

Introduction

Over the past several decades Sydney has experienced significant changes in employment patterns and changing trends in the journey to work. In 1945, 30% of total employment was in the Sydney CBD; however, this is estimated to fall to 10% by 2001 (The Warren Centre, 2000). This dramatic decline is attributed to the dispersal of employment to non-CBD locations over this time period such as the movement of manufacturing firms to suburban locations, the growth and dispersal of planned suburban shopping centres, and the dispersal of office activities into the suburbs – processes which involve workplace relocation and which are on-going. In addition, the growth of business and technology parks such as Macquarie Park at North Ryde, Norwest in Baulkham Hills, the Australia Centre at Homebush Bay, and several others, continue to influence the spatial re-distribution of employment in Sydney. In general, employment is widely dispersed throughout the metropolitan area.

A feature of the dispersion of jobs within Sydney is the spatial patterning of the journey to work. In 1999, approximately 16.5% of all work trips were to the CBD (Transport Data Centre, 2001). Outside the CBD the prevailing pattern is one of spatial clustering of trips from dispersed residences to a small number of major employment centres (such as Parramatta, Bankstown, Blacktown, North Sydney, Ryde, Liverpool, Penrith, Botany, and Chatswood etc) and a larger number of smaller employment nodes dispersed throughout the metropolitan area (Forrest, 1996). The trend is one of regionalisation of the journey to work, with associated changes in modal choice patterns. For example, while 69% of work trips to the CBD were made by public transport in 1996, this figure falls to less than 15% for trips to many suburban employment centres (Transport Data Centre, 1999). Public transport accounted for 22% of trips to work on an average weekday in 1998, and is not increasing its proportional share of travel in Sydney (Transport Data Centre, 2000). On the other hand, car dependency is on the increase – with negative impacts on environment and public transport sustainability (NSW Government, 1998).

While changes in journey to work patterns are well monitored and understood at the aggregate level in Sydney, the impacts of workplace relocation on travel demand are largely unknown by the planning community. The objective of this paper, therefore, is a preliminary assessment of the nature and extent of changes in journey to work patterns and activity patterns following workplace relocation. Specifically, our focus is on modal shifts that may occur as a result of relocation, particularly on public transport demand, and on changes in timing and distance characteristics of work trips. In addition, we investigate changes in the nature of non-work activity patterns following relocation, especially those activities that are linked to the journey to work or undertaken from the work location. Linkages between changes in travel demand and altered activity patterns are also investigated. Furthermore, we examine whether workplace relocation impacts longer-term decisions such as residential location and vehicle ownership. The implications of our findings for current policies of improving the longer-term sustainability of Sydney are also discussed.

Empirical assessments of the impacts of workplace relocation are based on a study of three organisations – a major food company, a government enterprise, and a pharmaceutical firm. The private sector firms have completely relocated their functions to a suburban location in Sydney's expanding northwest sector (Macquarie Park), while the government enterprise has relocated to Australia Centre at Homebush Bay. Extensive surveys were undertaken after each respective move that sought detailed information on employees travel-activity behaviour both before and after the move.

Previous Research

Journey to work

Very few studies have investigated the travel-activity impacts of workplace relocation at the international or local (Sydney) level. Some early examples are the works of Alexander (1978), Daniels (1972, 1981), Prinsloo and Kersten (1983), Williams (1978) and Wootton (1987) which only marginally investigated journey to work impacts of office decentralisation from CBD locations to suburban areas in London, Pretoria and Sydney respectively. The main objectives of many of the studies were the reasons for decentralisation in the context of changing social-demographic characteristics of urban areas. However, impacts such as lengthening work journeys, inequalities in accessibility to workplaces, and increasing amounts of long distance commuting for employees following decentralisation were reported.

