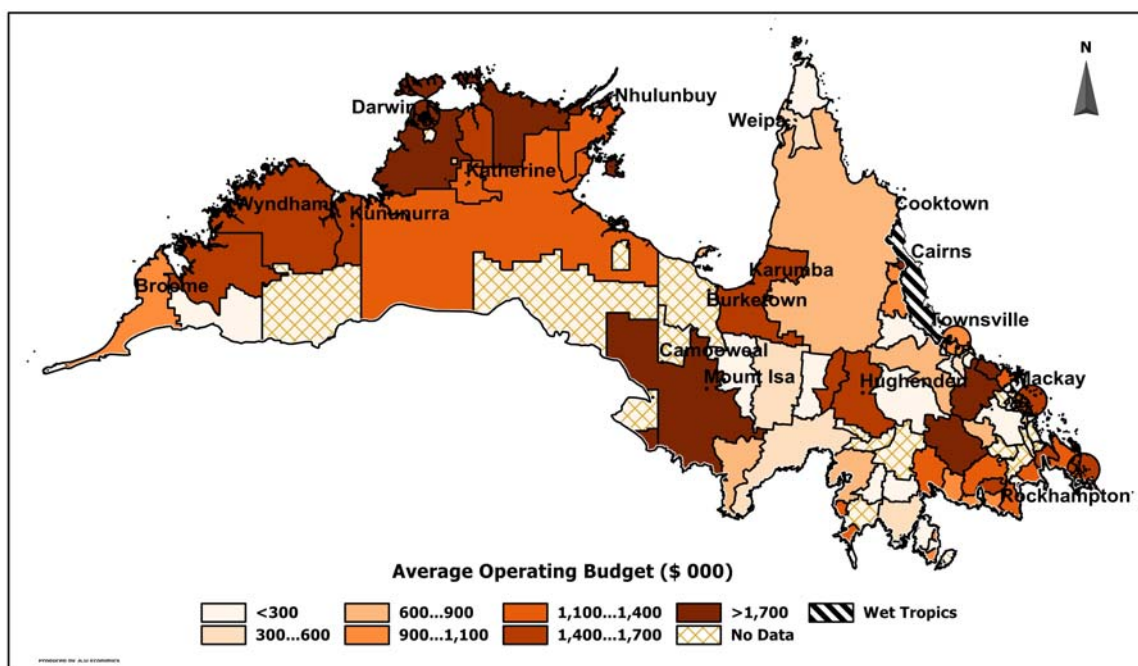


Figure 16: Average gross annual turnover of respondent organisations—by postcode (\$000)

2.3.3 Head office location

Fewer than 10% of organisations surveyed in accommodation, manufacturing, retail or transport sectors were branch offices. Within these industries head office was mostly located in the same postcode as the respondent. There were, however, several sectors where a relatively high proportion of the organisations had a head office that was located outside the respondent’s postcode. These included education (67%), personal (57%); finance (56%) and government (50%).

²⁴ To preserve confidentiality, results not reported for categories with five or fewer respondents.

Table 6: Proportion of respondents with head office in different town—by remoteness and industry

ANZSIC Industry	Remoteness				Average across all regions
	Inner Regional	Outer Regional	Remote	Very Remote	
Accommodation		10.00	9.80	0.00	7.44
Agriculture		0.00	10.00	33.33	18.52
Communications					16.67
Construction		21.43	0.00	16.22	14.29
Cultural		7.69	0.00	21.43	12.12
Education		77.78	45.45	70.59	67.39
Electricity					40.00
Finance		45.45	0.00	57.14	55.56
Government		46.15	0.00	47.37	50.00
Health		16.00	29.17	43.24	31.03
Manufacturing			0.00		6.67
Mining		66.67	25.00	57.14	42.11
Personal		41.67	37.50	78.57	57.14
Property		21.43	14.29	8.33	16.67
Retail		11.76	9.09	5.00	8.45
Transport		8.96	14.29	7.69	9.92
Wholesale		50.00			40.00
Average across all industries	41.67	20.68	17.07	24.31	21.22

2.3.4 Years of operation

Respondents were asked to indicate whether their organisation had been operating for (a) less than one year; (b) 1–5 years; (c) 6–10 years; or (d) more than 10 years. Answers were coded as (a) 0.5 years; (b) 3 years; (c) 8 years; and (d) 10 years (giving an unambiguous downward bias in this category), and the mean years of operation of organisations within each industry/region were calculated.

Across all respondents, the average length of time in operation was close to 8.5 years (Table 7). This was somewhat higher than might be expected given that more than 33.5% of all Australian small businesses have operated for less than five years (ABS 2004). This may be due to response bias—e.g. newly established organisations may have been less likely to complete the survey than those who had been operating for several years—but it may also have been the case that those businesses that do survive in this region, do so for a long time, meaning that there is a lower rate of business turnover in the TS than across the nation as a whole.

There were also some interesting sectoral differences. For example, organisations in communications, accommodation, property, and retail, were generally much ‘younger’ than other organisations. In fact, the average organisation in the educational sector had been in operation for almost twice as long as the average organisation in communications (9.5 years versus 5.8).

Table 7: Average years in operation—by remoteness and industry

ANZSIC Industry	Remoteness				Average across all regions
	Inner Regional	Outer Regional	Remote	Very Remote	
Accommodation	5.33	6.50	7.82	5.57	6.54
Agriculture		8.85	8.30	9.63	8.99
Communications		3.00	6.50	6.50	5.80
Construction	10.00	8.96	8.40	9.05	8.86
Cultural		9.10	10.00	9.15	9.31
Education		9.56	9.18	9.76	9.55
Electricity		10.00	10.00	8.00	9.20
Finance		8.50	8.64	9.00	8.63
Government	10.00	9.46	8.42	9.53	9.36
Health	10.00	8.50	8.79	9.05	8.84
Manufacturing		7.80	8.17	10.00	8.53
Mining	8.00	10.00	8.38	10.00	9.17
Personal	10.00	9.36	9.13	9.50	9.38
Property	10.00	7.92	5.64	5.79	7.04
Retail	0.50	7.91	7.68	7.44	7.57
Transport		8.44	8.15	8.11	8.20
Wholesale		9.13	8.00	10.00	9.10
Average across all industries	7.68	8.61	8.27	8.61	8.50

2.3.5 ATSI involvement in organisations

Despite the fact that most regions within the TS have populations comprising more than 25% ATSI peoples, relatively few respondents indicated that their organisation was owned or managed by an Indigenous person or organisation (just 6.11% over all). This was significantly less than expected on the basis of population ethnicity. A further breakdown of ATSI ownership or management by remoteness categorisation is given in Table 8.

Table 8: Proportion of respondent organisations owned or managed by ATSI peoples—by remoteness and industry

ANZSIC Industry	Remoteness			Average across all regions	
	Inner Regional	Outer Regional	Very Remote		
Accommodation		1.82	7.84	5.19	4.13
Agriculture		0	0	0	0
Communications					0
Construction		3.57	0	2.70	2.20
Cultural		15.38	0	28.57	18.18
Education		5.56	18.18	5.88	8.70
Electricity					0
Finance		4.55	0	0	2.78
Government		7.69	16.67	36.84	22.50
Health		4.00	16.67	21.62	14.94
Manufacturing			0		0
Mining		0	0	14.29	5.26
Personal		0	12.50	0	2.86
Property		7.14	0	0	4.17
Retail		5.88	9.09	0	5.63
Transport		1.49	0	7.69	2.48
Wholesale					0
Average across all industries	0	3.40	6.10	9.54	6.11

It must be acknowledged that the low ATSI representation observed in this study may have been the result of survey response bias (for example, organisations with ATSI owners and/or managers may have been much less likely to respond to the survey than their non-ATSI counterparts). Yet the low ATSI representation in organisations apparent in these results is consistent with findings of the Commonwealth of Australia (2003, p 25), which noted that “Indigenous participation in business is below the reasonable expectations of government and Indigenous parties themselves”. Accordingly, it may be reasonable to assume that the sample data are a reasonably accurate representation of the true population, the conclusion being that ATSI persons are under-represented in the management and ownership of organisations across the survey region.

This was particularly evident in agriculture, communications, electricity, manufacturing, and wholesale, among which not a single respondent organisation was owned or operated by persons of ATSI descent. With the exception of agriculture, these industries also had a relatively low proportion of workers who were of ATSI descent (Table 9). Agriculture was a particularly interesting exception: the average respondent organisation had a workforce that was almost one-fifth ATSI, but there was no ATSI involvement at the level of ownership/management.

That point aside, a relatively high proportion of respondent organisations within government (22.5%), cultural (18.18%) and health (14.92%), were owned or managed by ATSI persons. As might be expected, these figures were higher in the very remote areas than in the outer regional parts of the TS (Figure 17). It was also the government, health and cultural sectors that had the highest proportion of employees who were ATSI (with 29.4%, 28.4% and 24.1% respectively).

Table 9: Proportion of employees who are of ATSI descent—by industry and remoteness

ANZSIC Industry	Remoteness				Average across all regions
	Inner Regional	Outer Regional	Remote	Very Remote	
Accommodation		11.11	17.38	5.82	10.00
Agriculture		0.00	5.19	56.00	20.83
Communications					0.00
Construction		1.55	0.00	13.35	6.07
Cultural		5.27	8.33	37.45	24.10
Education		4.49	20.10	21.62	13.63
Electricity					2.35
Finance		0.85	13.25	0.00	2.09
Government		12.29	14.38	47.22	29.41
Health		11.72	23.08	42.17	28.40
Manufacturing		0.00	0.00	7.42	2.97
Mining		5.00	0.00	17.59	11.62
Personal		0.00	0.00	4.29	1.71
Property		0.00	11.73	10.42	3.83
Retail		10.28	13.79	6.63	10.11
Transport		10.00	11.67	13.63	12.36
Wholesale					1.67
Average across all industries	2.00	5.06	12.31	24.14	14.11

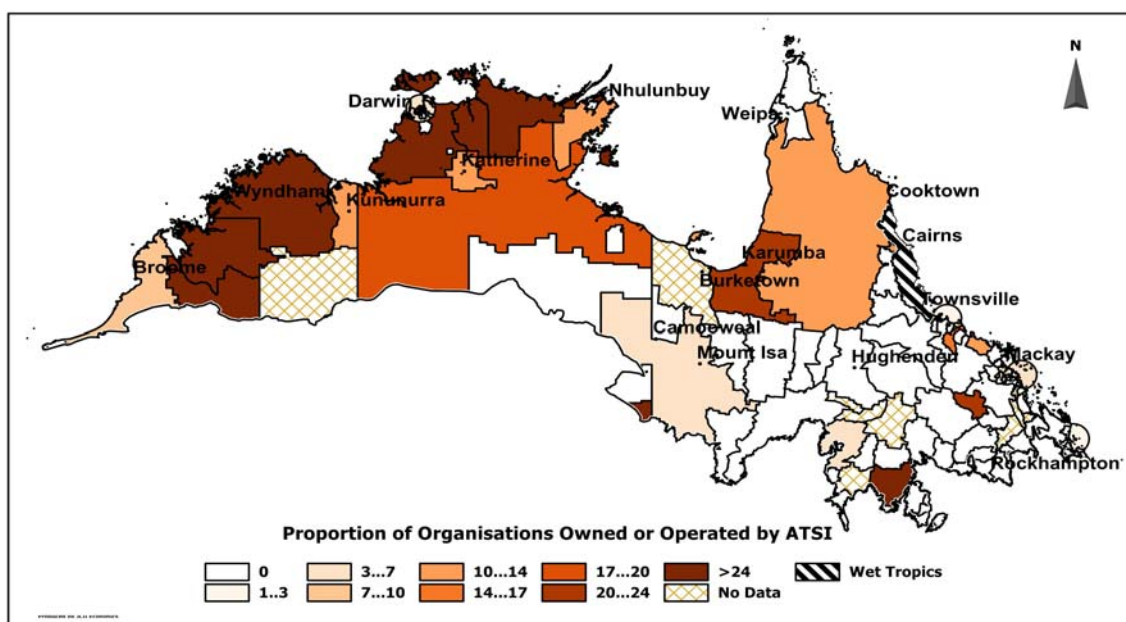


Figure 17: Proportion of organisations owned or operated by ATSI—by postcode

2.3.6 Proportion of employees who are family members

Table presents data on the average proportion of employees who were members of the owner/manager’s family in each industry/remoteness category. Unsurprisingly, organisations in industries which were relatively large (e.g. mining, government, education, health and cultural) generally had a low percentage of family members in their workforce. This contrasts markedly with agricultural, forestry and fishing sectors, where 65% of the average organisation’s workforce comprised family members. Other sectors which employed a relatively high proportion of family members included manufacturing (54.5%), accommodation (48.5%), transport (46.6%) and wholesale (45.6%).

Table 10: Proportion of family employees by remoteness and industry

ANZSIC Industry	Remoteness				Average across all regions
	Inner Regional	Outer Regional	Remote	Very Remote	
Accommodation	53.33	43.69	58.70	49.38	48.47
Agriculture		77.38	54.87	67.81	65.25
Communications					40.00
Construction		27.49	38.12	44.22	37.41
Cultural		12.50	0.42	4.17	6.32
Education		0.09	17.06	1.47	4.91
Electricity					24.44
Finance		36.79	0.00	33.33	34.37
Government		2.32	33.54	6.42	8.92
Health		42.02	14.55	23.96	27.86
Manufacturing			54.17		54.50
Mining		3.33	15.41	0.42	8.64
Personal		15.67	0.00	50.00	18.33
Property		29.72	61.43	32.29	34.44
Retail		22.01	32.28	43.21	33.19
Transport		54.20	39.83	36.41	46.60
Wholesale					45.62
Average across all industries	22.25	38.12	41.61	37.03	38.53

2.3.7 Proportion of employees who work part time

Figure 18 shows the average proportion of part-time employees within respondent organisations mapped at the postcode level. This confirms earlier observations regarding the relatively high proportion of part-time workers in remote areas. The 2001 ABS Census data indicates that 30% of Australian workers were employed part time, whereas this data indicates that the average organisation located in most regions of the TS had *more* than 30% of its workforce engaged part time.

Within the remote regions, there did not appear to be any systematic pattern in the data (e.g. there was no simple relationship between remoteness and proportion of workforce engaged part time). But this masks the fact that there is a relationship between remoteness and part-time employment across sectors (Table 11).

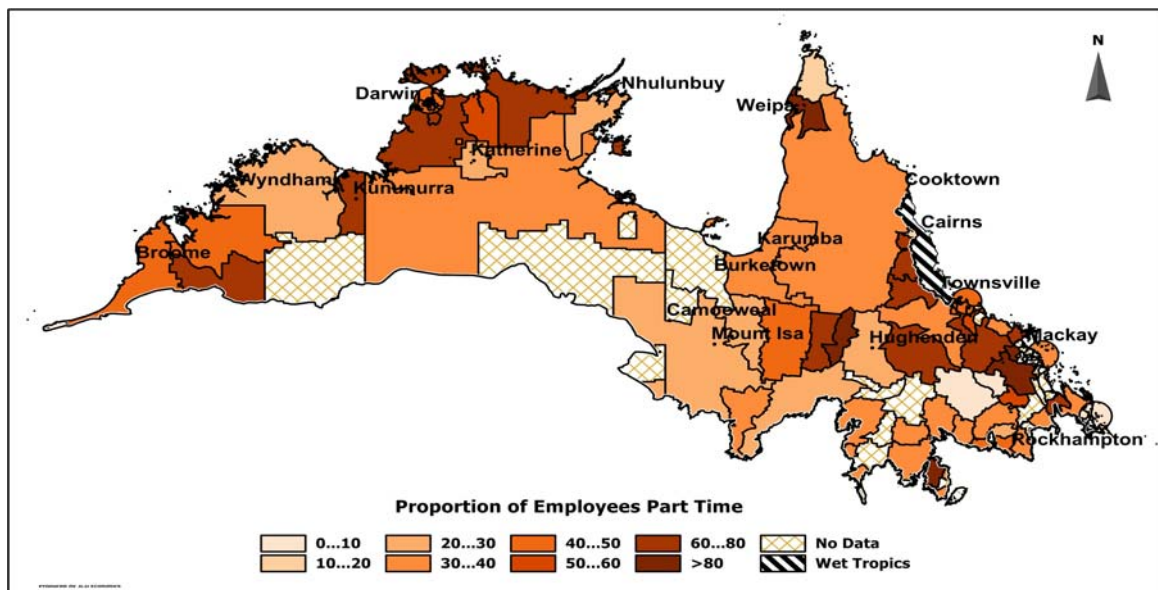


Figure 18: Proportion of employees working part time – by postcode

Table 11: Proportion of part-time employees by remoteness and industry

ANZSIC Industry	Remoteness				Average across all regions
	Inner Regional	Outer Regional	Remote	Very Remote	
Accommodation		61.18	56.39	49.63	56.59
Agriculture		62.50	41.42	42.90	44.85
Communications					70.00
Construction		21.24	40.31	42.47	35.24
Cultural		50.58	50.00	57.74	53.92
Education		50.15	37.03	51.19	47.23
Electricity					33.33
Finance		26.49	39.83	31.25	29.51
Government		19.40	43.88	34.25	29.41
Health		48.79	51.19	42.99	47.41
Manufacturing			33.33		23.48
Mining			35.50	2.37	27.23
Personal		59.31	83.33	29.25	52.78
Property		29.33	66.11	21.98	32.82
Retail		35.60	62.64	35.61	49.68
Transport		62.56	58.63	39.51	56.71
Wholesale					23.40
Average across all industries	30.27	49.34	51.61	42.51	47.56

Specifically, there were two sectors—construction and cultural—where organisations in remote parts of the TS appeared to employ a higher proportion of part-time workers than those in regional centres. There were six sectors (finance, government, health, personal, property and retail) which, when located in the remote parts of the savannas, had the highest proportion of part-time workers. And there were three sectors (accommodation, agriculture and mining) in which there was an *inverse* relationship between remoteness and part-time workers. That is, organisations located in outer regional areas had a higher percentage of part-time workers than those in inner regional areas. These organisations in turn, had a higher proportion of part-time workers than organisations in remote and very remote parts of the savannas. This was, no doubt, at least partly attributable to the fact that organisations which imported workers from outside the local area (e.g. fly-in-fly-out arrangements in mines) only did so if staff were able to work full time.

Consequently, remote areas with economies dominated by mining and/or agriculture were likely to have a lower proportion of part-time workers than remote areas which relied on other sectors for employment.

3 Key industries of the tropical savannas

As mentioned earlier, there are many ways to assess the importance of an industry/sector to a regional community. One simple method is to count the number of registered businesses or organisations of different types within each region—as was done when categorizing the names of organisations from the mailing list referred to Section 2. When researchers did this, the retail sector stood out as the most important sector across the entire TS region, closely followed by construction; property and then agriculture, although that ranking differed across regions. In the remote and very remote areas, for example, agriculture was the most commonly listed type of organisation, followed by retail, construction, and finally property.

The key problem with that type of approach, however, is that a simple count of the number of organisations of each type in a region does not provide any information about other characteristics which may be of interest, such as employment provided by the different sectors, or the availability of services provided, or their size. In this section of the report, we thus describe the way in which researchers sought to determine the relative importance of industries to communities using (1) ABS employment data; (2) survey data on perceptions of the ‘availability’ of different industries, and (3) survey data regarding the gross annual turnover.

To be more specific, Section 3.1 presents ABS data at the postcode level which allows one to examine (a) regional differences in the percentage of the total workforce employed in different sectors across the TS; and (b) regional differences in employment in individual sectors for key industries. Section 3.2 then goes on to examine the extent to which respondents thought different types of goods and services were available in their local communities (again, at the postcode level) while Section 3.3 estimates and compares the gross turnover of different industries across the TS. In the final section (3.4) information from the preceding sections is used to identify some of the ‘key’ industries of Australia’s tropical savannas.

3.1 Industries of employment

As can be clearly seen in Figure 19, in 2001, the retail sector employed the highest proportion of workers across Australia as a whole—yet this industry was a relatively unimportant employer of people in the two most remote parts of the TS²⁵. And while retail was also a key employer in inner regional parts of the TS, it was a relatively unimportant employer of people in the remote areas. Other industries which were less important to remote communities within the savannas than to Australia as a whole were manufacturing, wholesale, property, finance, and, to a lesser extent, health.

Thus, it appears that in 2001, the structure of the workforce in the inner and outer regional parts of the TS was similar to that of the Australian workforce as a whole—but this was not the case in remote areas. In remote parts of the savanna, government, agriculture and mining supported the largest proportion of the workforce. This suggests that the use of Australian or state/territory-wide figures to describe the economic and social activity of some regional centres may be justified. But to use such figures to describe the workforce of remote areas of the TS region is to risk an inaccurate description.

Before continuing, however, it should be noted that some sectors such as retail, have many owner-operated businesses. Thus these sectors may not have accounted for much formal employment in the 2001 ABS Census, but they may have provided much self-employment. The data presented in Figure 19 (and in subsequent figures within this sub-section) thus understate the importance of some sectors as providers of income in the TS because of high levels of self-employment.

²⁵ When producing this graph, postcode level data from the ABS 2001 Census were used to calculate the percentage of the workforce employed in each industry (using the Australian and New Zealand Standard Industrial Classification) and this information was further sub-divided according to the level of ‘remoteness’ of each postcode.

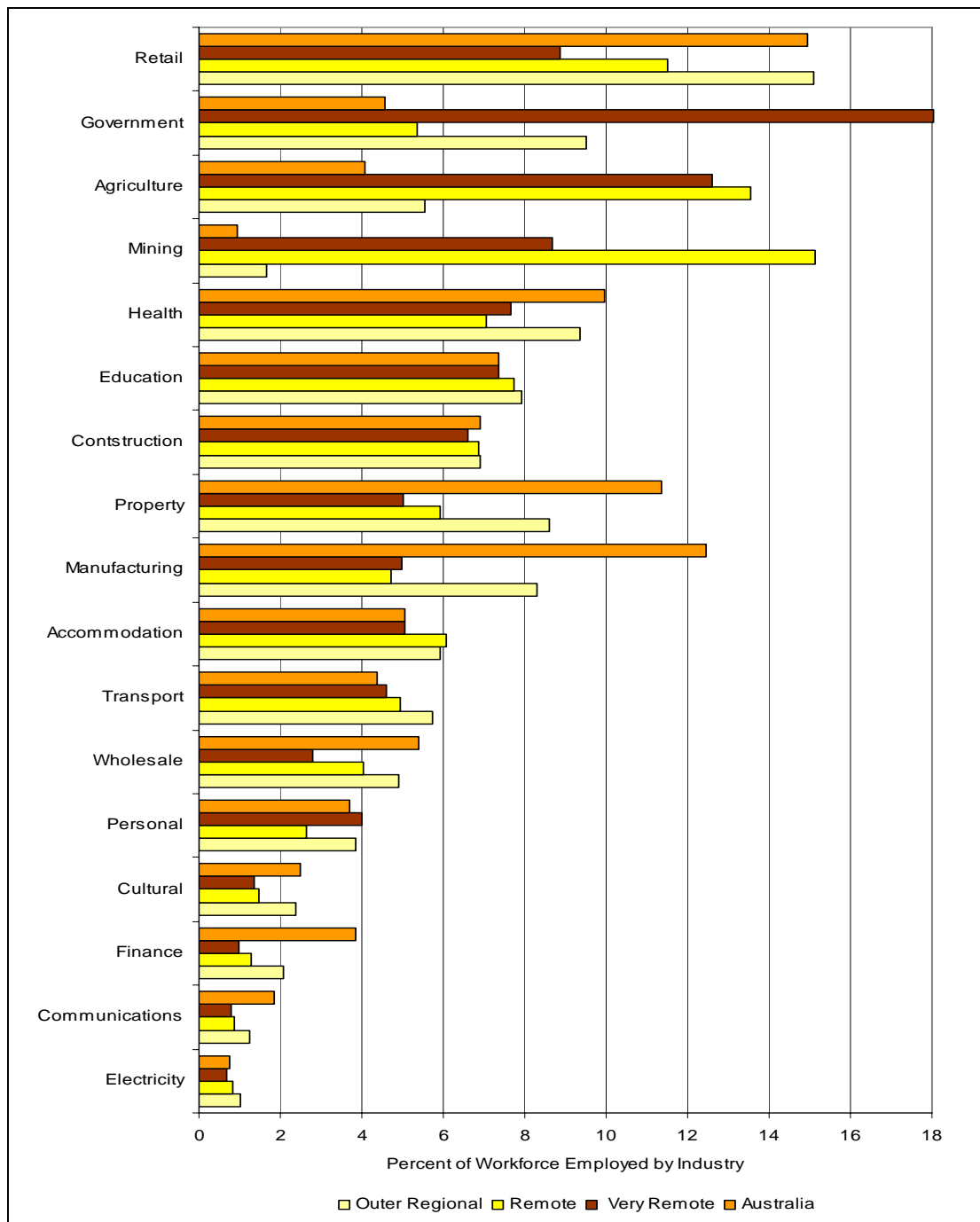


Figure 19: Percent of workforce employed in different industries in Australia and the TS—by remoteness—Data Source: ABS CDATA 2001

Regional differences in the relative importance of different industries are even more evident if examined at a finer geographic scale. Figure 20²⁶ clearly highlights the fact that the government sector was the single largest employer across almost two-thirds of the geographic area of the TS. On the surface, this may seem to conflict with other data sources—for example in the Northern Territory the mining industry accounted for 19% of Gross State Product during 2004–05 (Northern Territory Government 2005). Yet as noted by Pritchard (2005: 79), “the resources sector is frequently the largest contributor to northern remote Australian regions in terms of gross regional product...but other sectors (such as government or services) often tend to be more important in terms of local income flows.”

