
**IDENTIFYING INDUSTRIAL LOCATION
AND
SITE PREFERENCES
FOR
SMALL BUSINESS:
A SOUTH AUSTRALIAN CASE STUDY**

By

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Abstract:

This paper is based on a survey of 87 small to medium industrial land users which was undertaken in June 1997 to examine industrial property use and preferences within the Adelaide Statistical Division (ASD) of South Australia (SA). Adelaide, the state capital of South Australia has a metropolitan population of 1 million. The study was undertaken in response to a perceived mismatch by small business operators within the industrial land market between demand for and supply of industrial zoned land in Adelaide in terms of location, quality and site characteristics. The survey was undertaken across a cross section of small business land users in terms of location, tenancy and business type at a time when significant areas of industrial land within metropolitan Adelaide were being rezoned for residential and recreational purposes. Small business continues to be a major contributor to the SA economy but may be impeded in its development by uninformed planning decisions. This paper provides a focus on current characteristics and preferences of industrial property users in an attempt to better anticipate future demand for industrial space. The implications of the survey for decision making with respect to management of land and planning policy are explored

Keywords: Industrial Land; Small Business, Planning Policy, Land Management

1. Introduction to the study

This paper is based on a survey of 87 small to medium industrial land users, identified as small businesses under the criteria of less than 20 employees (ABS 1998). The majority of land users occupied allotments of 2000 square metres or less in areas zoned Light or General Industrial. The survey was undertaken in June 1997 and sought to examine industrial property use and preferences within the Adelaide Statistical Division (ASD) for the small business submarket. The study was undertaken in response to a perceived mismatch by operators within this land market between demand for, and supply of industrial zoned land in Adelaide in terms of location, quality and site characteristics. Adelaide, the state capital of South Australia (SA) has a metropolitan population of 1 million. The survey was undertaken at a time when significant areas of industrial land in Adelaide were being rezoned for residential and recreational purposes. It attempts to provide a focus on current characteristics and preferences of this group of industrial property users in an attempt to better anticipate future demand for industrial space.

Small businesses, including those using industrial land, continue to be major contributors to the South Australian economy but may be impeded in their development by uninformed planning decisions. In general the industrial sector in SA is still a significant employer and wealth generator for the State (Australian Bureau of Statistics (ABS) 1997) while the small business sector in particular accounts for about 48 percent of all businesses in SA and provides 51.8 percent of all non-agricultural private sector employment (ABS 1998). Given the contribution of small business (Peacock, 1997), there is a need to ensure their provision of adequate land and appropriate infrastructure. However the long term provision of such factors of production may be at risk because of over simplistic notions of manufacturing decline, perceptions of an oversupply of industrial zoned land, inappropriate land division, and the depletion of land stocks through the strategic conversion of industrial zoned land to residential in Adelaide metropolitan suburbs such as Bowden, Brompton, Mile End, Port Adelaide, and Elizabeth (Kupke & Kooymans 1998).

2. Objectives of the study

The objectives of the study were to identify current characteristics of small and medium industrial land users identified as small businesses in the ASD in terms of location, business activity, site characteristics, levels of mobility and tenancy. Also to identify the preferences of small and medium industrial land users in the ASD in terms of location and site characteristics. And finally to provide a focus on the spatial requirements of such industrial land users at a time of active rezoning of industrial land within the Adelaide Statistical Division.

3. Background to the study

3.1 Change to industrial location

In the 1990s the needs of industrial land users with regards to site and location factors are proving dynamic and at times difficult to anticipate. On site uses change as firms mature or contract, occupiers change as businesses expand, move or emerge while spatial patterns long assumed begin to disappear (Searle 1992). Old style businesses are coming under pressure from global competition, technology change, increased

regulation and market specialisation. Large businesses are becoming a series of related small business and clustering of smaller industries is becoming important as work becomes divided into discrete tasks, many of which may be contracted out (Rae 1995). Flexible land use policies are required if such units are to be in close proximity. Allotment sizes are important as small allotments may limit the capacity of firms to expand while vast allotments, badly maintained do little to enhance the business of niche manufacturers or wholesale retailers. Large expanses of vacant land may exist on the urban fringe yet diminishing industrial land stocks in inner suburbs can quickly create demand problems that impede on business development and lose interstate investment.

3.2 Theory of industrial location

Conventional industrial location theory is based on impressionistic ground evidence (Stilwell 1992) and puts the primary focus on the location decision of individual firms. In the past the more obvious influences have included access to requisite labour supplies, raw material sources, access to markets and transport cost. Most studies in Australia and overseas have confirmed such influences even under differing economic conditions (Stilwell 1992). However the listing of such factors does not go far in explaining how they shape location outcomes. As well the outcomes of such factors could be particularly volatile given particular sets of economic influences. Thus model building based on partial equilibrium analysis attempts to posit that the determinants of a firm's location will depend on the objective of the firm as well as the economic environment in which it operates. The former aspect involves the goals of cost minimisation, revenue maximisation or profit maximisation. The latter aspect involves an economic environment in which all factors of production are evenly dispersed, competition is strong and information is more or less perfect. General equilibrium analyses which attempts to identify location patterns for all firms simultaneously is still more restrictive in its assumptions. As a critique to such traditional explanations of location writers such as Massey (1973), Knox and Agnew (1989) and Stilwell (1992) canvass the need for recognition of the type of industry, its performance with respect to the rest of the economy, the cyclical nature of the macro economy, the role of

government regulations and incentives, the influence of monopolistic elements and the influence of institutional history and past decisions. Stilwell (1992) argues convincingly that perfect competition, the basis of the equilibrium approach, is a logical impossibility in the real world of industrial space. In such a world industrial location decisions based on the outcomes of economic restructuring are more likely to include elements of crisis management, risk aversion, regulatory and institutional change, inability to network and poor levels of information.

