AUSTRALIA'S REGIONAL CITIES AND TOWNS: MODELLING COMMUNITY OPPORTUNITY AND VULNERABILITY

Robert Stimson
School of Geography, Planning and Architecture, University of Queensland, St Lucia, Queensland, 4072, Australia.

Scott Baum
School of Geography, Planning and Architecture, University of Queensland, St Lucia, Queensland, 4072, Australia.

Patrick Mullins
Department of Anthropology and Sociology, University of Queensland, St Lucia, Queensland, 4072, Australia.

Kevin O'Connor
Department of Geography and Environmental Sciences, Monash University, Clayton, Victoria, 3168, Australia.

ABSTRACT Economic restructuring over the last decade or so has created a wide diversity of positive and negative outcomes for regional cities and towns across Australia, evident through change in a range of socio-economic measures over the decade 1986–96. This paper develops and applies a multi-variate model to categorise community opportunity and vulnerability by identifying a typology of large regional cities and towns in Australia with populations over 10,000. Cluster analysis and discriminant analysis are used for a set of variables which measure both changes over the decade 1986–96 and static measures at the 1996 census of population, industry and occupation mix, income distribution, and social housing disadvantage. Spatial patterns in the performance of large regional cities and towns on the dimensions of change are identified and analysed, and some regional policy implications are raised.

1. INTRODUCTION

The economic and social performance of Australia's regional cities and towns has been receiving considerable attention in recent years. Significant recent work includes Beer (1995a, 1995b, 1999), Beer, Bolam and Maude (1994), and Beer and Maude (1995). Earlier, Paris (1992) had looked at changes in the urban and regional system in New South Wales, and Sorensen (1993) considered strategies for the local economic development of country towns. Going back some decades, Smith (1965) provided the first national study on the functions of Australia's cities and towns which included a functional classification, and work in the 1970s by Logan, Whitelaw and McKay (1981) included an analysis of the functions and regions of influence of cities and towns in Australia. The most recent work by Beer (1999) provides us with an analysis

of the roles and functions of regional cities in Australia for the periods 1986–91 and 1991–96, including a multi-variate functional classification. In this work Beer draws on the study by Beer and Maude (1995) and contends that over the period 1976–1991 rapid development was occurring in a range of regional city types. Rather than only being limited to coastal retirement and tourism centres, growth also took place in general centres, manufacturing centres and agricultural centres.

In this paper we take a somewhat different analytical approach to the study of Australia's regional cities and towns. In late 1998, working through the Australian Housing and Urban Research Institute, the authors embarked on a national-scale project to measure community opportunity and vulnerability across both metropolitan and regional Australia, to investigate the characteristics of communities that are vulnerable, and to propose strategies which might be appropriate for their regeneration.

In its first phase, the task involved the development of a methodology to measure community opportunity and vulnerability. In particular, a set of typologies have been developed whereby localities (in the case of this paper large regional localities) may be categorised in terms of a continuum of opportunity/vulnerability. Position along the continuum is based on a series of static measures of economic and social performance and of change over the decade 1986–1996. In earlier papers (Stimson *et al*, 1999; Baum *et al*, 1999) we reported on the analysis of the continuum (defined by SLAs—Statistical Local Areas) comprising the five mega metro regions of Sydney, Melbourne, Brisbane-South East Queensland, Perth and Adelaide (as defined by O'Connor and Stimson, 1995) plus metro Canberra and Hobart. In this paper our focus is outside the mega-metro regions. It analyses community opportunity and vulnerability across 122 locations (SLAs) with populations of 10,000 and above (Figure 1). A further analysis focuses on Australia's rural urban communities, defined as small localities (SLAs) with populations of between 4,000 and 10,000. Detailed results, including a policy overview, of these collective studies are available in Baum *et al*, (1999).

2. CONCEPTUALISING COMMUNITY OPPORTUNITY AND VULNERABILITY

We conceptualise community performance in terms of a range of factors that may be thought to impinge on the opportunity and vulnerability of a regional city or town (Figure 2). In line with previous research regarding the effects of wider national social and economic transitions, local community performance is seen as being the outcome of a broad range of socioeconomic variables. It depends on changes in socioeconomic performance such as structural economic change, as well as socioeconomic characteristics measured at one point in time. These socioeconomic characteristics can reflect the strength of labour force attachment (that is, the level of unemployment or labour force participation), the structure of the job market and job opportunities, and the concentration of social disadvantage or advantage.

Figure 1. Regional Localities

Vulnerability		Opportunity
	Structural Change	
Negative/below average	Employment Growth	Above average
Positive/above average	Unemployment Growth	Negative/below average
Below average or negative growth in high-income households)	Income Growth	Above average growth in high-income households
	Socioeconomic Structure/ Composition	
>% in decline occupations (i.e. routine production workers	Occupation Structure	> % in growth occupations (i.e. symbolic analysts)
> % in decline industries (i.e. transformative sector)	Industrial Structure	> % in growth industries (i.e. producer services)
> % of low-income households	Household Income	> % high-income households
Commensurate with occupation	Human Capital	Commensurate with occupation
Low levels of attachment (i.e. high unemployment and low labour force participation)	Attachment to the Labour Force	High levels of attachment (i.e. low unemployment and high labour force participation)
High level of disadvantaged families (i.e. high levels of single parents)	Disadvantaged Families	Low level of disadvantaged families (i.e. low level of single parents)
High levels of housing stress	Housing	Low levels of housing stress

Figure 2. The Conceptual Framework for Community Opportunity and Vulnerability

Our intention was to develop a framework and analytical methodology that would enable us to treat in the same way each one of the 122 localities (which we categorise as large regional cities and towns) to generate clusters that would differentiate between them so as to clearly identify opportunity and vulnerability. Whilst it is tempting when conceptualising issues such as opportunity and vulnerability to think in terms of a dichotomous framework, the performance of a

given locality might better be considered in terms of its position on a continuum. Thus, the concepts of opportunity and vulnerability are not considered as polar opposites; rather localities might be categorised as lying somewhere along a continuum at which high opportunity and high vulnerability are at the extremes. Essentially, therefore, we are interested in identifying degrees of opportunity and vulnerability and the position of given localities along the continuum, as well as grouping localities into categories whose member localities are most alike in the multi-variate space defined by a series of measures that measure attributes that might link to opportunity and vulnerability. Importantly, the position of a locality on that continuum might be expected to change over time as it adjusts positively or negatively to the economic and social transitions which the wider society experiences.

Fundamental to our hypothesis of what constitutes community opportunity and vulnerability is the notion that, at a macro societal level, processes of globalisation and economic restructuring have been generating marked and substantial shifts in the mix of employment in industry sectors—a shift from the manufacturing and agricultural processes of the Fordist economy to the services and informational growth industries of the post-Fordist economy. Places of opportunity we see to be more likely to be positively adjusting to this change, while places of vulnerability are more likely not to be adjusting to this change. And as has for long been considered by researchers investigating social disadvantage, it is feasible to hypothesise that communities of opportunity will be generating higher incomes and be characterised by relatively lower incidence of households that exhibit measures of social disadvantage, while places that are vulnerable will have higher incidence of measures of social disadvantage.

2.1 Hypothetical Characteristics of Communities of Opportunity

Communities of opportunity might be seen as being localities being characterised by high or positive employment growth, by below average increase in unemployment rate (or above average decline in unemployment rate), and by positive growth in incomes (that is, above average increases in the proportion of high income households). Furthermore, they are likely to have greater concentrations of jobs in expanding occupations and industries, and commensurately higher levels of human capital. They are also likely to have greater concentrations of high income households, greater levels of labour force participation, and lower concentrations of disadvantaged families. And they are likely to have lower concentrations of households residing in public housing and have fewer households facing housing financial stress.

2.2 Hypothetical Characteristics of Vulnerable Communities

At the other extreme, vulnerable communities might be seen as most likely being characterised by low or negative employment growth, have above average growth in unemployment rate, and have below average increases in the proportion of high income households. They are also likely to have greater concentrations in occupations and industries in decline, greater concentrations of low income households, poor levels of labour force participation, and higher

concentrations of disadvantaged families. And they are likely to have higher concentrations of households residing in public housing and more households facing housing financial stress.

3. MODELLING COMMUNITY OPPORTUNITY AND VULNERABILITY

3.1 The Approach and Methodology

Attempts to define localities in terms of vulnerability, socioeconomic inequality or disadvantage abound in both the academic literature as well as the applied public policy setting. In this study we chose to use both hierarchical cluster analysis and discriminant analysis in what was essentially a two-stage process. Initially a clustering procedure was used to group localities based on a selection of variables, then discriminant analysis functions and associated output were used to determine which of the variables discriminated between the resultant clusters. Analysis was undertaken using the SPSS statistical computer package.