To the extent that income flows are linked to employment, it is evident that government is of vital importance to the TS. Further, this finding accords with those of the Commonwealth of Australia 2005 (p11.18) which clearly identifies the public sector as being the most significant employer of Indigenous people in very remote parts of

²⁶ When constructing this figure, ABS employment data were used to calculate the percentage of all workers employed in each sector within each of the 122 postcodes whose boundaries sit either wholly or partially within the TS. For each postcode, the industry employing the greatest number of people was identified and it is these industries which are mapped.

Australia. Evidently, it is not just Indigenous people who rely on the government for employment in these regions.

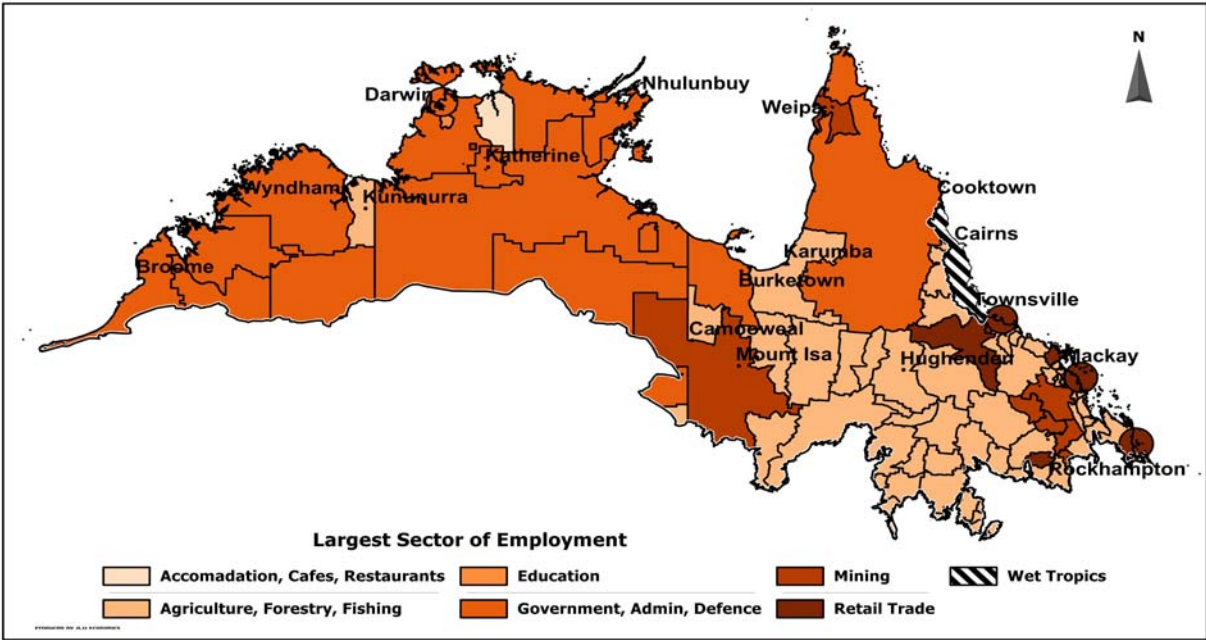


Figure 20: Largest sector of employment in the TS region—by postcode Data Source: ABS CDATA 2001

Figure 20 also shows that the retail sector was the most important industry of employment in regional centres; the mining sector was the largest employer in several enclaves (inland from Mackay/Rockhampton, around Mount Isa and Weipa); and the agricultural sector provided most employment to the majority of other (non-government) regions. Evidently, regions that are geographically ‘close’ can also be economically ‘distant’, and an industry which is a vital provider of employment in one district, may be all but irrelevant in another. The agricultural industry, for example, accounted for 100% of employment in some postcodes and no employment at all in others. There was also considerable variation in the dependence of regions on the government and the mining sector for employment. In some postcodes these sectors accounted for 96% and 56% of employment, respectively, and in others they provided no employment at all.

The most important point here, therefore, is that different communities in different parts of the TS depend upon different industries for employment—even when classified similarly with respect to their level of remoteness. It may not, therefore, be appropriate to simply aggregate regions within the TS according to their remoteness and then analyse the behaviour of associated averages.

Researchers thus examined regional variations in more detail, looking at the way in which employment in key industries varied across space. The following section presents data on the ‘Top Five’ industries identified in Figure 20 (i.e. agriculture, government, mining, retail, health); maps showing regional variations in employment to the other sectors are provided in Appendix C.

3.1.1 Government

As highlighted by Figure 20, the government sector²⁷ was the single largest employer across almost two-thirds of the TS (in geographic area). In many regions, particularly the most remote parts of NT and WA, this sector accounted for more than 30% of all employment (Figure 21). This was even higher than the percentage of workers employed in that sector in the Australian Capital Territory (24%), Appendix B. In contrast, government employees represented a much smaller proportion of workers (generally less than 10% and often less than 5%) in the south-eastern part of the TS—mostly in Queensland.

²⁷ The Government sector—as defined within the ANZSIC Industry code (ABS, 2006c)—“includes all central, state and local government units that are mainly engaged in government administration and regulatory activities as well as judicial authorities and commissions, representatives of overseas governments and the army, navy and air defence forces and civilian units mainly engaged in defence administration. The industry class for defence excludes units mainly engaged in manufacturing activities (such as naval dockyards and munitions factories) and units mainly engaged in operating colleges or similar educational institutions for the defence forces.”

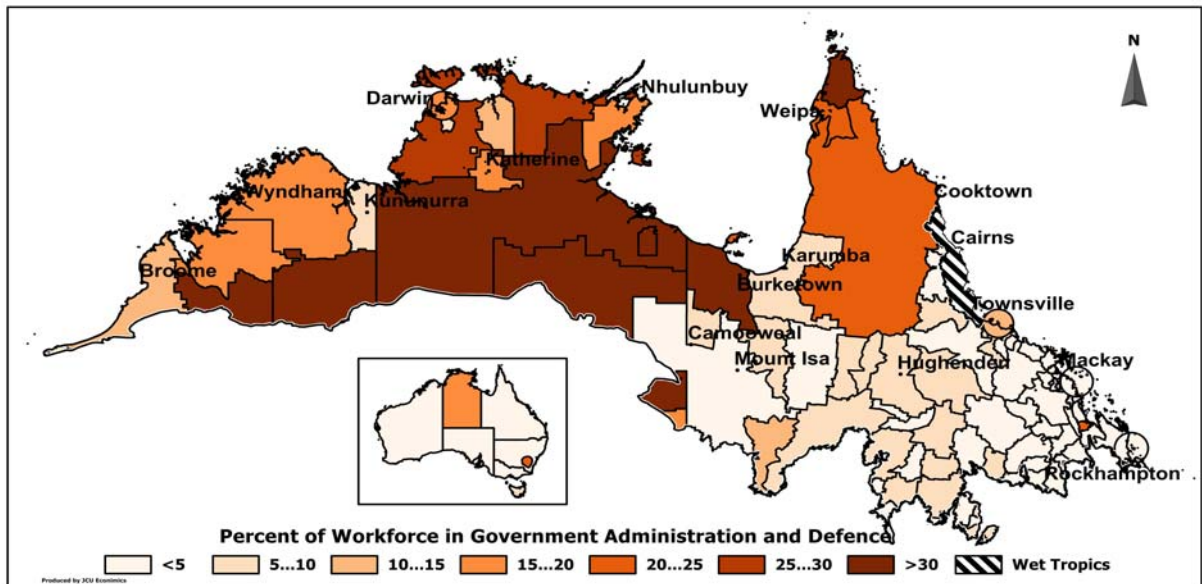


Figure 21: Percent of workforce in Government—by postcode Data Source: ABS CDATA 2001

Not only did this south east part of the savanna have a relatively small proportion of its workforce employed in government, but the Media M Group database contained a relatively small percent of government organisations in that area, particularly when compared to some of the more remote parts of the TS in Australia’s north west.

3.1.2 Agriculture

It is evident from Figure 22 that many parts of the TS were more heavily dependent upon the agriculture²⁸ for employment than other parts of Australia. In the ACT, for example, just 0.4% of all employees worked in that sector; and the figure was just 3.99% for Australia as a whole (Appendix B). In contrast, the agricultural sector employed more than 14% of the workforce in large tracts of the TS, particularly in Queensland.

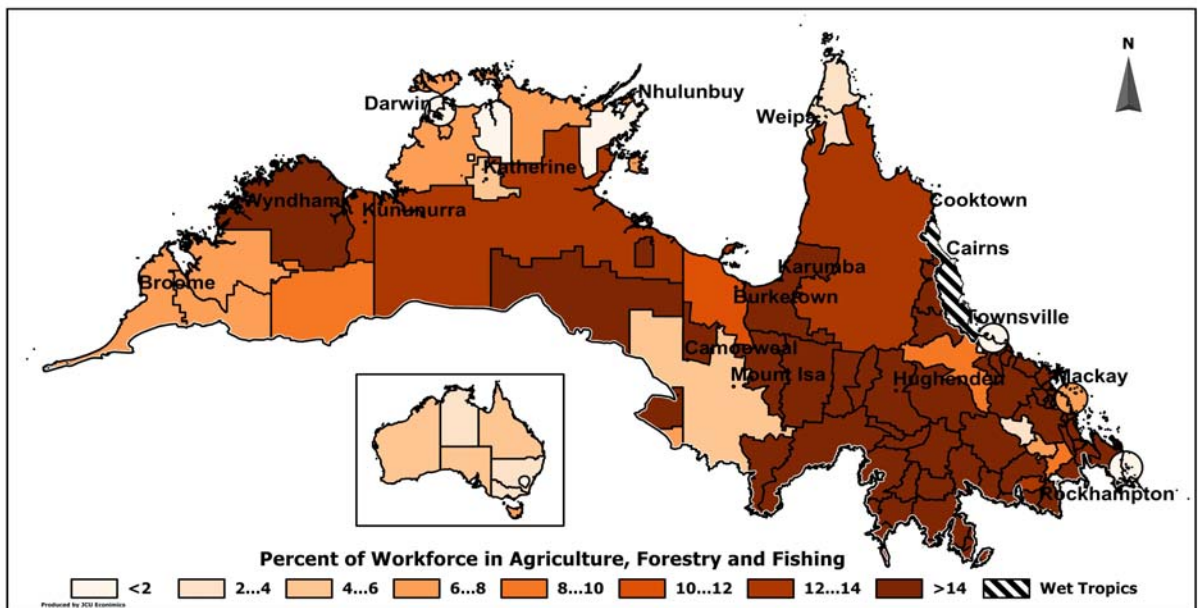


Figure 22: Percent of workforce in Agriculture—by postcode Data Source: ABS CDATA 2001

²⁸ The agricultural sector—as defined within the ANZSIC Industry code (ABS, 2006c)—“includes all units mainly engaged in agriculture, forestry, fishing and hunting. The term agriculture is used in the broad sense to include the breeding, keeping or cultivation of all kinds of animal or vegetable life except forest trees and marine life. Forestry includes afforestation, harvesting and gathering of forest products. Fishing includes the catching, gathering, breeding and cultivation of marine life from ocean, coastal and inland waters. Hunting includes the catching or taking of all types of animal wildlife on land.”

3.1.3 Mining

Despite the fact that the mining²⁹ sector accounted for less than 1% of employment throughout Australia as a whole, it was a vitally important sector in some parts of the TS, specifically in and around Mount Isa, Weipa, and behind Mackay/Rockhampton (Figure 23). On a person-by-person basis, it provided employment to approximately 4.85% of the TS workforce; but in some postcodes it employed more than 50% of all workers. That said, there were many parts of the TS where the mining sector was not an important employer: it is very much an ‘enclave’ industry.

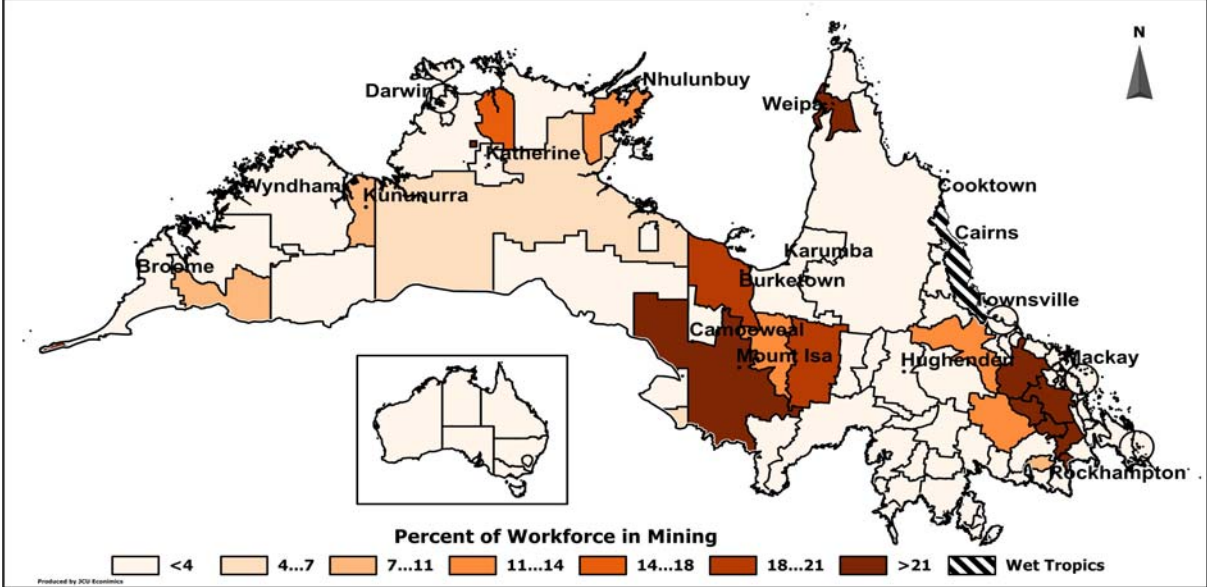


Figure 23: Percent of workforce in mining—by postcode

Data Source: ABS CDATA 2001

²⁹ In the ANZSIC Industry codes (ABS, 2006c), mining “includes all units mainly engaged in mining, in exploration for minerals, and in the provision of a wide variety of services to mining and mineral exploration, as well as mining units under development.”

3.1.4 Retail

The retail sector³⁰ accounted for almost 15% of employment in Australia, and more than 10% of employment in each state and 13.54% of employment in the TS (Figure 19). However, the TS estimate is, necessarily, weighted by population and is thus heavily biased towards the regional centres. As shown in Figure 24, the industry was a relatively unimportant employer throughout much of the TS³¹ and employed, on average, just 4.7% of the workforce across all postcodes.

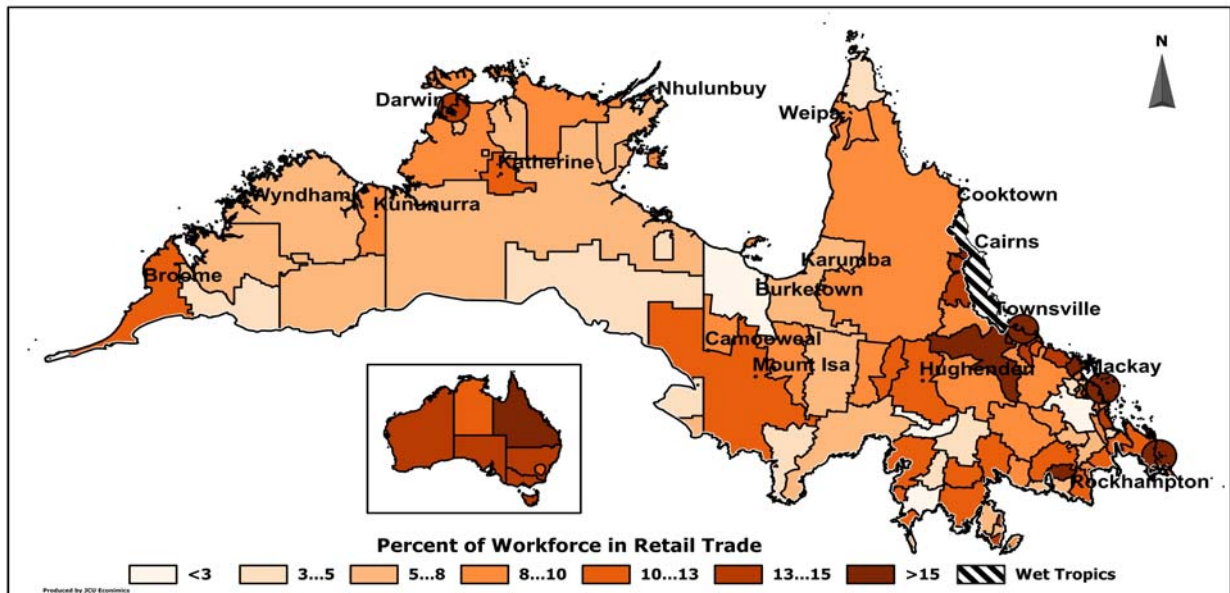


Figure 24: Percent of workforce in retail—by postcode

Data Source: ABS CDATA 2001

3.1.5 Health

The health sector (which includes all units that are ‘mainly’ involved in the provision of health and community services, ABS, 2006c) employed a smaller percentage of the TS workforce (8.75%), than the Australian workforce as a whole (9.7%)³². In the north-western part of Western Australia more than 13% of the workforce was employed in the health sector (see Figure 25). This contrasts markedly with parts of the Northern Territory and Cape York Peninsula, where the sector generally accounted for less than 4% of employment. At least part of this could be due to the fact that there was relatively little other employment in the north-western part of WA (compared to other parts of NT and Cape York) but these regional differences in health expenditure could also reflect differences in state government policies.

³⁰ Retail trade (ABS, 2006c) “includes all units mainly engaged in the resale of new or used goods to final consumers for personal or household consumption or in selected repair activities such as repair of household equipment or motor vehicles. Businesses engaged in retail trade include department stores or other shops, motor vehicle retailers and service outlets, stalls, mail order houses, hawkers, door-to-door sellers, milk vendors, vending machine operators and consumer co-operatives. Units mainly selling goods on a commission basis to final consumers for personal or household consumption are included—but cafés, restaurants, hotels and motels are included in a different division.”

³¹ Notable exceptions are the larger centres of Darwin, Townsville, Mackay and Rockhampton.

³² For more information see Appendix B.

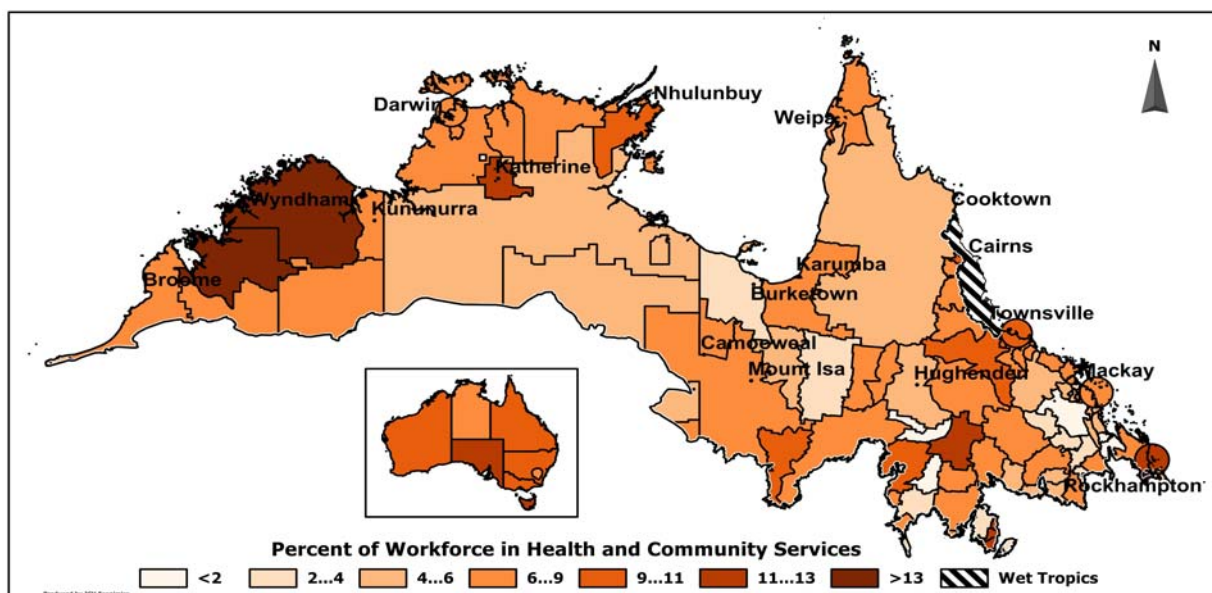


Figure 25: Percent of workforce in health—by postcode

Data Source: ABS CDTA 2001

3.2 Respondent perception of industry availability

Respondents who participated in both the email and the postal survey were asked to comment on the ‘availability’ of each of ANZSIC’s 17 industries within their local area³³. More specifically, the question was posed as follows:

Please advise whether the following types of businesses and organisations are available within your local region by ticking the appropriate box. Please answer regardless of whether you spend money at these businesses or not.

Type of business /organisation	None available locally	Small number available locally	Some available locally	Full range available locally
Retailers <i>e.g. supermarkets, stores, petrol stations</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Answers were coded on a scale of 1 to 4 (1 for *none available locally*; 4 for *full range available locally*) and each response was associated with the ARIA+ index corresponding to the postcode of the respondent’s organisation. It must be kept in mind that these responses came only from a sample of people involved in businesses, government or other not-for-profit organisations in the TS and may not reflect the opinions of the broader community. But they do provide a useful insight into regional variations in the availability of different types of Industries.

Not surprisingly, mean responses to questions about the availability of different types of goods and services were almost always lower in the remote regions than in the Outer Regional areas. These differences were statistically significant (ascertained via an ANOVA). Across the TS as a whole, the manufacturing, wholesale, government and mining sectors scored lowest on the availability scale, while the retail, construction and accommodation industries were identified as being the most available (Figure 26)³⁴.

³³ The term ‘local’ was explicitly defined as being within the same postcode, or same town—for cases where the town comprised multiple postcodes.

³⁴ Data from the ‘inner regional’ areas have been omitted from the chart since there were only five responses.