Within such a context this study seeks to identify the current location and site requirements particularly of small to medium sized industrial land users. There is a need for regulatory authorities to be informed of change as spatial policies need to recognise the implications of work force accessibility, transport, access to suppliers and services for today's industrial land users. Traditionally land use policies are characterised by the use of zoning and buffers. Zoning generally distinguishes between general, light and special industry zones with control regulations and designated areas for each. Yet clustering of industrial sites as a location outcome favours integration and the breakdown of barriers between land use. It fosters networking and local area interaction while general industry zones may need to become more diverse in terms of land use to include office services such as business management.

4. Methodology of the study

4.1 Survey

The study was based on a "drop and collect" questionnaire of small businesses occupying sites of 2500 square metres or less, on land zoned Light or General Industrial in metropolitan Adelaide. Sample size was based on previous empirical work conducted in the area of small business. There are approximately 33,000 small businesses in SA with less than 20 employees (ABS 1998). Given such a population the Yellow Pages® Small Business Index™ (1999) regular series of surveys uses a quota sample of 130 small businesses for Metropolitan Adelaide based on a national sample of 1200. In 1991, Callus, Kitay and Sutcliffe based their national survey on 2353 small business workplaces while Roberts (1993) undertook a national study using 1374 small business

companies. This survey was based on a sample of 130 surveys after a pilot survey of 10 businesses had been conducted. The sample was based primarily on geographic spread across the industrial areas of Adelaide but also sought to be representative in terms of tenancy and business type. The sample included the industrial areas of Welland, Hindmarsh and Bowden to the west of Adelaide, Regency Park, Greenfields and Wingfield to the north, Holden Hill to the east, and Plympton and Lonsdale to the south. These were industrial areas zoned Light or General Industrial which were well represented by small operators on sites of 2500 or less square metres. After significant follow up there were 87 responses to the survey which was a response rate of about 66 percent. The survey questions related to reasons for, and levels of satisfaction with, present industrial location and site characteristics. Respondents also indicated the significance of various location, building and site characteristics, their length of tenure, type of business and plans for future expansion. The data was analysed using the standard statistical package SPSS. The data was primarily cross tabulated with discriminant analysis the only multi variate technique applied. The methodology was considered appropriate given the fundamental nature of the study and the need to provide results which could be easily comprehended by policy makers and market participants alike.

4.2 Discriminant analysis

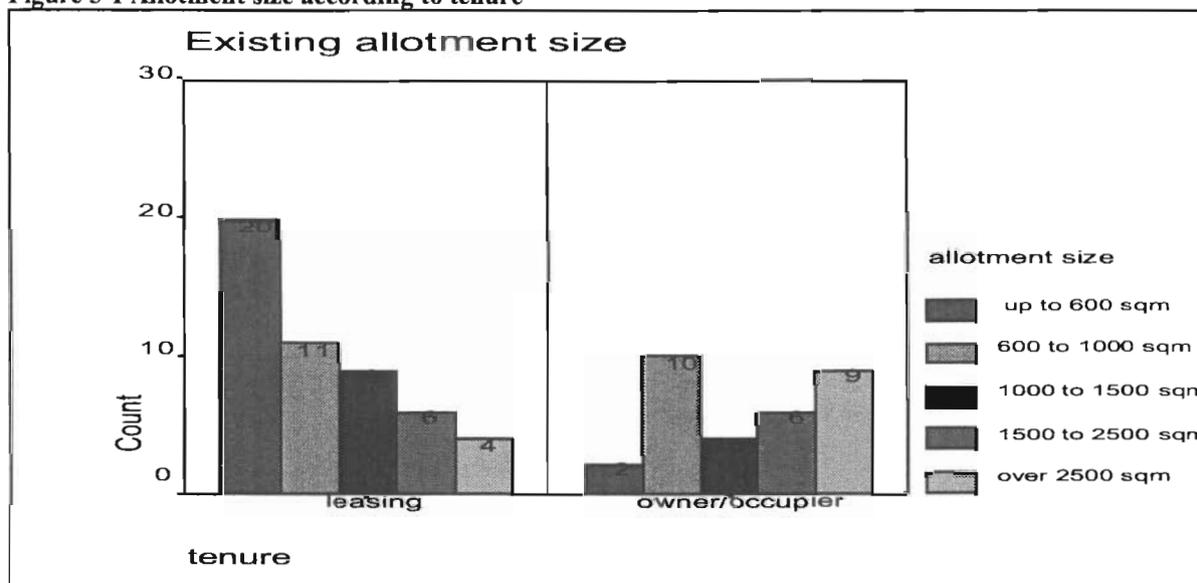
Discriminant analysis was used to test for any significant differences in site preferences based on business type, type of tenure or existing allotment size. This form of analysis allows for the identification of independent variables important in distinguishing between mutually exclusive groups for instance, groups based on business type, nature of tenure or allotment size. In other words how effectively might the preferences of industrial land users as surveyed be discriminated between, based simply on their business type that is service, wholesale, manufacturing or retailing, or in terms of their tenure that is owner or rental, or on allotment size. And, if groups can be discriminated, which characteristics for example, level of satisfaction, location preferences, or preferred allotment size, are most important in distinguishing one mutually exclusive group from another. These characteristics take the form of

independent variables which may be discriminant function which serves as a basis for classifying cases into groups (Nousis/SPSS 1993).