The agglomerative hierarchical cluster analysis technique is used as the grouping procedure. It has been shown to be a useful and effective procedure when the researcher wishes to classify observations into similar groups that can then be profiled for social and economic similarities and differences (Everitt 1993; Hair *et al*, 1987). The agglomerative method of hierarchical cluster analysis begins with each observation in a separate cluster. At each successive step, clusters that are closest together are combined to form a new aggregate cluster until the final cluster solution is produced which contains all observations. In this case, groups are constructed by minimising the variance of the squared Euclidean distances for each variable within observations using the Ward method[1].

There is no agreed upon method of selecting the candidate cluster solution (Aldenderfer and Blashfield, 1984; Everitt, 1983). However, a number of options have been suggested including analysing the agglomeration schedule to identify 'marked' increases in the value of the coefficient between two stages. Whilst this method was used here to identify possible cluster solutions the choice of the final cluster solution was also guided by the interpretability of the clusters, the manageability of the cluster numbers and the number of observations included in each cluster. This approach is consistent with that by Hill *et al* (1998) and Gittleman and Howell (1995).

Once the final cluster solution was chosen, we then used discriminant analysis to further analyse the cluster groupings. Discriminant analysis is an

[1] Other approaches not using the squared Euclidean distance minimisation method might provide an alternative and perhaps computationally superior solutions. We also recognise that we are open to criticisms that commonly may be laid against researchers using these types of multi-variate statistical procedures for clustering spatial units on a battery of variables comprising largely ratio data with their inherent problems of multi-colinearity and autocorrelation.

appropriate methodology in this case as we have a categorical dependent variable (cluster groups) and metric independent variables. Multiple discriminant analysis involves producing a linear combination of the independent variables that will discriminate best between the previously specified cluster groups. It allows identification of the variables that drive the classification process. Following Hill *et al* (1998) 'this allows us to discuss the typologies that the clusters represent from the data, rather than to look at place names and allow our prejudice or intuition to drive the cluster labelling' (p.1938).

In this analysis, stepwise discriminant analysis was used. It involved introducing variables into the analysis one at a time and maximising the between group variance relative to the within group variance. The result is a series of functions, each with particular qualities that depend on the relationship between the independent variables and the cluster solutions (the dependent variable). The output from the analysis was used in several ways. The discriminant analysis produces correlations between the individual functions and the independent variables. These are reported in the 'structure matrix' in SPSS and are used to identify the properties of each function. Once identified these are used in the interpretation and analysis of the clusters. The analysis also produces, for each observation, a series of discriminant scores. These are used in two ways:

(a) The centroids of the clusters which represent a cluster's mean on each function can be used to identify key differences between the clusters. This provides a general structure for identifying the way the characteristics of each cluster differs from other clusters**.**

(b) The discriminant scores were also used to compose a summary discriminant score. The summary score is derived by weighting each observation's score on a given function by the percentage of variation explained by that function, and then summing the individual scores for each observation.

Additional output includes a 'hit ratio' or classification score which identifies the proportion of the observations correctly classified[2].

Once the discriminant analysis is run and the essential statistics computed, the clusters can be analysed with reference to their associations with the discriminant functions, their summary discriminant score and a set of mean scores (cluster profiles) relating to selected socioeconomic variables.

3.2 Data Variables

The data used in this analysis of 122 large regional cities and towns comes from the Australian Bureau of Statistics (ABS) CData 96, a CD-Rom containing selected information from the Census of Population and Housing for the census years 1986 through 1996. We use both data at one point in time - the August

[2] The Ward method does permit the use of a relocation routine that reallocates cluster members when they deviate sufficiently from a clusters evolving profile that they become closer to another cluster. This has not been used in this analysis.

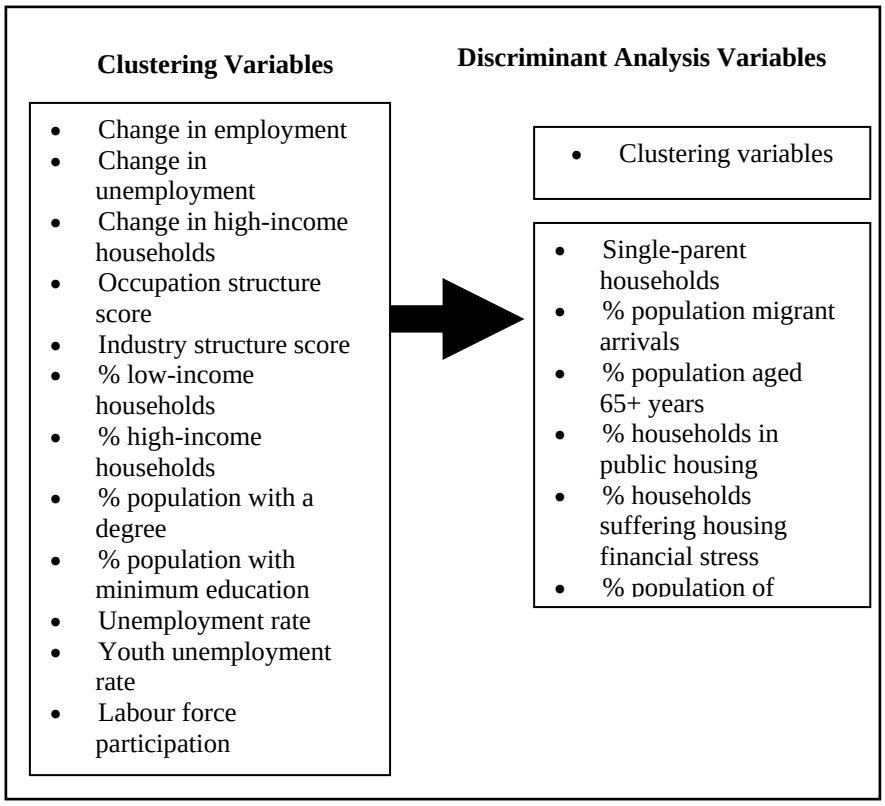

Figure 3. Clustering Variables and Discriminant Analysis Variables

1996 census—together with selected variables accounting for a decade of change between the 1986 and the 1996 censuses. There was considerable experimentation with a wide range of variables before the final group was chosen. These are described below. Figure 3 summarises the relationship between the clustering and the discriminant analysis variables used in the modelling approach outlined above.

Structural Economic Change

A number of variables accounting for structural economic change are included in the analysis. Following the Australian Productivity Commission (1998) key factors are changes in the size of the labour force, changes in the strength of the labour market, and changes in income characteristics. To account for these variables, three measures are used:

(a) percentage change in the numbers of persons employed (1986–1996)
(b) percentage point changes in the unemployment rate (1986–1996)
(c) percentage point change 1986–96 in the proportion of households earning

more than $40,000 (standardised to 1996 values)[3].

3.3 Population Change

Population change at a regional level has significant impacts on the growth and decline of local markets and results in complex patterns of gain and loss in investment and employment (Stimson *et al*, 1998). To account for population growth, the percentage change in total population between 1986 and 1996 is included.

Occupational Characteristics

One of the key changes occurring in the labour market is the composition of occupations. We sought to use a classification that would identify changes in the type of jobs due to the transition from the industrial to the post-industrial era and the new information economy. We thus followed Reich's (1991) classification identifying three categories—routine production workers, in-person service workers, and symbolic analysts. ABS data presents occupations according to the Australian Standard Classification of Occupations (ASCO), which when considered at an aggregate level (2 digit) is difficult to assign in a detailed way to Reich's three categories. However, the nine ABS categories can be assigned in the following ways to approximate Reich's categories:

(a)	Routine production workers:	Tradespersons and related workers Elementary clerical, sales and service workers Labourers and related workers.
(b)	In-person service workers:	Associate professionals Advanced clerical and service workers Intermediate clerical, sales and service workers Intermediate production and transport workers.
(c)	Symbolic analysts:	Managers and administrators Professionals.

These categories are widely used in structural analysis to provide an aggregate measure of engagement in the functions dominating the 'new' global economy. An aggregate score which combines Reich's three categories, and which account for the occupational structure of localities, is included in the

[3] This measure of change in the proportion of households between 1986 and 1996 earning 'high' incomes is taken as a rough estimate of increase and or decrease in the incidence of such households. The ABS does exclude time series income data from the CData file on grounds that inter-censal income data are not comparable on an individual household data. However, our concern here is to see the degree to which there has been an upward or downward shift in the proportion of households in an SLA that are 'higher' income earnings. The income categories used by the ABS were chosen so that the 'cut off' figure was as close as possible to the equivalent of $49,000 gross household income in 1986.

analysis[4]. In-person service workers are assigned a positive (high) weight in the index, whilst symbolic analysts are given a negative (low) weight. Conceptually, this is because the former occupations are particularly important in regional economies. Routine production workers receive a lower positive weight.

