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TRANSPORT INEQUITY & DISADVANTAGE IN CELTIC TIGER DUBLIN – PRELIMINARY RESULTS

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Abstract

This paper explores social equity issues in transport and land-use planning, using recently developed housing areas in Dublin as a case study. As a pillar of sustainable development, social equity is an important objective of transport planning. During the 2000s, Dublin experienced a significant increase in car ownership levels and usage. There is now a growing body of research that links increasing car ownership, usage and dependency to increasing levels of inequity and transport disadvantage.

The paper briefly outlines the evolving theoretical considerations of relevance to transport and land-use related equity, and establishes a framework from which to draw a sound moral judgement in relation to the above. The research explores key transport equity issues including the concept of 'forced' car ownership and car-dependency; accessibility barriers to life opportunities; and distributional issues in relation to different population and socio-economic groupings.

This paper presents preliminary findings from an archival analysis of areas developed from 2001 onwards; and from a self-administered postal and on-line household survey that was distributed to three case study areas on the edges of Dublin's urban area. The case study areas are predominately residential neighbourhoods that were developed during the 'Celtic Tiger' period to a form and density typical of this time. The three areas have all experienced a significant reduction in affluence between the 2006 and 2011 Census periods, coinciding with the economic recession that Ireland experienced at the time.

The methodology for data collection and analysis is discussed. A comparative analysis is undertaken between the three case study areas; neighbourhoods developed from 2001 onwards; and between the wider Dublin area using descriptive and inferential statistics. The paper presents the preliminary findings of this analysis, which concludes that there is evidence of disadvantage and inequity related to transport and land-use integration in residential suburbs developed during the Celtic Tiger period.

1. Introduction

Increasing car ownership, usage and dependency is a significant, and increasing global issue that presents one of the main challenges to sustainable development (Banister, 2005). A recent report by the Sustainable Development Commission (2011), presents considerable research evidence that links increasing car dependency in society to increasingly levels of inequity. Reducing the need to travel, particularly by car, and promoting more energy efficient modes of travel (for example, walking, cycling and public transport), are key objectives in sustainable development policy.

As a pillar of sustainable development¹, social equity is a key, but often forgotten, objective of transport planning. The World Bank (1996) argues that for transport policy to be effective it must support and improve the standard of living (economic and financial sustainability) and improve the general quality of life (environmental and ecological sustainability); and its benefits must be shared equitably by all sections of the community. While environmentalism and economic development have tended to dominate the sustainable development agenda over the last decade or so (Drexhage and Murphy, 2010), equity is beginning to emerge as an important issue in the literature. In the governance arena, significant emphasis is still being placed on economic growth over social equity and environmentalism, and has shaped the public policy landscape considerably, even through the current recession (Fainstein, 2010)

This paper presents preliminary findings from a study into social equity and transport planning issues in Dublin, Ireland; using areas that were developed mainly from 2001 onwards as a case study from which to explore these issues in greater detail. Dublin, and Ireland, in general has experienced a significant increase in car ownership, usage and dependency, with considerable trends towards unsustainable transport evident in areas developed during the 2000s (DoT, 2009; SEI, 2009; SEAI, 2013). Section 2 of the paper outlines the aims of the study. Section 3 discusses the theoretical context. Section 4 briefly describes the methodology employed and provides a summary of preliminary findings concerning an assessment of transport equity in neighbourhoods developed from 2001 onwards in Dublin. Section 5 concludes.

2. Research aims and objectives

The overall aim of this study is to investigate transport inequity and disadvantage with reference to recently developed housing areas in Dublin. The preliminary findings presented in this paper seek to answer the following research questions:

- (a) It is put forward that car dependency is higher than normal in post 2001 neighbourhoods.
- (b) It is postulated that in post 2001 neighbourhoods in Ireland, little attention was given to the development of transport and land-use integration. This has lead, it is hypothesised, to higher levels of transport disadvantage for those without access to cars, and for vulnerable population groups. Households without a car, or with limited access to a car, face considerable burdens associated with accessing education, work and services.
- (c) Forced car ownership, where those with the least ability to own and run a car do so in order to access essential services, is, it is postulated, evident in these post 2001 neighbourhoods.

¹ Although there is intense debate in the literature about what sustainable development really means, addressing this is outside the scope of this paper. This paper assumes the generally accepted description of sustainable development as the convergence of the three pillars of social equity, environmental protection and economic development (Drexhage and Murphy, 2010).

