

THE GROWTH OF CYCLING IN DUBLIN

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ABSTRACT

In the past few decades much research has been conducted on the increasing numbers of commuters taking up cycling to work. This modal shift has been encouraged by pro-cycling policies to increase the attractiveness of cycling and the construction of new cycling infrastructure. In Dublin, several policies have been applied such as a bike rental scheme, bicycle-purchasing schemes, reducing speed limits and the construction of segregated cycle lanes to promote cycling. This paper seeks to examine what, if any, impact these policies have had on cycling rates in Dublin. The paper compares census data from 2006 and 2011 to determine how cycling rates have changed and if the demographics of cyclists have changed in the city. The results presented in the paper show that cycling rates have increased in Dublin and that more females, those in higher age and socio-economic groups are cycling to work on a regular basis.

Keywords: Growth in cycling, Urban cycling

INTRODUCTION

This paper examines the growth of cycling to work in Dublin, Ireland. Dublin, like many other international cities, has been actively promoting cycling and has launched a number of policies to promote cycling in the city. The data presented in the paper compares census of population data from 2006 to 2011 to ascertain what increases in cycling have taken place in this 5-year period.

Dublin is the capital city of Ireland and has a population of 1.2 million (CSO, 2012). The topography of the city is relatively flat which makes it an ideal candidate city for cycling. Dublin has a mild climate with on average 61mm of rain per month. This compares with 64mm in Amsterdam, 44mm in Copenhagen and 78mm in Freiburg, all cities with a traditional reputation of being the most cycle friendly cities in the world (World.Climate.com, 2012). Given the climate and topography of Dublin it is an ideal candidate for growth in cycling rates.

In 2009, the Irish Department of Transport published two documents, the National Sustainable Travel Policy and the National Cycle Policy Framework

(Department of Transport 2009a, 2009b). Both documents set out goals for increasing the modal share of cycling and the development of cycle lanes and the promotion of cycling using marketing and promotion events. One such policy was the introduction of tax-free loans to purchase bicycles. Caulfield and Leahy (2011) examined how individuals that purchased bicycles under the tax-free loan system in Ireland had used their bicycles. The findings of the study showed that individuals that hadn't owned a bicycle in over seven years were now cycling on a regular basis and the main reasons for this take up in cycling was attributed to health benefits and the flexibility of the mode. Dublin, like many other international cities, has introduced a shared bike scheme called Dublin Bikes. The scheme has been very successful with over 3 million trips recorded in the first three years (Dublin Bikes, 2012). Research into the usage of the scheme has shown that the trips made using the scheme are commuting trips and that prior to the introduction of Dublin Bikes the majority these trips were made by walking or public transport (O'Neill and Caulfield, 2012).

One of the barriers to cycling is a perceived poor safety record. Cycling in Dublin is generally perceived as unsafe with both experienced cyclist and non-cyclists, but the increased provision cycle lanes may change this perception (Lawson et al, 2013). Caulfield et al (2012) also found that the provision of segregated cycle lanes in Dublin can change the perception of safety and further increase the attractiveness of cycling in the city. To improve the safety of cyclists and the attractiveness of the mode over 120km of cycle lanes have been constructed in Dublin since 1990, 25km of which are off-road cycle tracks (Dublin City Cycling, 2012). Each of these policy interventions are examined as part of package improvements in the city and census data is analysed to determine what if any impact they have had on cycling rates.

The paper is divided into the following sections. Section two presents a literature review of similar studies that have examined increases in cycling internationally. The third section of the paper describes the census data and the methods used to analyse the cycling trends in Dublin. The fourth section presents the results of the analysis conducted and the final section presents the discussion and conclusions.

DATA

The data used in this paper is taken from the 2011 and 2006 census of Ireland (CSO, 2012, 2006). The trips examined in this paper represent individual's regular trips to work. The data set has 1.8 million individual's trips in 2006 and 1.7 million individual's work trips in 2011, in Ireland. It should be noted that the results presented in this paper relate to the commute to work. Typically these trips account for a quarter of all trips (Central Statistics Office, 2009).