Industry Employment Characteristics

Apart from occupations, the structure of the industrial employment mix is also important. The ABS classifies industries into 17 broad categories. However we decided to reduce these into broader categories that reflect process as much as specific industry type. To this end, and following previous analysis (see, for example, Gipps *et al*, 1996; Stimson *et al*. 1997), we used the Browning and Singleman (1978) aggregation of industries approach which identifies six broad groupings:

(a) extractive activities (agriculture and mining)
(b) transformative industries (manufacturing, the utilities and construction)
(c) distributive services (wholesale and retail trade, transportation, storage and communication)
(d) producer services (insurance, banking, engineering, business services)
(e) social services (public administration, defence and community services)
(f) personal services (recreational services and entertainment).

An aggregate score accounting for the industry employment structure of localities is included in the analysis. It combines the six industry clusters into a summary score. To reflect trends in the structure of regional economies social services, producer services, and personal services are given positive weighting, while distributive services transformative industries extractive industries are given a negative weighting.

Human Capital Skills

Human capital development through formal education attainment is widely recognised as important in differentiating regional economic development and performance. It is taken as a major determinant of social position and a major determinant of employment attainment in the post-industrial economy. We

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account for human capital by two measures[5]:
(a) the proportion of persons with a university degree or above
(b) the proportion of persons with minimum education.

Income

Apart from the change in income associated with measures of structural economic change and the occupational mix of a community, two specific household income variables taken at the 1996 Census are included in the analysis:
(a) the proportion of high income households (>A$ 63,500)
(b) the proportion of low income households (<A$ 14,500).

Unemployment and Labour Force Participation

Employment or exclusion from work is an important attribute of community performance. Apart from the change in unemployment associated with measures of structural economic change, measures of unemployment at 1996 are included. Two variables are included to account for the impact of unemployment:
(a) the overall unemployment rate
(b) the youth unemployment rate.

A measure of labour force participation is also included to account for the buoyancy of local labour markets. Whilst separate measures for males and females could have been included, the total labour force participation rate is used here.

Socioeconomic Disadvantage

Measures of socioeconomic disadvantage have been included in various forms within a number of studies of inequality and difference. They reflect the disadvantage faced by many groups in society both in terms of being able to access scarce goods and services and in terms of discrimination. While any of a large range of specific variables relating to socioeconomic disadvantage could have been included, four specific measures were used that are widely regarded as being related to socioeconomic disadvantage. The measures included in this study are:
(a) the proportion of single parent families in 1996
(b) the proportion of the population who are recent arrivals
(c) the proportion of the population aged 65 years and older
(d) the proportion of the population who are from an Aboriginal and Torres Strait Islander background.

[5] This measure of change in the proportion of households between 1986 and 1996 earning 'high' incomes is taken as a rough estimate of increase and or decrease in the incidence of such households. The ABS does exclude time series income data from the CData file on grounds that inter-censal income data are not comparable on an individual household data. However, our concern here is to see the degree to which there has been an upward or downward shift in the proportion of households in an SLA that are 'higher' income earnings. The income categories used by the ABS were chosen so that the 'cut off' figure was as close as possible to the equivalent of $49,000 gross household income in 1986.

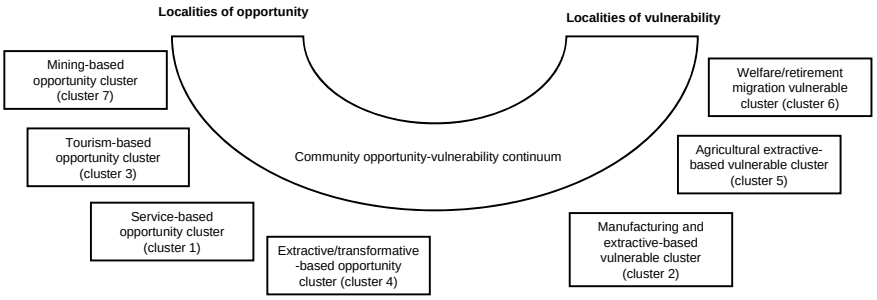

Figure 4. A Continuum of Community Opportunity and Vulnerability Clusters in Australia's Large Regional Cities and Towns

Housing

The importance of housing, and especially access to affordable housing, and its association with opportunity and vulnerability is well recognised. Three measures accounting for various aspects of the housing market are included in the analysis:

(a) the proportion of households living in public housing
(b) the proportion of households suffering housing financial stress in terms of mortgage payments
(c) the proportion of households suffering housing financial stress in terms of rental payments.

The definition of housing financial stress follows the National Housing Strategy (1991), whereby a household is considered to suffer from financial stress if they are in the bottom 40 per cent of the income distribution and are paying more than 30 per cent of their income on housing costs. Most people occupying public housing are not suffering this 'official' level of housing stress as they are on subsidised rents. However, there is a widely held view that the incidence of public rental housing is a factor that is associated with disadvantage and may in itself generate community vulnerability.

3.4 Choice of Geographic Scale

ABS data is available at levels of aggregation from collectors districts (approx. 200–300 dwellings) through to the state and national level. Whilst CD level data provides a fine grain unit of analysis, the data available is restricted and hence in this study Statistical Local Areas (SLAs) are used[6]. Within Australia there are approximately 1,300 SLAs covering both metropolitan, regional and rural localities. The areas chosen for analysis in the paper were:

[6] In some cases (i.e. Townsville and Cairns) larger Statistical Subdivisions (SSDs) are used.

(a) outside the mega metro regions (as defined by O'Connor and Stimson, 1995) and metro areas of Canberra and Hobart
(b) SLAs with a population greater than 10,000 people (this being the population level above which a locality can usually be designated the status of a city).

In the majority of cases the 122 localities correspond to Australia's large regional urban centres. It should be noted that these do not include SLAs comprising Newcastle, Wollongong, Geelong, the Gold Coast and the Sunshine Coast as these are included within the mega metro regions.

4. THE FINDINGS

Figure 4 shows the community opportunity-vulnerability continuum for the clusters of Australia's large regional cities and towns identified in this analysis. The cluster solution, the mean summary discriminant score, and the main cluster characteristics are presented in Table 1. Tables 2 to 6 provide additional analytical information. Table 2 sets out the structure matrix of the discriminant functions, while Table 3 presents the centroids of the clusters for each function. Table 4 provides cluster profiles based on a number of selected variables. Two tests of significance are provided for the cluster profiles:

(a) A comparison is made between the mean score for a particular cluster and the means score for the universe of regional localities (Table 5). This allows us to test the extent to which the means for a given cluster differs significantly from the mean for the entire population.
(b) A further test of the difference between means is presented in Table 6. We use these data to test if the means for the variables listed for each cluster are statistically different from each other. Following the approach of Hill *et al*, (1998), we look at adjacent clusters and test if the mean for each variable is significantly different for the mean of the same variable in its adjacent cluster.

The hierarchical cluster analysis of the 122 regional cities and towns was carried out using variables associated with structural economic change, labour force status and income (Figure 3) and resulted in a seven cluster solution being chosen. At face value the cluster solution provided a sound outcome with reasonable sized clusters which appeared easily interpretable. The discriminant analysis was carried out on the seven clusters with the initial economic/labour force factors plus the remaining socioeconomic factors as independent variables (Figure 3). The discriminant analysis resulted in six discriminant functions with the first four accounting for the majority of the variance (96.3 per cent). Each was significantly different from zero at the 0.01 critical level. The 'hit ratio' indicated that 87.9 per cent of the observations were correctly classified.