The studies by Daniels (1972, 1981) deserve mention for their results on journey to work impacts. In general, it was found that, following decentralisation, shorter trips were often more complex than those of longer distance, accessibility was not a major consideration of management in location decisions, the 'before' travel mode was a large influence on the 'after' travel mode, and that residential freedom at decentralised locations led to an increase in the use of private cars at the expense of public transport as a travel mode. One of the main policy implications to arise out of the study was the need for an adjustment of public transport timetables to suit office hours and provide the ability to cope with demand in order to avoid loss of public transport patrons.

More recent and detailed studies by Bell (1991) and Hanssen (1995) used large private companies for their before and after case studies. For example, the Bell study investigated the travel impacts of the relocation of Coles-Myer and their 1700 employees from the Melbourne CBD to Tooronga (8 km southeast of the CBD). Hanssen (1995) examined the transport impacts of relocation of the Gjensidige insurance company and their 1200 employees from the Oslo CBD to Lysaker, 5 km southwest of the CBD. There is a consistency in the results of these studies that may shed light on the present study of Sydney.

In general, these studies found that public transport was the most popular method of travel to work at the previous (CBD) location, whereas at the new location public transport use decreased very significantly and the share of travel by private vehicle

increased very markedly. Average travel time from home to work did not change significantly, although average travel distances from home to workplace decreased in the case of Melbourne and increased in the Oslo study. In both studies more than 10% of employees had changed their residence in the 12 months after relocation, and 8-10% of employees reported having bought a new car as a consequence of the relocation. Clearly, the relocation of a firm has an important influence on how employees travel to work, car ownership and residential location.

Activity Patterns

Relocation of the workplace may also affect the way employees reschedule their non-work activities to or from work, or during the workday, and also affect the level of complexity of such activities. Bell (1991) found that the total number of activities undertaken at the suburban location was about 10% less than was undertaken in the CBD. The types of activities that decreased with the move were shopping and social, with trips serving passengers (drop-offs and pick-ups) increasing significantly (related to the switch towards the use of cars). Fewer people participated in activities during the day at the suburban location, consistent with the view that there are more opportunities, and they are more convenient, at CBD locations (Scott, 2000). However, many of the activities were shifted to the after-work time slot.

In the case study of Oslo there was a significant reduction (from 16% to 9%) in the percentage of employees who reported undertaking activities (journeys) during working hours (Hanssen, 1995). The majority of these activities since relocation were carried out using the car as it was easier for employees to combine the work trip with other purposes – especially on the way home. By implication, the propensity to use public transport for such activities is diminished as it becomes more difficult to undertake complex journeys that involve multiple trip purposes (activities).

What is known from the activity literature is that the timing and location of the journey to work is important in determining the amount and type of activities undertaken as part of an associated trip chain. Non-work activities are less likely to be undertaken during peak hour commuting journeys, because the savings in time and travel energy, as noted by Oster (1979) are likely to be less. Suburban workplaces have different accessibility to activities when compared with CBD locations. Suburban workers are less likely to walk from their workplace to activities (Strathman *et al*, 1994), and thus trips which would be quite simple when made during the day in central locations, are made more complex at suburban sites.

Undertaking activities as part of the journey to work also depends on the mode of travel chosen. Public transport is less convenient for complex trip chains, whereas the private car allows versatility and flexibility. As other studies have shown, the mode of choice for most suburban workers is the private car. Location of the workplace influences choice of travel mode that, in turn, influences the propensity to form complex trip chains (Strathman *et al*, 1994).

In the case of Sydney trends are already evident of the increasing prevalence of non-work trips being linked to the work commute (Transport Data Centre, 1996). Hensher and Reyes (2000) have explored the implications of more complex travel-activity patterns for the propensity to use public transport in Sydney. Their study shows that as trip chains move from being simple to complex the relative utility gained from using public transport decreases. In particular they found that as the number of vehicles per household increases, or there is the presence of children in households, the relative utility from public transport use decreases. Secondly, it was reported that utility associated with the car increases as the complexity of a trip chain increases. A preliminary assessment of the link between activity patterns and use of public transport following workplace relocation is investigated in the present study.