RESULTS

The first set of results presented in this section examines the rates on increasing cyclist traffic in Dublin. In Dublin, Dublin City Council every November conducts a cordon count of traffic entering the city. Figure 1 presents the growth in percentage share of cycling from 2006 to 2011. These percentages represent the total share cycling as a percentage of total modal share. The results show that since 2006 there has been a steady increase in the numbers cycling into the city. When interpreting these results one should be aware that these counts are conducted in November, and as such the cycling numbers at this time of year would be lower than in other months due to the poor weather at this time of year in Dublin.

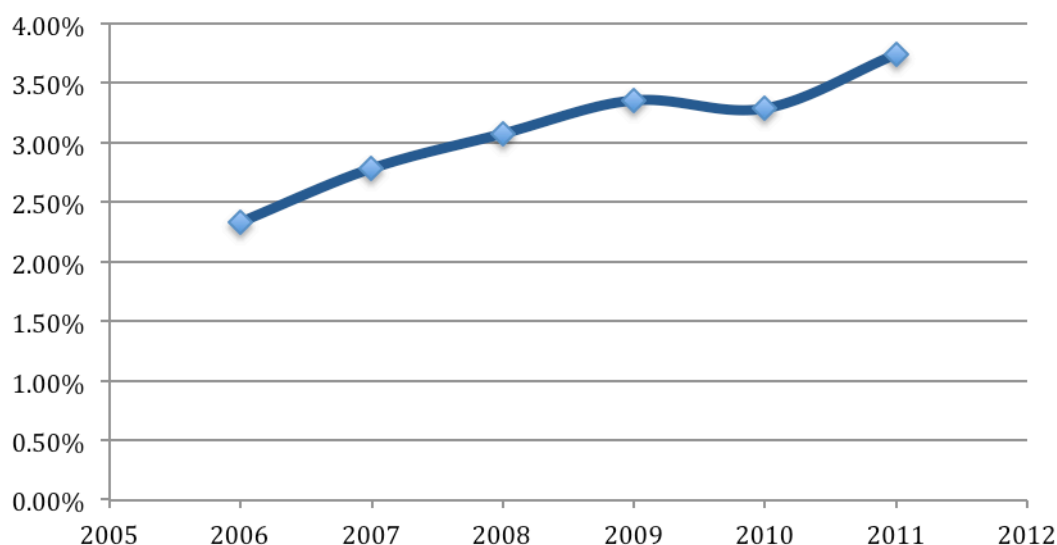


Figure 1 Modal Share of Cycling

Figure 2 shows the percentage change in modal share of cycling in Dublin. The change in cycling is represented by overall changes in each electoral district in the city. The findings show that substantial changes have occurred in the city in the period 2006-2011. The results show that in the city centre cycling has increased its modal share in some areas by as much as 10%. The results also show that the areas of greatest decline in cycling have occurred in the south west of the city. Tables 2 and 3 further examine the areas of increase and decline in cycling in the city.