The structure matrix (Table 2) shows the correlation between the variables included in the model and the six resultant functions. The discriminant analysis illustrates that variables accounting for measures of structural economic change, the industrial employment structure, income and economic/employment disadvantage account for the majority of the variance:

Table 1. Cluster Characteristics and Mean Discriminant Scores

Cluster	Mean Discriminant Score	Characteristics
Mining based opportunity cluster (Cluster 7)	176.42	Above average: Employment in extractive industries Proportion of high-income households Routine production workers Persons with basic education Change in high-income households
Tourism based opportunity cluster (Cluster 3)	128.97	Above average: Employment in producer services/personal services Proportion of high-income households Persons with a degree Employment growth Increase in population
Service based opportunity cluster (Cluster 1)	73.06	Above average: Employment in social services and personal services Persons with a degree Labour force participation Increases in unemployment
Extractive/transformative based opportunity cluster (Cluster 4)	52.85	Above average: Employment in extractive and transformative industries High-income households Routine production workers Persons with basic education Labour force participation Declines in unemployment Increases in high incomes Below average: Unemployment Housing hardship
Manufacturing based vulnerable cluster (Cluster 2)	–45.30	Above average: Increase in unemployment Proportion of single-parent households Employment in social services and distributive services Persons with basic education Housing stress Unemployment In-person service workers and routine production workers Below average: Population growth
Extractive based vulnerable cluster (Cluster 5)	–57.90	Above average: Symbolic analysts Low-income households Aged households Employment in extractive industries
Welfare/retirement migration vulnerable cluster (Cluster 6)	–199.88	Above average: Low-income households Unemployment Population change Aged households Proportion of single-parent families Housing stress

Table 2. Correlations Between the Discriminant Variables and the Canonical Discriminant Functions (Structure Matrix)

Functions	% Variance Explained		Correlation Coefficients
I. Economic/ Employment Advantage	41.0	% high income 1996	0.640
		% low-income households 1996	–0.562
		% unemployed 1996	–0.627
		Labour force participation rate	0.640
		% of households with rental difficulties	–0.444
		% persons aged 65 years and older	–0.480
		% of households with mortgage difficulties	–0.430
		% youth unemployed	–0.453
		% point change high income households	0.416
II. Industry Structure	25.8	Industry structure score	0.526
III. Employment/ Population Growth	17.2	% change in employment	0.818
		% change in population	0.681
		% point change in unemployment	–0.374
		% recent migrants	0.347
		% persons with a degree	0.302
IV.	12.3		
V. Occupation Structure	3.5	Occupation score	0.758
		% with basic education	0.654
VI. Disadvantage	0.2	% single-parent households	–0.441
		% public rental	–0.388
		% ATSI	–0.222

(i) The first function accounts for 41.0 per cent of the variance and is labelled the *economic/employment advantage* function. It represents socioeconomic advantage generally and advantage associated with strong labour force attachment. Positive scores on this function indicate higher proportions of advantage.

(ii) The second function is labelled the *industry structure* function and accounts for 25 per cent of the variance. High scores indicate employment in social services, producer services and/or personal services.

Table 3. Discriminant Functions at Group Centroids

Cluster	I	II	III	IV	V	VI
Service based marginal cluster (Cluster 1)	0.472	1.897	0.132	0.325	–0.430	0.081
Manufacturing based vulnerable cluster (Cluster 2)	–1.138	0.674	–1.419	0.496	0.665	–0.141
Tourism based opportunity cluster (Cluster 3)	0.362	0.932	5.317	–0.277	0.600	–0.335
Extractive/transformative based opportunity cluster (Cluster 4)	1.985	–0.944	0.227	–0.822	0.899	0.203
Extractive based vulnerable cluster (Cluster 5)	0.041	–1.156	–0.484	–1.579	0.572	–0.097
Welfare/retirement migration cluster (Cluster 6)	–4.202	–2.142	0.914	1.018	–0.180	0.133
Mining based opportunity cluster (Cluster 7)	5.683	–3.501	–0.277	3.288	–0.535	–0.144

(iii) The third function represents *employment/population growth* and accounts for 17.2 per cent of the variance. High scores indicate employment and/or population growth.

(iv) The fourth function accounts for 12.3 per cent of the variance, but is uncorrelated with any of the variables even though the function as a whole is significantly different from zero in its effects on the clusters.

(v) (V&VI) The final two functions account for only a small proportion of the variance. They are labelled the *occupational structure* function (V) and the *disadvantaged household* (VI) function, and account for only 3.5 per cent and 0.2 per cent respectively of the variance.

The data presented in Tables 1 through 6 can be used to interpret the clusters that result from the hierarchical cluster analysis. By referring to the summary discriminant scores and the cluster profiles it can be determined that of the seven clusters, four clusters (7,3,1,4) can be characterised as comprising regional cities and towns of opportunity, while the remaining clusters (2,3,6) may be characterised as comprising regional cities and towns of vulnerability.

The position of each of the 122 large regional cities and towns on a community opportunity-vulnerability continuum is determined by a calculation of a summary discriminant score for each locality. This is given in the Appendix which identifies localities by state on the continuum.

Table 4. Cluster Means for Selected Variables

Variables	Opportunity Clusters				Vulnerable Clusters			All Regional Cities and Towns
	7	3	1	4	6	5	2	
Point change in unemployment	–1.57 (1.08)	–5.86 (3.03)	1.10 (2.30)	–2.50 (3.23)	–2.83 (1.95)	–1.97 (2.24)	1.21 (3.71)	–0.765
Percentage change in employment	11.98 (22.95)	99.92 (27.02)	12.54 (15.89)	30.85 (20.23)	48.92 (28.99)	11.38(13.05)	2.51 (17.42)	20.20
Point change in high-income households	15.75 (5.55)	7.24 (6.96)	6.37 (2.19)	10.03 (2.66)	5.39 (1.40)	6.03 (1.71)	4.74 (2.17)	6.80
% aged 65+	5.31 (1.64)	8.29 (2.59)	11.57 (2.92)	10.06 (2.37)	17.89 (4.27)	13.34 (2.14)	14.24 (2.34)	12.55
% indigenous population	8.87 (5.06)	8.04 (10.30)	2.48 (2.89)	3.17 (3.68)	2.77 (1.48)	4.30 (3.94)	3.72 (2.67)	3.67
% recent migrant arrivals	2.02 (1.00)	1.75 (0.929)	0.93 (0.79)	1.03(0.63)	0.69 (0.35)	.56 (0.39)	0.66 (0.45)	0.86
Single-parent families	8.33 (1.02)	9.69 (3.12)	10.95 (1.45)	9.08 (1.45)	11.50 (1.84)	9.52 (1.59)	11.71 (1.03)	10.46
% high-income households	41.02 (3.42)	22.74 (6.81)	19.18 (5.37)	21.20 (4.17)	11.28 (2.63)	14.32 (2.17)	14.17 (2.24)	17.7
% low-income households	9.69 (2.97)	16.36 (5.29)	20.43 (4.10)	17.85 (2.45)	27.26 (2.95)	23.81 (2.49)	27.05 (3.75)	22.13
% unemployed	6.47 (0.579)	6.32 (1.66)	9.36 (1.77)	7.53 (1.74)	16.65 (2.77)	9.74 (2.29)	13.52 (2.47)	10.51
% youth unemployed	12.31 (1.50)	15.36 (8.64)	18.31 (4.03)	15.15 (5.68)	30.03 (3.26)	18.17 (4.26)	24.99 (3.75)	20.01
Population change	5.47 (15.50)	72.71 (21.68)	10.05 (12.23)	21.94 (19.27)	39.68 (23.45)	7.82 (12.61)	4.21 (13.14)	15.56
% households in public rental	9.13 (3.69)	5.26 (6.72)	6.33 (2.96)	4.38 (2.29)	3.10 (1.39)	4.52 (2.87)	9.77 (7.84)	6.10
% households with rental hardship	10.62 (4.51)	14.18 (6.19)	24.99 (4.77)	20.18 (3.63)	28.48 (2.57)	26.23 (4.64)	32.40 (5.73)	25.36

Table 4 *(contd).* Cluster Means for Selected Variables

Variables	Opportunity Clusters				Vulnerable Clusters			All Regional Cities and Towns
	7	3	1	4	6	5	2	
% households with mortgage hardship	1.49 (0.21)	4.01 (1.37)	4.28 (1.43)	3.62 (1.19)	7.33 (1.83)	5.57 (1.52)	5.98 (1.69)	4.96
% symbolic analysts	20.85 (1.59)	26.55 (4.61)	24.89 (4.71)	24.26 (3.84)	25.47 (2.65)	30.02 (5.93)	20.35 (2.09)	24.88
% in-person service workers	42.07 (1.31)	42.03 (2.86)	40.46 (3.55)	39.09 (3.62)	40.04 (3.09)	35.25 (3.45)	42.04 (1.56)	39.65
% routine production workers	37.07 (1.19)	30.94 (4.73)	33.96 (2.73)	36.50 (1.79)	34.49 (1.41)	34.73 (4.31)	37.15 (2.39)	35.13
% extractive	23.82 (5.92)	6.36 (2.68)	5.79 (5.47)	15.21 (9.56)	8.59 (2.85)	23.48 (6.43)	5.21 (3.04)	11.43
% transformative	16.22 (2.64)	13.99 (2.10)	19.33 (4.77)	22.18 (6.12)	17.34 (1.35)	16.96 (4.10)	20.87 (5.12)	19.01
% distributive	26.71 (2.34)	31.30 (7.39)	29.48 (4.45)	28.48 (7.17)	32.82 (4.33)	27.01 (3.54)	31.79 (3.88)	29.62
% producer services	8.51 (1.63)	12.25 (2.94)	8.97 (2.02)	8.26 (2.05)	9.18 (1.05)	6.62 (1.06)	9.05 (1.67)	8.56
% social services	17.13 (2.50)	18.80 (5.18)	25.69 (5.03)	17.16 (3.21)	22.76 (2.45)	18.34 (2.28)	23.00 (2.33)	21.64
% personal services	4.06 (0.54)	12.98 (6.13)	7.93 (3.37)	5.11 (1.13)	5.98 (2.09)	4.03 (1.39)	6.48 (2.47)	6.35
% degree holders	7.80 (0.65)	13.39 (4.98)	10.29 (8.99)	6.74 (1.21)	8.17 (2.17)	6.29 (1.27)	6.00 (1.17)	2.99
% persons with basic education	25.55 (1.97)	17.17 (4.32)	19.41 (3.19)	26.47 (3.85)	26.06 (2.97)	24.34 (3.84)	25.35 (3.51)	23.33
Labour force participation rate	67.89 (2.98)	63.58 (11.11)	60.24 (3.37)	62.27 (2.67)	49.30 (4.81)	57.47 (3.03)	54.25 (2.61)	58.12