3. Theoretical Context

Transport equity and transport disadvantage are now a growing research and policy field internationally. Equity is a complex, value laden and multifaceted subject, and its definition is not straightforward. For the purposes of this paper, transport related equity has been defined as the fair distribution of transport impacts (benefits and costs) throughout all sectors of society, but with particular concern for the disadvantaged (Litman, 2012; Martens, 2011). There has been a move within the transport planning fields (for example, in North America, the UK, and Holland) in recent years to explore its relationship with social equity in greater detail and to provide a more solid theoretical basis for transportation focussed equity (see, for example, Beyazit, 2011; Martens, 2011; Martens et al., 2012; Mullen et al., 2014; van Wee and Geurs, 2011; and van Wee and Roeser, 2013). This interest in the equity of transport is also very related to the transport and social exclusion, and transport disadvantage research agenda which has been gaining momentum in the UK, North America, Australia and South Africa since the publication of the 2002-2003 Social Exclusion Unit (SUE) study of transport and social exclusion in the UK (Lucas, 2012). For a summary of key advancements in this research and policy area, see Lucas (2012).

This research draws on egalitarian philosophies to provide a framework for the analysis and evaluation of the policies and outcomes of transport and land-use integration. The study focuses on equity rather than equality. Equity does not require that each person is treated the same, but that they are treated fairly, thus requiring a moral judgement. In her book on 'The Just City', Fainstein (2010) argues that 'the goal of equality is too complex, demanding, and unrealistic to be an objective in the context of capitalist cities' (p.36). The concept of fairness is key. The SDC (2011) argues that '(t)ransport has a central role to play in the creation of a fairer society' (p.11). Justice as fairness is central to the Rawlsian philosophical approach to justice which Sen (2009) describes as a 'major avowal that takes us well beyond the understanding generated by the previous literature on the subject of justice...' (p. 62). Rawl's (1971) 'difference principle' and Sen's 'capability approach' argue the importance of equality of opportunity, and where inequalities exist, they should benefit the disadvantaged in society.

The concept of disadvantaged people having adequate access to, for example, education and employment opportunities (equity or equality of opportunity) is usually accepted as an important function of transport; but there is less agreement with equity or equality of outcome (Litman, 2012; van Wee and Geurs, 2011). The latter implies that disadvantaged people, for example, actually succeed in these activities. Sen's (2009) capability approach places emphasis on the freedom to choose as long as the opportunity is available (i.e., equity of opportunity), rather than people's actual achievements (i.e., equity of outcome).

Although different countries have context specific groups of people (e.g. ethnic minorities) that can be classified as disadvantaged when it comes to transport, many are the same regardless of location. The SDC (2011) identifies a number of groups that are most disadvantaged when it comes to transport impact distribution in the UK. They are: those on low incomes; older people; the disabled; Black; Asian and minority ethnic groups; rural communities and future generations. Hine and Mitchell (2003) and Hine (2007) argue that those on low incomes, women (including women with young children, lone parents, elderly women and women in public sector housing), the elderly, disabled people and children are the groups most likely to experience transport disadvantage.

Accessibility (and associated access to opportunities) is the main benefit distributed through transport investment (Martens et al, 2012). The UK Social Exclusion Unit (SEU, 2003) define accessibility as the ability to reach desired goods, services, activities and destinations at a reasonable cost, in reasonable time and with reasonable ease. It recommends focusing on access to opportunities that have 'the most impact on life-chances, such as work, learning and healthcare' (p.1), particularly for disadvantaged groups (SEU, 2003). Accessibility can be further defined as 'the extent to which the land use and transport systems enable (groups

of) individuals to reach activities or destinations by means of a (combination of) transport modes' (Geurs and van Wee, 2004, p. 127). A distinction is made between accessibility and mobility², the latter of which has dominated the policy arena since the popularisation of the car. This has largely been to the detriment of those without access to a car and disadvantaged groups (for example: children; the elderly; the disabled and the poor) (Martens et al., 2012; SDC, 2011).

These, and other, theoretical developments provide a basis from which further research in this area can proceed. However, there is a considerable research gap in this area in the Republic of Ireland³ as the same research or policy focus has not been realised, particularly within recently developed urban contexts. Some exceptions to this within academia, in urban contexts, include Wickham (2006), and more recently Caulfield and Ahern (2014), and Rau and Vega (2012), with Wickham being the main author focusing on issues relating to transport and social exclusion, car dependency and quality of life. This study seeks to address this research gap. Accessibility and equity of opportunity, within the broader framework of sustainable development, are the two key principles from which transport equity analysis will be based upon.