Legend

Modal Share of Cycling

% change from 2006-2011

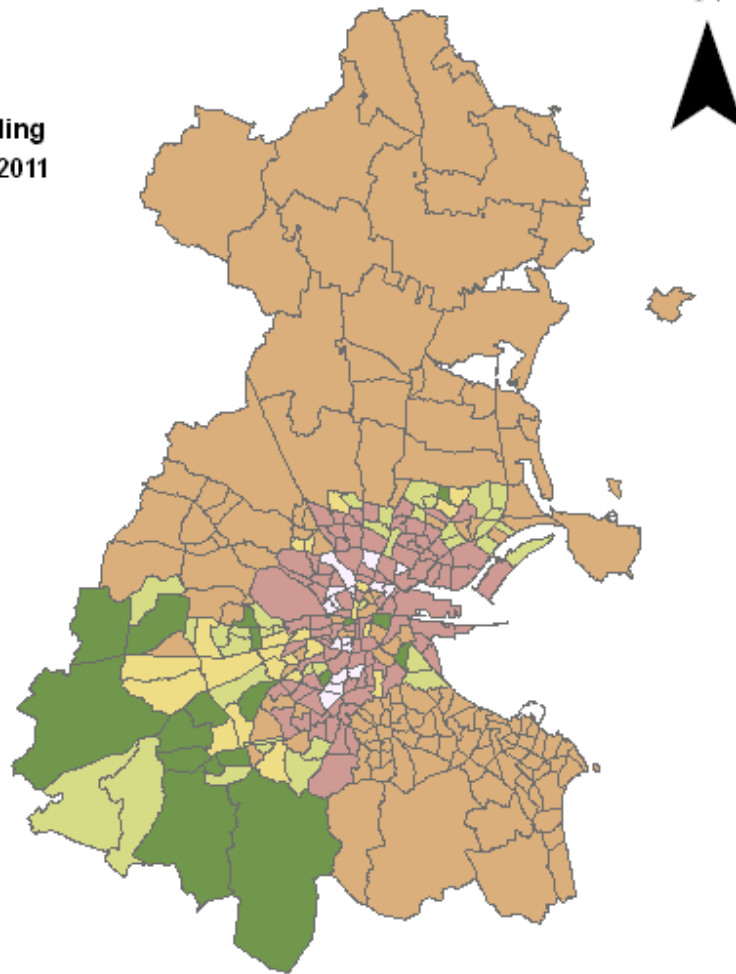
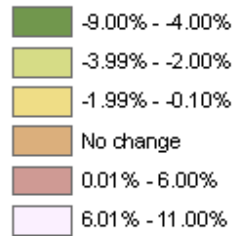


Figure 2 Modal share change in cycling from 2006 to 2011

Table 2 below shows the differences between modal share from 2011 to 2006. The findings show that while Dublin has experienced a 1% increase in cycling it has also experienced a 1% fall in walking to work. The results also show that over 50% of those traveling to work do so by car and alone.

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Table 1 Comparison of modal share 2006-2011

Mode of transport	2011		2006		% Difference
	N	%	N	%	
Walk	67,680	13	70,044	14	-1
Cycle	26,670	5	20,588	4	+1
Bus	65,593	13	76,785	15	-2
Rail	39,717	8	39,510	8	-
Motorcycle	4,790	1	6,607	1	-
Car	260,751	51	260,630	51	-
Car-Passenger	16,226	3	19,969	4	-1
Lorry or Van	17,040	3	19,232	4	-1
Other Means	1,281	0	1,027	0	-
Work from Home	12,012	2	8,213	2	-
Total	511,760	100	514,392	100	

Table 3 presents the results for difference between the characteristics of those cycling in Dublin in 2006 compared to those in 2011. The figures show that there has been a 5% increase in cycling by females between 2006 and 2011. The findings for age show that those in the older age groups 35-44 and 45-54 have shown increases in the numbers cycling. The departure time information shows that there has been an increase in the numbers of cyclists departing later to work. One of the most interesting findings in the data presented in Table 3 is that within the socio-economic groups more individuals in the higher professions are cycling in 2011 compared to 2006. The final set of results shown in Table 3 show that while more people are cycling, the average journey time has gotten longer.

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Table 2 Changing demographics of cyclists