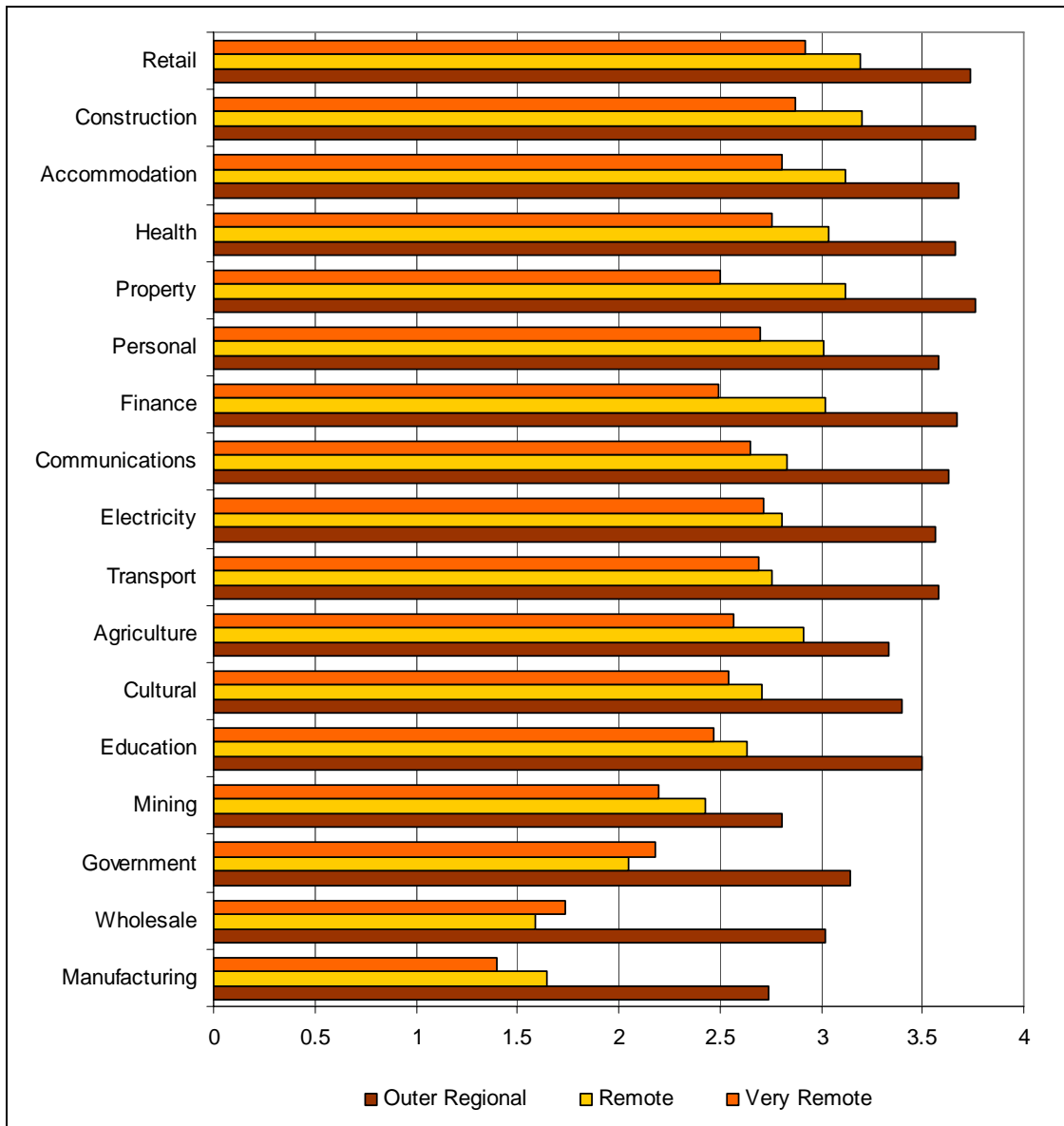


Figure 26: Respondent perception of the availability of different industries within the TS—by remoteness

Interestingly, it was not always the sectors that provide the most regional employment (government, agriculture and mining, as discussed in the preceding section) that were perceived by respondents as being the most available. A large part of this could reflect the fact that organisations within both government and mining sectors are generally larger than those within the retail sector. So respondents may have reported that there are relatively few of these organisations scattered throughout the TS (particularly if compared to the number of retail outlets). But these organisations may still be important to the region for the employment and commodities they provide. Similarly, some sectors (retail in particular) are likely to include many owner-operated businesses. Small retail outlets may, therefore, be prevalent across large tracts of the savannas, providing goods, income and self-employment, but little formal employment.

When examined at a finer geographic scale, differences in the availability of industries across space become even more apparent. As shown in Figure 27 and Figure 28, for example, neither the manufacturing nor wholesale sectors were readily available to most communities across the TS, although they were present in regional centres.

Table 12: Respondent perception of the availability of different industries in the TS—by remoteness (1=None available locally; 4 = full range available locally)

ANZSIC Industry	Remoteness				Average across all regions
	Inner Regional (N=5)	Outer Regional (N=305)	Remote (N=248)	Very Remote (N=318)	
Accommodation	3.50	3.68	3.12	2.81	3.18
Agriculture	3.50	3.33	2.91	2.57	2.92
Communications	3.50	3.63	2.83	2.65	3.01
Construction	3.75	3.76	3.20	2.87	3.25
Cultural	3.08	3.40	2.71	2.54	2.86
Education	3.25	3.50	2.63	2.47	2.84
Electricity	3.46	3.56	2.81	2.72	3.01
Finance	3.92	3.67	3.02	2.49	3.03
Government	2.42	3.14	2.05	2.18	2.44
Health	3.83	3.66	3.04	2.76	3.14
Manufacturing	2.38	2.74	1.65	1.40	1.89
Mining	2.25	2.81	2.43	2.20	2.45
Personal	3.58	3.58	3.01	2.70	3.08
Property	3.92	3.76	3.12	2.50	3.09
Retail	3.58	3.74	3.19	2.92	3.26
Transport	3.31	3.58	2.76	2.69	2.99
Wholesale	2.92	3.02	1.59	1.74	2.10
Average across all industries	3.30	3.44	2.71	2.48	2.86

As suggested by the employment data presented in the preceding sub-section, a full range of mining services and agriculture, fishing and forestry businesses were available in some parts of the TS, but not in others (Figure 29 and Figure 30). This inconsistent pattern of availability is also apparent in other, related support industries such as electricity (Figure 33); transport and storage (Figure 34); finance services (Figure 31); and property and other business services (Figure 32). Interestingly, there is relatively strong visual correlation between the availability of these ‘support’ sectors and the existence of mining and mining services. Other sectors which also appear to have some regional correlation in availability include retail (Figure 35), construction (Figure 36), personal (Figure 38) and—to a lesser extent—communications (Figure 37). Perhaps unsurprisingly, there also seems to be some regional correlation in the availability of the two sectors that are closely associated with tourism—accommodation (Figure 39); and cultural (Figure 40).

Health services are perceived as being ‘available’ across most regions, albeit at a relatively low level (Figure 41). This contrasted with respondent impressions of the availability of government (Figure 42) and, to a lesser extent, education (Figure 43), where there are large areas with low availability scores³⁵.

³⁵ Largely, but not solely, attributable to the large geographic area of two key postcodes.

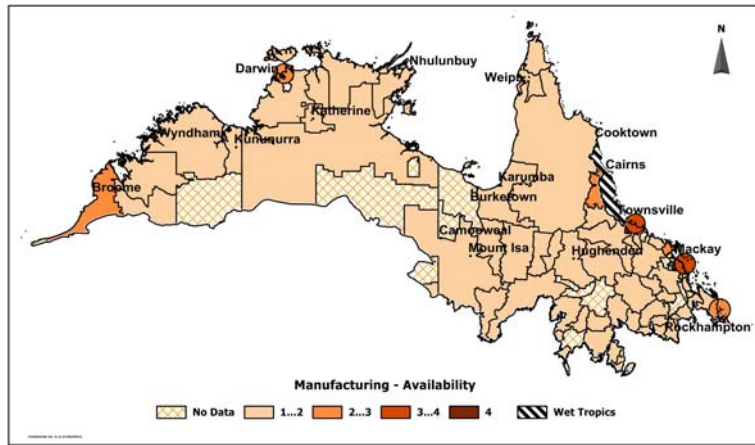


Figure 27: Manufacturing: Respondent perception of availability

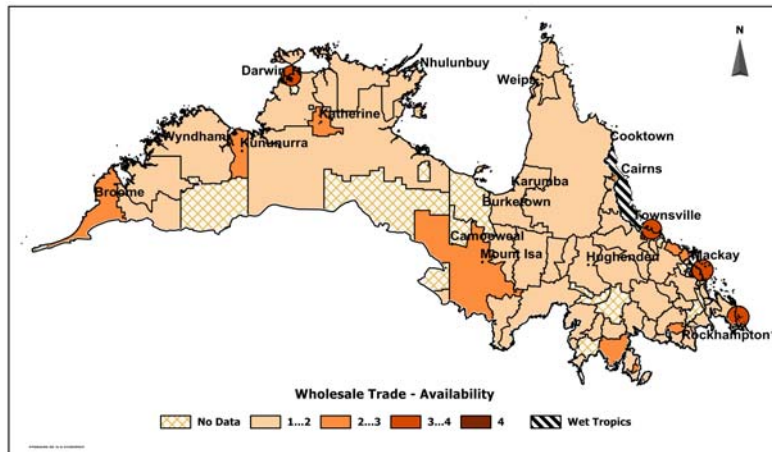


Figure 28: Wholesale: Respondent perception of availability

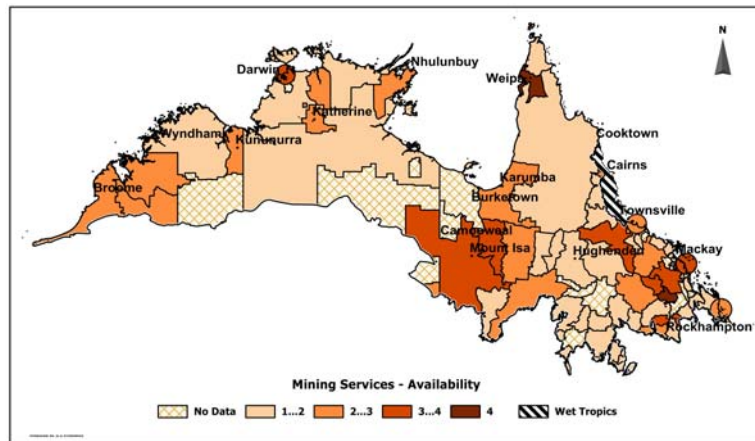


Figure 29: Mining: Respondent perception of availability

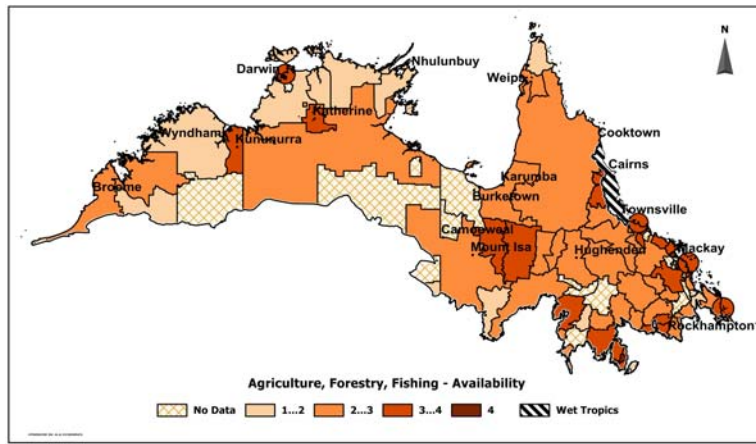


Figure 30: Agriculture: Respondent perception of availability

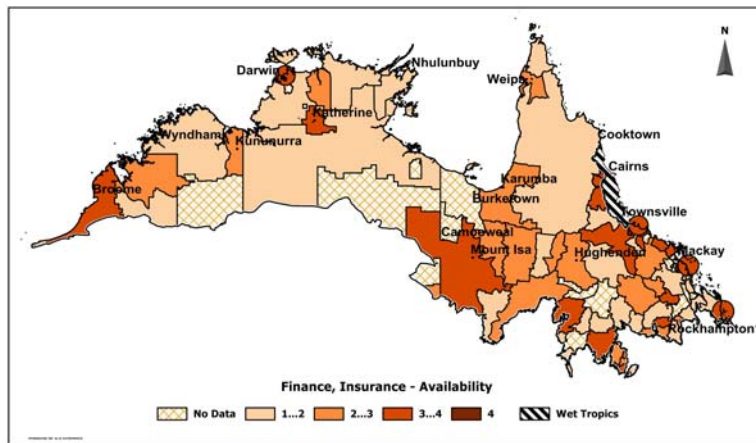


Figure 31: Finance: Respondent perception of availability

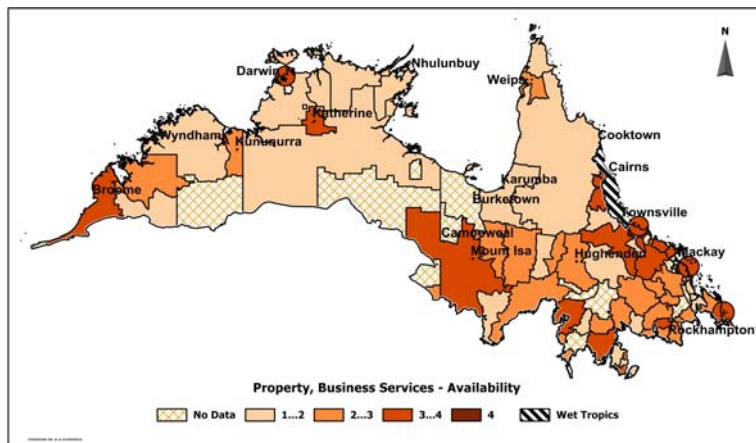


Figure 32: Property: Respondent perception of availability

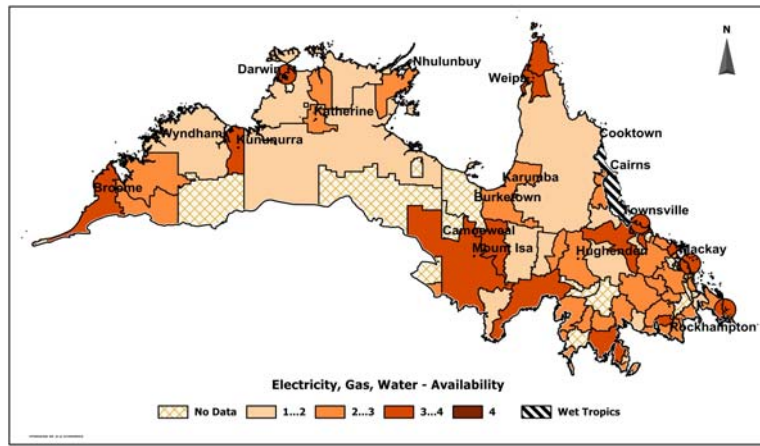


Figure 33: Electricity: Respondent perception of availability

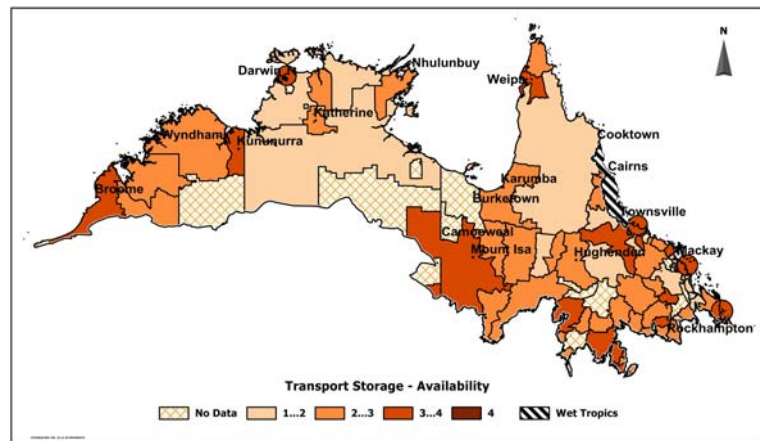


Figure 34: Transport: Respondent perception of availability

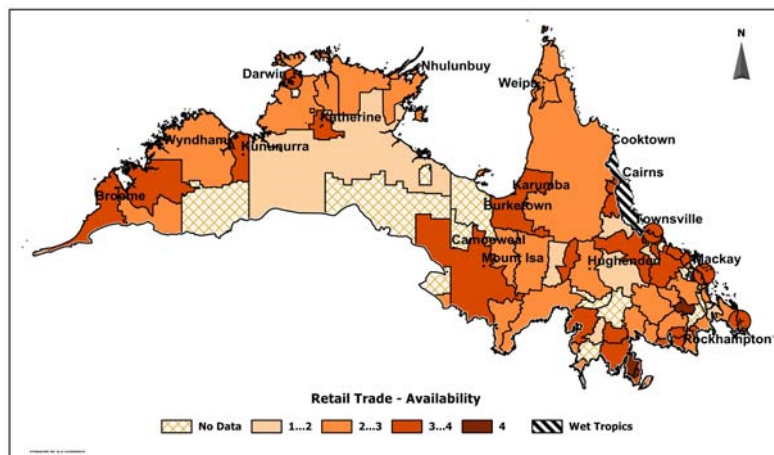


Figure 35: Retail: Respondent perception of availability

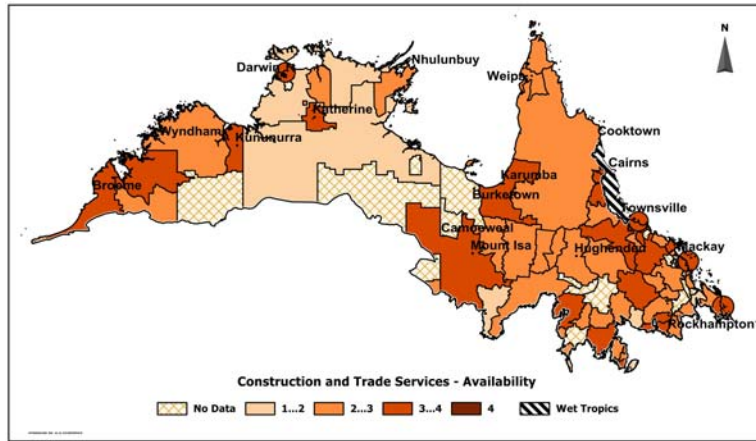


Figure 36: Construction: Respondent perception of availability

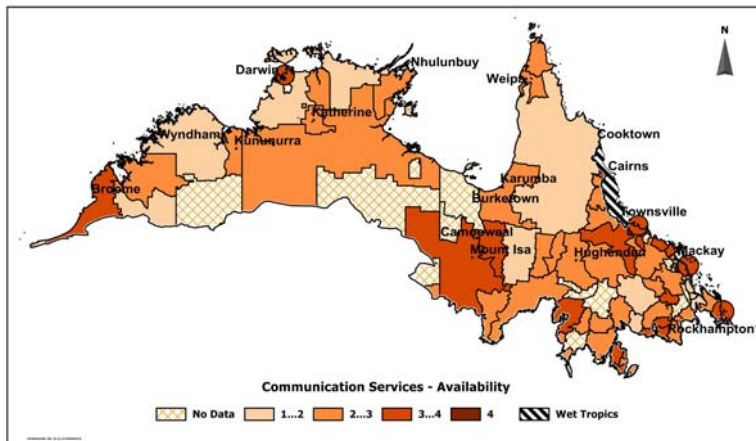


Figure 37 Communications : Respondent perception of availability

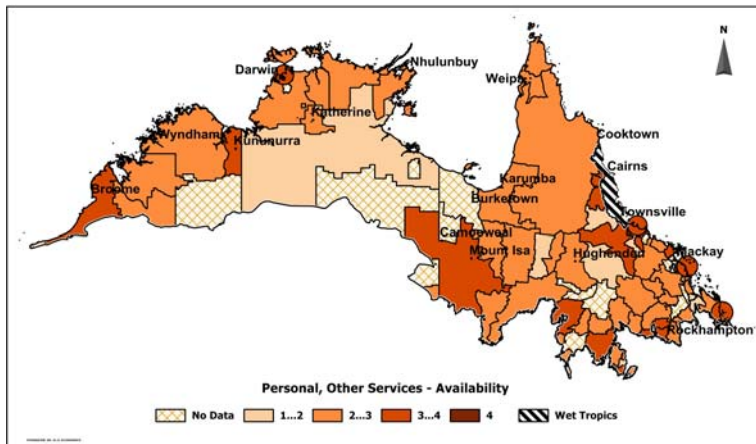


Figure 38: Personal: Respondent perception of availability

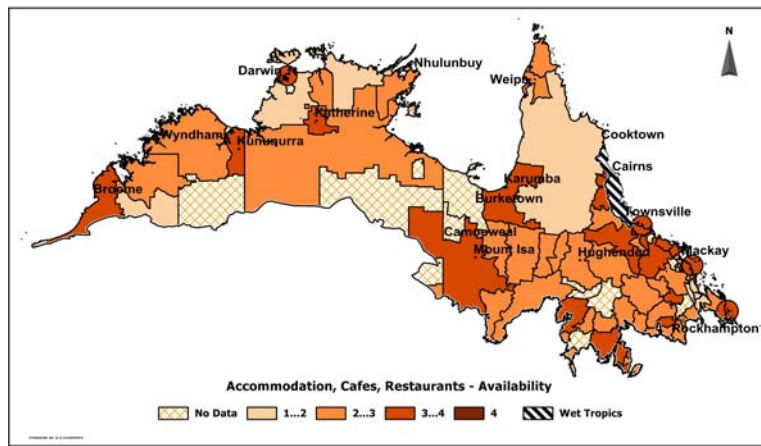


Figure 39: Accommodation: Respondent perception of availability

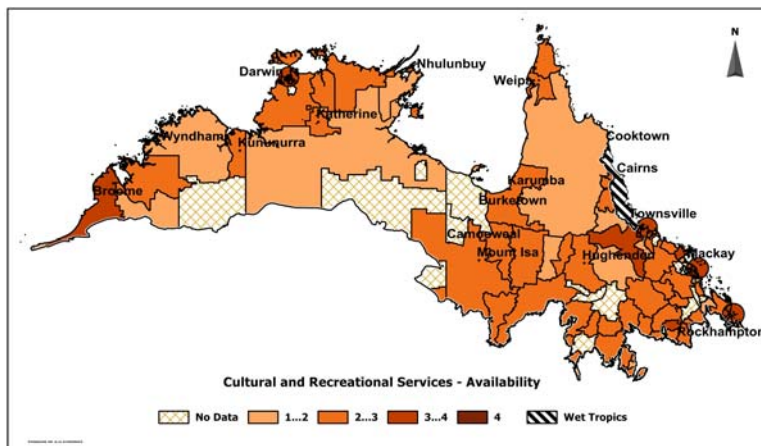


Figure 40: Cultural: Respondent perception of availability

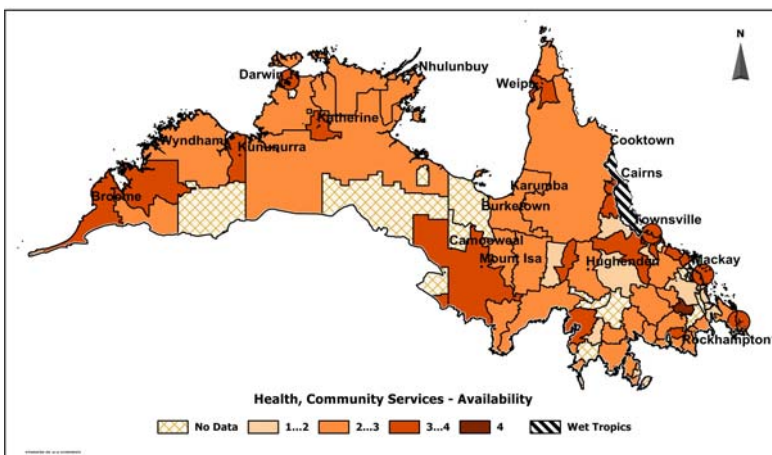


Figure 41: Health: Respondent perception of availability

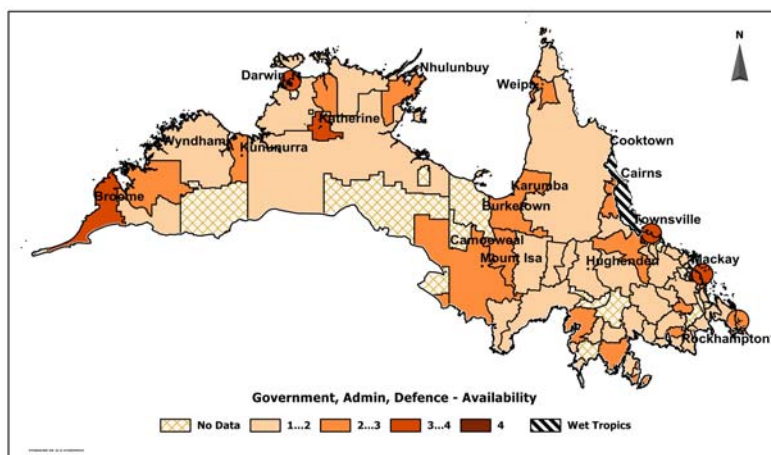


Figure 42: Government: Respondent perception of availability

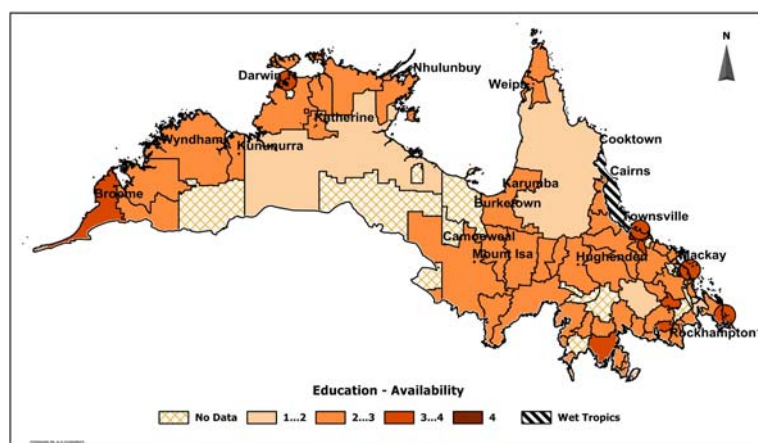


Figure 43: Education: Respondent perception of availability

3.3 Industry turnover

We are not aware of the existence of any data that would enable a comparison between aggregate incomes generated by different industries across the TS. However, we were able to use the survey data to make some ‘back-of-the-envelope’ calculations that allow the drawing of inferences about the likely financial contribution of key industries to the region.