Variables with higher levels of significance in terms of discriminating groups will be indicated by their existence and level of influence within the function, as indicated by their associated coefficient or weight. Variables with larger standardized coefficient values (described as standardized canonical discriminant function coefficients) within the linear equation indicate greater significance in discriminating one group from another. Wilks' Lambda is the test statistic used to identify what proportion of total variance in the sample is not explained by differences within the groups. Large values of lambda indicate that the group means do not appear

combined into a linear form known as a to be significantly different and that group membership is largely indifferent to the range of variables used to discriminate between such groups. In other words there may be little evidence of any distinction for example in location preferences between land users when classified according to tenure or business type. Eigenvalues indicate the ratio of between group to within group sum of squares. Large eigenvalues of up to 1 are associated with well performing functions where differences between groups, when compared to differences within groups, are important. Where attempts are made to classify cases into more than two groups the number of functions used will increase. Thus when classifying cases into three groups two functions are used

Figure 5-1 Allotment size according to tenure



5. Results

5.1 Survey

The survey results have been broken down according to tenure, business type, allotment size and length of occupancy. Not every question was answered so total counts differ.

Some 43 per cent of respondents belonged to the manufacturing sector though the service sector (29 percent) and the wholesale/distribution sectors (22 percent) were also adequately represented. Only seven percent of respondents were retailers, which reflects the recent inclusion of such a land use into industrial areas. Over 50 percent of respondents were on allotments of less than

1000 metres and most had been at their existing site for over five years.

Figure 5-1 illustrates the break down of allotment size according to tenure and shows that some 40% of leased allotments were less than 600 square metres compared to only 7% of those owned. In contrast only 8% of leased allotments exceeded 2500 square metres compared to 33% of those owned. Allotment size reflected land use requirements for particular sectors. Sites of over 2500 square metres were evenly divided between business involved in manufacturing (50%) and wholesaling (50%). Allotments of less than 600 square metres also included these business types but were dominated by the service sector (44 per cent). However there was no significant relationship between business type and tenure with each sector, service, retail, wholesale and manufacturing

showing an even division between site owners and those leasing. Figure 5.1a shows that levels of satisfaction with existing premises were slightly higher for owner occupiers than for those leasing. 47 percent of owner occupiers expressing

high levels of satisfaction with their site compared to 38 percent of those leasing.

Figure 5-1a Level of satisfaction with existing site according to tenure

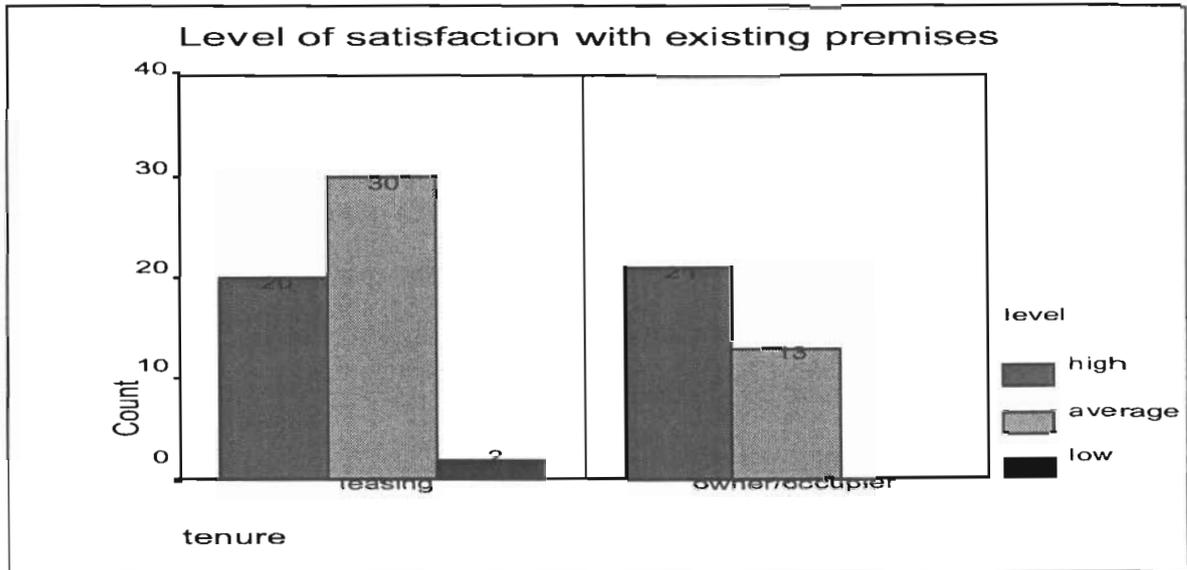


Figure 5-2 reveals that given a selection of location factors which included access, labour supply and land price, the Adelaide City Central Business District (CBD) dominated as the main location focus for all industrial land users surveyed. Some 40 percent of respondents cited this as the most important influence on their location decision. Direct access to main roads was also a key influence for both those businesses which leased

(24 percent) and for owner occupiers (32 percent). Some 13 percent of all land users considered proximity to other major industries to be most significant. However only 4 percent of all land users considered cheap rentals or land price to have any significant influence on their location choice while access to labour supplies was considered important by only 3 percent.