Residential Location

A final aspect of workplace relocation that has been reported in the literature is the impact on decisions concerning residential location. For example, Bell (1991) found that 15% of employees reported moving their place of residence in the twelve months following workplace relocation. In addition, it was found that the geographic distribution of the residences of employees had also changed – more employees now lived in the eastern part of Melbourne (up from 48% to 55%), closer to the Tooronga site.

In Oslo, the overall residential distribution of employees remained static over the 12-month period between surveys. However, about 60 per cent of employees had further to travel to the new location, and 34 per cent stated that they intended changing either their residence or job after the move (Hanssen, 1995).

These findings are of interest for the immediacy with which residential location impacts have occurred, as this is usually considered a longer-term decision factor. Furthermore, the present study is interested in the possible link between mode choice, vehicle ownership and residential location.

The empirical context

The main approach used by Bell (1991) and Hanssen (1995) to assess the travel impacts of workplace relocation has been the before and after method, which is designed to monitor in detail the actual changes resulting from relocation. The present research uses the after study method to evaluate retrospectively the travel-activity impacts of workplace relocation on employees at each of the case study organisations. (The names of the organisations are not published at the request of their respective management).

During the period January-February 2000, the multi-national food company consolidated eight of its business units into one site at Macquarie Park in close proximity to Sydney's Macquarie University and Macquarie Centre (the site is adjacent to these landuses). The eight previous locations were spread throughout the eastern part

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of the Sydney metropolitan area, including a CBD site, and at suburban employment centres; Homebush, Mascot, Eastwood, Alexandria, Chatswood, Silverwater, and Summer Hill. Macquarie Park, 15 km north west of the CBD, is an area of rapid employment growth, and is one of the few major suburban employment centres not directly serviced by a rail line. (A station will be provided to service Macquarie Park as part of the Parramatta-Chatswood rail line that is scheduled to open in 2006).

The Macquarie Park site is serviced by Sydney's public transport network, being a short bus ride from Epping railway station on the main Northern Line. Government and privately operated bus routes link the site with many locations on the North Shore and to the west as far as Parramatta and the Hills District. It is also well serviced by arterial road networks located near the intersection of Sydney 'MetRoads' 2 and 3 (M2 Hills Motorway and Lane Cove Road).

The relocation of a NSW State Government enterprise from a previous site at Burwood to a new site at Australia Centre, Homebush Bay, occurred in two stages. The first stage of the move, which occurred in December 1996, saw relocation of the IT division to a new building at Australia Centre. Stage two occurred in June 1998 when remaining divisions were moved to the new site. The motives for relocation were due to the need to upgrade physical facilities for safe operation of the computer network and for improved security of work operations.

While the new site, within the precinct of 'Australia Centre' business park in Homebush Bay, is in close proximity to former Olympic venues, facilities for personal business activities are extremely limited, and require travel outside the centre. In terms of transport, the Homebush site contains its own railway station (Olympic Park) and is situated at the junction of the M4 motorway and north - south arterial road (Centenary Drive). Although the site is centrally located and is linked to the transport network, a number of factors hinder its accessibility; for example, Olympic Park rail station is not on a through train line. This is in contrast to the previous site at Burwood, which was well serviced by public transport (a main station on the Main Western Line) and was within a few minutes walk of the rail station and of major retail and commercial activity opportunities.

The pharmaceutical company was originally from Germany and was based in Artarmon on Sydney's North Shore. The site at Artarmon, however, was viewed as being too small for a company that had experienced major growth over several years, despite being in a very accessible part of Sydney, and being on the North Shore train line as well as on several bus routes (via the Pacific Highway). In addition, the Artarmon site was only a few minutes walk from the rail station. The company relocated to the new site in 1999.

The site chosen for relocation – Macquarie Park at North Ryde – was perceived as very appropriate due to presumed minimal impacts on employees associated with the relocation process (considering the relatively close proximity of North Ryde to Artarmon). However, accessibility at the North Ryde site is less satisfactory compared to the Artarmon site. There is no train line within convenient walking distance and, in order to get to the site from the North Shore by train, a round trip through either the city

or Hornsby is necessary, followed by a bus from Epping Station. There are limited bus routes that go to the area from Gordon, Chatswood and Wynyard Railway Stations. Only three roads can be used to get to the area from Artarmon; Mona Vale / Ryde Road (from the Northern Beaches through Pymble), Fullers / Delhi Road (from Chatswood) and Epping Road.