Specifically, for each industry/remoteness category, we multiplied the estimated number of operational organisations³⁶ by the corresponding estimate of the average gross annual turnover (as per Table 5) to generate an estimate of the total regional turnover of each industry. These estimates are presented in Figure 44 and Table 13).

Before continuing, it is important to stress that these estimates are derived from survey data relating to Annual Gross Turnover (or operating budget, in the case of government departments). They are *not*, therefore, directly comparable to ABS estimates of regional product or income. Furthermore, these estimates are themselves, only as accurate as the data from which they were derived—and there were clearly some problems with the accuracy of postal database, sampling etc. Nevertheless, the figures presented in Table 13 appear plausible. Our database listed 28,000 organisations that were located within the TS region (approximately 1.5% of all Australian businesses³⁷). And the aggregate estimate of the annual turnover of all organisations in the TS is just over \$25 million; approximately 1.55% of the ABS’s (2007a) estimate of the total income of all Australian businesses during 2003–04. So whilst we urge readers to treat these figures as indicative rather than definitive, we note that they provide useful insights into the structure of regional economies.

In the first place, it is evident that the retail sector plays a vitally important role within the TS. It may employ fewer people than the government, agricultural or mining sectors, and the average annual turnover of organisations within the retail sector ranks only seventh (out of 17 sectors) however there are numerous retail

³⁶ Approximately 25% of all surveys were RETURNED TO SENDER. We therefore estimated the number of operational organisations within each category as 0.75 times the number listed in the database. To ensure comparability with ANZSIC classifications, the ‘Indigenous’ sector was omitted. The 351 Indigenous organisations in Table were allocated to each of the other industries, assuming that the population of Indigenous organisations was distributed across industry and space as per the sampled respondents.

³⁷ 2,265,562 businesses were registered in Australia in 2003–04 (Australian Bureau of Statistics, 2007, Catalogue 81550)

outlets throughout the region. By sheer weight of numbers, Retail stands as one of the most ‘important’ sectors of the TS (if measuring ‘importance’ by the estimated aggregate annual turnover in each industry). This serves to affirm respondent perceptions of the availability of different industries, where Retail scored highest in most regions.

The construction, property, and agricultural sectors appeared to be similarly ‘important’ players in the TS, each with an estimated aggregate annual turnover in excess of \$2m. The two least ‘important’ sectors in terms of aggregate annual turnover are electricity and communications.

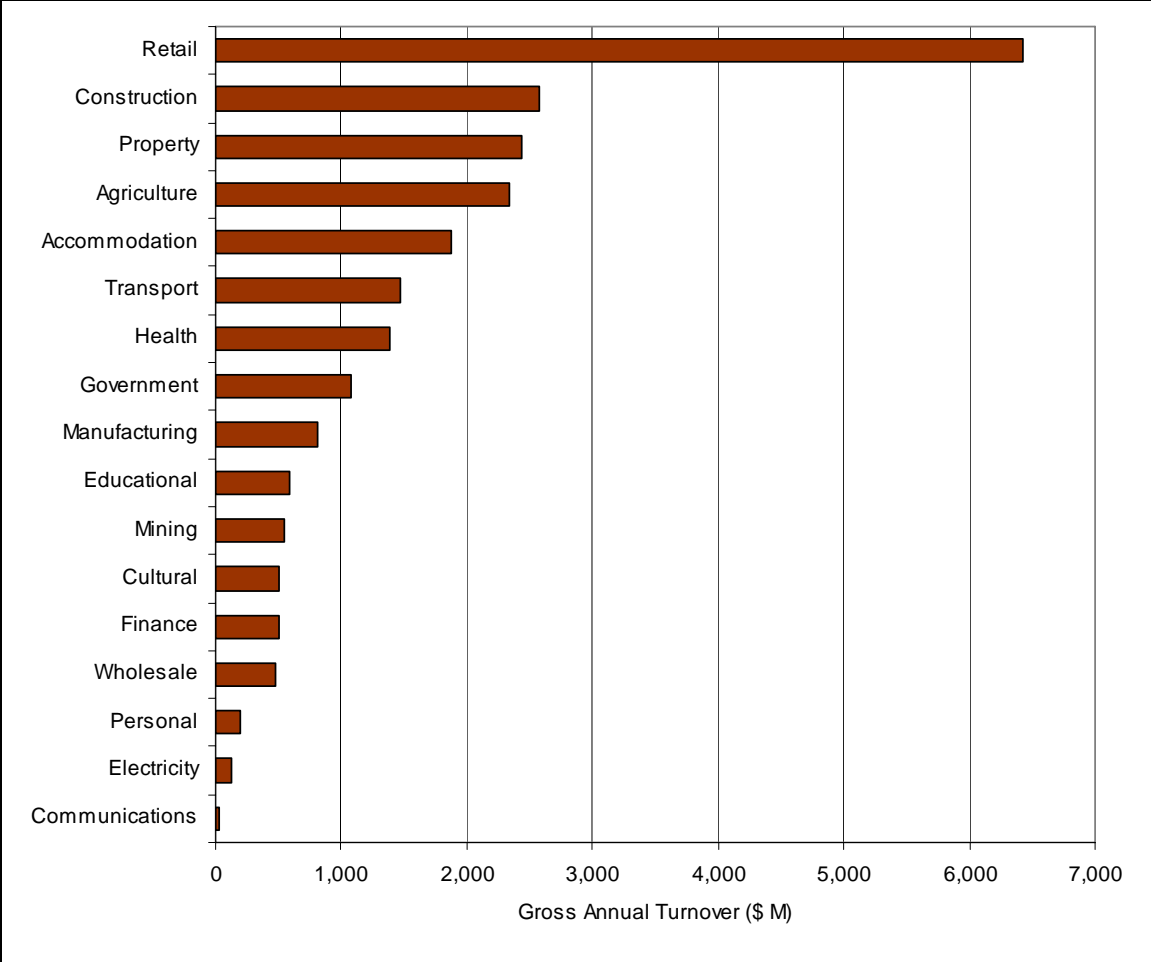


Figure 44: Estimated aggregate gross annual turnover of industries within the TS

As might be expected, there were also differences across regions with differing levels of remoteness (Table 13). Specifically, it was the retail, agriculture and accommodation sectors which dominated the very remote parts of the TS. In contrast, the agricultural sector dominated the remote areas—closely followed by retail. Construction and property were also relatively important in these remote parts, although Accommodation was less important than in the very remote parts. The retail sector was unquestionably the most significant ‘player’ in the outer regional areas, with construction and property also figuring prominently.

Table 13: Estimated aggregate turnover—by remoteness and industry (\$M)

ANZSIC Industry	Remoteness				Group Total
	Inner Regional	Outer Regional	Remote	Very Remote	
Accommodation		805	272	526	1870
Agriculture		407	1190	662	2336
Communications					34
Construction		2384	331	264	2578
Cultural		428	20	96	507
Education		176	170	141	581
Electricity					128
Finance		322	115	30	500
Government		588	95	339	1073
Health		1122	50	292	1384
Manufacturing		397	36		811
Mining			173	95	546
Personal		114	29	37	197
Property		2108	331	166	2435
Retail		5618	715	1118	6429
Transport		1486	126	382	1472
Wholesale		419			482
Total	1307	16,549	3585	5055	25,469

3.4 Summary

In 2001, the top five sectors for employment across Australia as a whole were: retail; manufacturing; property; health; and education (accounting for 14.94, 12.46, 11.35, 9.95 and 7.35 percent of the workforce respectively). The ‘most’ important sectors to Australia as a whole in terms of total income earned were manufacturing, wholesale and retail and the most important sectors in terms of total wages and salaries paid were property, manufacturing and retail. Yet ABS employment data, and survey data on the perceived ‘availability’ and average gross annual turnover of different sectors at a relatively fine geographic scale, indicates that these sectors which were so ‘important’ to Australia as a whole, were not always important to communities within the TS.

Specifically, it is only the less remote parts of the TS (two in the inner regional and 47 in the outer regional postcodes respectively) that had employment structures similar to those of Australia as a whole. Two of the 122 postcodes that sit either wholly or partially within the TS identified the same top five employment sectors as Australia as a whole—and both of these postcodes were classified as ‘inner regional’ areas. The top five sectors of employment in the ‘outer regional’ parts of the TS were similar, but not identical, to those of Australia. They included: retail; manufacturing; property; and health sectors; (accounting for 15.08, 8.3, 8.6 and 9.34 percent of the workforce respectively)—but government turned out to be a more important sector of employment than education.

Like other parts of Australia, the retail and the health sectors were important employers in remote parts of the TS (providing jobs to 8.9 and 7.7 percent of the workforce). The most important sectors of employment in the remote parts of the TS region were however government, agriculture, fishing and forestry and mining. These industries were not part of Australia’s top five. Survey data relating to the availability of and annual turnover of different industry sectors across different parts of the TS serve to confirm those general observations, although retail became *the* most important regional sector when ranked using these measures.

While wholesaling is clearly one of Australia’s most important sectors—either measured by the employment it provides or by the total income attributable to the industry—it appeared to be a relatively unimportant in the TS. Other sectors which did not feature prominently in the TS—in terms of employment, (estimated) aggregate turnover, or respondent perceptions of ‘availability’—included the electricity and communications sectors. This was particularly evident in the remoter parts of the savannas. Interestingly, the lack of availability and the low estimates of aggregate turnover within the communications sector conform to observations from a wide variety of sources regarding the general lack of communications infrastructure in remote parts of northern Australia (See, Bandias and Vermui, 2005).

Pritchard (2005) talks about the ‘dual’ economic structure of many regions in northern Australia (namely the resources and the public sector) and Altman (2001) notes that in some remote Indigenous communities “the market (or the private sector) is at best small, at worst non-existent” and suggests that a “hybrid economy” framework is needed to understand Indigenous issues. We concur with Altman’s suggestion of the need for a ‘hybrid’ framework although tentatively suggest that such a framework might prove useful in many remote communities; not just Indigenous communities. Although non-Indigenous people do not participate in the ‘customary’ economy, they too, have the option of trading goods and services within the local community rather than participating in formal markets (e.g. trading their fishing catch or other agricultural outputs for other services). And anecdotal evidence suggests that such practices may be more common in rural and remote communities than in urban centres. Thus it may not be enough to simply distinguish between the customary, private and public sectors (as per Altman, 2004), or between remote and non-remote communities (as we have largely done in this chapter), or between resource and public-sector based economies (as per Pritchard).

The key message from this chapter, is that small, regional communities in the TS—particularly those in remote and very remote parts—are *not* just ‘smaller versions’ of larger, Australian communities. Their economic structure may differ, sometimes significantly, from that of Australia as a whole. And the economic structure of one regional community may differ significantly from that of another, adjoining region. Many remote communities, for example, may rely almost entirely on one sector for employment—and that sector, is frequently the government. But considerable variation is expected. A community that relies almost entirely on the government sector for employment may be adjacent to one that relies on the agricultural sector, which in turn, may be adjacent to one that is dependent upon mining.

The “phenomena of industry clusters ... is nothing new...and the economic reasons for the geographic concentration of firms and industries” are varied (Roberts, 2004). But we found no evidence of a simple, predictable relationship between the remoteness of a region and its economic structure. One cannot simply examine the inner regional and the very remote parts of the TS, interpolating results for areas that lie somewhere between the two extremes. Likewise, one cannot assume that similarly remote regions will have similar economic structures.

This has important policy implications. Data collected and aggregated across relatively large regions may not adequately describe what is happening within its component parts; and models which use regionally aggregated data sets are unlikely to produce results that are meaningful to small communities. Further, it suggests that researchers may need to think about different ways of describing and analysing rural and remote economies.

4 Organisational Expenditure in the TS

The previous section highlighted some of the key differences between the economic structure of communities in the tropical savannas (TS) and that of Australia overall. It also highlighted key differences between communities within the TS, arguing that communities could be similarly remote, yet structurally different. Whether or not such structural differences translate into differences in expenditure patterns (and multipliers) across regions and industries is the issue on which this section focuses.

Specifically, this section presents and analyses survey expenditure data and calculates business-level multipliers in accordance with the method described in Section 2. It is structured as follows.

Section 4.1 presents information about the types of goods and services purchased by respondent organisations, in aggregate, and by type of industry—irrespective of whether these goods were purchased locally or imported. Section 4.2 looks at the types of goods and services purchased locally (or, by extension, imported) while Section 4.3 combines information from the preceding two sections, to estimate the total proportion of all revenues that respondent organisations spent within each local industry. Section 4.4 uses the formulas of Section 2 to estimate the total proportion of all revenues re-spent within local communities, while the final section (4.5) presents estimates of business-level multipliers by industry and by region, and compares them to other multiplier estimates from the published literature.

4.1 What types of goods and services do organisations require?

In accordance with the method outlined in Section 2, respondents were asked to indicate the approximate proportion of total organisational revenues (or budget, in the case of government organisations) that was:

- spent on the products of each of the 17 ANZSIC industries;
- spent on wages, salaries and supplements (or kept by owners of businesses for living expenses);
- allocated to taxes (local, state and federal); and
- set aside for savings or profits.

In the first instance, researchers calculated the average percentage of all revenues spent within each industry (Figure 45)³⁸. Across all respondents, the highest average percentage of revenues went towards wages and salaries (19.54%)³⁹. Respondent organisations also spent a relatively large share of total revenues within the retail sector (16.6% of all revenues); monies set aside for savings and profits (7.0% of total revenues) were the next big-ticket items. Expenditure in other sectors comprised less than 6% of all revenues—the smallest amounts, on average, going to mining, personal, government, cultural and health sectors.

There were, however, some interesting differences in the expenditure patterns of organisations within different sectors. As highlighted in Table 14, for example, organisations within the finance sector reported spending almost 50% of all revenues on wages, while those in the electricity sector, reported spending just 4.95 % of their revenues on that item.

³⁸These averages, are weighted averages—calculated by multiplying the average reported expenditure within any given sector by the number of organisations who reported having made that type of expenditure and then dividing by the total number of organisations responding to the expenditure question. They do not, therefore, sum to 100.

³⁹ While not directly comparable, this estimate closely approximates ABS (2007) estimates of the 2004–05, average wage and salary expenditure of all Australian businesses (20.2% of total expenses; 17.8% of total income).

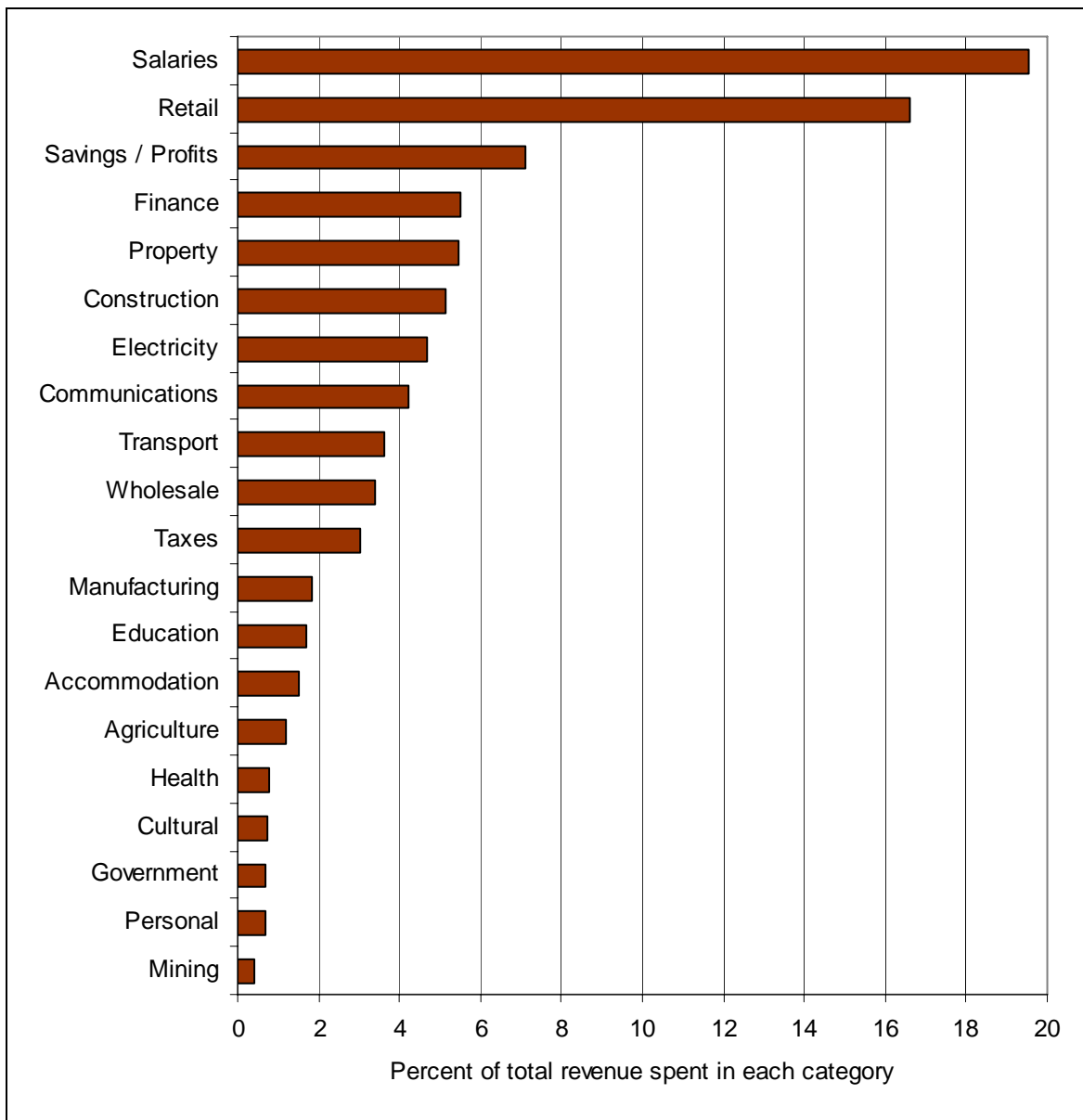


Figure 45: Mean Percent of total revenues spent on different types of goods and services—all respondents

Further, agricultural organisations reported spending a much higher proportion of revenues on wages and salaries than their Australian counterparts (15.5% compared to 9%). Some of this could reflect the fact that much of the agricultural activity within the TS is comprised of dryland grazing—an activity which requires relatively little capital when compared to other forms of agriculture (such as cropping). Consequently one might expect graziers to spend a larger share of revenues on labour than, for example, cotton farmers.

Many other sectors in the TS also seemed to have spent a higher proportion of revenues on labour than their Australian counterparts. Indeed it was only organisations within accommodation, cultural, education, electricity, manufacturing and transport sectors which seemed to spend noticeably less. Evidently, many organisations within the TS used relatively labour intensive production techniques than their national counterparts.

Table 14: Proportion of revenues spent on wages and salaries by industry: TS survey and ABS Australia-wide data compared

ANZSIC Industry	Mean wages as % total revenues (TS survey data)	Average—wages as % total income Aus ABS 2007a	Average—wages as % total expenses Aus ABS 2007a
Accommodation	13.04	21.82	23.10
Agriculture	15.49	8.86	9.66
Communications	17.13	15.76	19.01
Construction	16.98	12.58	13.82
Cultural	13.71	16.10	18.33
Education	25.01	49.51	54.14
Electricity	4.95	8.08	9.29
Finance	46.78		
Government	28.22		
Health	35.30	35.20	40.59
Manufacturing	9.01	14.34	15.47
Mining	18.30	10.38	13.52
Personal	26.85	24.27	27.69
Property	26.65	21.71	26.24
Retail	19.11	9.96	10.28
Transport	14.26	19.53	20.38
Wholesale	24.37	7.08	7.40
Average across all industries	20.89	17.88	20.02

Table 15 allows us to investigate differences in expenditure patterns across industries in more detail. Each column shows the way in which respondents within a particular industry spent their revenues. For example, if one looks down the first column (titled Accommodation), one finds that the average respondent organisation within the accommodation sector, spent less than 1% of its revenues within the accommodation and agricultural sector, 2% of revenues on communications, 4.8% on construction, 6.6% on education, and 18.2% on retail goods. In contrast, the ‘average’ agricultural organization, spent much more within the agricultural sector (16.5% of revenues), and put aside less for savings/profits. This thus table serves to confirm *a priori* expectations: namely that expenditure patterns differed across sectors and these differences were statistically significant⁴⁰.

As noted earlier, there were significant differences in the proportion of total revenues spent on wages, and there were similar differences in retail expenditures. For example, most organisations reported having spent at least 20% of revenues within the retail sector. But organisations in finance, government and mining sectors purchased comparatively little retail products; the average organisation within these sectors spent less than 10% of revenues on retail goods. More will be said about these links in subsequent sections.

⁴⁰Ascertained via an ANOVA.

Table 15: Proportion of total revenue spent in different sectors—by industry

Industry \$→	Accommodation	Agriculture	Communications	Construction	Cultural	Education	Electricity	Finance	Government	Health	Manufacturing	Mining	Personal	Property	Retail	Transport	Wholesale
Expenditure % total revenue ↓																	
Accommodation	0.14	1.85	2.00	1.59	4.43	1.38	4.27	2.50	3.29	2.83	3.12	1.90	2.15	3.45	2.26	0.58	1.50
Agriculture	0.03	16.46	0.00	0.08	0.00	0.06	1.00	0.00	1.58	0.00	0.00	0.00	0.00	0.00	0.13	0.00	25.18
Communications	2.09	4.43	11.00	6.39	8.81	4.18	1.24	4.37	5.92	6.05	5.26	3.10	6.29	5.80	6.19	2.18	3.50
Construction	4.81	2.09	2.00	14.19	7.38	4.92	27.13	1.72	8.59	4.82	3.69	4.60	2.77	2.11	2.86	2.89	2.17
Cultural	0.47	0.14	5.80	0.19	3.38	0.69	0.20	0.22	1.69	0.36	0.00	0.30	0.08	0.67	0.19	1.15	0.00
Education	5.97	2.41	5.20	3.73	7.52	7.86	12.27	2.41	5.30	5.09	4.81	2.45	6.73	2.81	5.59	1.70	1.33
Electricity	0.26	0.59	0.20	1.33	3.43	9.02	1.35	2.04	5.37	3.87	0.36	2.05	1.35	1.93	1.29	0.37	0.33
Finance	6.63	7.66	5.00	6.35	4.90	1.95	1.52	4.91	1.50	4.48	2.77	4.40	3.77	6.54	5.10	6.45	2.33
Government	0.08	0.38	4.55	1.01	1.48	2.29	0.20	0.17	4.35	0.73	0.00	1.60	0.54	0.98	0.38	0.22	0.00
Health	0.10	2.47	0.67	0.94	0.52	0.31	0.52	0.26	1.00	1.11	0.22	1.40	1.62	1.43	2.32	0.43	0.00
Manufacturing	0.75	0.57	1.80	2.11	0.95	0.14	0.00	0.22	0.15	1.58	14.78	2.20	0.08	0.15	4.30	4.47	5.00
Mining	0.10	0.08	0.00	0.66	0.05	0.03	0.00	0.00	0.62	0.18	0.00	13.80	0.04	1.52	0.06	0.00	0.67
Personal	0.00	0.41	0.00	1.57	0.00	0.08	0.00	0.22	0.21	0.11	0.01	0.60	11.65	0.37	0.36	0.06	0.17
Property	8.07	0.74	14.00	2.07	2.33	8.76	4.20	9.91	4.27	3.78	2.06	2.00	4.31	4.15	4.74	5.48	3.60
Retail	18.19	17.81	21.01	14.55	18.67	16.43	14.00	2.52	8.80	11.85	12.27	7.40	13.15	11.31	13.37	27.85	4.17
Transport	0.84	7.35	2.20	4.27	6.38	4.81	3.68	2.87	7.40	4.75	11.18	3.90	4.31	3.11	5.86	3.14	4.83
Wholesale	3.53	2.84	0.00	4.32	8.00	1.22	12.01	0.04	0.88	2.69	4.44	0.40	0.69	0.23	15.88	0.21	3.50
Salaries	13.04	15.49	17.13	16.98	13.71	25.01	4.95	46.78	28.22	35.30	9.01	18.30	26.85	26.65	19.11	14.26	24.37
Taxes	1.06	5.16	0.00	5.88	0.62	1.72	6.60	1.24	4.42	3.85	8.11	10.00	1.88	4.50	7.23	1.33	6.83
Savings/Profits	12.26	3.36	4.40	4.22	5.10	0.92	0.00	9.02	0.81	2.62	5.22	6.50	1.96	10.93	2.53	9.26	12.17

If one looks across the rows of Table 15, it is possible to determine which types of organisations spent large amounts of revenues within that sector. For example, if one looks across the first row (titled Accommodation), one finds that the cultural, electricity and property sectors spent more on accommodation than other sectors (they spent 4.43, 4.27 and 3.45 percent of total revenues on goods and services provided by the accommodation sector). Organisations in the transport sector spent very little on accommodation.