Figure 5-2 The most important industrial location factor according to tenure

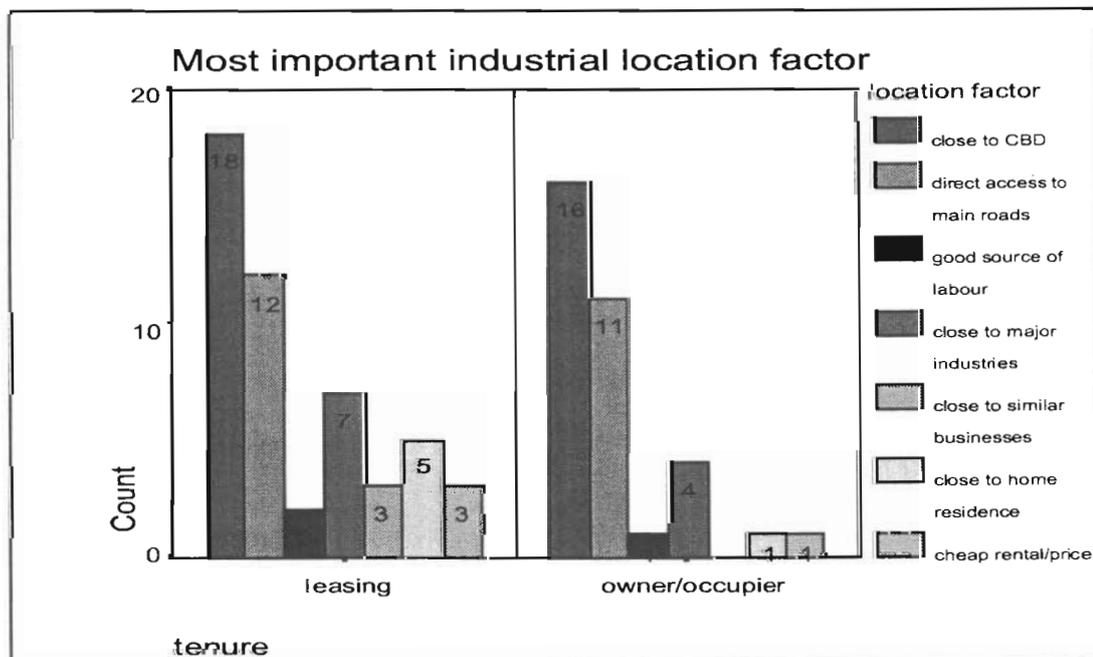


Figure 5-3 illustrates that given a selection of industrial site characteristics ranging from landscaping to road width, the most important site characteristic both for owners and for those leasing, was ease of truck

access (35 percent) closely followed by adequate warehouse clearance (23 percent). Land users who were leasing also considered exposure to main road traffic to be significant (20 percent).

Figure 5-3 The most important industrial on site factor according to tenure

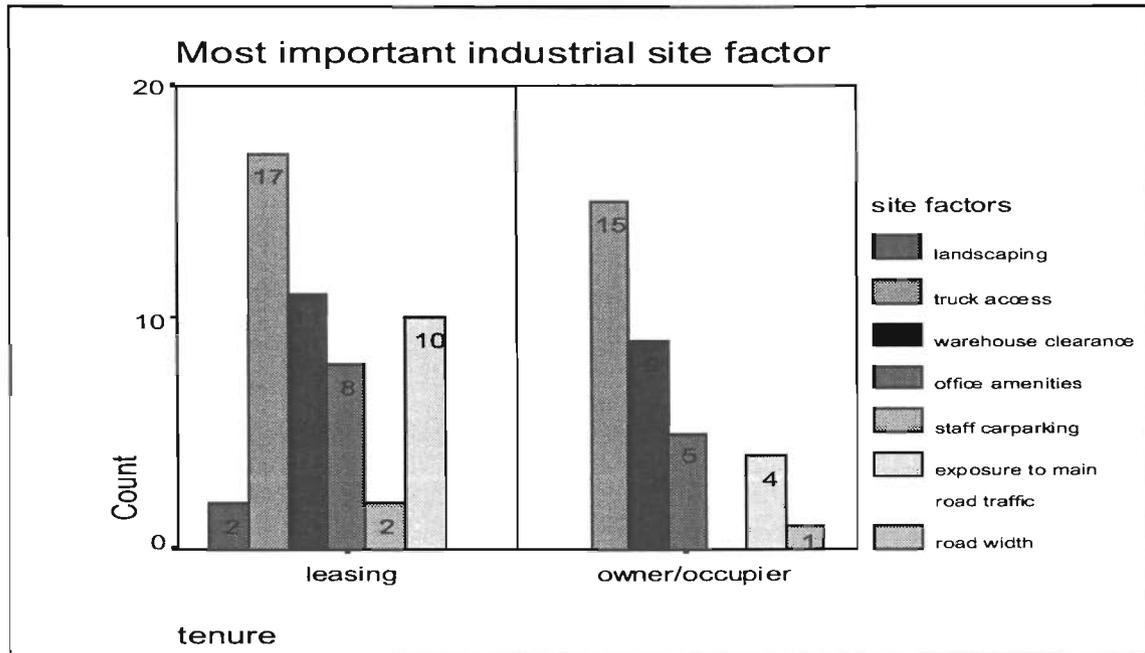
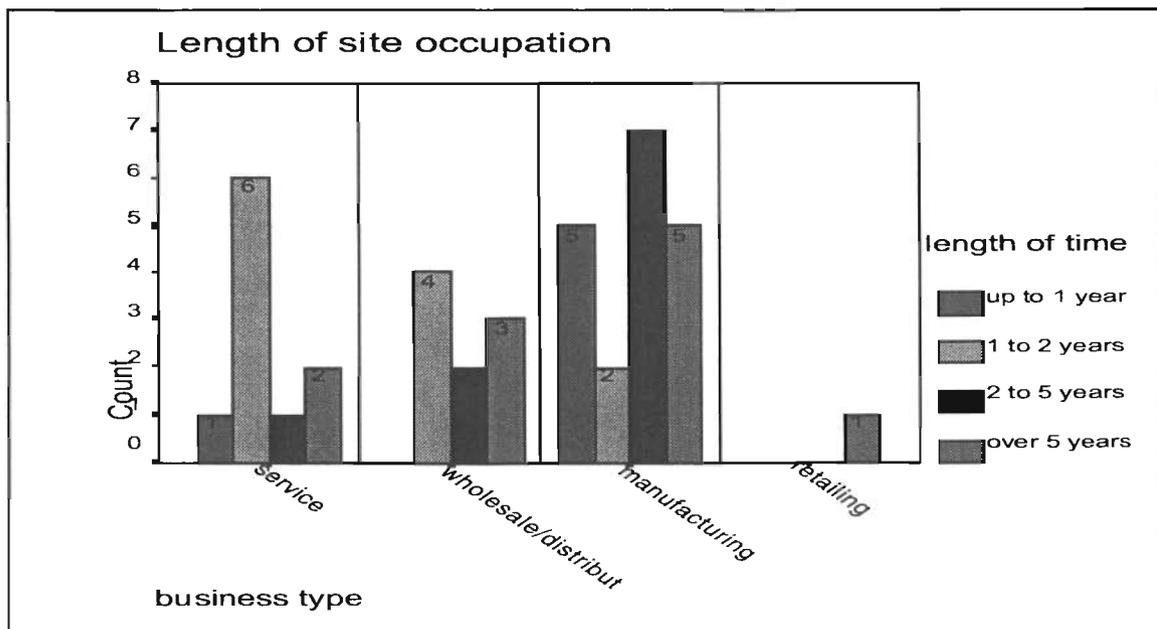