Survey Methodology

All surveys were undertaken during the period May-July 2000. Questionnaires were distributed by management either in hardcopy or electronic form to respective employees. The questionnaire was structured into four parts; travel behaviour since the relocation; travel behaviour before relocation; impacts of relocation; and socio-economic information.

Parts one and two were largely similar, allowing direct comparisons between 'before' and 'after' behaviour. Responses were sought for a 'typical' workday both before and after the relocation. Of particular interest in both parts were the types and number of modes used in the journeys to and from work, and the activity patterns associated with the journeys to and from work, and during the day. The journeys to and from work, in both parts, were examined separately in order to allow comparisons between the timing of activities, and to test if journeys to work differed from journeys from work. Respondents were also asked about the distance between their home and workplace, as well as the time taken for the journeys to and from work. Start and finish times were used to compare hours of work between the two work locations.

Respondents were also requested to indicate why they chose particular types of travel, which were grouped into two categories, either private motor vehicles or public transport. The options given for the main reason for using a particular type of travel mode were taken from the Household Travel Survey (Transport Data Centre, 1999). Opinions of public transport between home and workplace were also requested, together with suggestions for improvement. This aspect of the surveys is not analysed in the present study.

Part three dealt with impacts of the move, requesting respondents to indicate if they had moved or intended moving, if they had bought a car or intended buying one, and how important the relocation was in the decision-making process. Respondents were also given the opportunity to provide an open response as to the main impacts of the relocation on themselves and their households. Part four requested socio-economic information such as gender, age group, occupational category, employment type and household structure.

Analysis of survey responses indicated that respondents had no difficulty in recalling travel-activity patterns before the move. This was especially true for survey responses from employees at the NSW Government enterprise that had relocated two years prior to the survey. In general, the survey data did not indicate possible bias associated with the timing of the 'after' surveys.

Response Rates

A total of four hundred questionnaires were distributed at the multi-national food company during May 2000; with the company arranging the distribution of questionnaires to every second employee. A total of 206 usable questionnaires were returned, a response rate of 51.5%. Eighty per cent of respondents had worked with the company before the relocation, with the remaining 20% having joined the company since that time (Bickerstaff, 2000).

Surveys conducted at the NSW State Government enterprise were distributed to all 150 employees in June 2000. A total of 125 completed surveys were returned which represents a response rate of 83% (Tinker, 2000).

The distribution of surveys at the pharmaceutical company was via e-mail to all employees (n=66). A total of 54 completed surveys were returned, a response rate of 81% (Edenhofner, 2000).

Study Results

Mode choice for the journey to work

The impact of workplace relocation on the choice of modes for the journey to work is a major finding of this study (Table 1). Using the notion of a priority mode (most important mode used) for the journey to work, Table 1 indicates an overall increase in car use by respondents from 75% to 87%, although most of this increase is attributed to the use of private cars across the three organisations. Public transport use by respondents has dramatically declined from 23.9% to 11.5%. The decline is most significant for train travel, especially by employees of the government enterprise. Further analysis of changes in mode choice before and after relocation found no significant differences based on gender – females were just as likely as males to switch from public transport to private car for the journey to work following relocation.

Changes in the use of public transport may be attributed to the nature of public transport services at the Macquarie Park and Australia Centre sites. The site of the food company is a short bus ride from Epping station, but buses are the only public transport directly serving the site. Thus public transport trips to Macquarie Park that include a train leg also require a bus journey and, as a result, are likely to have a more complex trip structure than bus-based trips. Sixty per cent of public transport users from the food company reported using at least three modes to access the Macquarie Park work site, but averaged just under 2 modes before the relocation. In addition, public transport users experienced an average travel time of 71 minutes for the journey to work, compared with 42 minutes for car users.