This row-by-row analysis clearly highlights the fact that some sectors had relatively strong links to a wide variety of other sectors. For example, every industry spent at least some revenue on wages. This was also true of the retail sector—with organisations spending between 4 and 30% of total revenues on retail goods—and, to a lesser extent in the construction and communications sectors, where most industries seem to have spent around 5% of revenues.

In contrast, it was evident that the agricultural, mining and—to a lesser extent—personal, health and government sectors had weak forward links; few respondents report having spent much within these sectors. Indeed the only organisations that the agricultural sector regularly supplied goods and services to, were those in the wholesale, agricultural and government sectors. And the mining sector supplied few inputs to any sector except itself. Evidently, agricultural and mining organisations in the TS rely more heavily on export sales than do other types of organisations.

4.2 What types of goods and services do organisations purchase from local suppliers?

Whilst the preceding analysis gives an indication of the types of goods and services purchased by different industries, it provides us with little useful information about the importance of these purchases to regional communities. For example, an organisation could spend a relatively high proportion of total revenues within the retail sector. But if all of purchases are made with Sydney retail outlets, then these purchases do little to raise the income of other local businesses. It is, therefore, important to consider the propensity of businesses to purchase goods from local suppliers, and this information was also collected in the survey. Specifically, respondents were asked to indicate how much of the organisation’s expenditure *within* each of the various ANZSIC industries, went to locally⁴¹ and non-locally based businesses (θ_j), as per the questionnaire excerpt below:

For each of the following, please indicate roughly how much of the money that your organisation spends goes to locally and non-locally based businesses/organisations. In which town(s) do you spend money if not spent locally? Please leave the row blank if your business/organisation does not spend money with those organisations.

Type of business/organisation that money was spent with	% spent with locally based businesses / organisations	% spent with non-locally based businesses / organisations	In which town(s) do you spend money if not spent locally?
e.g. Communication services – (when all money that is spent on communications is spent with businesses/organisations that are located in Brisbane)	0%	100%	Brisbane
e.g. Retailers - (when 70% of all money spent with retailers is spent at businesses/organisations that are within your local area and the rest is spent with businesses/organisations that are located in Darwin and Broome)	70%	30%	Darwin, Broome
Retailers e.g. supermarkets, stores, petrol stations%%	

Figure 46 shows the ‘average’ values from the shaded column (above). It shows that respondent organisations purchased more than 90% of all mining goods and services from within the local area. In contrast, less than 65% of money spent on educational goods and services was spent with local organisations. Evidently, educational goods and services were much more likely to be imported than mining services. Other goods and services which were frequently imported from outside the region included those provided by the wholesale, transport, retail, and manufacturing sectors, with less than 75% of total expenditure within each of these sectors spent with locally based businesses.

⁴¹ A purchase was deemed to have been made locally, if it occurred within the same postcode (or same town, if the town was large enough to contain more than one post-code) as that of the respondent organisation.

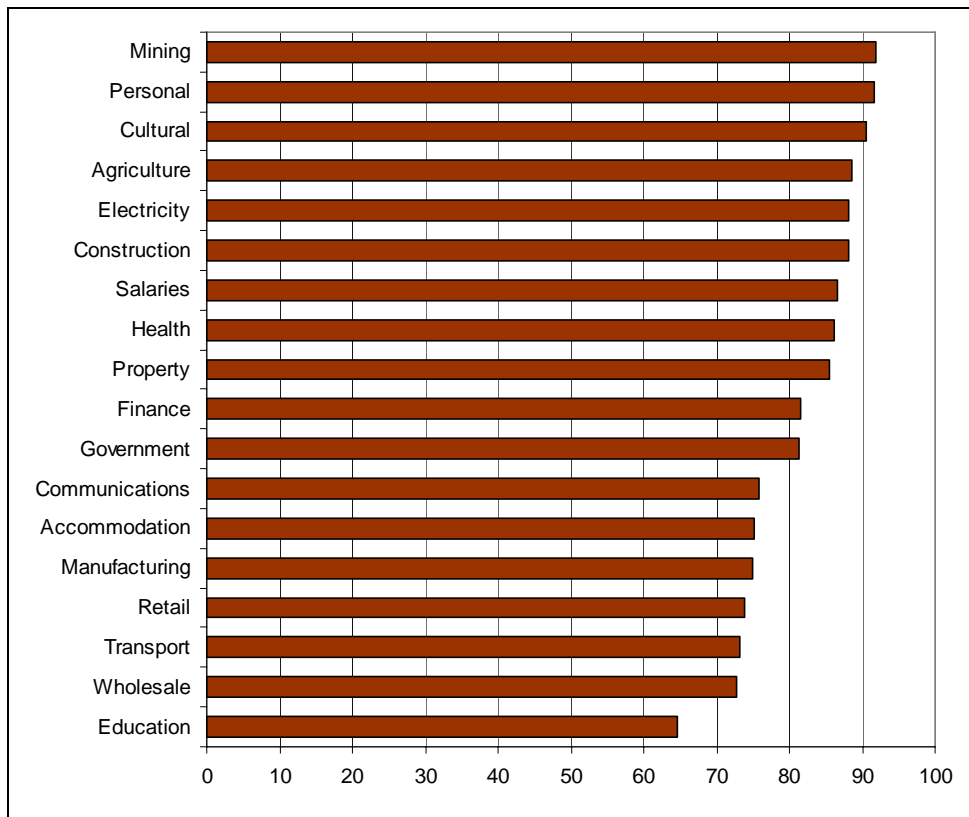


Figure 46: Proportion of total expenditure on different types of goods and services spent with local businesses

There were also many sectoral differences in the propensity of organisations to import different types of goods and services as illustrated in Table 16. Specifically, each column of this table shows the proclivity of respondents within a particular industry to purchase different types of goods and services from within their local area (postcode). For example, if one looks down the first column (titled Accommodation), one finds that the average accommodation business spent 78.54% of all its accommodation budget within local areas, and purchased 87.5% of required agricultural products locally, 91.26% of communication services locally, and just 60.52% of wholesale products.

Evidently, some organisations were more likely to import particular types of goods and services than others—for instance, organisations within the accommodation sector were more likely to import retail goods than organisations within the construction sector.

Table 16: Proportion of expenditure on different types of goods and services that is spent locally—by industry

Industry spending the money →	Accommodation	Agriculture	Communications	Construction	Cultural	Education	Electricity	Finance	Government	Health	Manufacturing	Mining	Personal	Property	Retail	Transport	Wholesale
% 'Local' expenditure within each sector ↓																	
Accommodation	78.54	53.27	90.00	82.25	75.56	78.79	75.20	70.67	73.81	83.61	92.00	74.14	80.47	52.21	83.13	64.00	75.00
Agriculture	87.50	85.55		89.17	100.00	97.50	100.00	100.00	100.00	91.50	65.00	86.67	100.00	100.00	86.67	100.00	27.50
Communications	91.26	64.86	96.67	77.93	80.91	59.87	83.33	52.50	60.60	79.14	93.33	58.89	79.03	69.38	72.91	84.03	38.33
Construction	80.44	81.55		91.62	92.27	84.17	73.33	92.14	85.87	93.17	94.29	89.09	88.83	84.62	90.81	84.42	87.14
Cultural	85.77	85.00	90.00	96.13	47.50	97.00	52.50	100.00	80.92	90.70	100.00	90.00	100.00	100.00	91.43	93.24	100.00
Education	57.31	56.25	100.00	61.67	70.00	49.55	78.50	69.50	64.47	61.27	73.33	77.50	69.30	66.84	82.78	67.27	80.00
Electricity	91.42	85.34	100.00	89.31	88.00	75.00	100.00	82.73	79.44	91.79	100.00	100.00	82.81	90.50	83.50	90.25	74.17
Finance	84.95	64.92	100.00	79.57	75.71	83.65	100.00	85.69	79.33	82.13	85.00	73.00	80.37	66.11	86.02	86.80	88.00
Government	84.09	87.50	80.00	85.50	10.00	68.33	90.00	100.00	54.70	96.15	100.00	73.33	83.33	77.50	60.00	90.00	100.00
Health	86.96	83.17	80.00	91.38	70.00	84.00	100.00	55.00	88.44	89.25	70.00	72.92	90.00	83.33	83.66	89.29	100.00
Manufacturing	62.50	61.67		73.75	78.33	55.00	100.00	20.00	100.00	90.71	79.50	92.50	100.00	50.50	66.00	82.92	52.50
Mining	100.00	84.00		87.33		96.00	100.00	100.00	100.00	90.00	100.00	84.29	100.00	100.00	87.50	100.00	100.00
Personal	83.18	91.47		98.10	100.00	88.57	100.00	100.00	88.75	95.65	100.00	98.33	76.00	88.75	97.06	87.14	100.00
Property	72.97	84.47		100.00	100.00	71.69	100.00	89.06	97.63	97.10	88.00	93.90	100.00	83.18	94.12	76.71	77.50
Retail	66.67	65.73	71.67	85.91	90.36	61.89	97.50	79.87	69.27	83.03	81.43	89.93	74.96	69.21	83.33	64.59	66.00
Transport	75.16	70.39		75.94	60.00	76.67	100.00	68.94	74.21	84.20	51.44	71.25	80.63	55.20	68.92	72.40	46.00
Wholesale	60.52	85.00		95.45	70.00	26.43	100.00	83.33	73.13	88.42	73.33	99.75	100.00	74.17	46.52	86.25	100.00
Salaries	87.05	82.91	89.17	87.55	87.90	86.46	94.80	86.67	84.10	91.64	83.67	84.89	86.20	83.26	86.06	86.60	94.80

At least some of these observed differences are likely to be due to the following factors which are all likely to influence an organisation's decision to buy locally or to import from outside the region:

The availability of local supplies and the specific type of goods required

Some of this observed variation in the propensity to purchase 'locally' (or to import) is likely to be related to supply-side conditions and the tendency of different types of industries to locate in different regions. Manufacturing organisations, for example, are more likely to be located in the larger regional centres and may therefore have access to a broad range of local suppliers. In contrast, agricultural organisations are more likely to be located in remote areas where there were fewer suppliers. If a good or service is not available locally, then the organisations will have to import it—irrespective of costs. Consequently, the propensity of different types of organisations to import particular types of goods and services may differ because (a) different types of organisations required different types of inputs; (b) different types of organisations chose to operate in different locations; and (c) different types of inputs were available in different locations. The survey data provides some evidence in support of this⁴².

The cost of local supplies (compared to the cost of imports), and the cost of the item relative to total budget

If a good or service is available locally, then one would expect an organisation to compare the cost of the local purchase with the cost of an import (also taking into account both transport and transaction costs). Some of the observed differences in the propensity of different types of organisations to purchase goods locally or otherwise may thus be caused by differences in the price of inputs (and also transport and transaction costs) relative importance to the organisation. This is because organisations may seek to minimise total costs by seeking cheap sources of supply for 'big ticket' expenditure items. For smaller items, it may make more sense to purchase items locally. Thus, goods and services that comprise a relatively small share of an organisation's budget (for example, the stationery purchases of a hotel) are more likely to be purchased locally than those goods and services which comprised a relatively large share of the total budget (for example, the stationery purchases of a newsagent). Here too, the survey data provides evidence that this may be occurring in some sectors⁴³.

The buying policies by organisations or their headquarters

Some organisations were part of larger operations that buy inputs in bulk and distribute them to regional officers. While the survey did not provide specific information that allowed us to detect the presence of such systems, anecdotal evidence suggests that organisations in the government, education, mining, accommodation and transport sectors are likely to have these types of arrangements.

4.3 In which 'local' sectors do organisations spend the most money?

If one is interested in the regional economic impact of an organisation, one cannot simply look at *what* the organisations buys—purchases made outside the local area do not bring direct financial benefits to other parts of the community. Likewise, one cannot simply look at *where* the organisation purchases its goods and services; the actual amount spent is equally important.

To illustrate, let us assume that there are two organisations (A and B), both of which spend 50% of total organisational revenue within the retail sector, but one of which imports a larger share of retail purchases. Let us also assume that there are two organisations (C and D), both of which import 50% of all retail projects, but one of which spends a larger share of revenues within the retail sector. This information is summarised below, the key point being that organisations may, simultaneously, have similar input requirements (or similar tendencies to import) and dissimilar regional economic impacts.

⁴² Researchers calculated (Pearson) correlation coefficients between the reported 'availability' of a particular industry (as discussed in the previous section) and the percent that organisation's industry purchases that were made locally. These were statistically significant (and positive) for goods and services purchased within the Retail, construction, agricultural, accommodation, health, transport, wholesale, communication and electricity sectors. Researchers also calculated (Pearson) correlation coefficients between the Area+ score associated with an organisation's postcode and the percent that organisation's industry purchases that were made locally. These were statistically significant and positive for goods and services purchased within retail, property and manufacturing sectors.

⁴³ Researchers calculated (Pearson) correlation coefficients between the percent of an organisation's revenue spent within a particular industry and the percent of industry purchases that were made locally. These were found to be statistically significant (and negative) for goods and services purchased from within the construction, property, personal, educational, and wholesale sectors.

Organisation	Percent of all revenues spent within retail sector R_j , from section 4.1	Percent of all retail expenditure spent 'locally' θ_j , from section 4.2	Percent of all revenues going to 'local' retail outlets
A	50	80	40
B	50	10	5
C	50	50	25
D	10	50	5

It is, therefore, important, to combine information about the amount that is spent on different types of goods and services (R_j , from Section 4.1) with information about the amount that is spent locally (θ_j , from Section 4.2), to get a true picture of the importance of organisational expenditure within a region—as has been done in Figure 47. Specifically, this diagram shows the average proportion of total revenue that respondent organisations spent within 'local' ANZSIC sectors and with 'local' householders⁴⁴.

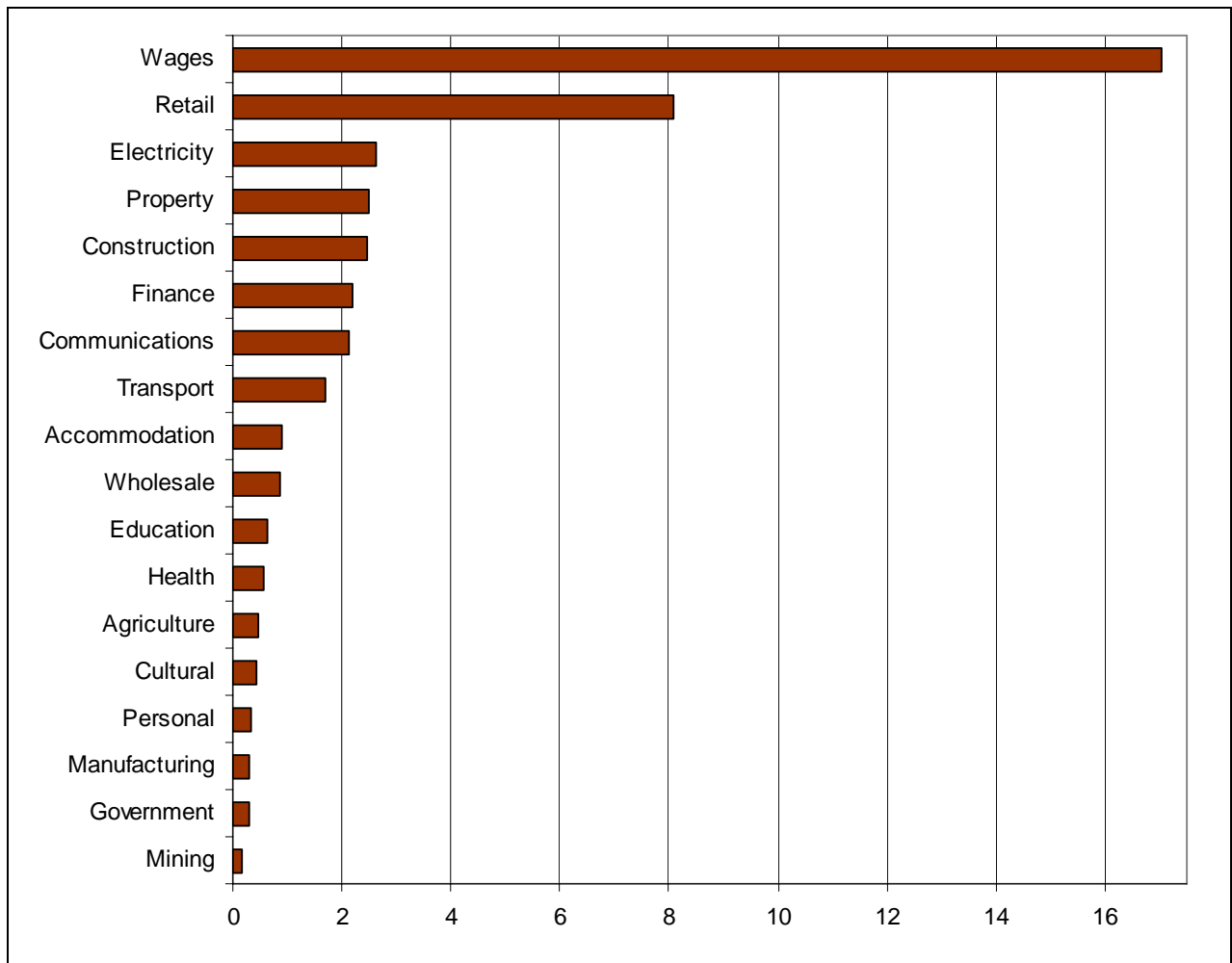


Figure 47: Average percent of total revenues spent within different 'local' industries

Most apparent from this figure is the fact that it is the local household sector that receives the largest share of organisational revenues—17% on average. The local retail sector is the next largest recipient of monies, receiving, on average, just over 8% of organisational revenues. Financial flows to other local businesses within the other 16 ANZSIC sectors are generally small, receiving, together, just 18% of total local revenues.

Table 17 below uses this information to categorise sectors according to the strength of their forward linkages (i.e. according to the relative, estimated value of inputs provided to other sectors). This is contrasted with similar information provided by the NT Government (2005b) on forward linkages within the N.

⁴⁴ These averages are *weighted* averages. Specifically, the values reported here were calculated by multiplying the average value of $R_j \times \theta_j$ by the proportion of respondent organisations who spent money on input 'j'.

Table 17: Forward linkages in the TS and the NT

	Linkages within the TS	Linkages within the NT
Strong forward links	Household Retail	Agriculture Communications Finance Manufacturing Property Transport
Weak forward links	Accommodation Agricultural Cultural Government Education Health Manufacturing Mining Personal Wholesale	Accommodation Construction Cultural Government Health Mining Personal Wholesale and Retail

Perhaps most interesting here, are the results pertaining to the agricultural, manufacturing and retail sectors—where there are stark contrasts between this study’s estimates of the strength of forward linkages within the TS and those published by the NT Government (2005b). There are several possible reasons for these apparent anomalies.

First, the two studies used different methodological approaches. Even if all else were the same (study area, time, sample, etc), one would expect different results. The two studies also worked at different geographic scales, related to different regions, and consequently referred to different populations. Further, the samples, and sampling techniques of the two studies also differed, and the level at which the data were aggregated differed.

The aggregation issue is likely to be particularly important for retail. This study treated retail as a separate sector, but it was amalgamated with wholesale in the NT study. If forward linkages of the wholesale sector are particularly weak then this could bias the amalgamated results, and may at least partially explain why the retail sector was identified as having weak forward linkages in the NT, but strong forward linkages in this TS study.

As regards the results pertaining to the agricultural and manufacturing sectors: it is important to remember that a sector can have weak forward linkages for either (or both) of two reasons:

- If other sectors do not, generally, require their goods and services;
- If other sectors require their goods and services, but do *not* choose to purchase them ‘locally’ (many respondent organisations imported manufacturing products from outside their local area).

The first factor is likely to be the primary cause of the observed low forward linkages in the agricultural sector—few respondents report having spent a large share of revenues within that sector (Table 15). The second factor is likely to be the primary cause of the apparently conflicting results regarding the strength of forward linkages within the manufacturing sector (and possibly also some of the other sectors such as communications, finance, property and transport) and arises because this study and the NT study work at different geographic scales.

To be more specific, in this study, purchases were only deemed to have been made locally, if they occurred within the respondent’s postcode (or town, if the town contained more than one postcode). So if a service station located in Tennant Creek purchased manufactured goods from Darwin, then those goods would be classified as imports within this study. But the whole-of-NT study would not classify the products as imports, since they come from within the NT.

Consequently, one expects industries that are all but non-existent in remote areas (e.g. communications, electricity, manufacturing, and wholesale—see Section 3.2), to have weak forward links *within* those regions. But these industries may also have strong forward links within larger regions that include towns/centres where such industries exist. The two results are entirely consistent.

4.4 Which sectors spend the most ‘locally’?

The foregoing discussion identified sectors that supplied many of the goods and services required by industries of the TS—namely the household and retail sectors. This indicates that these two sectors will benefit (hurt) most when there is regional economic growth (decline). But it is also important to identify sectors that are significant users of local inputs—the *demand* side of the equation. This allows one to determine which sectors purchase the largest proportion

of their inputs from other, local organisations, and therefore generate the most significant regional economic impact when expanding or contracting.

To do this, researchers used Equation 2 to calculate the total proportion of respondent revenues (or budget in the case of government enterprises) spent within the respondent’s local community:

$$\rho_i = \sum E_j = \sum R_j; \theta_j$$

In the first place, organisations were grouped according to the sector in which they operated, and the ensuing averages were calculated. Yet the distribution was highly skewed, and a few large values of ρ_i were found to have great influence on mean values—particularly within sectors with relatively few respondents. Consequently, researchers calculated *median* values, and it is those that are presented in Figure 48 (the number of organisations within each industry that provided data on ρ_i are shown within the chart).

Organisations within government and health sectors spend, on average, more than 60% of total revenues/budget within their local community⁴⁵—more than twice that of organisations within accommodation and transport sectors. And these differences were statistically significant⁴⁶: a post-hoc comparison of means found that mean ρ_i was higher within government, health and construction sectors, than within accommodation, and transport sectors. The ‘average’ organisation within the health sector also spends more within the ‘local’ community than the ‘average’ organisation within agricultural, property and education sectors.