	2011		2006		% Difference
	N	%			
Gender					
Female	7885	28	4812	23	+5
Male	20659	72	15776	77	-5
Total	28544	100	20588	100	
Age group					
15-24	1739	6	2761	13	-7
25-34	11093	39	8107	39	-
35-44	8156	29	4777	23	+6
45-54	5078	18	3304	16	+2
55-64	2256	8	1484	7	+1
65+	222	1	155	1	-
Total	28544	100	20588	100	
Departure time					
Not stated	263	1	1400	7	-6
Before 06:30	1999	7	1633	8	-1
06:30-07:00	2187	8	2269	11	-3
07:01-07:30	2822	10	3189	16	-6
07:31-08:00	4608	16	4007	20	-4
08:01-08:30	6102	21	3862	19	+3
08:31-09:00	5164	18	1491	7	+11
09:01-09:30	2139	7	1785	9	-2
After 09:30	3260	11	779	4	+7
Total	28544	100	20415	100	
Socio Economic Group					
Employers and managers	4676	16	2492	12	+4
Higher professional	4808	17	3140	15	+2
Lower professional	5791	20	3377	16	+4
Non-manual	6345	22	4427	22	-
Manual skilled	1799	6	2182	11	-5
Semi-skilled	2833	10	2683	13	-3
Unskilled	992	3	1015	5	-2
Own account workers	418	1	281	1	-
Farmers	46	0	18	0	-
Agricultural workers	83	0	40	0	-
All others gainfully occupied	753	3	933	5	-2
Total	28544	100	20588	100	
Average Travel Time					
Less than 5 mins	1099	4	819	4	-
6 – 10 mins	3989	14	3221	16	-2
11 – 15 mins	5371	19	3960	20	-1
16 – 20 mins	5897	21	4003	20	+1
21 – 30 mins	7102	25	4584	23	+2
31 mins or more	4547	16	2952	15	+1
Total	28005	100	19539	100	

When examining the 2011 data one of the interesting questions was to determine in the areas that have shown an increase in cycling, did they have different demographics to those areas that saw a decline or no change. The results presented in Table 4 are segmented into four groups using the results presented in Figure 2. The first columns present the overall averages of all commuters in Dublin County; the other three sets of results are presented are segmented by changes in cycling in the different areas (increases, no changes and decreases). The first sets of results presented in Table 4 are for gender and age. The results show that there is very little deviation amongst the gender variables. The results for age show that in the area with increase cycling numbers has 37% of residents aged 25-34, this is 3% greater than the Dublin Average. The results for car ownership show that in the area with an increase in cycling figures that those households with more than one car are less in this area compared to the other areas. The results for mode of transport used shows, as one would expect, cycling numbers are the highest in the area with growth in cycling. The mode choice figures also show that in the areas with no change or a decrease in cycling, greater numbers travel to work by car alone. Average trip time values are the final variable presented in Table 4. The findings show that those living in areas with increased numbers of cycling have on average lower trip times compared to those in the other areas examined. It should be noted however that those living in these areas are closer to the city centre, which would be the largest trip attractor in Dublin.

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Table 3 Demographic Changes in Areas with a Large increase in Cycling

	Dublin Average		Areas with increase		Areas with no change		Areas with a decrease	
	N	%	N	%	N	%	N	%
Gender								
Female	256,973	49	76,168	50	114,300	48	65,561	49
Male	269,085	51	77,606	50	123,288	52	67,254	51
Total	526,058	100	153,774	100	237,588	100	132,815	100
Age group								
15-24	41,328	8	12,711	8	16,790	7	11,619	9
25-34	179,896	34	57,096	37	75,944	32	46,399	35
35-44	133,938	25	35,611	23	63,373	27	34,516	26
45-54	102,743	20	29,107	19	48,942	21	24,224	18
55-64	58,689	11	16,551	11	27,638	12	14,232	11
65+	9,464	2	2,698	2	4,901	2	1,825	1
Total	526,058	100	153,774	100	237,588	100	132,815	100
Number of cars per household								
One	187,390	37	57,498	40	79,321	35	49,721	39
Two	195,365	39	44,775	31	100,548	44	49,469	39
Three	42,669	9	9,925	7	22,361	10	10,274	8
Four or more	13,587	3	3,122	2	7,141	3	3,279	3
None	61,765	12	29,592	20	17,968	8	13,981	11
Total	500,776	100	144,912	100	227,339	100	126,724	100
Mode of transport								
Walk	67,680	13	31,158	21	22,137	10	14,205	11
Cycle	26,670	5	13,497	9	8,329	4	4,766	4
Bus	65,593	13	24,247	16	22,966	10	17,973	14
Rail	39,717	8	9,077	6	24,146	10	6,425	5
Motorcycle	4,790	1	1,353	1	2,132	1	1,286	1
Drive – alone	260,751	51	59,278	40	129,235	56	71,354	55
Drive – passenger	16,226	3	3,551	2	7,487	3	5,111	4
Van	17,040	3	3,453	2	7,943	3	5,555	4
Other	1,281	0	272	0	669	0	333	0
Work from home	12,012	2	3,501	2	6,624	3	1,872	1
Total	511,760	100	149,387	100	231,668	100	128,880	100
Average Travel Time								
Less than 5 mins	27,742	6	7,231	5	13,440	6	6,971	6
6 – 10 mins	56,631	12	15,009	11	25,624	12	15,762	13
11 – 15 mins	60,763	12	18,774	13	25,360	11	16,422	13
16 – 20 mins	78,160	16	25,678	18	32,000	15	20,189	16
21 – 30 mins	118,043	24	38,141	27	50,676	23	28,811	23
31 mins or more	146,780	30	37,965	27	73,541	33	34,813	28
Total	488,119	100	142,798	100	220,641	100	122,968	100