Table 5. Results of T-Tests of the Difference Between Means for the Universe of Localities and Each Cluster

	Opportunity Clusters				Vulnerable Clusters		
	7	**3**	**1**	**4**	**6**	**5**	**2**
Degrees of freedom	4	4	35	16	12	23	23
% aged 65+	–9.83*	–3.67*95	–2.02	–4.44*	4.51*	1.81	3.54*
% ATSI	2.29	0.95	–2.47*	–0.59	–2.18*	0.77	0.92
% recent arrivals	2.61	2.17	0.63	0.78	–1.58	–3.64*	–2.02
% single parents	–4.65*	–0.55	2.02	–3.17*	2.04	–2.87*	5.90*
% high-income households	15.24*	1.66	1.66	3.46*	–8.79*	–7.64*	–7.74*
% low-income households	–9.37*	–2.43	–2.48*	–6.98*	6.28*	3.30*	6.42*
Unemployment rate	–15.60*	–5.65*	–3.89*	–7.00*	7.98*	–1.65	5.97*
Youth unemployment rate	–11.42*	–1.20	–2.52*	–3.74*	11.09	–2.11*	6.49*
Population change	–1.46	5.89*	–2.70*	1.33	3.70*	–3.00*	–4.23
% public rental	1.83	–0.27	0.46	–2.84*	–7.75*	–2.69*	2.29*
% rental hardship	–7.29*	–4.04*	–0.46	–5.38*	4.38*	0.91	6.01*
% mortgage hardship	–36.15*	–1.55	–2.85	–4.74*	4.67*	1.97	2.95*
% symbolic analysts	–5.66*	0.811	0.017	–0.63	0.719	4.24*	–10.57*
% in-person service workers	4.12*	–1.86	1.36	–0.63	0.668	–6.25*	7.52*
% routine production workers	3.63*	–1.98	–2.57*	2.69*	–1.62	–0.45	4.12*
% extractive	4.67*	–4.22*	–6.18*	1.74	–3.58*	9.17*	–10.02*
% transformative	–2.36	–5.33*	0.41	2.20*	–4.44*	–2.45*	1.77
% distributive	–2.77	0.508	–0.18	–0.69	2.66*	–3.60*	2.74*
% producer services	–0.07	2.81*	1.21	–0.60	2.11	–7.38*	1.44
% social services	–4.03*	–1.22	4.82*	–5.79*	1.65	–7.07*	2.86*
% personal services	–9.36*	2.42	2.80*	–3.04*	–0.62	–8.13*	0.259
% degree holders	–0.66	2.42	1.53*	–4.29	0.29	–6.54*	–8.32*
% basic education	2.51	–3.19	–7.38	3.43*	3.31*	1.28	2.82*
Labour force participation rate	7.32*	1.09	3.76*	6.48*	–6.59*	–1.04	–7.24*
Change unemployment	–1.66	–3.76*	4.87*	–2.37*	–3.81*	–2.63*	2.61*
Change employment	–0.80	6.59*	–2.89*	2.25*	3.57*	–3.31*	–4.97*
Change high income	3.58*	0.122	–1.34	5.19*	–3.79*	–2.38	–4.78*

* = significant at 0.05 level

Table 6. Results of *T*-Tests of the Difference Between Means for the Indicated Pairs of Clusters

	Opportunity Clusters			Vulnerable Clusters	
	7 & 3	**3 & 1**	**1 & 4**	**6 & 5**	**5 & 2**
Degrees of freedom	8	39	51	35	46
% aged 65+	–2.17	–2.37*	1.87	4.34*	–1.39
% ATSI	0.16	2.72*	–0.76	–1.33	0.59
% recent arrivals	0.43	2.13*	–0.16	1.03	–0.86
% single parents	–0.92	–1.55	4.29*	3.41*	–5.62*
% high-income households	5.36*	1.35	–1.36	–3.77*	0.24
% low-income households	–2.45*	–2.01	2.38*	3.77*	–3.53*
unemployed	0.19	–3.63*	3.52*	8.14*	–5.50*
youth unemployment	–0.77	–1.31	2.39*	8.72*	–5.89*
Population change	–5.64*	9.71*	–2.76*	5.40*	0.97
% public rental	1.13	–0.632	2.34*	–1.66*	–3.08*
% rental hardship	–1.04	–4.58*	3.60*	1.61*	–4.09*
% mortgage hardship	–4.07*	–0.40	1.66	3.13*	–0.88
% symbolic analysts	–2.61*	0.739	0.47	–2.59*	7.53*
% in-person service workers	0.03	0.94	1.29	4.55	–8.79*
% routine production workers	2.81*	–2.11*	–3.39*	–0.18	2.40*
% extractive	6.00*	0.22	–4.72*	–7.89*	12.58*
% transformative	1.47	–2.45*	–1.87	0.32	–2.92*
% distributive	–1.32	0.78	0.64	4.39*	–4.45*
% producer services	–2.49*	3.21*	1.18	6.12*	–5.66*
% social services	–0.64	–2.86*	6.38*	5.48*	–6.99*
% personal services	–3.24*	2.82*	3.24*	3.39*	–4.23*
% degree holders	–2.48*	0.75	1.61	3.33*	0.823
% basic education	3.94*	–1.41	–7.09*	1.40	–0.952
Labour force participation rate	0.84	1.47	–2.18*	–6.34	3.98*
Change unemployment	2.97*	–6.12*	4.80*	–1.17	–3.59*
Change employment	–5.55*	10.54*	–3.64*	5.44*	1.99
Change high income	2.13	0.59	–5.41	–1.16	2.28*

• = significant at 0.05 level

We discuss the characteristics and the locational patterns of these clusters of opportunity and vulnerability across Australia's regional cities and towns in the following sections.

4.1 Clusters of Opportunity in Australia's Regional Cities and Towns

Four of the seven clusters (7,3,1,4) identified can be considered as representing, to varying degrees, a sub-set of the universe of regional cities and towns characterised as *communities of opportunity*. A review of the cluster profiles in Table 4 suggests that these clusters share a number of similarities. The clusters all have above average proportions of high income households and rates of labour force participation. They have below average proportions of low income households and below average unemployment rates. They recorded below average rates of housing financial stress and high proportions of high income households. Although this general picture reflects the overall nature of the localities of opportunity, it does not reveal the differences between the three clusters. An examination of the discriminant functions (Table 2), the discriminant functions at their group centroids (Table 3), the cluster profiles (Table 4) and the results of the t-tests (Tables 5 and 6) provides insights into the difference between the clusters.

The spatial pattern of Australia's regional cities and towns that have been identified as members of these four clusters of opportunity is shown in Figure 5, and the names of the large regional cities and towns are listed in Table 7.

Mining Based Opportunity Cluster (Cluster 7)

This small cluster of only five regional cities and towns represented are situated in Western Australia (Kalgoorlie/Boulder, Port Hedland, Roebourne), Queensland (Mt. Isa) and New South Wales (Singleton). The economic/employment advantage function is high (positive) and the industry function is low (negative). The cluster is labelled the *mining based opportunity cluster* due to the significant concentration in extractive industry employment and its general high levels of affluence and strong labour market characteristics. As a group, these cities and towns record a high level of employment in Browning and Singleman's (1978) extractive industry category (23.82 per cent) and of persons employed in Reich's routine production worker (37.07 per cent) and in-person service workers (42.07 per cent). These are significantly different from the universe of localities (Table 5), and in the case of the extractive industry and routine production worker measure, are different from the adjacent cluster (Table 6). Reflecting the high income levels generally associated with mining employment in regional localities this cluster records significant above average proportions of high income households (41.02 per cent) and above average growth in high income households (+15.57 percentage points). The cluster also records high rates of labour force participation (67.89 per cent), high proportions of indigenous peoples (8.87 per cent), and above average rates of recent arrivals (2.02 per cent).