4. The Study

Housing developed during the early-mid 2000s is often referred to as Celtic Tiger⁴ housing, as construction was a major component and driver of the economy in Ireland at the time, which was experiencing an economic, and associated building, boom. This period was the most significant building period of the 20th and 21st century, with 23% of Dublin's housing stock constructed between 2001-2011 (CSO, 2012). It was also a period that saw the increasing suburbanisation and dispersal of housing and employment, and increasing levels of car ownership and car dependence.

The international financial crisis of 2007/2008 brought the property industry to a sudden halt (with many housing areas left unfinished and lacking services), and a sustained period of falling house prices (and associated housing immobility due to negative equity), rising unemployment, falling household incomes and recession followed. This increased the numbers of people who experiencing relative deprivation, and brought new groups of people, including households in areas previously categorised as 'affluent' or 'marginally above average' in the Pobal HP Deprivation Index 2006 into relative disadvantage by 2011. In 2006, 30.5% of Celtic Tiger households were classified as either marginally above, or marginally below average. By 2011, this had increased to 42.2%, most of this increase coming from a reduction in affluent and very affluent households (Haase and Pratschke, 2012).

4.1 Case Study Methodology

This research employs an embedded case study research design and a mixed methods design approach including archival (Census of Ireland) analysis, survey work and field observations. Three sub case-study areas are being used to explore the subject area in greater detail than can be provided from the archival analysis alone, and to test converging

² Although there is much debate in the literature regarding its definition, mobility simply refers to the movement of people, or the amount of movement (Ross, 2000), but does not take account of the actual ability to reach destinations.

³ While, in Northern Ireland, there is a growing body of research in the area of transport and social exclusion in both urban and rural contexts (see, for example, Kamruzzaman and Hine, 2012 and Blair et al., 2013), the same research focus is currently not evident in the Republic of Ireland, particularly in urban contexts.

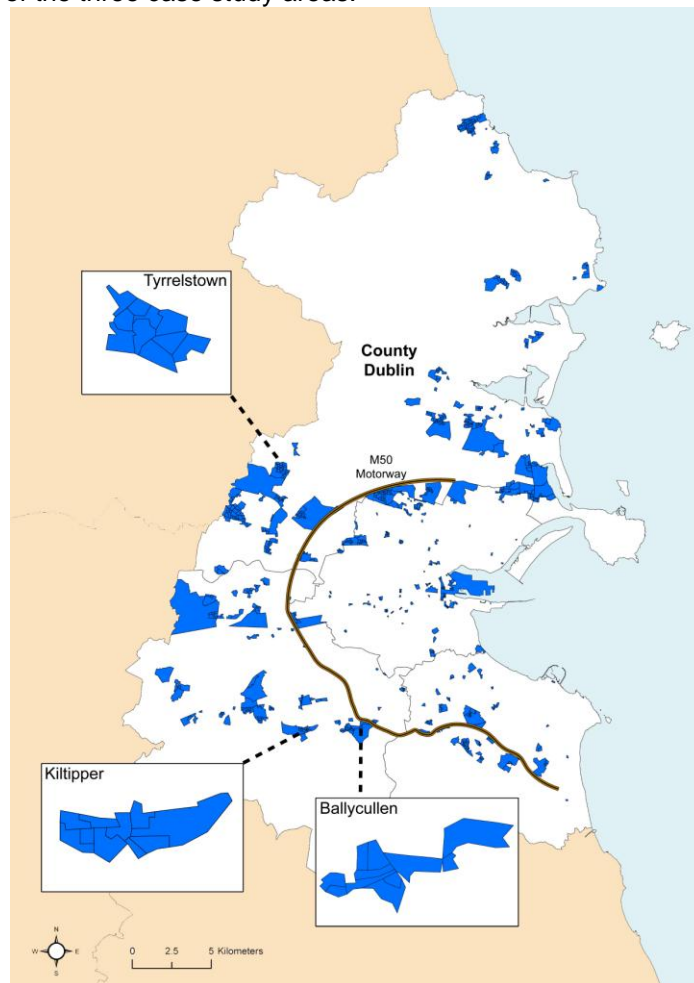
⁴ The term 'Celtic Tiger' was coined by the UK economist Kevin Gardiner in 1994 and widely refers to the period of significant economic growth that took place in Ireland from the 1990s to 2006 (www.finfacts.ie).