Figure 5-4 shows that 63 percent of manufacturers have occupied their sites for over two years while the majority of businesses in the service sector (70 percent)

have occupied their sites for less than 2 years. This reflects the amount of capital investment required within the manufacturing sector.

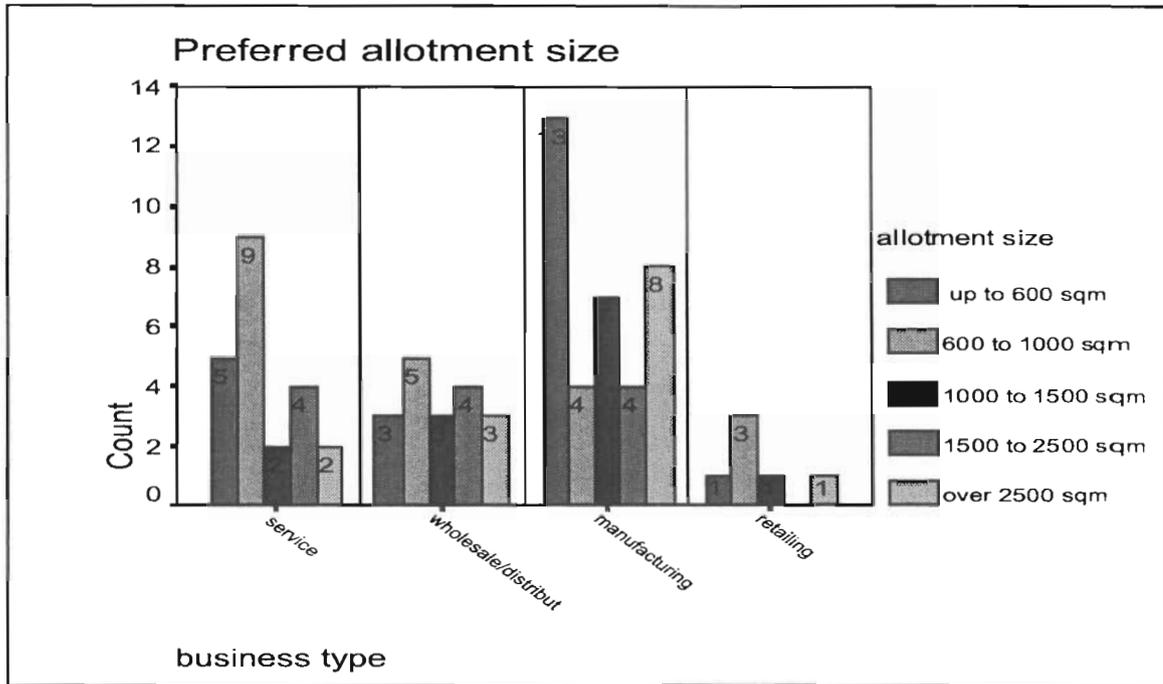
Figure 5-4 Length of occupation according to business type



A breakdown of users according to preferred allotment size (Figure 5-5) reveals a spread of preferences. However 65 percent of all land users expressed a preference for

allotments of less than 1500 square metres with 50 percent expressing a preference for sites of less than 1000 square metres.