Table 1 **Mode choice for the journey to work (% of all employees)**

Priority Mode ^a	Total		Government Enterprise		Food Company		Pharmaceutical Company	
	Before	After	Before	After	Before	After	Before	After
Car ^b	75.0	87.0	65.0	86.0	80.0	89.0	85.0	88.0
Train	20.5	7.3	31.2	12.8	15.9	5.8	8.0	2.0
Bus	3.4	4.2	1.6	0.8	8.5	11.6	5.0	6.3
Walk	0.9	0.8	1.6	0.0	4.9	6.3	2.0	3.0
Bicycle	0.3	0.5	0.8	0.8	0.0	0.0	0.0	0.0
Respondents (total)	312	385	125	125	206	206	54	54

Source: Surveys

^a See text for meaning of priority mode.

^b Includes car driver, car passenger and company car.

Relative inaccessibility of the Macquarie Park site by public transport may also account for the decrease in train use, with only trains on the main Northern Line stopping at Epping, and passengers from other lines having to change trains at least once. For employees of pharmaceutical company similar problems prevail in terms of their use of the train as the new site is located five kilometres from Gordon and Epping stations. Reasons given by employees for use of the car include “that trains and buses are too far from the relocated site.....”.

About 95% of respondents at the government enterprise reported high levels of dissatisfaction with public transport services to the Homebush site in comparison to those experienced at Burwood. A further 3% indicated very high levels of dissatisfaction with public transport services to Homebush. When questioned about public transport services to Homebush, 71% of respondents reported that the main concern with public transport services to the area was that bus services operating between Homebush Bay and Strathfield station were ‘infrequent, late and crowded’.

Changes in average travel time and mode choice based on aggregated regions of residence are shown in Tables 2 and 3. While there occurred a significant shift to car (from public transport), the average travel time to work has remained constant across survey respondents. However, for respondents who reside in the eastern and southern suburbs, Sutherland, Wollongong, and the southwest parts of Sydney, the advantages of a shorter (on average) journey to work have dissipated. Most of these areas are also generally well served by heavy rail, and the eastern and southern suburbs are well served by government bus (State Transit) services. The relocation to Macquarie Park or to Homebush Bay means that employees who still wish to use public transport need to make additional transfers, therefore adding to the dis-utility of the trip. It was not surprising that 46% of public transport users residing in these areas of Sydney rated public transport services to Macquarie Park as very poor.

Table 2 **Average travel time to work (minutes)**

Region	Before		After		Change (minutes)	Change (%)
	Minutes	Number ^a (n=385)	Minutes	Number ^a (n=385)		
Eastern suburbs	32.23	27	51.67	30	+19.44	+60.32
Southern suburbs	37.75	74	42.53	81	+4.78	+12.66
North shore	34.38	83	29.33	101	-5.05	-14.69
Northern beaches	38.50	10	46.43	14	+7.93	+20.60
North west	53.33	36	36.85	39	-16.48	-30.90
Western suburbs	51.93	59	43.81	63	-8.12	-16.64
South west	43.13	16	52.35	17	+9.22	+21.38
Sutherland	44.00	21	65.25	20	+21.25	+48.30
Central Coast	80.56	9	74.62	13	-5.94	-7.37
Wollongong	65.00	2	77.50	2	+12.50	+19.23
Total (average)	42.62		42.53		-0.09	-0.21

Source: Calculations by authors

^a Number of respondents for each region.