lines of enquiry. As this study is still on-going, this paper presents preliminary findings from both the archival and sub-case study area analysis. The three study areas were chosen based on criteria including:

- Areas that have all experienced a reduction in affluence between 2006 and 2011 (due to the economic recession) and represent the affluence levels that are most typical of housing built from 2001 onwards (i.e., 'marginally above average' and 'affluent' as defined by the Pobal HP Deprivation Index).
- Suburban housing areas outside of the M50 motorway that surrounds Dublin, but within the city and suburbs settlement area (as defined by the CSO).
- Housing areas to a form and density typical of this development period, and to a density encouraged by national planning policy⁵.

The three case study areas are Ballycullen and Kiltipper within South Dublin County Council and Tyrrelstown within Fingal County Council (See Figure 4.1 below). This paper presents the initial findings from a self-administered postal household survey that was distributed to 3232 households (all households) within the three case study areas in late February 2014. There was an option given for householders to complete the survey online using Survey Monkey. After the removal of uncompleted surveys, an overall response rate of 20.5% (representing 650 surveys) was achieved, with 91% of this figure being returned by post and the remaining 9% online.

Figure 4.1: Map showing areas where at least 70% of housing was built from 2001 onwards and the location of the three case study areas.



⁵ The mean density for the 3 areas is 40.7dw/ha. The mean for all 2001+ neighbourhoods is 40.3dw/ha. The general recommended density for such housing was guided by the Residential Density Guidelines for Planning Authorities (DoEHLG, 1999) which recommended densities in the region of 35-50dw/ha.

The highest response rate of 28.4% (307) was achieved in the most affluent area (Ballycullen). The response rates for Tyrrelstown and Kiltipper were 17.3% (181 surveys) and 15% (162 surveys) respectively. The response rate can be considered at both the household level for which most of the analysis will be conducted, as well as the case study area level. At the household level (i.e., all case study areas combined), the overall response rate is well in excess of the minimum sample size of 343 that would be required to satisfy a 95% confidence level with a 5% confidence interval. Corrected for finite population, the individual case study areas response rates achieve different sample size margin of errors: Ballycullen (95% confidence level, 4% confidence interval); Tyrrelstown (95% confidence level, 6% confidence interval); Kiltipper (95% confidence level, 6.5% confidence interval). Although the latter two case study areas have confidence levels higher than the more conventional 5% rate, the response rates are considered sufficient, as the analysis is primarily focussed on the household level, and much of the analysis involves more than 650 cases as 2 adults per household provided individual specific data, where relevant.

4.2. Preliminary Results and Findings

Analysis is undertaken using descriptive and inferential statistical tests (gamma and Pearson chi square) using the statistical software package IBM SPSS (version 20). Relationships are generally only considered significant at the alpha level of 0.05. The population groups of particular interest to this context are low and low-middle income households, non-car owning or low car-owning households, lone parents, women, and children. These groups are relevant to the research questions for this project related to transport disadvantage for the car-less in new areas, and also to the issues of forced car ownership. As this is an on-going project, the findings presented within this paper address a number, but not all, of these groups. Two key variables (car ownership and lone parents) from the sample are weighted to better reflect the population and to overcome potential non-response bias. The initial results are presented below⁶.

The survey explores a number of social equity related issues including the concept of 'forced' car ownership and car dependency; housing immobility, barriers to life opportunities and distributional issues in relation to different population and socio-economic groupings. The preliminary findings to-date are presented as evidence supporting the individual research questions.

Research Question 1:

'It is put forward that car dependency is higher than normal in post 2001 neighbourhoods.'

Analysis from the 2011 Census of Ireland (2012) provides evidence to support the hypothesis that car dependency is higher than normal in 2001+ areas than in Dublin in general. Table 4.1 shows the number of private cars per household for the Dublin city and suburbs settlement area, for the Dublin county area and for 2001+ areas. It demonstrates that 2001+ areas have considerably less households with no cars, and more households with 1 car and 2 cars, than the Dublin average. This study uses car ownership levels as a proxy for car dependency. Trends in Ireland indicate as car ownership levels increase, the car is being used more and is associated with greater levels of trip making (NTA, 2013). For example, 2001+ areas have the highest modal share by private means⁷ for journeys to work and school (55.8%), and correspondingly, the lowest modal share by active⁸ means (44.2%). The average for the whole of Dublin is 51.7% by private means and 48.3% by active means (CSO, 2012).