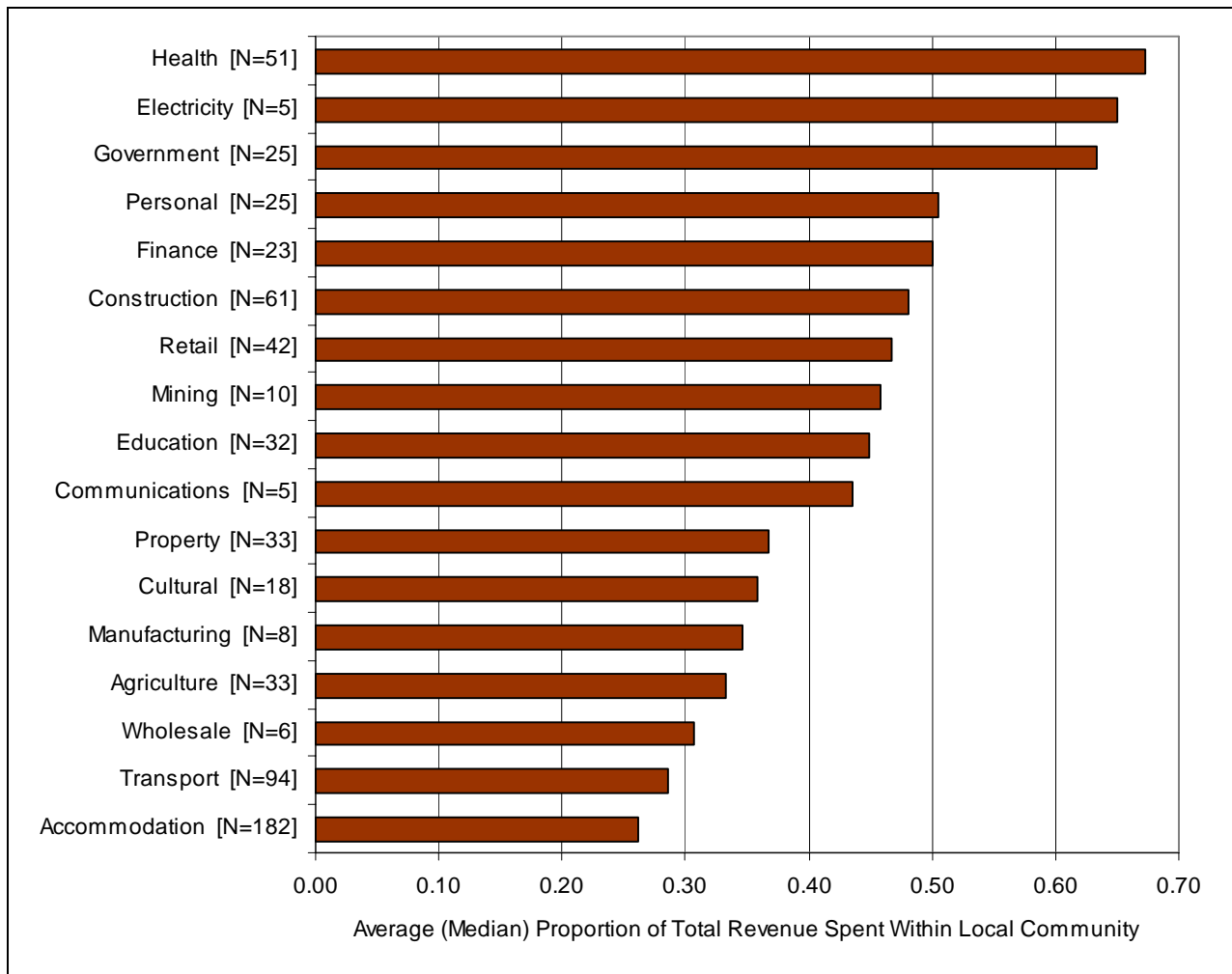


Figure 48: Average (Median) proportion of revenues spent ‘locally’—by industry

⁴⁵ This was also true of organisations within the electricity gas and water sector, however, there were only five respondents from this group and statistical analysis indicates that expenditures within this sector are not statistically different to expenditures in other sectors.

⁴⁶ As indicated by an ANOVA.

Table 18 below uses that data to categorise sectors according to the strength of their backward linkages and this is contrasted with similar information provided by the NT Government (2005b) on backward linkages that exist within the NT.

Table 18: Backward linkages in the TS and the NT

	Linkages within the TS	Linkages within the NT
Strong backward links	Government Health	Communications Electricity Transport
Weak backward links	Accommodation Transport	Agriculture Finance Property Manufacturing

Just as there were differences between this study’s and the NT Government (2005b) assessments of the strength of forward links, so too are there differences here. When assessing these differences, it is important to note that an industry will have weak backward linkages if it does not purchase many local inputs. As is apparent from the preceding analysis, this will occur if:

1. The types of inputs required by that sector are not available locally; or
2. The inputs required by that sector are available locally, but organisations choose to import those goods from elsewhere.

It seems that the results reported here, may be largely attributable to (1).

As highlighted in Section 3, many sectors which were readily ‘available’ in regional centres, were all but non-existent in the remoter parts of the TS. Organisations that require inputs from these non-existent sectors must import inputs from outside their local area, and will, therefore, have weak backward links. Similarly, organisations that use, predominantly, inputs which are available locally, will import fewer goods and services, and will, therefore, have strong backward links.

The data supports that hypothesis: organisations with strong backward links—those in the government and health sectors—spent more than 50% of total revenues within sectors prevalent throughout the TS (households, retail, agriculture and, to a lesser extent, construction, see Section 4.1). In contrast, organisations with weak backward links—those in the accommodation and transport sectors—spent comparatively less on wages and retail goods and more within sectors uncommon in remote areas (e.g. cultural, wholesale, property, transport, manufacturing sectors). As was the case in the previous section, differences between these findings and those relating to the NT economy, are not inconsistent; they arise because of differences in the way each study defines a ‘local’ purchase.

In Figure 48, it is clear that there are also observable differences in spending patterns across the regions. Interestingly, it seems that organisations in and around some of the smaller regional centres (Broome, Katherine, Cloncurry, and Weipa) spend a larger share of the total revenues/budgets within their local communities than organisations located in either the very remote or the less remote parts of the TS. Without further information it is difficult to discern why this pattern exists, but it might be at least partially due to the fact that organisations in different regions have access to different suppliers and transport infrastructures.

For example, organisations located near regional centres like Darwin and Townsville can access goods and services from other parts of the world with relative ease via air, rail or road, therefore easily importing inputs. In contrast, organisations located near smaller regional centres may rely on locally based ‘distributors’. Organisations in very remote locations may not even have access to distributors so must import all themselves.

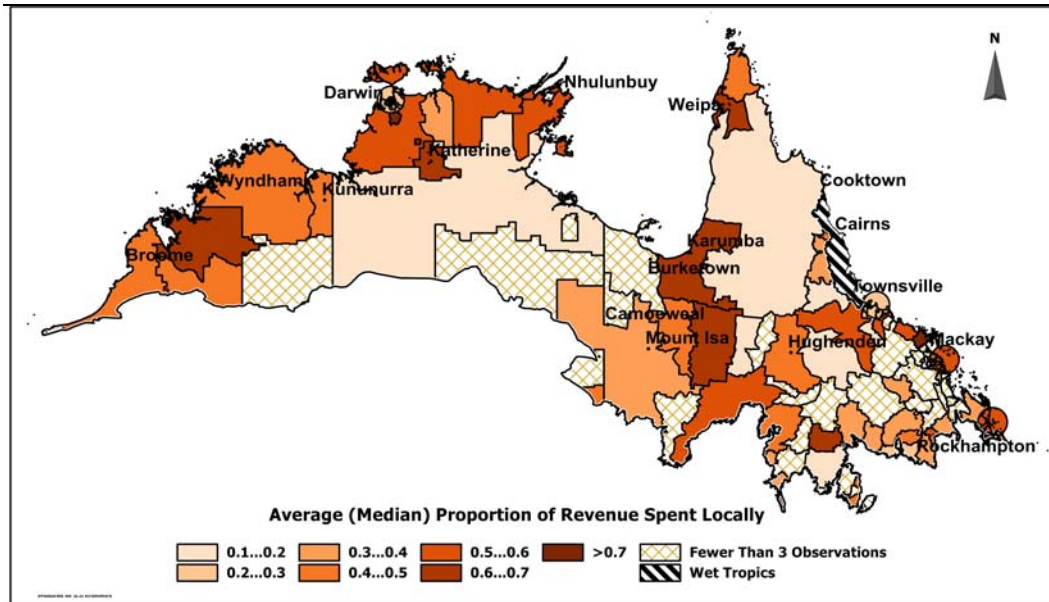


Figure 49: Average (Median) Proportion of Revenue spent locally—by postcode

That point aside, regional differences in expenditure patterns are also likely to occur because different types of organisations are likely to locate in different areas and different organisations spend their money differently. It is, therefore, important to consider both the type and the location of an organisation simultaneously.

In the first place, this was done by looking at the average (Median) proportion of total revenue that is re-spent locally—by industry and by remoteness (Table 19)⁴⁷.

⁴⁷ Values are not reported in cells where the number of respondents is less than three

Table 19: Average (Median) proportion of total revenue spent locally—by industry and remoteness

<i>i</i>	<u>Remoteness</u>			Group Total
	Outer Regional	Remote	Very Remote	
Accommodation	0.20 [N=86]	0.45 [N=34]	0.35 [N=61]	0.26 [N=182]
Agriculture	0.35 [N=7]	0.31 [N=10]	0.36 [N=16]	0.33 [N=33]
Communications	[N=1]	[N=1]	[N=3]	0.44 [N=5]
Construction	0.40 [N=20]	0.57 [N=14]	0.54 [N=25]	0.48 [N=61]
Cultural	0.38 [N=7]	[N=2]	0.31 [N=9]	0.36 [N=18]
Education	0.31 [N=13]	0.45 [N=9]	0.51 [N=10]	0.45 [N=32]
Electricity	[N=1]	[N=2]	[N=2]	0.65 [N=5]
Finance	0.50 [N=19]	[N=2]	[N=2]	0.50 [N=23]
Government	0.59 [N=8]	[N=3]	0.73 [N=13]	0.63 [N=25]
Health	0.70 [N=15]	0.60 [N=15]	0.70 [N=21]	0.67 [N=51]
Manufacturing	[N=2]	[N=3]	[N=3]	0.35 [N=8]
Mining	[N=2]	0.42 [N=5]	[N=3]	0.46 [N=10]
Personal	0.58 [N=12]	0.50 [N=5]	0.39 [N=7]	0.51 [N=25]
Property	0.40 [N=21]	0.29 [N=4]	0.30 [N=7]	0.37 [N=33]
Retail	0.47 [N=8]	0.47 [N=21]	0.56 [N=12]	0.47 [N=42]
Transport	0.20 [N=57]	0.46 [N=22]	0.46 [N=15]	0.29 [N=94]
Wholesale	[N=5]	[N=1]		0.31 [N=6]
Group Total	0.36 [N=285]	0.47 [N=155]	0.45 [N=212]	0.41 [N=659]

Most interesting here, is the fact that industry expenditure does not appear to vary systematically across regions of differing levels of remoteness. Indeed there were only two statistically significant differences:

- across all respondents, the mean proportion of total revenues spent ‘locally’ was found to be statistically lower amongst organisations located in outer regional areas (0.36) than among organisations located in remote and very remote areas (0.47 and 0.45);
- organisations within both transport and the accommodation sectors located in outer regional areas were found to have spent less locally (around 20% of total revenues) than those located in remote and very remote areas (between 35 and 45%).

That there were few statistically significant differences in expenditure patterns across space was at least partially due to the small sample size in some sectors; there were simply too few respondents within the electricity, mining, communications, wholesale and manufacturing sectors to detect differences in expenditure patterns across space.

However, there were more than 50 respondents from the construction and education sectors, and more than 30 respondents from within retail, property, and agricultural sectors. Yet there was no statistically discernable

relationship between the expenditure patterns of these types of organisations and the remoteness of the region in which they operated. This suggests that most of the observable differences in the expenditure patterns across space apparent in Figure 48 arise because different types of organisations tend to locate in different regions.

4.5 Business Level Multipliers

4.5.1 'Raw' Estimates

The formulas provided in Section 2 were used to calculate a *raw* business-level multiplier for each respondent organisation: $M_i = 1/(1-\rho_i)$. As previously, respondent organisations were grouped according to the postcode in which they operate, and the ensuing averages (medians) were calculated.

It is important to remember that these multipliers are not analytically equivalent to those generated from IO and CGE models. They tell us how much the total, combined, revenues/incomes of all organisations and persons within a single postcode are likely to change in response to an initial change in the revenue of just one organisation (providing the assumptions, detailed in Section 2, hold). If, for example, the median business-level-multiplier in postcode 'x' is equal to 1.25, and if the local retail store receives an extra \$100 in revenue (more sales), then this estimate tells us that the combined increase in the revenues/incomes of all businesses and households within that postcode will be \$125 (1.25 x \$100). This includes the \$100 earned by the retail store, plus an additional \$25 dollars that other local businesses and householders earn when that retail store purchases more inputs from them.

Since M_i is calculated directly from ρ_i , organisations with high a ρ_i will, by definition, have a high business-level multiplier. Consequently it is not surprising to find that the 'patterns' of Figure 50 mimic those of Figure 49: the 'average' (median) organisation located in and around some of the smaller regional centres (Broome, Katherine, Cloncurry, and Weipa) has a higher business-level-multiplier than the 'average' (median) organisation that is located in either the very remote or the less remote parts of the TS.

As previously mentioned, respondent organisations were also grouped according to the industry in which they operate and the ensuing averages (medians) were calculated. To repeat an earlier point: M_i is calculated directly from ρ_i . So one expects to find that the average (median) business-level multipliers of organisations within government and health sectors are significantly higher than those associated with organisations within accommodation and transport⁴⁸—the pattern simply follows that of ρ_i .

By extension, the statistically significant differences in ρ_i detected in the previous section also apply here: average business-level multipliers are higher within government, health and construction sectors, than within the accommodation, and transport sectors; and the average health organisation has a higher business-level multiplier than the average organisation within the agricultural, property or education sectors. But there are few statistically significant differences in the business-level multipliers associated with similar organisations located in different regions. The exceptions to this are organisations within the accommodation and transport sectors.

⁴⁸ This was also true of organisations within the electricity gas and water sector, however, there were only five respondents from this group and statistical analysis indicates that expenditures within this sector are not statistically different to expenditures in other sectors.

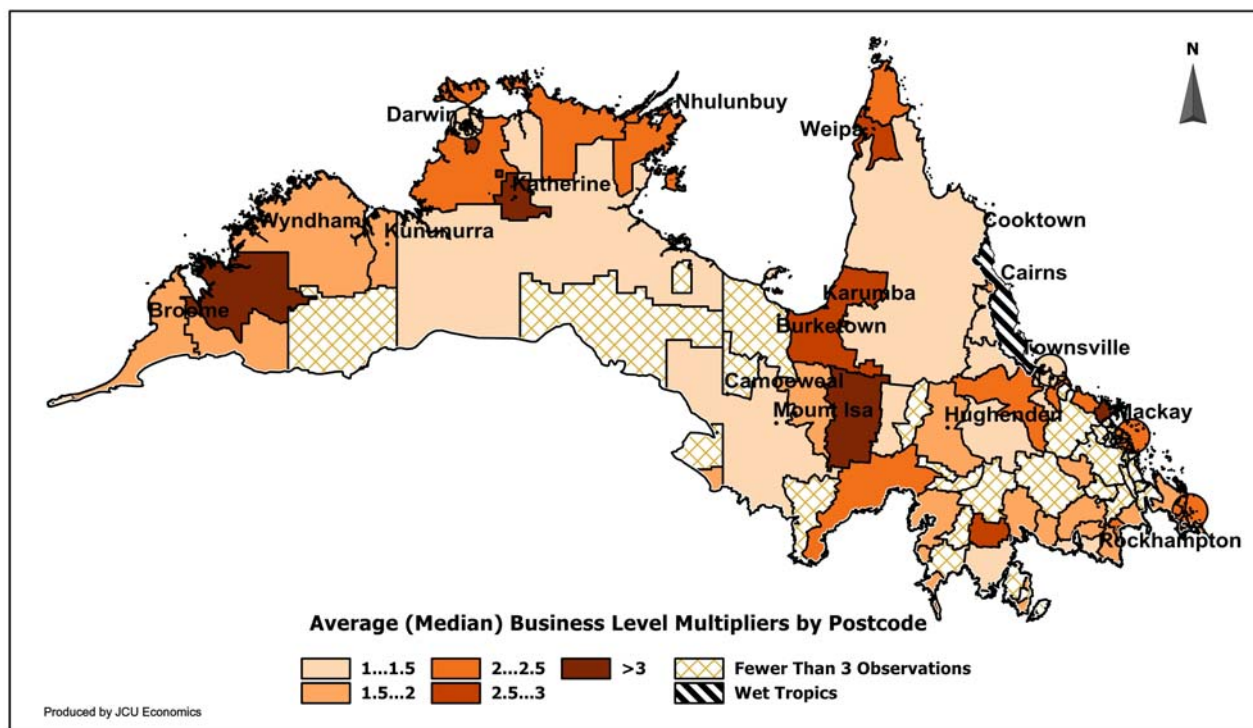


Figure 50: Average (Median) RAW business-level multiplier—by postcode

Figure 51 presents the estimates of the average (median) *raw* business-level-multipliers associated with each industry, irrespective of location—except in the accommodation and transport sectors where it was possible to identify statistically significant differences in mean ρ_i . For those sectors, the main ‘bar’ shows the median business level multiplier across all respondents within that sector, but we also include separate bars relating to the median business level multipliers associated with those organisations located in different regions.

These estimates tell us how much the total, combined, revenues/incomes of all organisations and persons within a typical postcode are likely to change in response to a change in the revenue of just one local business within a particular sector. They indicate, for example, that a one-dollar increase in the income of a health-sector organisation could generate up to three dollars of regional, within-postcode, revenue. This includes the initial dollar of revenue earned by the organisation, plus an additional two dollars of income across all other sectors within that same postcode (private, public and household). Further, these results indicate that the regional economic impact of an expansion in either the health or the government sectors could be substantially greater than an equivalent expansion in either the transport or the property sector—and the preceding analyses suggests that this is primarily because organisations within the health and government sectors use as inputs, goods and services that are available across vast tracts of the Tropical Savannas.

When looking at the relative size of these estimates, readers are cautioned to remember that the number of respondents from some industries was small. This is particularly so for the communication, electricity, manufacturing, mining, and wholesale sectors (with just 5, 5, 8, 10 and 6 respondents respectively). Consequently, the business-level multiplier estimates associated with these sectors should be treated with particular caution—at least until the results can be verified in other studies. Indeed, we urge readers to treat all of these estimates with caution; they are, necessarily, products of the assumptions used to calculate them, and these assumptions are unlikely to correctly describe ‘reality’ in all regions at all times. For example, multiplier estimates that have been calculated using IO analysis, are strictly speaking, only applicable if all prices are constant, and if all industries use their inputs in fixed proportions. If economies of scale are present, or if inputs are substitutable, then multipliers will provide misleading information; and Access Economics (2005, p.14), notes that the problem of substitutability may be particularly prevalent within the accommodation and transport sectors, because spending on travel within these industries is a substitute for spending on other items. Further, it is important to remember that these multipliers are not analytically equivalent to those generated from IO and CGE models, and that several assumptions must hold for their predictions to hold.

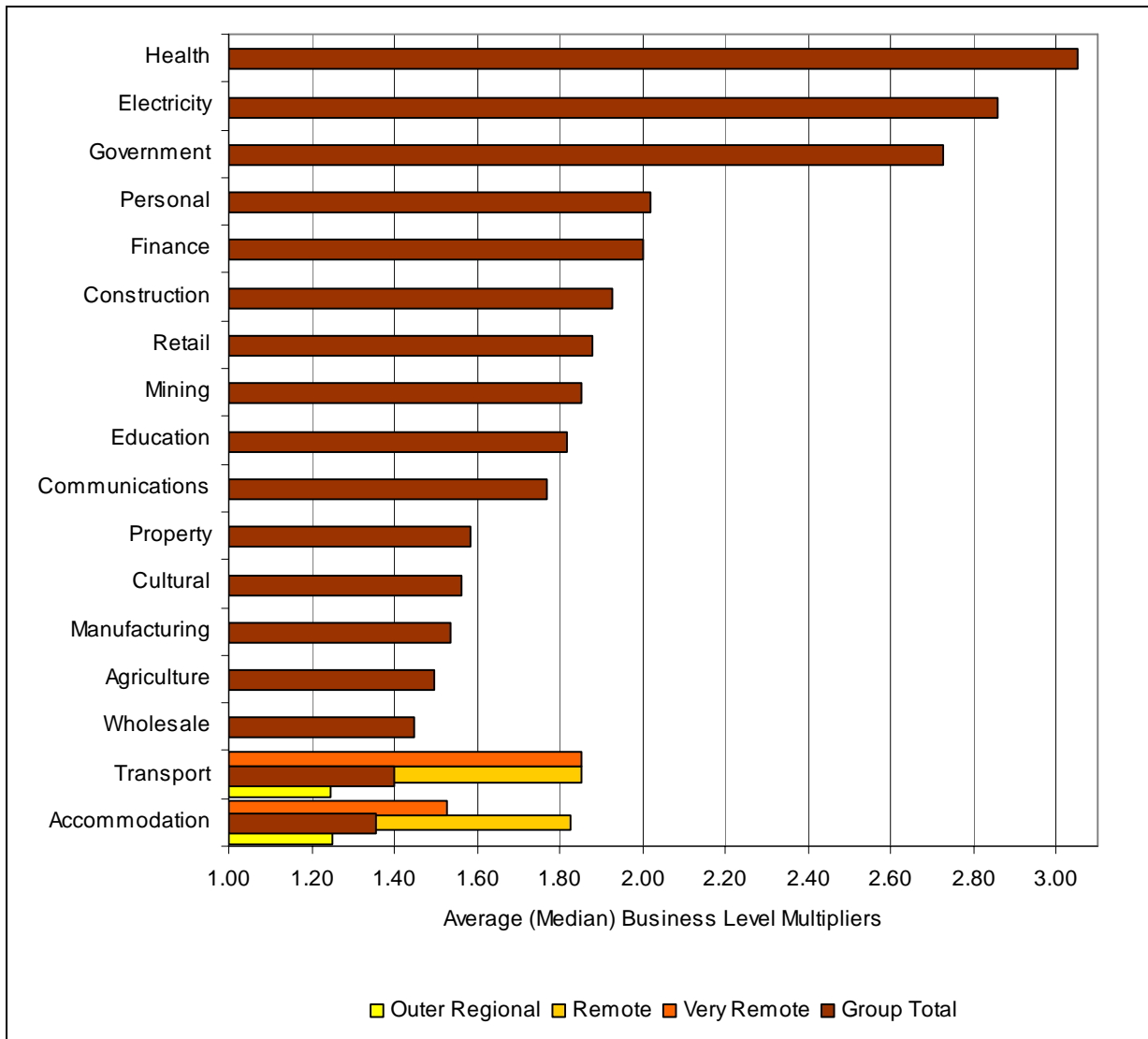


Figure 51: Average (Median) RAW business-level multipliers—by industry

4.5.2 Comparison with multiplier estimates from other studies

Despite the preceding words of warning, it was interesting to compare these estimates with those of previous studies, as was done in Table 20. Here, we chose to omit business-level multiplier estimates that related to sectors from which relatively little data was collected (communications, electricity, manufacturing, mining and wholesale). So the estimates shown were the average (median) *raw* business-level multipliers of organisations within each sector for which there were more than 10 respondents. The multiplier estimates in the other columns were collected from a range of other studies that looked at different regions within Australia. Some of these other studies focused on a single industry, and others reported multiplier estimates for a range of different sectors.

Table 20: Average (median) RAW business level multipliers compared to multiplier estimates from other Australian studies

ANZSIC Industry	'Raw' Business level-multipliers	Johnson (2004) Gascoyne	Johnson (2001) Kimberley	Johnson (2001) WA	Johnson (2004) WA	ABS (2001c)	Misc.
Accommodation	1.35	2.1	1.68	2.615	2.62	2.991	1.97 ⁴⁹ 1.93 ⁵⁰ 1.25–1.89 ⁵¹
Agriculture,	1.50	1.87	1.396	2.25	1.81	2.576	2.5 ⁵²
Communications		2.08	1.66	2.276	2.21	2.537	
Construction	1.93	1.935	1.53	2.449	2.305	2.866	1.87 ⁵³
Cultural	1.56	2.293	1.61	2.315	2.343	2.797	
Education	1.82	2.8	1.75	2.612	2.49	3.034	
Electricity		1.74	1.345	2.041	2	2.346	
Finance	2.00	1.955	1.55	2.16	2.285	2.636	
Government	2.72	2.49	1.81	2.731	2.745	3.228	
Health	3.05	2.67	1.68	2.621	2.56	3.002	
Manufacturing		2.197	1.63	2.471	2.59	2.92	
Mining		1.34	1.295	1.9	1.77	2.38	1.4 ⁵⁴ 2.00 ⁵⁵
Personal	2.02	2.385	1.565	2.489	2.38	2.891	
Property	1.58	2.318	1.69	2.376	2.374	2.18	1.95 ⁵⁶
Retail	1.88	2.083	1.51	2.579	2.227	2.757	
Transport	1.40	2.107	1.63	2.395	2.422	2.819	
Wholesale		2.47	1.68	2.62	2.79	3.23	

Interestingly, the *raw* business-level multipliers associated with the agriculture, construction, education, personal, retail sectors were all reasonably close to the general equilibrium multipliers produced from Johnson's studies of the Gascoyne and Kimberley economies. They were also smaller than those relating to Western Australia and Australia as a whole. This is as expected, since multipliers that relate to large regions are typically larger than those relating to small regions where imports tend to be relatively high. In contrast, the business-level multipliers associated with the accommodation, cultural, property and transport sectors are lower than those reported in other studies, whilst those relating to the finance, government and health sectors are somewhat higher than might have been expected.