Table 7. Regional Cities and Towns of Opportunity

Mining Based Opportunity Cluster (Cluster 7)	Tourism Based Opportunity Cluster (Cluster 3)	Service Based Opportunity Cluster (Cluster 1)		Extractive/ Transformative Based Opportunity Cluster (Cluster 4)
Western Australia Kalgoorlie/ Boulder Port Hedland Roebourne Queensland Mount Isa New South Wales Singleton	New South Wales Snowy River (Jindabyne) Victoria Alpine-East (Bright/Mt. Beauty) Western Australia Broome Queensland Cairns Douglas-Port Douglas-Mossman	New South Wales Bathurst Orange Armidale Goulburn Queanbeyan Tamworth Albury Dubbo Wagga Wagga South Australia Mount Gambier Tasmania West Tamar Victoria Ararat Baw Baw West Campaspe-Echuca Glenelg-Portland Horsham-Central La Trobe-Traralgon Mildura Mitchell-North (Seymour) Wangaratta-Central Warrnambool Wellington-Maffra Wellington-Sale Ballarat Collac Greater Bendigo Greater Shepparton Wodonga Indigo-Beechworth Macedon Ranges (Macedon)	Northern Territory Alice Springs Darwin Queensland Kingaroy Thuringowa Toowoomba city Townsville	New South Wales Griffith Leeton Maitland Muswellbrook Victoria Mitchell-South (Broadford) Western Australia Busselton Harvey Manjimup Bunbury Esperance Queensland Hinchinbrook (Ingham) Whitsunday (Proserpine/ Airlie Beach) Mackay Gladstone Burdekin (Ayr/Home Hill)

Figure 5. Clusters of Opportunity

Tourism Based Opportunity Cluster (Cluster 3)

Another small group of five regional cities and towns in New South Wales, Victoria, Western Australia and Queensland form a *tourism based opportunity cluster*. The alpine localities of Snowy River in New South Wales and Alpine in Victoria are part of the main skiing areas in Australia, whilst areas such as Broome in Western Australia and Port Douglas and Cairns in Queensland are coastal tourist areas in remote northern locations. The cluster has a high (positive) employment/population growth function (Table 3). This reflects the growth of these areas as key domestic and international tourist localities. Reflecting the tourist base of this cluster, as a group these regional cities and towns record the highest proportion of employment in the personal services cluster (12.98 per cent). The cluster also records the largest increase in employment (+99.92 per cent) and declines in unemployment (–5.86 percentage points). The cluster had a significant population increase (72.71 per cent) and significant proportions of persons employed in producer service occupations (12.25 per cent), recent arrivals (1.75 per cent) and persons holding a degree (13.39 per cent). In many instances these are different from the sample as a whole as well as the adjacent cluster.

Service Based Opportunity Cluster (Cluster 1)

The third large opportunity cluster comprises a large group of cities and towns, many of which have important regional and rural service functions, which are defined as a *service based opportunity cluster*. These 36 localities account for about one in three of the regional cities and towns in Australia, and are found in all states except Western Australia. Specific localities include Armidale and Albury in New South Wales; Mount Gambier in South Australia; West Tamar in Tasmania; Townsville and Kingaroy in Queensland; Ararat and Mildura in Victoria; and Alice Springs and Darwin in the Northern Territory. Some of these localities have regional universities. Together many of these cities and towns make up a group of large regional centres or non-metropolitan cities. Their economies are dependent to a considerable degree on government funded service functions, including administration, health and education. The cluster has a high (positive) industry structure function. In relation to the other opportunity clusters this group has lower levels of advantage and has witnessed declines in economic performance. In particular the cluster has recorded above average increases in unemployment (+1.10 points and a commensurate below average employment growth (+12.59 per cent). The cluster also records the lowest labour force participation rate and proportion of high income households and has the highest rate of unemployment (general 9.36 per cent; youth unemployment 18.31 per cent), low income households (20.43 per cent), single parents (10.95 per cent) and aged persons (11.57 per cent). Reflecting the role that many localities in this cluster perform in terms of service provision, the cluster recorded the highest proportion of persons employed in the social services industry cluster (25.69 per cent). This is significantly different from the universe of localities as a whole (Table 5) as well as the adjacent cluster (Table 6).

Extractive/Transformative Based Opportunity Cluster (Cluster 4)

This smaller group of 16 large regional cities and towns are distributed across New South Wales, Western Australia and Queensland. They have been identified as an *extractive/transformative based opportunity cluster*. Specific localities include Griffith and Leeton in New South Wales; Mitchell-South (Broadford) in Victoria; Bussleton and Manjimup in Western Australia; and Hinchinbrook and Gladstone in Queensland. These regional cities and towns are based mainly on serving agricultural/pastoral regions, but some also are involved in the processing of rural products. Gladstone is something of an anomaly as it is based on heavy manufacturing. The high economic/employment advantage function is associated with significant proportions of high income households (21.20 per cent) and relatively low levels of disadvantage (unemployment, households with housing financial stress). Apart from these characteristics, this cluster is similar to the previous mining based extractive industry-type cluster (cluster 7). It has an above average proportion of routine production workers (33.94 per cent) and persons employed in the extractive industries (15.21 per cent). The cluster also records a significant above average percentage point increase in high income households (+10.03 percentage points), percentage increases in employment (+30.85 per cent) and a significant fall in unemployment (–2.50 percentage points).

4.2 Clusters of Vulnerability in Australia's Regional Cities and Towns

In contrast to the above sub-set of opportunity clusters in Australia's regional cities and towns, the three remaining clusters can be considered as representing the group of vulnerable regional localities. As with the clusters of opportunity, a review of the cluster profiles (Table 4) suggests that these clusters (6,5,2) share a number of similarities. The clusters all have above average proportions of low income households, households facing housing stress and aged households. They also have below average levels of high income households, increases in income and rates of labour force participation. Additionally two of the clusters (6,2) also share high rates of unemployment. An analysis of the relevant data in Tables 2 to 6 illustrates that, over-and-above these similarities, these three clusters can be differentiated along a number of lines. The spatial patterns of Australia's regional cities and towns that have been identified as members of these three clusters of vulnerability are mapped in Figure 6, and the names of the large regional cities and towns are listed in Table 8.

Welfare/Retirement Migration Vulnerable Cluster (Cluster 6)

A cluster of 13 large regional cities and towns is labelled the *welfare/retirement migration vulnerable cluster*. They are located in coastal New South Wales and Queensland. Specific localities - a number of which are often referred to in discussions of 'sun-belt migration' growth - include Coffs Harbour and Byron Bay in New South Wales and Hervey Bay in Queensland. The cluster has a low (negative) economic/employment advantage function, reflecting the cluster's level of vulnerability, and a low (negative) industry structure function.

Table 8. Regional Cities and Towns of Vulnerability

Welfare/Retirement Migration Vulnerable Cluster (Cluster 6)	Extractive Based Marginal Cluster (Cluster 5)	Manufacturing Based Vulnerable Cluster (Cluster 2)
New South Wales	New South Wales	New South Wales
Ballina	Bega Valley	Broken Hill
Bellingen	Cowra	Casino
Byron Bay	Forbes	Grafton
Coffs Harbour	Gunnedah	Inverell
Eurobodalla (Batemans Bay/ Moruya)	Moree Plains	Port Stephens
Great Lakes (Forster/ Tuncurry)	Mudgee	South Australia
Hastings	Narrabri	Port Augusta
Kempsey	Parkes	Port Lincoln
Lismore	Tumut	Port Pirie
Maclean	Young	Whyalla
Nambucca	Taree	Western Australia
Queensland	South Australia	Geraldton
Livingstone (Yepoon)	Murray Bridge	Albany
Hervey Bay	Tasmania	Tasmania
	Huon Valley	Burnie
	Meander Valley (Prospect)	Central Coast (Ulverstone/ Penguin)
	Victoria	Devonport
	Campaspe-Kyabram	Waratah/Wynyard
	Gannawarra	Launceston
	Moira-West (Nathalia/ Nunurkah)	Victoria
	Moyne-South (Port Fairy/ Koroit)	E. Gippsland-Bairnsdale
	South Gippsland-Central	La Trobe-Moe
	Queensland	La Trobe-Morwell
	Atherton	Queensland
	Bowen	Gympie
	Burnett (Burnett Heads/ Bargara)	Maryborough
	Mareeba	Warwick-Central
	Johnstone (Innisfail)	Bundaberg
		Rockhampton

In terms of disadvantage, the cluster records a high proportion of low income households (27.26 per cent), and unemployment (general 16.65 per cent; youth 30.03 per cent). These unemployment figures are significantly higher than both the universe as a whole (Table 5) and the adjacent cluster (Table 6) and reflect the welfare characteristics of the cluster. Reflecting the sun-belt migration function of a number of the localities this cluster also records an above average level of population change (39.68 per cent). Additionally, the cluster records the highest proportion of aged households (17.89 per cent) and the lowest labour force participation rate (49.30 per cent).