⁶ Note: Some results are presented in 'Adult 1' and 'Adult 2' format as some questions in the survey allowed for responses for 2 adults in each household, where relevant.

⁷ By car (driver or passenger) or by van.

⁸ Active means refers to journeys (the longest part of the journey, by distance) on foot, by bicycle or by public transport.

Table 4.1: Number of Cars per Household				
	Dublin City & Suburbs Settlement Area	County Dublin	2001+ Areas	Percentage Difference
0 Cars per household	26.2%	24.5%	13.1%	-13.1% / 11.4%
1 Car per household	42%	42%	49.4%	+7.4% / 7.4%
2+ Cars per household	31.8%	33.5%	37.5%	+5.7% / 4%
Source: Compiled from 2011 Census of Ireland (CSO, 2012)				

Research Question 2:

'It is postulated that in post 2001 neighbourhoods in Ireland, little attention was given to the development of transport and land-use integration. This has lead, it is hypothesised, to higher levels of transport disadvantage for those without access to cars, and for vulnerable population groups. Households without a car, or with limited access to a car, face considerable burdens associated with accessing education, work and services.'

Commuting and Modal Inequity

Analysis of the 2011 Census of Ireland reveals inequities in terms of commuting times and modes for 2001+ areas. Housing areas developed in 2001 onwards also have the highest mean commuting times for journeys to work and school. Housing areas built before 2001 have a mean commuting time of 25.4 minutes, while housing areas built in 2001 and after have a mean commuting time of 27.6 minutes. There is evidence of modal inequity within 2001+ neighbourhoods as it takes longer to commute to work or school by active modes (mean = 29 minutes) than private modes (mean = 25.3 minutes).

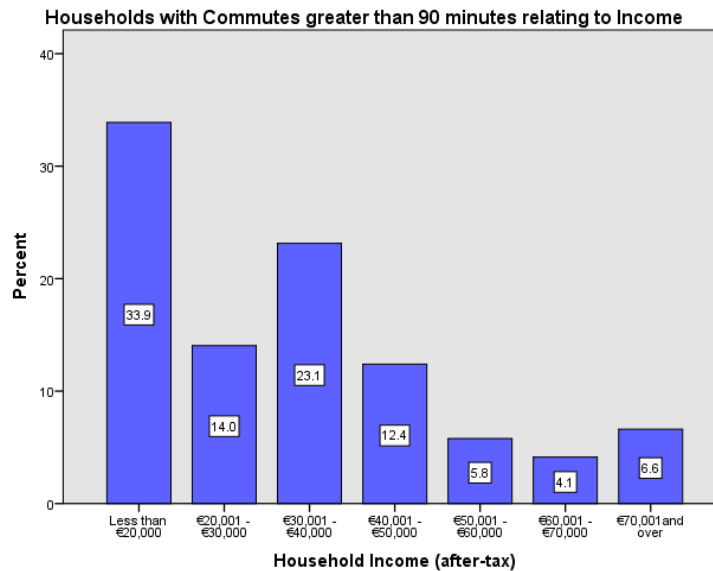
Analysis of the household survey finds residents commuting to work by public transport face significant travel time burdens as compared with commuting by private modes or by bicycle/on foot. Mean door-to-door commuting times for those travelling on foot and by bicycle was 30.5 minutes, and 29.6 minutes by private means (car driver or passenger, van, or motorbike). In contrast, the journey time for those who travel the greatest distance by public transport is over twice as long as 63.4 minutes. This disparity in commuting times illustrates how public transport commuters are at a considerable disadvantage in terms of time as compared with car based commuters.

The survey findings also provide evidence that it is low-middle income households that are disproportionately experiencing burdens associated with commuting times to work. The highest mean commuting times are experienced by the €20,001 – €40,000 income groups (see Table 4.2). The statistical relationship is stronger once commuting times are in excess of the mean commuting times for all 2001+ areas (i.e., over 30 minutes). This is supported by a gamma value of - 0.246 showing a moderate relationship which is statistically highly significant ($p > .000$). Another significant finding (see Figure 4.2 overleaf) reveals that the lowest income group (less than €20,000) are disproportionately represented in the longest commuting category (90 minutes and over). 34% of households with an income of less than €20,000 have a commute of 90 minutes or over each way, where-as only 4-6% of households earning €50,001 or over experience the a similarly long commute. Low-middle income households are more likely to use the bus as their primarily commuting mode, which is a significant contributor to the longer commuting times, whereas the higher income households are more likely to use a car.