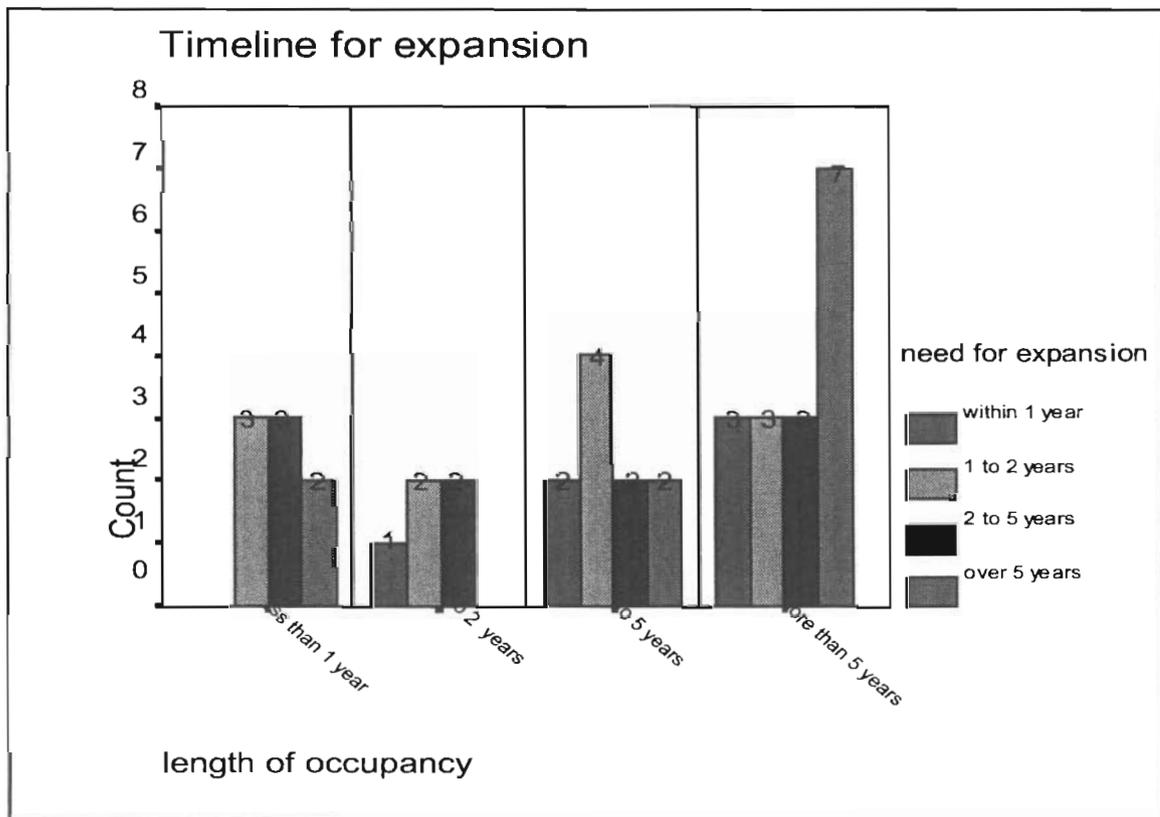
Figure 5-5 Preferred allotment size according to business type



Some 46 % of all businesses expected to outgrow their present sites within two years. A significant number of land users (71

percent) regardless of the length of their existing tenure expected to outgrow their premises within five years (Figure 5-7).

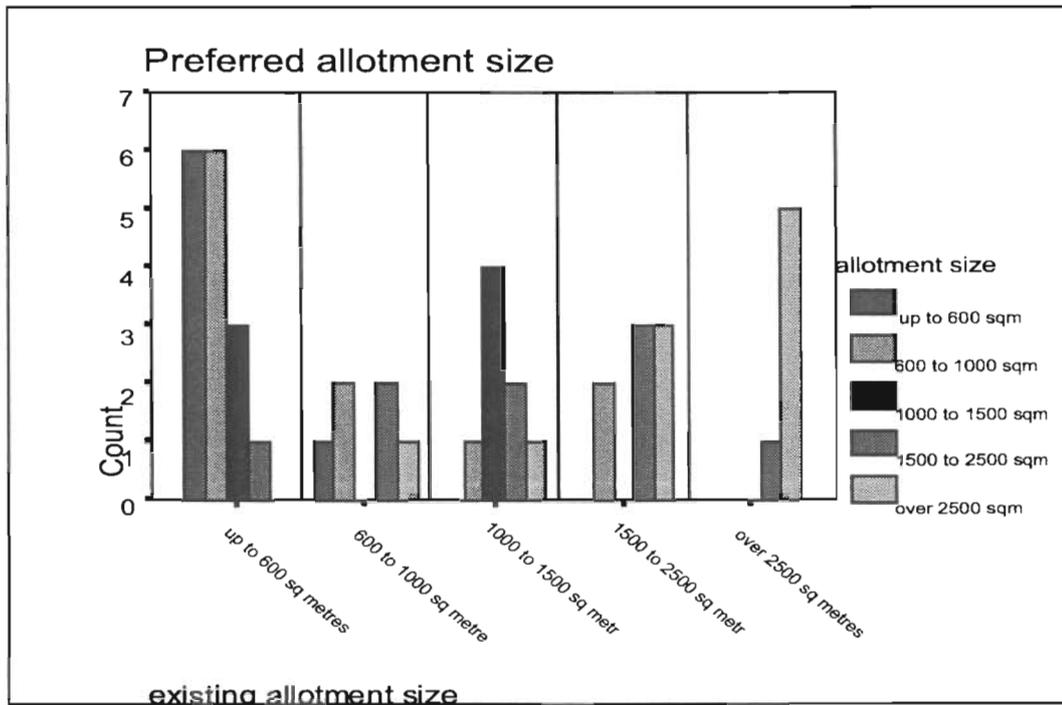
Figure 5-7 Timeline for expansion according to length of occupation



Some 68 % of businesses were located on allotments of less than 1500 square metres. Despite anticipating a need for new premises within 5 years, 56 percent of all land users expressed a preference for allotments of less than 1500 square metres (Figure 5-8). The

majority of those respondents on allotments of less than 1000 square metres and less than 1500 metres expressed a preference, 68 percent and 76 percent respectively, for their existing lot size.

Figure 5-8 Preferred allotment size according to existing allotment size



5.2 Discriminant Analysis

Discriminant analysis was used to test for any significant differences in site preferences based on business type, type of tenure or existing allotment size. The results of the analysis indicates that for groups classified according to business type i.e. service, wholesaler or manufacturing, industrial location choice is significant as a discriminatory variable though based only on Function 1. Figure 5-9 indicates that this first discriminant function accounts for some 87.6% of total variance. However when Function 2 is considered the low eigen value associated with the function indicates that it

is not performing well while the relatively high Wilks' Lambda and low Chi-square (Figure 5-9) also indicate that the differences between the three groups based on group means is low. Thus the small to medium land users surveyed cannot be adequately distinguished by business type in terms of what they believe to be important location factors. They are responding as a group to what they consider to be important in terms of location choice. As discussed earlier this was proximity to the CBD, access to good road networks and proximity to other industrial users.