Figure 6. Clusters of Vulnerability

Extractive Vulnerable Cluster (Cluster 5)

The second vulnerable cluster has been identified as the *extractive vulnerable cluster*, consisting of 24 cities and towns situated in all states except Western Australia and the Northern Territory. Specific locations include Cowra and Mudgee in New South Wales; Murray Bridge in South Australia; Huon Valley and Meander Valley in Tasmania; Campaspe-Kyabran and Gannawarra in Victoria; and Atherton and Bowen in Queensland. These localities are mainly agricultural/pastoral-based towns that have become stagnant or are in decline. Often they used to have important rural product processing functions. The cluster has a negative industry structure/affluence function reflecting the influence of the industrial structure of the localities as a group. The cluster has significant above average proportions employed in Browning and Singleman's (1978) extractive activity category (23.48 per cent). Whilst the cluster recorded an above average decline in unemployment (–1.97 percentage points), it recorded relatively poor growth in employment (+11.38 per cent). This cluster does record an above average proportion of symbolic analysts (30.02 per cent) which probably reflects the agricultural base of many of the localities and the fact that property managers are included in this category. In terms of measures of vulnerability, the cluster records above average rates of aged households (13.34 per cent), indigenous population (4.30 per cent) and households in housing stress (rent 4.52 per cent; mortgage 26.23 per cent). The cluster is perhaps not as vulnerable as the other two vulnerable groups in that it has slightly below average rates of low income households and unemployment.

Manufacturing Based Vulnerable Cluster (Cluster 2)

A cluster of 24 regional cities and towns located in New South Wales, South Australia, Western Australia, Tasmania, Victoria and Queensland, is labelled the *manufacturing industry vulnerable cluster*. Specific localities include Broken Hill and Grafton in New South Wales; Port Augusta and Whyalla in South Australia; Geraldton in Western Australia; Burnie and Devonport in Tasmania; East Gippsland-Bairnsdale and La Trobe-Moe in Victoria; and Maryborough and Gympie in Queensland. Many of these localities were developed during early periods of industrial growth in the era of protectionism, and have since seen a reduction in manufacturing fortunes. The cluster records a low (negative) industry structure function. The manufacturing basis of this cluster is seen in the above average proportion of persons employed as routine production workers (37.15 per cent) and a significant proportion employed in Browning and Singleman's transformative industry category (20.87 per cent). Other significant factors in this cluster include an above average increase in unemployment (+1.21 points) and a below average rate of employment growth (+2.51 per cent). In terms of disadvantage, the cluster records above average rates of single-parent families (11.71 per cent), low income households (27.05 per cent), and high rates of unemployment (general 13.52 per cent; youth 24.99 per cent). The cluster also records a disadvantaged housing position with above average means on all three housing measures (public housing 9.77 per cent; rental stress 32.4 per cent;

mortgage stress 5.98 per cent).

5. DISCUSSION

The analysis of community opportunity and vulnerability across Australia's non-metro regional cities and towns with populations of 10,000 and above at the 1996 Census has demonstrated the existence of a high degree of differentiation in their performance on the variables used in this study to identify clusters of opportunity and vulnerability.

Size of a city or town per se is not a differentiating factor, with there being a correlation coefficient of only +0.07 between population size and the total summary discriminant score. And there is not a clear distinction between the clusters of opportunity and vulnerability on the basis of a coastal/inland location and dichotomy.

It is interesting that many of the rapidly growing 'sun-belt' coastal urban areas in New South Wales and Queensland are in the welfare/retirement migration vulnerable cluster (cluster 6), which raises some important policy issues for governments in planning economic development and services provision across a long coastal strip of rapid urbanisation, including the longer-term sustainability of this form of growth. Those relatively few regional cities and towns in this coastal 'sun-belt' growth strip along Eastern Australia that have been identified as communities of opportunity tend to be either localities such as Cairns (cluster 3), where the basis of that growth and opportunity is based on tourism, or places such as Townsville-Thuringowa (cluster 1) whose opportunity is derived from public sector led community services, regional functions and defence. In South Australia, the regional centre of Mt Gambier in the state's southeast is also included in cluster 1.

Just as interesting is the marked variation that exists in socioeconomic performance across Australia's inland regional cities and towns, particularly in Victoria, New South Wales and Queensland. On the one hand there is a large number of localities that meet the contemporary stereotype of the vulnerable inland city or town experiencing decline or stagnation, as evidenced by the extractive vulnerable cluster (cluster 2)—towns such as Young, Cowra, Parkes and Forbes on the tablelands of New South Wales; Kyabram and Port Fairy in Victoria; and Atherton, Mareeba, Bowen and Innisfail in northern Queensland. On the other hand, there exist a significant number of cities and towns of opportunity across inland Australia, particularly in New South Wales (such as Armidale, Tamworth, Bathurst, Orange, Goulburn, Dubbo, Wagga Wagga, and Albury), in Victoria (such as Mildura, Horsham, Ararat, Ballarat, Colac, Shepparton, Wangaratta and Wodonga) and in Queensland (Toowoomba, Kingaroy and Townsville) whose opportunity is based on a broader base of services (cluster 1). It may be surprising to some to find that a town such as Traralgon, in the depressed Latrobe Valley region of Victoria, is in this cluster of services based services opportunity.

There are also a considerable number of inland cities and towns in New South Wales that are communities of opportunity based on serving agricultural and pastoral hinterlands and which process agricultural products (cluster 4), such

as Griffith and Leeton. It is significant how some towns in the Hunter Valley are communities of opportunity based on agricultural service functions, including Maitland and Muswellbrook with their utilities functions. Gladstone in Queensland also has been included in cluster 4, although its services is based on mining and manufacturing. And in Western Australia, Esperance, Manjimup, Busselton and Bunbury are examples of coastal towns of opportunity based on primary production service functions.

Not surprisingly, the analysis reported in this paper has identified a considerable number of regional cities and towns in all states across Australia as vulnerable communities as a result of economic restructuring that has resulted in the decline of old-style manufacturing, utilities and mining functions (cluster 2). These include the Gippsland region towns of Moe, La Trobe and Morwell in Victoria; Burnie, Devonport, Waratah/Wynyard and the central coast area of Tasmania; Port Augusta, Port Pirie and Whyalla in South Australia; Albany in Western Australia; Maryborough in Queensland; and Broken Hill in New South Wales. Some of the cities and towns in this vulnerable cluster (cluster 2) may appear to be classified somewhat anomalously, but closer scrutiny reveals some towns—such as Casino, Grafton and Inverell in New South Wales; Burnie in Tasmania; and Rockhampton, Gympie and Warwick in Queensland and Port Lincoln in South Australia—have suffered declines in agricultural and/or other extractive industries, including manufacturing industries processing these products. Many of the cities and towns in cluster 2 have been single industry towns. It is possible that the cities and towns in cluster 2 might require long term sustained public policy intervention as a result of the dramatic restructuring they have experienced and the very high levels of unemployment and income support through transfer payments.

Finally, two distinct types of communities of opportunity based on specialised economic functions are evident. First, there are the mining based towns of opportunity (cluster 7) found in remote locations in Western Australia—Kalgoorlie-Boulder, Port Headland and Roebourne. Also included is Mt Isa in Queensland, which to some might be a surprising inclusion as it is in population decline. Second, several are the tourism based opportunity towns. These form two distinct groups. There are the coastal tourism localities of Cairns and Port Douglas in Queensland and Broome in Western Australia, and there are the two snowfields centres of Murray River in New South Wales and Alpine-East in Victoria.

6. CONCLUSION

What this analysis of community opportunity and vulnerability across Australia's regional cities and towns demonstrates is a complex set of patterns of performance in which:

(a) opportunity is not always related to population growth and is not confined to the coastal sun-belt regions
(b) growth can be seen to create vulnerability
(c) vulnerability is spread across both coastal growth and inland agricultural service centres

(d) some coastal and inland centres that once prospered under protected manufacturing and utilities production have become vulnerable
(e) opportunity in the new services sectors such as tourism has swept up a small number of often remote locations as communities that are thriving
(f) numerous inland cities and towns demonstrate both the continued strong performance and likely longer-term viability of some traditional regional service centres in both coastal and inland locations, where public funded functions in administration-education-health are important ingredients of that success.