4.5.3 Final (Adjusted) Business-Level Multiplier Estimates

At least some of the observable differences between the *raw* business-level multiplier estimates derived in this study and the regional multiplier estimates of other studies arise because of differences in methodological approach. As noted in the introductory chapter, the simple formula that is used to calculate the *raw* business-level multipliers assumes that the spending of all sectors within a postcode are identical to that of the sector which experiences the initial increase in income. This will upwardly bias the estimates for sectors that spend more than average within their 'local' economy (e.g. the government and health sectors), and downwardly bias estimates of sectors that spend less than average within their local economies (e.g. accommodation, transport and agriculture). In other words, the 'true' multipliers that apply to these sectors, are likely to be more moderate than the *raw* business-level multipliers reported here. In accordance with the method outlined in the introduction, we therefore calculated adjusted business-level-multipliers for each organisation (M^A) as:

$$M^A_i = 1 + \rho_i + \rho_I \times \frac{\bar{\rho}}{\bar{\rho}} \times 1/(1 - \bar{\rho}).$$

⁴⁹ West and Gamage (2001) Victoria

⁵⁰ WA tourism commission (2003)

⁵¹ McDonald and Wilks (1986)

⁵² ABARE estimate for Dairy Australia (2006).

⁵³ HIA Economics Group (2004) Australia

⁵⁴ Rolfe et al (2003), Nebo shire

⁵⁵ Clements and Ye (1995), WA

⁵⁶ Northern Territory Govt (2005)

As noted earlier, our data does not permit us to identify a precisely correct measure of $\bar{\rho}$ for use within the formula so we calculated two different M^A 's using two different values for $\bar{\rho}$:

$$M_j^{A1} = 1 + \bar{\rho}_j + \bar{\rho}_j \times \bar{\rho}^{\text{Total}} \times 1/(1 - \bar{\rho}^{\text{Total}}).$$

$$M_j^{A2} = 1 + \bar{\rho}_j + \bar{\rho}_j \times \bar{\rho}^{\text{Retail}} \times 1/(1 - \bar{\rho}^{\text{Retail}}).$$

Where:

$\bar{\rho}_j$ = 'average' (median) proportion of total revenues which all respondent organisations within industry j spent within their local area.

$\bar{\rho}^{\text{Total}}$ = 0.39 = 'average' (median) proportion of total revenues which all respondent organisations spent within their local area⁵⁷.

$\bar{\rho}^{\text{Retail}}$ = 0.47 = 'average' (median) proportion of total revenues which all respondent organisations in the retail sector spent within their local area.

The estimates are presented, and compared with the *raw* estimates, in Figure 52. The adjustments make no change to the overall rankings—multipliers associated with the health and government sectors are still highest—but the extent of the biases introduced via our methodological short-cut are now apparent. Evidently, the biases are more significant within the health, electricity and government sectors than elsewhere. Also evident is the fact that the M^{A1} and M^{A2} multiplier estimates do not differ significantly from each other; either of these estimates are clear improvements on the biased *raw* estimates of the preceding section.

The largest 'adjusted' business-level multipliers are associated with organisations within the health and government sectors (2.1 and 2.04); the lowest are associated with organisations within the accommodation and transport sectors (1.4 and 1.5). This indicates that every extra dollar of expenditure within the health or government sector could generate *another* dollar of revenues/income for other households or organisations located within that same postcode. The impact of extra expenditure within the accommodation or transport sectors is less—an extra dollar spent in those sectors might only generates an extra 40-50 cents of revenue/income amongst 'other' local households and organisations.

Across the entire NT economy, it is the wholesale and retail, health, education and government sectors that have the largest multipliers (Northern Territory Government 2005b). Our investigations of within-postcode organisational expenditure suggest that the health, and government sectors also have relatively high multiplier effects within small post-code level regions. But the multipliers associated with the wholesale, retail and education sectors are lower within individual postcodes of the TS than they are for the Northern Territory economy.

⁵⁷ We also considered using $\bar{\rho}^{\text{Weighted}} = 0.393$ = weighted 'average' (median) proportion of total revenues which respondent organisations spend within their local area, calculated by multiplying $\bar{\rho}_j$ by the estimated proportion of total aggregate gross annual turnover within the TS (from Table 19) attributable to industry j . However, the estimate of $\bar{\rho}^{\text{Weighted}}$ closely approximated $\bar{\rho}^{\text{Total}}$, so we have not presented *adjusted* multiplier estimates based on this.

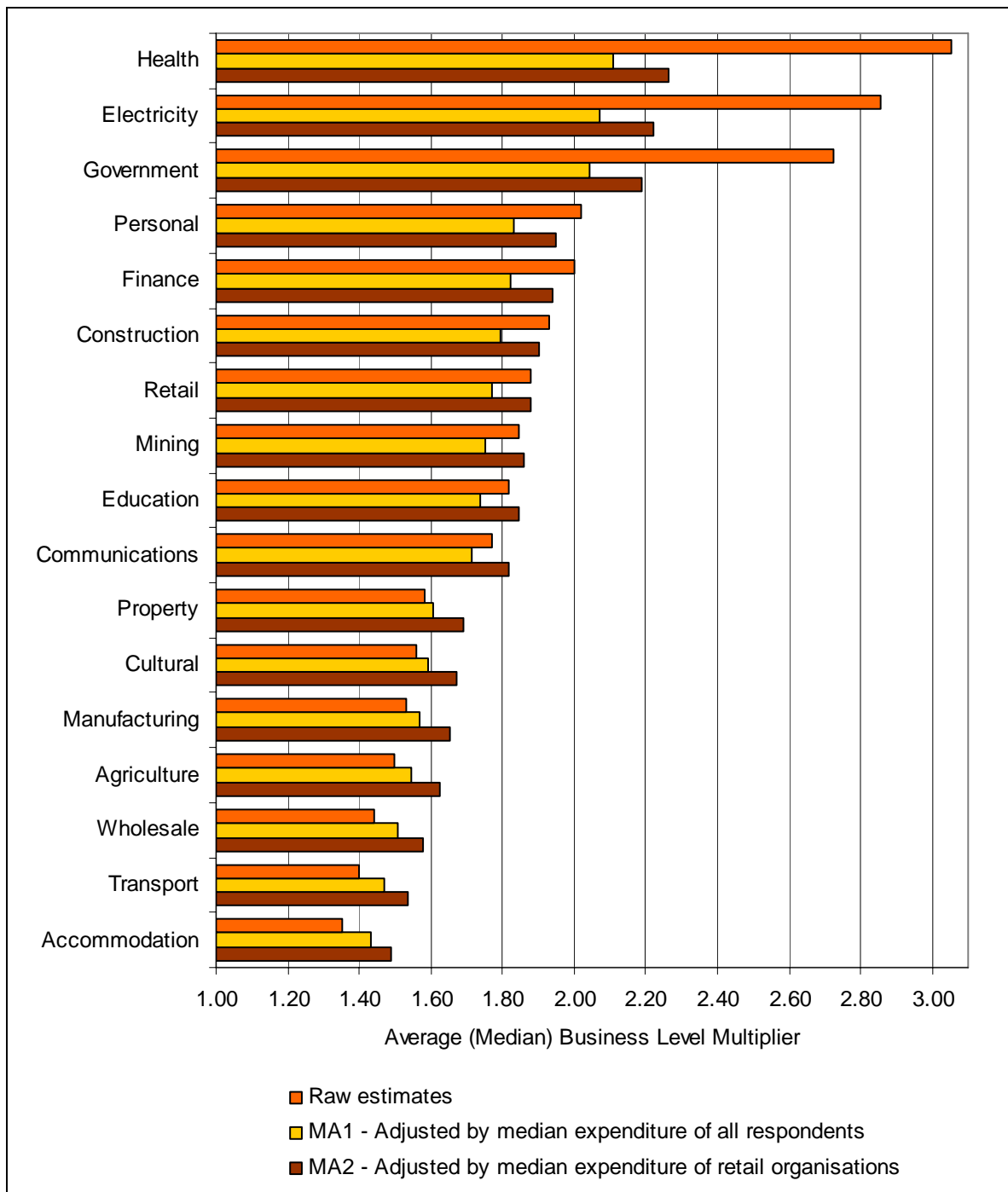


Figure 52: Adjusted business level-multiplier estimates—by industry

Finally, we note that subsequent enquiries could do still more to improve upon these estimates by collecting data on the expenditure (and savings) patterns of householders in remote areas. Relatively little is known about their spending patterns, and this is clearly a significant omission. It is the household sector which is the largest, single, recipient of organisational revenues within the TS, and their expenditures will thus have a significant influence on the size of regional multipliers. Many people in very remote regions (especially Europeans in remote Indigenous communities), for example, intend staying for only a few years and are believed to have high local savings rates while investing these savings in distant cities. If their saving, taxation and import rates are, on average, higher than those of the organisations included in this survey, then the ‘true’ regional multipliers of the TS may be lower than those reported here.

5 Concluding comments and policy recommendations

The estimates of multipliers provided by this study yield useful information for policy makers and others concerned with economic development in the tropical savanna region. It is important to know, for instance, when deciding which sectors deserve most encouragement that the largest business-level multipliers are associated with the health and government sectors (approximately 2) while the lowest are associated with the accommodation and transport sectors (closer to 1.5). This means that every dollar of expenditure within the government or health sector generates *another* dollar of revenues/income for other households or organisations that are located within that same postcode. The impact of extra expenditure within the accommodation or transport sectors is somewhat less—an extra dollar spent in those sectors generates an extra 50 cents of revenue/income amongst other local households and organisations.

In other words, these results indicate that an expansion of the health or government sector could do more to promote regional development than an equal expansion of the accommodation or transport sector. This is somewhat disheartening news to those interested in promoting regional development in an era when trends are to reduce rather than increase government expenditure.

Ultimately, the decision of whether or not government expenditure should be increased must be made in the political arena, but it is worth emphasising an important point. A labour force will be more productive if it is healthy, well-educated, and has access to land, capital, and public infrastructure. So current expenditure on health, education and public infrastructure will not only create short-run benefits. It may also create long-term regional benefits, via significant increases in productivity. See Taylor and Stanley (2005) for a discussion of these matters in relations to remote Indigenous communities.

But this research has not simply provided information about the size of multipliers so that readers can ‘judge’ or argue about the importance of different industries to regional development. It has, perhaps more importantly, provided information about factors that influence the size of regional multipliers. Instead of arguing about how best to ‘inject’ funds into a regional economy (in an attempt to provide what can only be a temporary stimulus), policy makers can use this information to think about ways of trying to increase the size of regional multipliers, thereby creating sustained benefits that build upon the strengths of existing local industries.

To be more specific, it seems that much of the difference in the size of these multipliers is attributable to the fact that different industries/sectors have different input requirements, and that only some inputs are widely available across the tropical savannas. Organisations with relatively high business-level multipliers—those in government and health sectors—spent more than 50% of total revenues within sectors that are prevalent throughout the TS (households, retail, agriculture and, to a lesser extent, construction). In contrast, organisations with relatively low business-level multipliers—those in accommodation and transport sectors—spent comparatively less on wages and retail goods and more within sectors that are not generally prevalent in remote areas (e.g. the cultural, wholesale, property, transport and manufacturing sectors).

This suggests that at least some local expenditure is supply constrained—further evidenced by the statistically significant relationship between the propensity of an organisation to import products from outside the region and the perceived availability of those products. It may, therefore, be possible to increase the size of local multipliers by encouraging the development of support industries—the overall aim being to provide existing organisations with the option of purchasing goods and services locally. Members of remote communities could, for example, be encouraged to start enterprises that provide needed inputs to other existing local businesses: Table 15 provides information about the types of goods and services required by different organisations in the TS, and Table 12 provides information about the types of goods and services which are not already widely available in the region.

The strategy could work particularly well in cases where there is not enough ‘final demand’ to support several businesses. Instead of competing against each other for scarce customers, organisations could profit by supplying different types of goods and services along a single supply chain. Businesses that seek to earn money by supplying inputs to other businesses, will only receive a portion of the total revenues received by the businesses at the top of the supply chain (government organisations, for example, spend only 15% of their budget within the construction sector). But that portion of revenues may be preferable to the alternative of receiving no income at all, and some individuals may like the option of running a part-time business. Further, some enterprises may be able to provide inputs to multiple businesses, thereby receiving multiple ‘portions’.

Of course such a strategy will only work if existing, organisations are both willing and able to purchase inputs from within their local area. Some of this will, necessarily, depend on how expensive local products were compared to similar imports. But some of this will also depend upon the purchasing policies of local organisations.

The operators of some hotels belonging to national chains, for example, are required to purchase inputs from their parent companies, typically located outside the local area. Little can be done to interfere with the purchasing policies of private companies, but those in charge of approving building applications, might wish to consider such factors if, for example, deciding whether company A or company B should be given priority. Similarly, those negotiating mining concessions may wish to give preferential treatment to enterprises that have some sort of ‘buy local’ policy (or, at the

very least, are not party to contractual arrangements which require them to purchase goods outside the local area). In other words, it may be possible to raise the size of local multipliers by encouraging existing organisations to source required inputs locally, since this may help stimulate the development of new regional industries. It is, however, important to bear in mind that the key reason for promoting 'buy-local' policies is to provide short-term support to emerging industries. Once local supply chains are fully operational, buy local policies may be neither necessary nor desirable.

The legal discovery of Native Title is having beneficial effects in terms of regional development. While the changes to the law have not resulted in Indigenous Australians obtaining greater access to large areas of their traditional estates, in many cases it has forced developers (miners and others) to negotiate directly with local Indigenous people. Sometimes these negotiations result in Indigenous Land Use Agreements (ILUAs), and sometimes they have simply led to a more locals-friendly ('good neighbour') approach by the organisation. Typically, the Indigenous negotiators want some income from the project (which is typically spent locally), employment for the local people and sometimes local purchases of locally supplied goods and services. Sometimes these are in the form of contracting out of services which would have otherwise been supplied in-house. All of these developments are beneficial for local economic development.

There may also be scope to reconsider government purchasing policies. To be more specific, many government departments (local, state and federal) follow federal government purchasing policies (see, for example: Department of Treasury and Finance, 2006). Amongst other things these policies provide for Common Use Arrangements (CUA). CUAs contain detailed lists of items that are frequently purchased by government, with the names of approved suppliers of those items. And employees of government departments are sometimes bound by those agreements—items listed in a CUA can only be purchased from approved suppliers. Because the government can thus guarantee significant sales to approved suppliers, it has significant leverage when negotiating CUA prices, terms and conditions. When employees purchase goods that are not listed on a CUA, they must often follow guidelines which are designed to ensure that goods and services are obtained at competitive rates; the more expensive is the purchase, the more open are tenders to external competition⁵⁸.

On the surface, these sorts of policies seem to be a wise, justifiable way of promoting competition and thus saving taxpayers' money. But that may not be the case if considered in the broader context. While small rural businesses might stand a good chance of securing small contracts, they could struggle when asked to compete against national and international firms for larger contracts. So the policies may, unintentionally, suppress rural industry. A 'purchase-local' policy (or 'purchase local' if no CUA supplier within x kilometres) might initially cost taxpayers more, but if such a policy created local employment, and stimulated remote economies, then it might also reduce the need for other branches of government to provide regional income-support. If the reductions in income support payments are greater than the increased cost of inputs, then the net effect of the 'purchase local' policy would be to lower the taxpayer burden.

Of course, whether or not buy-local policies have the potential to create both regional and national economic benefits is an empirical question. As is almost always the case, there is unlikely to be a 'one size fits all' answer. Buy-local policies may create net benefits in some regions, but probably not in all.

A key problem here, however, is that government departments are often managed as if they were private businesses and this discourages holistic (general equilibrium) thinking. If, for example, the head of a government department were to invoke a buy-local policy that generated departmental deficits, then he/she might be reprimanded or replaced with a more 'efficient' manager. This could occur even if that policy created both regional and national benefits. Like private enterprises, individual government departments may not, therefore, enact policies that are of regional or national benefit if such policies adversely affect their budget. So like private enterprises, individual government departments may need to be provided with incentives to adopt buy (or employ) local policies, if such policies are deemed appropriate.

To conclude, the most important message of our research is that those who are interested in regional development should not just think about the (final) goods and services that are delivered to or produced within regional communities. They should also think about the inputs that are used to produce, or deliver, those goods and services. The development paths of remote communities, particularly, will be just as heavily influenced by decisions that are made regarding input sourcing and usage as they are by decisions regarding outputs. Indeed input use decisions may be *more* important. Organisations that purchase inputs from a variety of different sectors within a rural community will help promote industrial diversification and this will ultimately increase that community's resilience, thereby ensuring that the development path is sustainable into the long run.

⁵⁸ The 'spirit buying rules', for example require government employees who wish to purchase goods or services valued at more than \$1000 and (and less than \$10,000) to obtain at least three verbal quotes. Purchases of more than \$10,000 must have 'invitations' to more than three suppliers; those over \$100,000 must involve quotes from at least 6 suppliers (etc), see Department of Treasury and Finance, 2006.

To repeat an earlier quote:

“if regional development is to be associated with the improvement of economic and social prospects for people within a region, as opposed to simply optimising the size of gross regional product, then it is incumbent upon analysts and practitioners to construct regional development strategies around an elevated understanding of *local* scale economic and social interactions.” (Pritchard, 2005:91)

The ‘elevated’ understanding of local economic interactions that this research provides suggests the following postscript:

If regional development is to be associated with the sustainable improvement of economic and social prospects for people within a region (as opposed to simply optimising the size of gross regional product), then it is incumbent upon analysts and practitioners to construct regional development strategies that provide local people with the opportunity to ‘share’ the benefits of increased production by actively participating in the production process.

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Appendix A

The questionnaire

Researchers at James Cook University are trying to find out where businesses and other organisations in Northern Australia are spending their money. This questionnaire asks about the types of goods and services that are available in your local area and about where your organisation spends money (e.g. with local businesses or in Sydney). What is special about this study is that it is trying to encourage an increased understanding of regional Australia. We hope that you are able to take the time to complete and return this survey to assist in this important work.

Please note, that in this survey your “local” area is defined as your postcode area or town (if your town has more than one postcode – like Townsville and Darwin).

Firstly, please provide some background information on your business.....

1. Which of the following best describes your MAIN type of business? Please check one box only.

- RETAIL TRADE *e.g. petrol station, supermarket, butcher etc*
- CONSTRUCTION AND TRADE SERVICES *e.g. building construction, trade services etc*
- PROPERTY AND BUSINESS SERVICES *e.g. cleaning services, accountants, lawyers etc*
- FINANCE AND INSURANCE *e.g. banks, insurance, finance etc*
- AGRICULTURE, FORESTRY AND FISHING *e.g. farming, horticulture, aquaculture, fishing etc*
- ACCOMMODATION, CAFES AND RESTAURANTS *e.g. hotels, cafes, restaurants, casinos, RSL's etc*
- HEALTH AND COMMUNITY SERVICES *e.g. childcare services, medical services, vets etc*
- TRANSPORT, TRAVEL AND STORAGE *e.g. air, road, rail or sea transport, warehousing*
- CULTURAL AND RECREATIONAL SERVICES *e.g. libraries, museums, radio and TV services etc*
- PERSONAL AND OTHER SERVICES *e.g. households employing staff, religious orgs etc*
- MANUFACTURING *e.g. food and beverage manufacturing etc*
- EDUCATIONAL SERVICES *e.g. schools, adult/community colleges*
- GOVERNMENT ADMINISTRATION AND DEFENCE *e.g. public administration, justice etc*
- WHOLESALE TRADE *e.g. builder supplies wholesaling etc*
- COMMUNICATION SERVICES *e.g. postal and courier services etc*
- MINING, QUARRIES AND RELATED SERVICES *e.g. sand and gravel, coal mining etc*
- ELECTRICITY, GAS AND WATER SUPPLY *e.g. sewerage and drainage services etc*
- OTHER (please specify)

2. Where is your organisation located?

NAME OF TOWN: POSTCODE:

3. Is 'head-office' located in a different town?

NO YES

IF YES:

NAME OF TOWN: POSTCODE:

4. Is your organisation owned and/or operated by Aboriginal and/or Torres Strait Islanders?

NO YES

5. How would you describe your organisation?

SOLE PROPRIETOR

PARTNERSHIP/FAMILY BUSINESS

COMPANY

COMMUNITY OR NOT-FOR-PROFIT ORGANISATION

GOVERNMENT ORGANISATION OR DEPARTMENT

OTHER (PLEASE SPECIFY)

6. How many years has your organisation been in operation?

LESS THAN 1 YEAR

1 – 5 YEARS

6 – 10 YEARS

MORE THAN 10 YEARS

7. The following questions relate to the size of your organisation. For organisations with multiple sites (e.g. branch offices, franchises etc) please only include the number of employees at your specific location.

a) Including yourself how many people are currently employed by your business?
.....

b) How many of these employees are full-time?

c) How many of these employees are part time?

d) How many of these employees are members of your own family?

e) How many of these employees are Aboriginal or Torres Strait Islanders?

f) Roughly, how many of your employees live in a different town and commute to and from work?

The next few questions are asking about what types of services you have available locally, and where your business/organisation spends its money.....

8. Please advise whether the following types of businesses and organisations are available within your local region by ticking the appropriate box. Please answer regardless of whether you spend money at these businesses or not.

TYPE OF BUSINESS/ORGANISATION	NONE AVAILABLE LOCALLY	SMALL NUMBER AVAILABLE LOCALLY	SOME AVAILABLE LOCALLY	FULL RANGE AVAILABLE LOCALLY
Retailers <i>e.g. supermarkets, stores, petrol stations</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Construction and trade services <i>e.g. builders, electricians, plumbers</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Property and business services <i>e.g. real estate agents, lawyers, accountants, cleaning services</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Finance and insurance <i>e.g. banks, insurance companies</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Agriculture, forestry, fishing and hunting <i>e.g. primary producers, farms</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Accommodation, cafes and restaurants <i>e.g. caterers, hotels, restaurants, takeaways</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Health and community services <i>e.g. doctors, vets, community care, childcare</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Transport, travel and storage <i>e.g. travel, freight, warehousing services</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cultural and recreational services <i>e.g. libraries, museums, galleries</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Personal and other services <i>e.g. religious organisations, interest groups</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Manufacturers <i>e.g. food manufacturers</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Educational services <i>e.g. TAFE, schools, universities</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Government administration and defence	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wholesalers <i>e.g. food and beverage wholesalers</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Communication services <i>e.g. phone, postal, couriers</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mining, quarries and related services <i>e.g. mines or mining companies</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Electricity, gas and water suppliers <i>e.g. gas supply, sewerage, drainage</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

9. For each of the following, please indicate roughly how much of the money that your organisation spends goes to locally and non-locally based businesses/organisations. In which town(s) do you spend money if not spent locally? Please leave the row blank if your business/organisation does not spend money with those organisations.

Type of business/organisation that money was spent with	% spent with locally based businesses / organisations	% spent with non-locally based businesses / organisations	In which town(s) do you spend money if not spent locally?
e.g. Communication services – (when all money that is spent on communications is spent with businesses/organisations that are located in Brisbane)	0%	100%	Brisbane
e.g. Retailers - (when 70% of all money spent with retailers is spent at businesses/organisations that are within your local area and the rest is spent with businesses/organisations that are located in Darwin and Broome)	70%	30%	Darwin, Broome
e.g. Health and community services - (when no money is spent on health services)	---	---	
Retailers e.g. supermarkets, stores, petrol stations%%	
Construction and trade services e.g. builders, plumbers%%	
Property and business services e.g. rent, cleaning%%	
Finance and insurance e.g. banks, insurance companies%%	
Agriculture, forestry, fishing and hunting e.g. farms%%	
Accommodation, cafes and restaurants e.g. caterers, hotels, restaurants, takeaways%%	
Health and community services e.g. doctors, vets, community care, childcare%%	
Transport, travel and storage e.g. travel, freight%%	
Cultural and recreational services e.g. library, museums%%	
Personal and other services e.g. religious organisations%%	
Manufacturers e.g. food manufacturers%%	
Educational services e.g. staff training%%	
Government administration and defence%%	
Wholesalers e.g. food and beverage wholesaling%%	
Communication services e.g. phone, postal, couriers%%	
Mining, quarries and related services%%	
Electricity, gas and water supply e.g. sewerage%%	
Wages and salaries (or \$ kept by owners for living expenses)%%	
TAXES:%		
Local government e.g. rates etc%%	
State government eg payroll taxes%%	
Federal government eg GST, income tax,%%	
Savings or profit%%	
Other (please specify)%%	

10. Roughly what percentage of your total business revenue or budget (if Government organisation) is spent with (or on) the following types of businesses/organisations/activities....