Table 3 **Region of residence and method of travel to work**

Region of Residence	Car (%)		Public Transport (%)		Walk/Bicycle (%)	
	Before	After	Before	After	Before	After
Eastern suburbs	57.7	70.0	38.4	26.7	3.8	3.3
Southern suburbs	77.5	95.1	18.3	3.7	4.2	1.2
North shore	75.0	85.1	25.0	11.9	-	-
Northern beaches	80.0	92.9	20.0	7.1	-	-
North west	97.0	94.9	3.0	5.1	-	-
Western suburbs	68.4	90.5	31.6	9.5	-	-
South west	68.8	82.4	31.2	17.6	-	-
Sutherland	80.0	95.0	20.0	5.0	-	-
Central coast	44.4	46.2	55.6	53.8	-	-
Wollongong	100.0	100.0	0.0	0.0	-	-
Total (average %)	74.8	87.3	23.9	11.5	1.2	1.3
Total respondents	241	336	77	44	4	5

Source: Surveys

Respondents who reside in the northwest, west, and north shore suburbs of Sydney have, on average, experienced a shorter travel time to work since relocation. However, this has only served to encourage increased car use given the poorer levels of public transport services from these areas which entails connectivity problems and, as a result, additional transfers (Table 3). In general, those areas with the shortest average travel times before relocation have experienced some of the largest increases in car use and largest decreases in public transport use following relocation. Even those areas with the shortest average travel times since relocation have, however, experienced increased car use and decreased public transport use. The only exception is northwest Sydney which by reason of close proximity to Macquarie Park has generated a small decline in car use and increase in public transport use by survey respondents.

The situation among survey respondents at the Homebush Bay site deserves special mention. Since relocation from the public transport accessible Burwood site, those respondents who use public transport (train or bus) to Homebush have experienced, on average, a 10 minute increase in journey time – mainly associated with the need to transfer at Strathfield. It is not surprising, therefore, that these survey respondents reported the largest decrease in public transport use.

In addition, ten respondents from the government enterprise who used public transport before relocation had reported purchase of a vehicle for their journey to work since relocation. A more dramatic situation occurred among respondents from the food company where 37% of public transport users before relocation had reported purchasing a vehicle in the first six months following relocation, with 5% considering purchase of a vehicle. Approximately 16% and 8% of all respondents from the food company that had relocated to the new site had reported buying a car or planning to buy a car respectively. The relocation of the company, and the journey to work activity implications this entailed, was most often cited as the reason for purchasing a vehicle.

Changes in activities

The relocation to Macquarie Park and Homebush Bay sites respectively also influenced the range of non-work activities undertaken by employees of the three case study organisations. Results reported in this paper refer to activities that are undertaken on a typical day both before and after relocation, and are expressed in terms of the number of participants in activities during the day. Non-work activities are those activities that can be undertaken en route to or from work, or during working hours.

Table 4 shows that, overall, there has been a marginal increase in the number of survey respondents who participated in non-work activities following relocation. Gender differences were not statistically significant prior to relocation, but were significant following relocation. Table 4 also reveals large variations in activity participation across the case study organisations that highlights the influence on mode choice patterns of the presence or absence of activities at relocated sites.

Table 4 **Number of participants in activities**

	Total		Government Enterprise		Food Company		Pharmaceutical Company	
	Before	After	Before	After	Before	After	Before	After
Male	126 (46.4) ^a	133 (48.7)	52 (50.9)	28 (62.2)	67 (45.5)	94 (49.4)	7 (31.8)	11 (28.9)
Female	145 (53.5)	140 (51.2)	50 (49.1)	17 (37.7)	80 (54.4)	96 (50.5)	15 (68.1)	27 (71.0)
Total	271	273	102	45	147	190	22	38

Source: Surveys

^a Values in parentheses are percent of respondents participating in activities.

In the case of survey respondents from the food company, there was an increase in the percentage of employees participating in activities across the day. There was also a slight increase in the average number of activities per person, from 4.91 to 4.97 activities per day. Activity participation increased following relocation for dropping off and picking up passengers, and grocery shopping on the way home (Table 5). Overall, the results would appear to contradict those of the Bell (1991) study that reported a 10% decrease in activity participation at the suburban location (Tooronga), mainly in recreational and social activities. This study found a slight increase in the total number of activities, and noted an increase in the percentage of respondents participating in recreation activities, although there was a small decrease in participation in buying and eating food on the way home. Clearly, the presence of a large regional shopping centre (Macquarie Centre) opposite the site contributes to opportunities for undertaking activities (especially during the day), despite the accessibility problems reported by public transport users in particular.