Globalisation processes do seem to be creating communities of opportunity in a relatively small number of regional cities and towns in Australia, mainly through exporting of minerals, tourism and agricultural products processing. It is also evident that the processes of economic change through industry restructuring as it affects in particular some regional cities and towns that once had prosperous manufacturing industries, together with out-migration from some places do seem to be creating vulnerability across significant belts of inland Australia's regional urban communities.

The analysis reported in this paper represents a first systematic attempt to categorise Australia's regional cities and towns, with sizeable populations of over 10,000, into clusters of community opportunity and vulnerability and to position localities on a 'continuum' of community opportunity/vulnerability using a mixture of static and dynamic measures of socioeconomic performance over the closing period of the 20th century. Along with the functional classification of regional cities by Beer (1999), the results raise important policy issues. Having identified a significant number of regional cities and towns that are vulnerable (clusters 6, 5 and 2),these communities might become the targets for a more concerted nationally coordinated approach to engineer strategies to better plan and manage their futures so as to potentially lessen the adverse consequences of those attributes which render them vulnerable. In addition this paper, through identifying the dimension of places of community opportunity, could help focus attention on the need to develop strategies that might take advantage of the processes that are creating opportunities for community expansion and vitality.

It is, however, important to stress that the research reported in this paper is exploratory. Indeed there could be considerable debate over the selection of variables used for the analysis; it is possible that there are lagged causes and effects that are not picked up; and the 'hit rate' of 87.9 per cent in the clustering of localities does indicate that as many as 14 of the large regional cities and towns might be 'classified' in an inappropriate cluster. Our choice to restrict ourselves to census data variables to measure community opportunity and vulnerability is also open to question. Indeed the inclusion of wider issues of quality of life—both quantitative and qualitative measures including issues relating to environmental degradation, life-style preferences, climatic variability, government finances, and technological change—would provide a whole set of new and important dimensions for the assessment of community opportunity and vulnerability.

It will be interesting to repeat this study for the decade 1996–2006, and it could be expected that some localities that are identified as communities of vulnerability as a result of the analysis for the decade 1986–96 will have become communities of opportunity, or vice versa. Only analysis over successive 5 or 10 year inter-censal periods will enable us to identify long term trends in the socioeconomic performance of Australia's regional cities and towns. The results of our analysis and our interpretations in this paper no doubt will be controversial to some analysts and for some localities, and the issues they raise certainly have significance for the contemporary debate on the performance and future of regional urban Australia.

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Appendix. The Total Summary Discriminant Score of SLAs and their Rank-Order Position on a Community Opportunity–Vulnerability Continuum

Summary	Discriminant Score	New South Wales	Victoria	Queensland	Western Australia	South Australia	Tasmania	Northern Territory
Greatest Opportunity	232.46	Snowy River (3)						
	215.45							Alice Springs (1)
	195.77				Port Hedland (7)			
	194.95	Queanbeyan (1)						
	190.03				Kalgoorlie–Boulder (7)			
	180.60			Mount Isa (7)				
	177.41				Roebourne (Karratha, Wickham) (7)			
	177.19		Mitchell South (4)					
	175.80							Darwin City (1)
	163.46		Macedon Ranges (1)					
	138.31	Singleton (7)						
	124.63		Alpine East (3)					
	116.20	Bathurst (1)						
	111.98		Wodonga (1)					
	109.14			Cairns (3)				
	109.10	Goulburn (1)						
	109.02	Muswellbrook (4)						
	108.87			Douglas–Port Douglas (3)				
	105.38		Wangaratta Central (1)					
	97.34			Gladstone (4)				

Appendix. The Total Summary Discriminant Score of SLAs and their Rank-Order Position on a Community Opportunity–Vulnerability Continuum

Summary	Discriminant Score	New South Wales	Victoria	Queensland	Western Australia	South Australia	Tasmania	Northern Territory
	90.18		Mitchell North (1)					
	86.20					Mount Gambier (1)		
	83.32	Wagga Wagga (1)						
	81.12		La Trobe–Traralgon (1)					
	78.94				Harvey (4)			
	77.43			Thuringowa (1)				
	74.80		Wellington–Sale (1)					
	73.41			Whitsunday (4)				
	73.04		Horsham Central (1)					
	71.68			Townsville (1)				
	70.39	Griffith (4)						
	69.74				Broome (3)			
	69.08		Campaspe–Echuca (1)					
	66.81	Orange (1)						
	64.46		Glenelg–Portland (1)					
	61.28	Dubbo (1)						
	56.65				Manjimup (4)			
	55.70		Warrnambool (1)					
	54.08			Burdekin (4)				
	53.69	Albury (1)						
	53.30		Collac (1)					
	52.55		Ballarat (1)					
	52.38			Toowoomba (1)				

Appendix. The Total Summary Discriminant Score of SLAs and their Rank-Order Position on a Community Opportunity–Vulnerability Continuum

Summary	Discriminant Score	New South Wales	Victoria	Queensland	Western Australia	South Australia	Tasmania	Northern Territory
	47.36			Rockhampton (2)				
	47.14		Baw Baw West (1)					
	46.92		Indigo–Beechworth (1)					
	46.29	Leeton (4)						
	34.13			Mackay (4)				
	32.70	Maitland (4)						
	26.52	Armidale (1)						
	26.41				Bunbury (4)			
	25.16		Greater Bendigo (1)					
	22.99						West Tamar (1)	
	17.06			Warwick (2)				
	16.56		Shepparton (1)					
	12.28	Tamworth (1)						
	9.07				Busselton (4)			
	6.14		South Gippsland Central (Venus Bay, Leongatha) (5)					
	4.87			Hinchinbrook (4)				
	3.76						Launceston (2)	
	1.35	Tumut (5)						
	–2.95					Port Augusta (2)		
	–3.97		Wellington–Maffra (1)					

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Summary	Discriminant Score	New South Wales	Victoria	Queensland	Western Australia	South Australia	Tasmania	Northern Territory
	–5.40		Campaspe–Kyabram (5)					
	–5.43			Johnstone (5)				
	–5.98			Kingaroy (1)				
	–8.02		La Trobe–Morwell (2)					
	–8.37		Ararat (1)					
	–8.37		Mildura (1)					
	–12.06			Bowen (5)				
	–13.64	Port Stephens (2)						
	–15.84				Esperance (4)			
	–17.97			Atherton (5)				
	–19.24				Geraldton (2)			
	–22.05			Livingstone (6)				
	–27.95			Gympie (2)				
	–29.86	Moree Plains (5)						
	–36.04					Murray Bridge (5)		
	–38.53		Moira West (5)					
	–41.31	Young (5)						
	–44.79					Whyalla (2)		
	–45.51		E. Gippsland–Bairnsdale (2)					
	–47.84		La Trobe–Moe (2)					
	–48.43		Moyne South (2)					
	–48.97	Casino (2)						

Appendix. The Total Summary Discriminant Score of SLAs and their Rank-Order Position on a Community Opportunity–Vulnerability Continuum

Summary	Discriminant Score	New South Wales	Victoria	Queensland	Western Australia	South Australia	Tasmania	Northern Territory
	–49.90						Waratah/ Wynyard (2)	
	–57.13	Narrabri (5)						
	–57.17						Burnie (2)	
	–57.51	Gunnedah (5)						
	–58.43	Parkes (5)						
	–58.67						Devonport (2)	
	–60.58						Central Coast (2)	
	–61.80			Mareeba (5)				
	–64.03	Grafton (2)						
	–64.71				Albany (2)			
	–66.41		Gannawarra (Kerang) (5)					
	–68.13			Maryborough (2)				
	–69.52					Port Lincoln (2)		
	–71.21						Huon Valley (5)	
	–72.30	Mudgee (5)						
	–74.69	Cowra (5)						
	–76.83	Bega Valley (5)						
	–81.23	Inverell (2)						
	–86.46					Port Pirie (2)		
	–96.76	Lismore (6)						
	–100.13	Forbes (5)						

Appendix. The Total Summary Discriminant Score of SLAs and their Rank-Order Position on a Community Opportunity–Vulnerability Continuum

Summary	Discriminant Score	New South Wales	Victoria	Queensland	Western Australia	South Australia	Tasmania	Northern Territory
	–108.77			Bundaberg (2)				
	–127.40	Broken Hill (2)						
	–133.64	Ballina (6)						
	–142.05						Meander Valley (5)	
	–152.82	Taree (5)						
	–170.79			Burnett (5)				
	–172.21	Coffs Harbour (6)						
	–189.99	Eurobodalla (6)						
	–193.95	Hastings (Port Macquarie) (6)						
	–218.94			Hervey Bay (6)				
	–226.95	Great Lakes (6)						
	–251.54	Kempsey (6)						
	–251.98	Byron (6)						
	–265.53	Maclean (6)						
	–278.01	Bellingen (6)						
Greatest Vulnerability	–296.93	Nambucca (6)						