Table 4.2 Mean commuting times per income band
(Average door-to-door commute each way in minutes.)

Income (after-tax)	Mean	N	Std. Dev.
Less than €20,000	33.194	67	22.7446
€20,001 - €30,000	36.321	120	23.2121
€30,001 - €40,000	38.194	170	24.8435
€40,001 - €50,000	34.833	105	25.1291
€50,001 - €60,000	32.372	164	17.8313
€60,001 - €70,000	31.256	125	17.8455
€70,001 & over	34.472	123	19.0912
Total	34.541	874	21.6428

Figure 4.2 Percentage of households in case study areas with long work commutes (>90 minutes) related to household income



Access to Opportunities, Family & Friends

The household survey reveals that car ownership levels have a moderate to strong association with householders reporting access¹⁰ related barriers to employment and further education. The SEU (2003) notes the importance of access to employment and education to further one's life chances. The relationship is a negative one – as car ownership increases, access related barriers to finding suitable employment and adult education decrease. A gamma value of 0.315 for 'Adult 1' and 0.422 for 'Adult 2' indicates our ability to accurately predict whether a person reports barriers to suitable employment is improved by more than 32% and 42% respectively, if we know how many cars per household. With chi squares of 37.57 (df 4) and 29.7 (df 4) respectively, both are statistically highly significant ($p > 0.000$). With regards to access related barriers to adult education, a gamma value of .288 indicates a moderate association. The chi square of 25.48 (df 4) reveals a high statistical probability ($p > 0.000$), that the result would be replicated in the general population.

Out of journeys to the supermarket, newsagent, bank/post-office and family/friends, journeys to family and friends were the most difficult for those without a car. 40% of the latter reported this journey as being 'difficult' or 'very difficult' as compared to only 8.4% of those who owned a car. These figures are supported by a highly significant ($p > 0.000$) chi square of 64.81 (df 2), and a gamma value with a strong association (0.492).

Research Question 3:

'Forced car ownership, where those with the least ability to own and run a car do so in order to access essential services, is, it is postulated, evident in these post 2001 neighbourhoods.'

Forced car ownership concerns the involuntary purchase and maintenance of a car for accessibility purposes due to a lack of other transport options (Banister, 1994; Currie et al., 2009). It is particularly connected with lower income households. The findings presented below, all from the household survey, provide evidence to support the argument that there is forced car ownership in 2001+ areas.

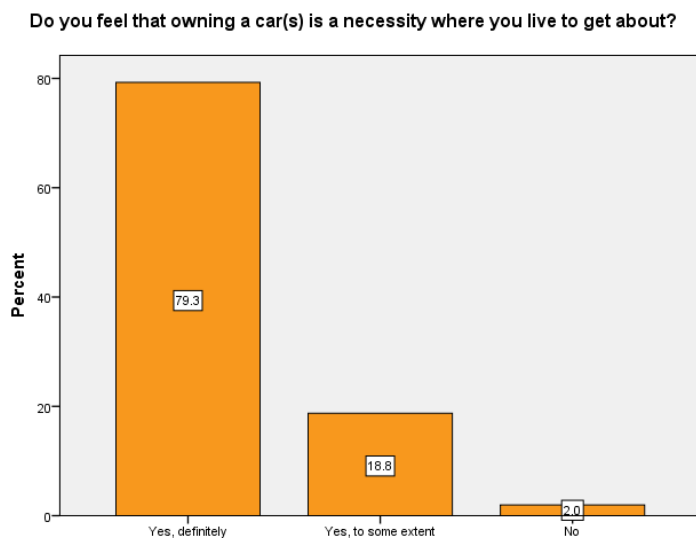
Car as a necessity

The vast majority of car-owning respondents said that they felt that a car was a necessity to get about (see Figure 4.3 overleaf). Out of the non-car households, only 30% reported not to need a car as they can get around satisfactorily without one. This is a particularly concerning statistic considering that all case study areas are located within approximately 10-12 kilometres (i.e. not large distances for a capital city) of the city centre and all are within the city and suburbs settlement area, albeit at the edge of this area. In addition, all are within 4km of a designated major or county town centre within their respective local authority areas.