In terms of the number of activities undertaken, there was no significant difference between city and suburban workers before and after relocation (Mann-Whitney U-Test, $p = 0.601$). This is an unexpected result, but may occur because of the nature of the survey data rather than a deviation from expected behaviour. The data provides no indication of the location of activities, so it is not possible to say whether an activity occurred close to the workplace or close to the residence. The result does show, however, that the propensity to participate in activities may not be dependent on work location.

Further analysis indicated no difference in the number of activities undertaken between users and non-users of public transport before and after relocation (Mann-Whitney U-Test, $p = 0.374$ before, $p = 0.945$ after). There was, however, a significant difference in the number of activities undertaken as part of the journey home (Mann-Whitney U-Test, 95% confidence), and in the total number of activities per day after relocation (Mann-Whitney U-Test, 95% confidence) based on gender. Females participated in an average

of 1.70 activities on the way home since relocation, compared with 1.34 for males. Before relocation, the average number was 1.74 and 1.28 for females and males respectively. The average total number of activities per day for females was 5.43 before and 5.24 after relocation as compared with 4.45 and 4.69 for males respectively.

Table 5 Respondents participating in each activity: Food company

Activity	To Work				From Work			
	Before		After		Before		After	
	%	No. ^a	%	No.	%	No.	%	No.
Buy/Eat Food	6.1	10	3.4	7	20.7	34	18.9	39
Drop off Passengers	12.2	20	13.6	28	3.0	5	6.8	14
Grocery Shopping	6.1	10	2.9	6	38.4	63	43.7	90
Work Business	10.4	17	8.7	18	17.1	28	14.6	30
Health Care	3.0	5	3.4	7	9.1	15	8.7	18
Pick up Passengers	1.8	3	2.4	5	12.2	20	10.7	22
Personal Business	4.3	7	1.5	3	8.5	14	6.8	14
Other Shopping	4.3	7	0.5	1	17.7	29	17.5	36
Recreation	3.7	6	3.4	7	14.6	24	15.5	32
Other	3.7	6	2.9	6	7.9	13	9.2	19

Source: Surveys

^aNote that some respondents participated in more than one activity.

In contrast to increased activity participation levels among respondents from the food company, those from the government enterprise experienced a significant decline following relocation (Table 4). Analysis of activities undertaken during the working day before and after relocation indicate that, at the Burwood site, 78% of employees left the work premises at some stage during the day. In doing so, 99% of respondents chose to walk to their activities, mainly to the easily accessible Burwood shopping district.

Following relocation the situation changed considerably with only 57% of respondents now undertaking trips for activities during the working day. Many of these activities were undertaken while travelling to or from work, although this was difficult to analyse from the survey data. Furthermore, there has been a dramatic change in travel mode use for non-work related activities during the working day as the number of employees that walked fell to a low of 12.7% of respondents. Use of the car for travel to activities during the working day rose to 45.6% of respondents; the number of private car users rose to 63.4%; and company car users rose to 16.9%.

The main reason for this extensive shift is the substantial decline in participation across all activity categories, especially for personal business (Table 6). It is not surprising that the Burwood site provided ample activity opportunities for employees (e.g. Burwood Plaza and Westfield Shopping Town). In contrast, the Homebush site is characterised by a marked deficiency in activity opportunities, necessitating car travel outside the area for such services. About 75% of respondents indicated that the Homebush site rated poorly for availability of activities compared to the former Burwood site.

Table 6 Activities undertaken during the day: Government enterprise

Activities	Before (Burwood)		After (Homebush)	
	% ^a	No.	% ^a	No.
Food Drink	88.0	110	87.0	60
Grocery Shopping	36.0	45	17.4	12
Clothes Shopping	35.2	44	2.9	2
Post Letters/Bills	56.8	71	31.9	22
Banking	23.2	29	7.2	5
Newsagency	21.6	27	1.4	1
Dry Cleaning	22.4	28	2.9	2
Gym	2.4	3	0.0	-
Jog/Walk	1.6	2	14.5	10
Total		359		114

Source: Surveys

^a Percentages sum to more than 100% due to multiple responses.