Figure 5-9 Group classification based on Business Type

Eigenvalues				
Function	Eigenvalue	% of Variance	Cumulative %	Canonical correlation
1	0.244 ^a	87.6	87.6	0.443
2	0.034 ^a	12.4	100.0	0.183

Figure 5-10 Group classification based on Business Type

Wilks' Lambda

Test of Function(s)	Wilks' Lambda	Chi-square	Df	Sig.
1 through 2	0.777	16.131	10	0.096
2	0.967	2.168	4	0.705

When land users were considered according to tenure i.e. owner occupied or leasing, discriminant analyses indicated that preferred new allotment size did act as an influence on the classification of the two groups. Function 1 exhibits a higher eigen value and a lower lambda as shown below

(Figure 5-11 & Figure 5-12) with a standardized coefficient of 0.853 (Figure 5-13) associated with preferred new allotment size. This suggests that there is some distinction between land users when considered by tenure and that this distinction is primarily based on preferred allotment size.

Figure 5-11 Group classification based on Tenure

Eigenvalues

Function	Eigenvalue	% of Variance	Cumulative %	Canonical correlation
1	0.283a	100.0	100.0	0.469

a. First 1 canonical discriminant functions were used in the analysis

Figure 5-12 Group classification based on Tenure

Wilks' Lambda

Test of Function(s)	Wilks' Lambda	Chi-square	Df	Sig.
1	0.780	17.547	5	0.004

Figure 5-13 Group classification based on Tenure

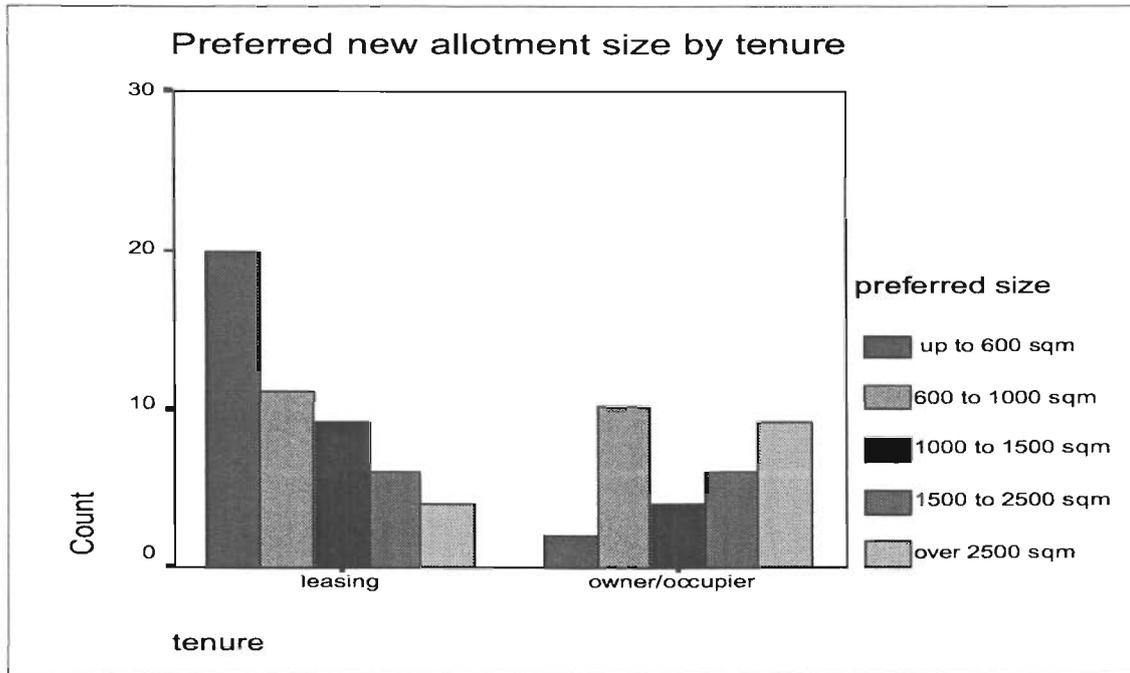
Standardized Canonical Discriminant Function Coefficients

	Reason for location of industrial premises	Level of satisfaction with location	Preferred new allotment size	1st most imp site factor	2nd most imp site factor
Function 1	-0.253	-0.537	0.853	0.101	0.221

Figure 5-14 also shows the distinction between tenure groups. 41 percent of those leasing would prefer an allotment of under 600 square metres compared to only 9 percent of owner-occupiers. Only 8 percent

of those leasing would prefer an allotment of over 2500 square metres compared to 29 percent of owner occupiers.

Figure 5-14 Preferred new allotment size by tenure



Distinctions between groups when identified by existing allotment size that is up to 1000 square metres, 1000 to 2500 square metres and over 2500 square metres, also produced

significant results with an eigen value of .939 for Function 1 (Figure 5 -15) and a Wilks' Lambda of .506 (Figure 5-16).

Figure 5-15 Group Classification based on Allotment Size

Eigenvalues

Function	Eigenvalue	% of Variance	Cumulative %	Canonical correlation
1	0.939 ^a	97.9	97.9	0.696
2	0.020 ^a	2.1	100.0	0.140

a. First 2 canonical discriminant functions were used in the analysis

Figure 5-16 Group Classification based on Allotment Size

Wilks' Lambda

Test of Function(s)	Wilks' Lambda	Chi-square	Df	Sig.
1 through 2	0.506	24.550	10	0.006
2	0.980	0.716	4	0.949

Preferred new allotment size was again the strongest influence on this group classification based on Function 1 with a standardized coefficient of 1.060 (Figure 5-17). This would support the earlier

discussion that allotment size is a key issue with regard to small business land users and that despite plans for extension, preferences for new allotment sizes are in line with existing block size.