Type of business/organization/activity	% of <u>total revenue (or budget)</u> spent on this type of business/organization/activity
e.g. Communication services – (when communications comprise 15% of your budget)	15%
e.g. Health and community services - (when health comprises 5% of your budget)	5%
e.g. Retailers - (when retail comprises 22% of your budget)	22%
Retailers e.g. supermarkets, stores, petrol stations%
Construction and trade services e.g. builders, plumbers%
Property and business services e.g. rent, cleaning%
Finance and insurance e.g. banks, insurance companies%
Agriculture, forestry, fishing and hunting e.g. farms%
Accommodation, cafes and restaurants e.g. caterers, hotels, restaurants, takeaways%
Health and community services e.g. doctors, vets, community care, childcare%
Transport, travel and storage e.g. travel, freight%
Cultural and recreational services e.g. library, museums%
Personal and other services e.g. religious organisations%
Manufacturers e.g. food manufacturers%
Educational services e.g. staff training%
Government administration and defence%
Wholesalers e.g. food and beverage wholesaling%
Communication services e.g. phone, postal, couriers%
Mining, quarries and related services%
Electricity, gas and water supply e.g. sewerage%
Wages and salaries (or \$ kept by owners of businesses for living expenses)%
TAXES:	
Local government e.g. rates etc%
State government eg payroll taxes%
Federal government eg GST, income tax,%
Savings or profit%
Other (please specify)%
TOTAL – this column should add to approximately 100	100%

11. Roughly, what percentage (%) of your business revenue (or budget or customer base) comes from:

YOUR LOCAL AREA%
ELSEWHERE IN YOUR STATE%
OTHER STATES OF AUSTRALIA%
OVERSEAS%

12. Roughly, what percentage (%) of your revenue (or budget or customer base) comes from:

PRIVATE BUSINESS%
HOUSEHOLDS/PRIVATE INDIVIDUALS%
LOCAL GOVERNMENT (e.g. COUNCIL)%
STATE OR NT GOVERNMENT (including schools, hospitals, rail services etc)%
AUSTRALIAN FEDERAL GOVERNMENT%

13. **Optional question:** What is your annual gross turnover (or budget)? For organisations with multiple sites (e.g. branch offices, franchises etc) please only consider your specific location.

- LESS THAN \$10,000 PER YEAR
- \$10,000 TO \$500,000 PER YEAR
- \$500,001 TO \$1 MILLION DOLLARS PER YEAR
- BETWEEN \$1 AND \$5 MILLION DOLLARS PER YEAR
- MORE THAN \$5 MILLION DOLLARS PER YEAR

Now, a few questions about other ways in which your businesses/organisation interacts with the regional environment.....

14. Does your business/organisation support any charitable organisation/s, community organisation/s and/or other group/s?

NO YES

IF YES, PLEASE PROVIDE DETAILS:

NAME OF ORGANISATION/GROUP	LOCATION OF ORGANISATION/GROUP	NATURE AND APPROX VALUE OF 'SUPPORT' GIVEN TO ORGANISATION/GROUP
<i>e.g. Darwin Football Club</i>	<i>Town- Darwin Postcode: 0800</i>	<i>Donation of team jerseys - \$1200</i>
1.	Town- Postcode:	
2.	Town- Postcode:	
3.	Town- Postcode:	
4.	Town- Postcode:	

15. Please list any other ways in which your business contributes to the surrounding community-

.....

16. Does your business purchase green energy?

NO YES I DON'T KNOW

17. Roughly, how much electricity does your business use? (for example, 1000 kWh per day)

Amount Units (please circle one) Time frame (please circle one)
 Dollars / kWh / mWh / gWh Per day / Per month / Per quarter / Per year

18. Roughly, how much water does your business use? (for example, 2000 litres per month)

Amount Units (please circle one) Time frame (please circle one)
 Dollars / Litres / Megalitres Per day / Per month / Per quarter / Per year

19. Where does most of the water used by your business come from?

- LOCAL GOVERNMENT SUPPLIED
- OWN SOURCES (DAM)
- OWN SOURCES (RAINWATER/TANKS)
- PUMPED FROM RIVERS
- PUMPED FROM GROUNDWATER
- RECYCLED
- OTHER

20. Does your business use recycled water (e.g. for irrigation or industrial processes)?

- NO YES I DON'T KNOW

21. Approximately how much sorted waste (e.g. recyclables) is generated by your business on a weekly basis?

- NUMBER OF WHEELIE BINS (APPROX 0.24 CUBIC METRES)
- NUMBER OF SMALL SKIPS (APPROX 1.5 CUBIC METRES)
- NUMBER OF LARGE SKIPS (APPROX 3 CUBIC METRES)

22. Approximately how much unsorted waste is generated by your business on a weekly basis?

- NUMBER OF WHEELIE BINS (APPROX 0.24 CUBIC METRES)
- NUMBER OF SMALL SKIPS (APPROX 1.5 CUBIC METRES)
- NUMBER OF LARGE SKIPS (APPROX 3 CUBIC METRES)

Are there any comments you would like to make, in relation to this survey or in general?

.....

.....

Please tick this box if you would like a copy of the results of this study sent to you

Thank you for your participation. 😊

For any enquiries regarding this survey contact Natalie Stoeckl on telephone 07 4781 4868.

Appendix B

Tables showing employment by sector using raw numbers and postcode data

Table 21: Percent of workforce employed in different industries across the TS—by remoteness (Census 2001)

ANZSIC Industry	Regions within the tropical savannas				All of TS (122 PCs)	Australia as a whole
	Inner Regional (2 PCs)	Outer Regional (47 PCs)	Remote (23 PCs)	Very Remote (50 PCs)		
Accommodation	5.38	5.93	6.06	5.05	5.73	5.07
Agriculture	1.59	5.55	13.56	12.62	7.81	4.08
Communications	1.50	1.26	0.86	0.79	1.12	1.83
Construction	6.61	6.89	6.85	6.59	6.81	6.89
Cultural	1.72	2.37	1.48	1.35	2.00	2.50
Education	10.08	7.91	7.72	7.35	7.91	7.35
Electricity	2.24	1.02	0.84	0.68	1.01	0.75
Finance	2.68	2.08	1.27	0.98	1.79	3.85
Government	3.57	9.51	5.36	18.02	10.32	4.56
Health	10.25	9.34	7.07	7.65	8.75	9.95
Manufacturing	11.02	8.30	4.72	4.98	7.32	12.46
Mining	1.12	1.66	15.15	8.67	4.85	0.93
Personal	4.44	3.84	2.65	4.01	3.76	3.71
Property	7.05	8.59	5.91	5.01	7.41	11.35
Retail	18.32	15.08	11.50	8.88	13.54	14.94
Transport	6.47	5.73	4.96	4.59	5.44	4.39
Wholesale	5.95	4.92	4.05	2.79	4.44	5.39
Total	100.00	100.00	100.00	100.00	100.00	100.00

Table 22: Percent of workforce employed in different industries—Minimum, Maximum, Average and Standard deviation for postcodes in the Tropical Savannas (Census 2001)

ANZSIC Industry	Minimum % of workforce employed within industry	Maximum % of workforce employed within industry	Average across all Postcodes within TS	Standard Deviation across all Postcodes within TS
Accommodation	0	31.8	5.3	4.7
Agriculture	0	100.0	21.0	20.1
Communication	0	16.2	1.1	1.7
Construction	0	16.2	6.3	3.1
Cultural	0	6.9	1.3	1.2
Educational Services	0	31.9	6.5	3.8
Electricity	0	3.9	0.7	0.7
Finance and Insurance	0	5.3	1.1	1.1
Government	0	95.6	9.8	14.4
Health	0	18.8	6.7	3.6
Manufacturing	0	20.8	5.7	4.6
Mining	0	56.6	6.6	12.3
Personal	0	13.4	2.8	2.2
Property	0	13.7	4.7	3.0
Retail Trade	0	20.3	9.3	4.7
Transport	0	18.8	5.2	3.4
Wholesale	0	10.7	3.3	2.2

Appendix C

Maps showing employment by postcode across TS for sectors employing relatively small proportion of workforce

Educational Services

A higher proportion of the TS workforce was employed in educational services than in Australia as a whole (7.91 % compared to 7.35%, Table 21). Although some parts of the TS had a relatively high percentage of the workforce employed in this industry (notably the region near Charters Towers, an area renowned for its boarding schools), there was relatively little regional variation (Figure 53).

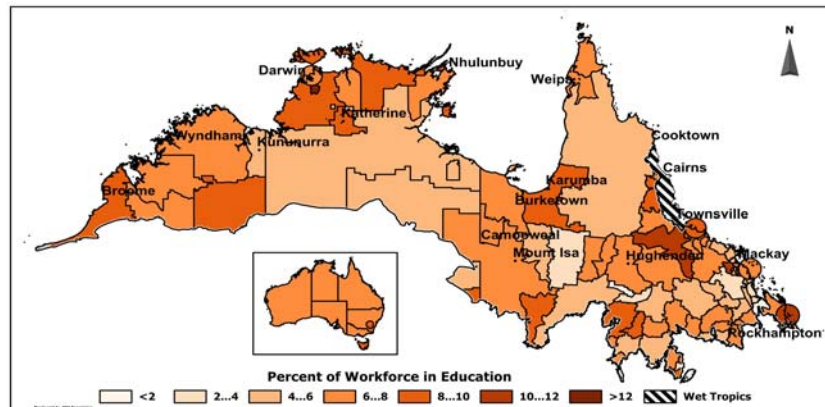


Figure 53: Percent of workforce in education, by postcode
Data Source: ABS CDATA 2001

Construction

Calculated on a person-by-person basis, there was little difference between the percent of workers employed in Construction across the entire TS and across Australia as a whole (6.81% and 6.89% respectively, see Table 21). When considered at a finer geographic scale, however, it became clear that the industry was relatively less important to the remoter parts of the TS (in WA and the southern part of NT) than to other areas, see Figure 54.

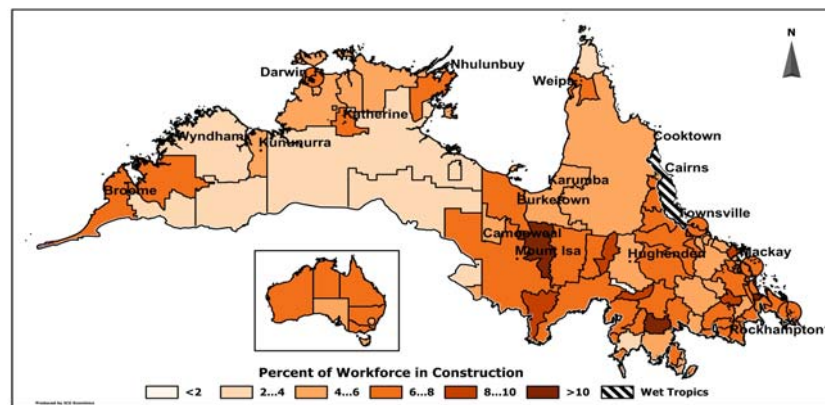


Figure 54: Percent of workforce in construction, by postcode
Data Source: ABS CDATA 2001

Manufacturing

Manufacturing accounted for a much smaller percentage of employment in the TS (7.32%) than in Australia as a whole (12.46%), and there were clear differences in the importance of this industry across the region (Figure 55). Not surprisingly, the sector generally accounted for a larger share of employment in and around the regional centers and mining communities than in the remote, desert areas.

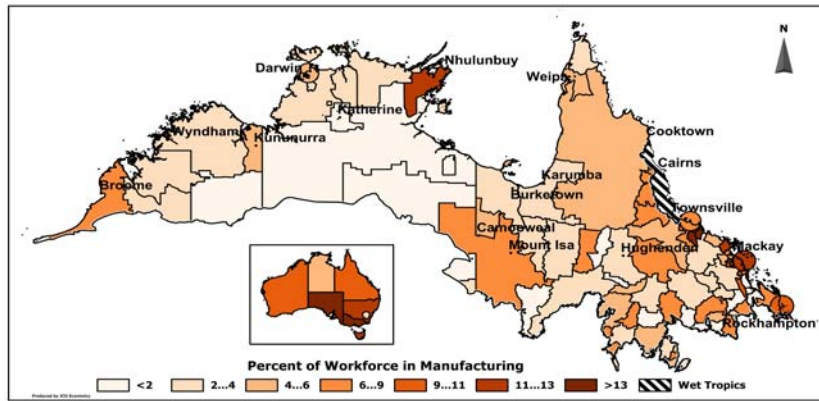


Figure 55: Percent of workforce in manufacturing, by postcode
 Data Source: ABS CDATA 2001

Accommodation

Many regions within the Australian Savanna were more reliant upon the Accommodation sector for employment than Australia as a whole (where approximately 5% of the workforce was engaged in that sector, see Table 21). In particular, some of the more popular tourism regions of Broome/Derby (the Kimberly), Kununurra, Kakadu National Park showed a clear dependence on that sector for employment, as did parts of Cape York Peninsula (Figure 24).

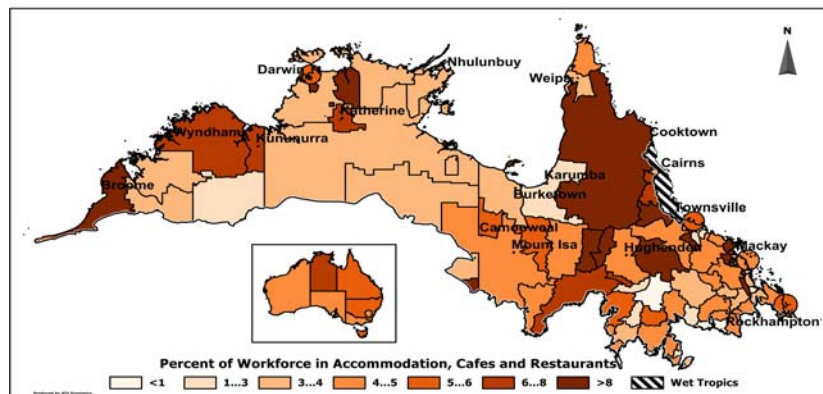


Figure 56: Percent of workforce in accommodation, by postcode
 Data Source: ABS CDATA 2001

Nevertheless, there is relatively little variation in the proportion of workforce employed in this industry (particularly if compared to the mining and government sectors which vary by as much as 20 percentage points from one region to another).

Transport, Travel and Storage

Perhaps at least partially reflecting the remoteness of the region, the transport, travel and storage sectors provides employment to a larger proportion of the TS workforce than to the entire Australian workforce (5.44% compared to 4.39%—see Table 21).

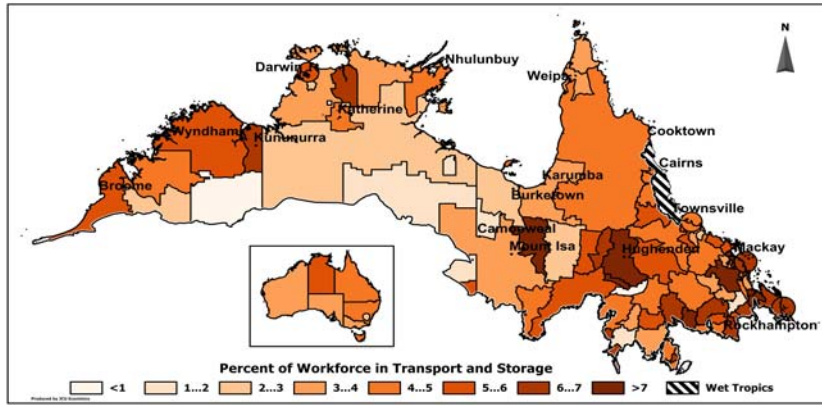


Figure 57: Percent of workforce in transport and storage, by postcode
 Data Source: ABS CDATA 2001

Property

On a person-by-person basis the property sector employed approximately 11.35% of Australians, making that sector more important to the country as a whole than to the TS region (where 7.41% of all workers are employed in that sector). As is evident in Figure 58, the sector tends to be a less important provider of employment to the remote regions than to the areas in and around regional centres.

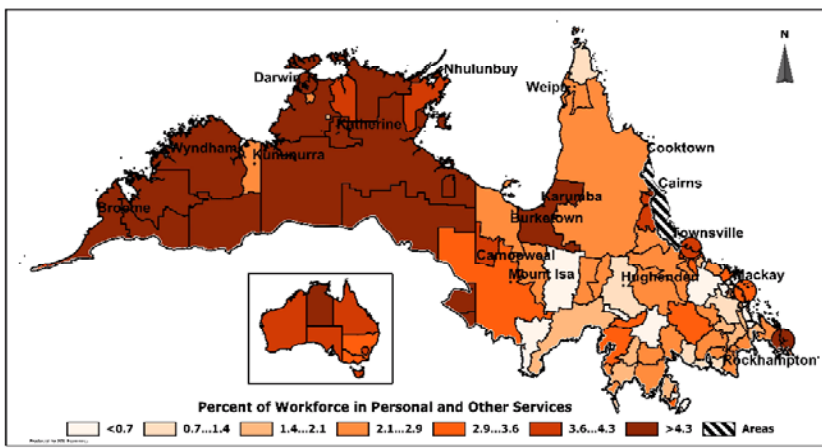


Figure 58: Percent of workforce in property, by postcode
 Data Source: ABS CDATA 2001

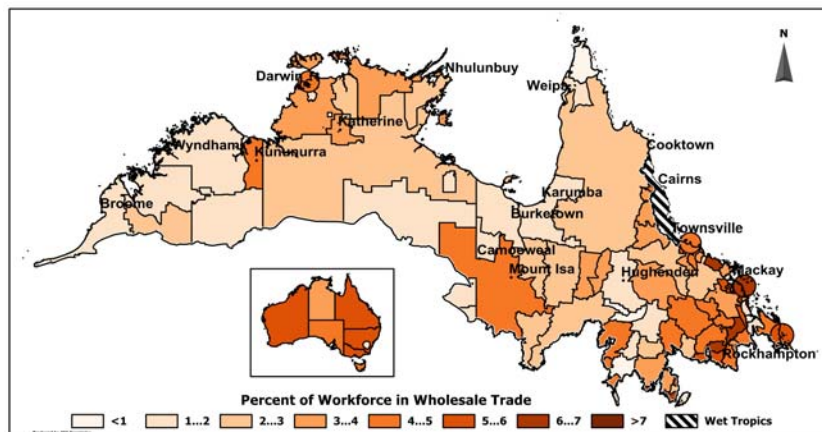


Figure 59: Percent of workforce in wholesale, by postcode
 Data Source: ABS CDATA 2001

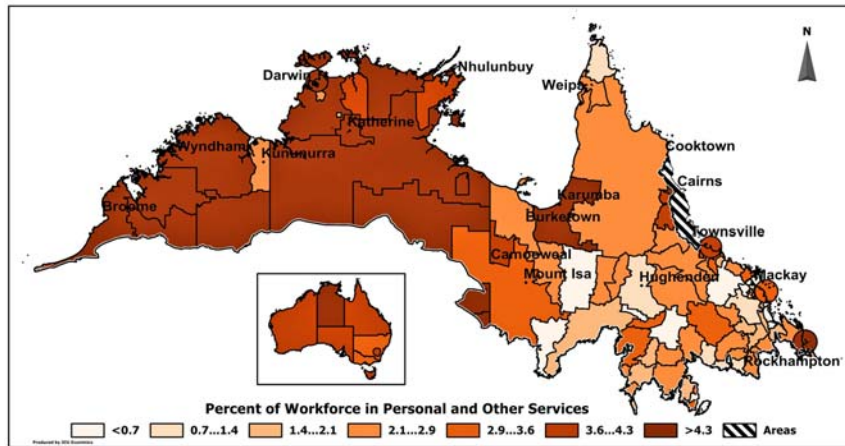


Figure 60: Percent of workforce in personal, by postcode
 Data Source: ABS CDATA 2001

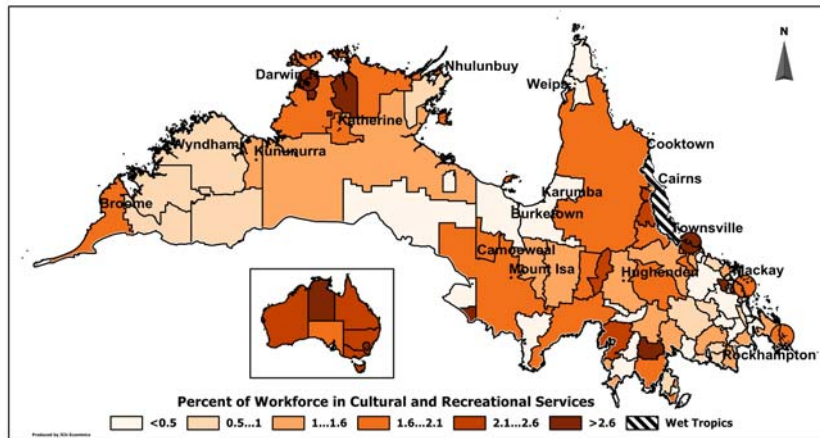


Figure 61: Percent of workforce in cultural, by postcode
 Data Source: ABS CDATA 2001

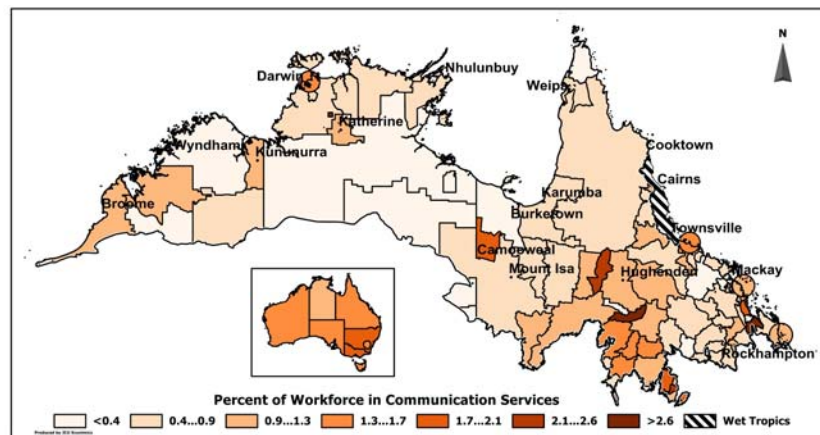


Figure 62: Percent of workforce in communications, by postcode
 Data Source: ABS CDATA 2001

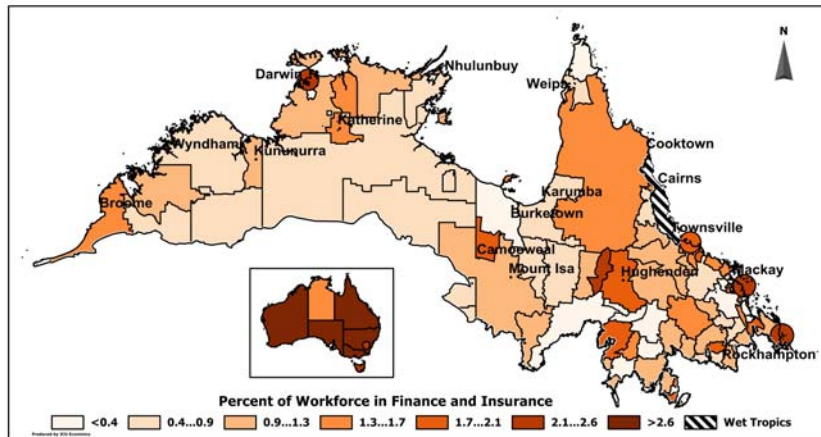


Figure 63: Percent of workforce in finance and insurance services, by postcode
Data Source: ABS CDATA 2001

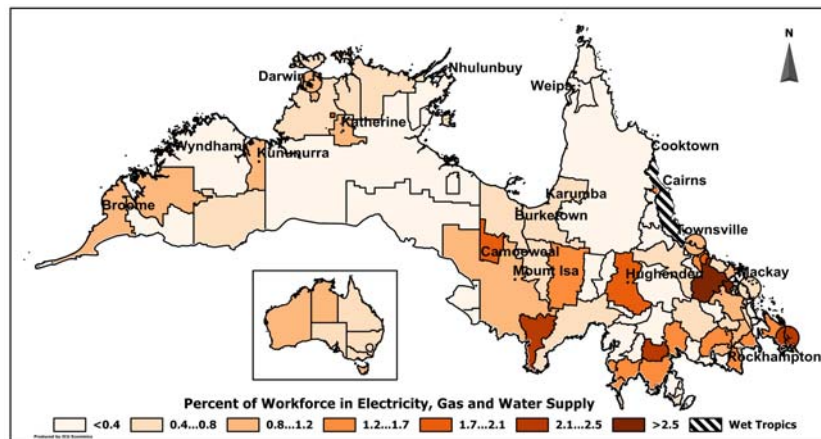


Figure 64: Percent of workforce in electricity, gas, water, by postcode
Data Source: ABS CDATA 2001