Over half (56%) of survey respondents at the government enterprise indicated that the area required more places for activity opportunities; for example, banking facilities, post office and retail/food outlets. Of additional interest is that approximately 20% of these respondents indicated that another person (household member) had taken over the role of shopping, paying bills, banking or posting letters, among other activities, since workplace relocation.

Changes in residential location

An additional aspect of workplace relocation is the impact on employee decisions to move closer to their new work site. Bell (1991) reported that 15% of Coles-Myer employees had moved their place of residence – closer to the new work site – in the short period between the before and after surveys. In the case of Oslo, about 34% of respondents stated that they intended changing their place or residence or job after the move (Hanssen, 1995).

In the present study, the survey data revealed that no employees from the government enterprise or the pharmaceutical company had changed residence prior to the move or at the time of the surveys. However, in the case of the food company, about 23% of survey respondents had already changed their residential location, and another 16% reported planning to move residence in the six months following the survey. This is indicative of the immediacy with which employees have responded to workplace relocation. The majority of employees who reported changing residence or planning a move were from the southern suburbs of Sydney, although a few employees from northern and western parts of Sydney also moved residence. About 44% of respondents from the food company who had moved or planned to move stated that relocation of their workplace was an important or very important factor in their decision to move.

Conclusions

This paper has reported on a preliminary assessment of the travel-activity impacts of workplace relocation undertaken by three organisations in Sydney. The findings of the study are, in many respects, similar to those reported by Bell (1991) and Hanssen (1995) for Melbourne and Oslo, and should raise concerns for longer-term public transport sustainability and for strategic policies which attempt to reduce dependence on the car.

A major finding of the study is the significant change in travel behaviour which can occur when an organisation (or firm) undertakes workplace relocation – the major change being a shift in travel from public transport to car based travel. Overall, there was a 50% reduction in the use of public transport and car use increased by 16% across all survey respondents. However, these changes in travel behaviour were even more polarised among respondents from the government enterprise. The overwhelming consensus among all respondents using public transport following relocation was of increased disutility of the trip and increased inaccessibility to the work sites – the main reasons given for shifting to car use.

The implications of this finding is all the more significant if one considers all workplace relocation occurring in Sydney in any given year, and over a longer period of time. It is likely that New South Wales Government strategies that are targeting reduced car movements to reduce car congestion as well as emissions may not be adequate to achieve longer-term sustainability in Sydney without also understanding the relocation

process and its negative consequences for travel mode choice. The dispersal of both major and smaller employment nodes, many of which are business parks that grow due to firm relocation, and which are outside of identified transport corridors are likely to promote further car use due to the process of regionalisation of the journey to work which they engender. Our finding suggests that integrated transport-landuse planning as currently envisioned and practiced in Sydney may require a basic rethink.

A second major finding of the study indicated that, despite no overall reduction in the number of non-work activities, the absence of activity opportunities at a major work site (Australia Centre at Homebush Bay) is linked to very significant shifts from public transport to car use, and to the purchase of vehicles by previous public transport users. Relocation from an activity rich to activity poor site leads to a rearrangement of activities where more employees choose to perform non-work activities outside of normal working hours – mainly to and from work – thereby contributing to traffic flows.

If such a site(s) are also relatively inaccessible by public transport, the interaction effect promotes higher levels of car use and lower levels of public transport use as compared with sites that are activity rich (e.g. Macquarie Park). This finding suggests a need for substantially improved integrated transport-landuse planning, where the provision of specific activity opportunities at both large and small employment nodes dispersed throughout the metropolitan area becomes paramount.

In sum, our preliminary assessment has highlighted some important travel-activity impacts of relocation that, in turn, has raised some important implications for the policy and planning community, and for the sustainability of Sydney.

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