42% of all households that have 2 or more cars would consider reducing to 1 car if local transport and services were better. This figure increases to 75% for the lowest income households (under €20,000 per annum after tax). This lends further support to the argument that there is a degree 'forced' car ownership in these areas, particularly for the lowest income grouping, who would have the least means to own and run a car. These findings also have interesting transport policy implications as they give an indication of the number of car trips that could be reduced each year if services were improved in 2001+ areas.

¹⁰ Transport related access.

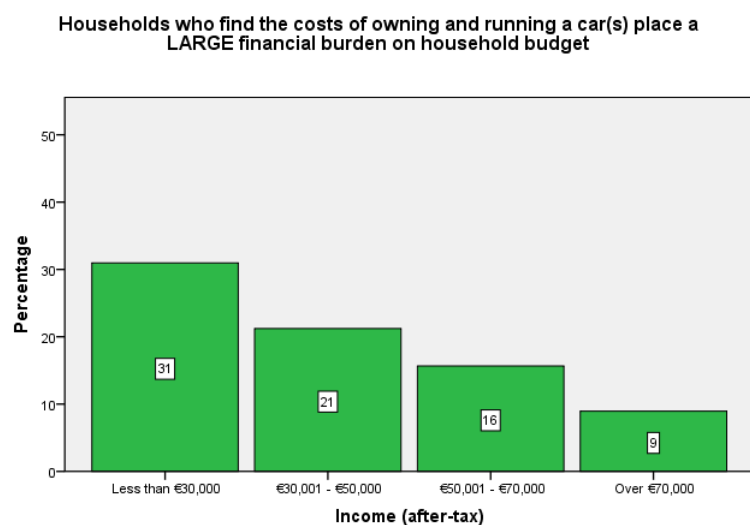
Figure 4.3: Percentage of survey respondents who feel that owning a car is a necessity where they live to get about



Car ownership & financial burdens

81% of households reported that the costs of owning and running a car placed a burden on their household budget, 21% of which is to a 'significant' level. There does not appear to be any statistically significant relationship revealed between the amount of cars per household and the extent of self-reported financial burdens associated with car ownership. However, a strong association (indicated by a gamma value of 0.301) and a highly significant statistical relationship (indicated by a chi square of 33.28, df 6) is revealed between household incomes and self-reported financial burdens associated with car ownership. Car dependency appears to be placing a disproportionate financial burden on low-middle income households (see Figure 4.4).

Figure 4.4: Percentage of households who find the costs of owning and running a car place a large financial burden on their household budget.



In addition to negative impacts on low-middle income households, only 6.5% of lone parents reported no financial burden associated with car ownership, as compared with 20.9% for other household compositions. With a chi square of 10.77 (df 2) and a statistical significance of $p=0.005$, the probability is high that the relationship between financial burdens associated with car ownership and lone parents would be repeated in the general population.

5. Concluding Comments and Future Research Steps

This paper presents the initial findings from an archival analysis and a self-administered postal survey which forms part of a larger research study into transport related social equity issues in Celtic Tiger housing areas in Dublin. Because of the normative nature of equity, the subject area will inevitably draw varying and conflicting views. However, as noted in earlier sections, accessibility and equity of opportunity, within the wider framework of sustainable development, are the key considerations from which the relative equity of these areas will be judged.

The research may be at too early a stage to make a full judgement call but the evidence is pointing to an inequitable and unsustainable situation due to, for example, the high levels of car-dependency, and the degree of 'forced' car ownership, particularly for lower-middle income families who can least afford the costs associated with car ownership. Those who commute by public transport, in particular, are experiencing significant time penalties over those who drive. In addition, the survey results illustrate that without a car, residents find significant accessibility barriers to employment and adult education. These opportunities represent critical life chances for people, and the findings illustrate that it is the people who are most disadvantaged, and arguably those that need them most, that are not getting access to the chances that those on higher incomes and with higher personal mobility are.

Further research will refine the research hypothesis and assessment framework, and will examine potential impacts on a wider range of population groups. The next stages of the study involve the mapping of a range of employment and education destinations and types from the case study areas using census data, and to assess the accessibility to these opportunities based on different travel modes and for different population groups; including lone parents, children, and low-middle income families.

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