Figure 5-17 Group Classification based on Allotment Size

Standardized Canonical Discriminant Function Coefficients

	Reason for location of industrial premises	Level of satisfaction with location	Preferred new allotment size	1st most imp site factor	2nd most imp site factor
Function 1	0.052	-0.186	1.060	0.133	0.328
Function 2	-0.872	0.599	0.202	0.414	-0.131

6. Implications of the study

The immediate implications of this study are that policy and planning mechanisms must continue to facilitate the competitiveness of the small business industrial sector. Industrial land users must compete for resources such as land, labour and capital and to achieve returns on these resources, their businesses must be competitive. For many involved in industrial activity, particularly smaller operators, the returns may be so low that the only long term investment they retain is the land if owned. If the returns to industrial land use are not fostered other users of land such as residential will force industrial activity out. The implications of the survey results and the discriminant analysis are that policy makers and planners should promote the maintenance of land for industrial use close to the CBD, in particular the retention of those sites which have been vacated by older redundant industries or through the downgrading of infrastructure services such as rail. Such sites should be retained for the redevelopment of new industrial activity rather than for immediate residential subdivision as these sites are likely to be keenly sought by industrial users seeking allotments of less than 1000 square metres which have good access to the CBD.

In terms of land management the need by businesses for export orientation, interstate and overseas makes access to transport a critical location variable in Adelaide along

with ease of access and egress for vehicles and people.

Thus there exists a relationship between land use and access, transport planning and urban design. Industrial land management should not just be about providing cheap serviced land on the outskirts of cities, but also should look to the effective and productive use of land through the facilitation of such relationships. Narrow road widths impede long vehicles while parking may be a problem for the work force, for customers and for deliveries.

Spatial policies should be about more than managing the externalities of industrial activity. Planning should seek to improve accessibility and access in light of how the use of an industrial site or a group of sites is related to the real world articulated by Stilwell (1992). Planning may need to encourage the clustering rather than the separation of industrial activities which in turn favours specialisation and fosters networking. As well rigid zoning regimes are not suited to the dynamic nature of the industrial sector. Zoning should encourage economic viability, be strategic in focus and flexible in outcome. It may need to include floating zones, allow more mixed use, provide variety in allotment size and be more performance related.

State planning approaches also need to be closely linked to local government with better coordination of parking, allotment size, and landscaping. Thus land management agencies also need to recognise the diverse nature of the industrial sector, including small business and the need to link land management with transport and infrastructure policies.

This study confirms that decisions with respect to industrial land management need to be based on a proper understanding of the demand characteristics of key user groups, in particular site and location preferences and that planning decisions need to be pro active in anticipating industrial land use change and constructive in response.

References/Bibliography

- ABS (1997) *South Australian Economic Indicators* June 1997 AGPS
- ABS (1998) Characteristics of Small Business, ABS Catalogue No 8127.0 AGPS
- Adams, CD, Russell, L & Taylor-Russell, CS (1992) Development constraints, market processes and the supply of industrial land *Land Development Education Trust* 49-61
- Blair, J & Yardley, R (1994) Planning for industrial land in the Sydney region *Australian Planner* (Mar) 16-21
- Callus, R Kitay, J & Sutcliffe P (1992) Industrial Relations at Small Business Workplaces *Small Business Review*, Bureau of Industrial Economics pp122
- Economic Development Authority (EDA) SA (1993) *The Creation of an Internationally Competitive Business Environment* AGPS
- Florida, Richard (1995) Regional creative destruction: production organisation, globalisation & the economic transformation of the Midwest *Economic Geography* 3 314-334
- Hughes, William (1994) Determinants of demand for industrial property *The Appraisal Journal* (April) 303-309
- Jones Lang Wootton (1996) *Adelaide Industrial Property Market Summary* JLW
- Knox, P & Agnew, J (1989) *The Geography of the World Economy* Edward Arnold
- Kupke, V & Kooymans R (1998) *Modelling the Take up of Vacant Industrial Land*, Fourth Annual Pacific-Rim Real Estate Society Conference (PRRES), Perth, Western Australia
- Massey, D (1973) Towards a Critique of Industrial Location Theory, *Antipode*, 6
- Nicholson, RJ & Tebbutt, SG (1979) Modelling of new orders for private industrial building *The Journal of Industrial Economics* 28 147-160
- Norusis, M J/SPSS Inc. (1993) *SPSS for Windows Professional Statistics Release 6.0* SPSS
- Peacock R (1997) *Small Business in South Australia: A Snapshot*, Small Enterprise Series No 32 (Adelaide: University of South Australia March 1997)
- Rae, John (1995) Industrial property: the effect of changing technology *The Valuer & Land Economist* (Feb) 391-394
- Roberts, P (1994) Business Expansion : now there's a capital idea *Financial Review* 7 April 1994 p2
- Searle, Glen (1992) The impact of new technology on industrial land *Urban Futures Journal* 2 (1) 69-76
- Smith, N (1989) Uneven Development and Location Theory: Towards a Synthesis in Peet, R. & Thrift, N (eds) *New Models in Geography* Unwin Hyman
- Stilwell, FBJ (1972) *Regional Economic Policy* Macmillan
- Stilwell, FBJ (1992) *Understanding Cities & Regions* Pluto Press
- Troy, P (ed) (1995) *Technological Change & the City* Federation Press
- Yellow Pages® (1999) *Small Business Index™ "Special Reports" November 1999* Telstra Corporation Melbourne