DISCUSSION AND CONCLUSIONS

The results presented in this paper show a city in transition from a low cycling base to a city that embraces cycling as a sustainable and viable alternative to mechanised modes of transport. Dublin is comparable to many other global cities and the lessons learned in Dublin could be applied in many other cities. While the analysis presented in this paper can't pinpoint any single measure as being responsible for the modal shift towards cycling, it does show the effectiveness of the package of measures used in Dublin.

One of the key findings of the paper is the identification of the changes in demographics in cyclists in the city. A key target group to encourage to take up cycling are females and those in with higher incomes that have car availability. The results in this paper show that there has been a 5% increase in females cycling to work and a substantial increase in the numbers in the higher professions cycling to work on a regular basis.

As discussed in the paper, Dublin has introduced several policies to promote cycling over the past five years. The findings in this paper point to the success of the envelope of measures used in Dublin have achieved some modal shift towards cycling. To some extent the research the research presented does underestimate the levels of cycling happening in the city as it doesn't look at the non-work trips.

Dublin unlike other European cities has a lower cycling base and the rates of non-mechanised mode share were comparable with North American cities. However, Dublin has made substantial strides to become a cycling friendly city and to have cycling as a viable alternative to mechanised modes of transport. Lessons can be learned from the study presented in this paper for other cities both in Europe and North America on how take up and the attractiveness of cycling can be changed with a mix of new infrastructure provision and promotion of cycling.

ACKNOWLEDGEMENTS

The author would like to thank the Central Statistics Office of Ireland for kindly supplying the data used in this research.

REFERENCES

Central Statistics Office. National Travel Survey, CSO, Dublin, Ireland, 2009.

Caulfield, B., Leahy, J., Learning to cycle again: examining the benefits of providing tax-free loans to purchase new bicycles, *Research in Transportation Business & Management*, 2, 2011, pp 42 – 47.

Department of Transport, 2009a. Smarter Travel: A New Transport Policy for Ireland 2009–2020, DoT, Dublin.

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Department of Transport 2009b. Ireland's First National Cycle Policy Framework, DoT, Dublin.

Dublin City Cycling. Accessed on line 19/10/12 <http://www.dublincitycycling.ie/cycling-facilities/cycle-lanes-and-facilities>

Lawson, A., Pakrashi, V., Ghosh, B., Szeto, W.Y. Perception of safety of cyclists in Dublin City. *Accident Analysis and Prevention*. 50 (2013) 499-511

O'Neil, P. Caulfield, B., Examining user behaviour on a shared bike scheme: the case of Dublin Bikes, The 13th International Conference on Travel Behaviour Research, Toronto, 2012.

World Climate.com. Accessed on line 7/11/12 <http://www.worldclimate.com>