Transportation Research Part D 25 (2013) 49–58

Contents lists available at ScienceDirect

Transportation Research Part D

journal homepage: www.elsevier.com/locate/trd

A study of feasibility and potential benefits of organised car sharing in Ireland

Niamh Rabbitt, Bidisha Ghosh *

Civil, Structural and Environmental Engineering Department, Trinity College, Dublin 2, Ireland

ARTICLE INFO

Keywords:
Car sharing
CO_2 emissions
Sustainable travel
Travel cost analysis

ABSTRACT

In this study, the market potential of car sharing has been evaluated using multiple alternative scenarios which examine the geographic, financial and environmental factors influencing car sharing adoption. The scenarios are applied to the available and collected travel information of the Irish population to estimate the potential impact of introducing car sharing in Ireland. The analysis identified that car owners who travel predominantly on alternative modes, could make significant cost and CO_2 savings through car sharing. A reduction of yearly CO_2 emissions of 86 kt is readily achievable through car sharing, with reductions up to 895 kt possible with appropriate policy and financial support. These figures are comparable to other measures proposed under the Irish National Climate Change Strategy.

1. Introduction

The 2009 National Travel Survey (Central Statistics Office, 2011a) found that 73% of journeys in Ireland and 61% of journeys in Dublin were made by private car. The transport sector in 2007 was responsible for 36% of Ireland's energy-related CO_2 emissions, higher than any other sector. Statistics published by the Sustainable Energy Authority of Ireland (SEAI) confirm that in 2010, private car transport accounted for 41.9% of all energy used in transport and 16.2% of national final energy consumption (Central Statistics Office, 2011b). With increasing concern over the rising cost of fuel and CO_2 emissions, ways of reducing both car travel itself and the impacts of car travel are being sought. The 2007–2012 National Climate Change Strategy (Department of the Environment, Heritage, and Local, Government, 2007) identified opportunities for such reductions through the alignment of transport investment with spatial planning and a modal shift through Transport 21, Not included in these measures is the use of car sharing (CS).[1]

Active subscription to a car sharing service (CSS) changes individual travel behaviour which impacts on: the greenhouse gas emissions of travel, levels of public transport use, the times at which people travel, levels of private car ownership, distances travelled in private vehicles, and levels of cycling and walking. In North America, among CSS members 80% of households own no cars and the number of cars owned by all households was reduced by 50% after joining CSS (Martin and Shaheen, 2010). In Europe, 14–40% of the car sharing members (CSMs) sold at least one car after joining a CSS (Loose, 2010). The average distance travelled in CS cars is significantly lower than the distance travelled in cars owned by members prior to joining, although a group of CSMs increased their car dependence after joining a CSS. About 60% of CSMs came from no-car households who joined CSS to gain access to a car with a smaller number joining as an alternative to purchasing

* Corresponding author. Tel.: +353 18963646; fax: +353 16773072.
E-mail address: bghosh@tcd.ie (B. Ghosh).

[1] The term 'car sharing' refers to the car rental schemes where members can rent cars from convenient points on a short term, for a monthly subscription fee, a per hour fee and/or a per km travelled fee.

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http://dx.doi.org/10.1016/j.trd.2013.07.004

another vehicle. On joining a CSS, the car dependence of these CSMs increased along with their individual CO_2 emissions; although the increase is considerably lower than that associated with the purchase of a car.

CS allows members' access to a car for specific journeys without the capital cost of owning a car and it appeals mainly to specific segments of the population, particularly those who live in a one or two person, carless households, employed, highly educated, and do not commute by car and are aged between 25 and 49 years (Loose, 2010; Cervero, 2003; Martin and Shaheen, 2010). Overall a population with CSMs has a lower level of car-dependency and transport related CO_2 emissions than a similar population without access to CSS. The purpose of this study is to identify the potential of CSS when introduced to Ireland.

2. Methodology

A methodology for estimating potential market and the impact of CSS in Ireland is developed. As outlined in Fig. 1, the potential market of CSS in Ireland has been estimated in a three stage process. In the first stage, a geographic analysis was carried out. Following the literature review, six criteria were used to identify likely users (LU) based on socio-demographic data. The population density of LU in unit geographic areas were then calculated. Based on the population density of LU and the business requirements of CSS, each unit area was then categorised into one of five CSS viability levels. In the second stage an economic and environmental analysis was carried out to establish whether individual car owners could derive a financial benefit from a switch to CS, whether individual non-car owners could derive a benefit from car access at a reasonable price and whether there could be an environmental benefit arising from this behaviour change. This analysis was based on a survey of individual travel patterns and Department of Transport data. A best case, worst case and most likely scenario of travel behaviour changes were applied to each individual's survey responses. The resulting cost and CO_2 emissions impacts of these behaviour changes were calculated. In the final stage, the results of the geographic and environmental analyses were combined to assess the potential scale and impact of differing levels of CS uptake.

CS is most suitable for the lifestyles and travel patterns of certain groups of people, defined as LU. Following Loose, 2010; Cervero, 2003; Martin and Shaheen, 2010, these most likely CS users were identified as residents of one/two person households, aged between 25 and 49 years, working or self-employed, have at least an ordinary degree, residents of no

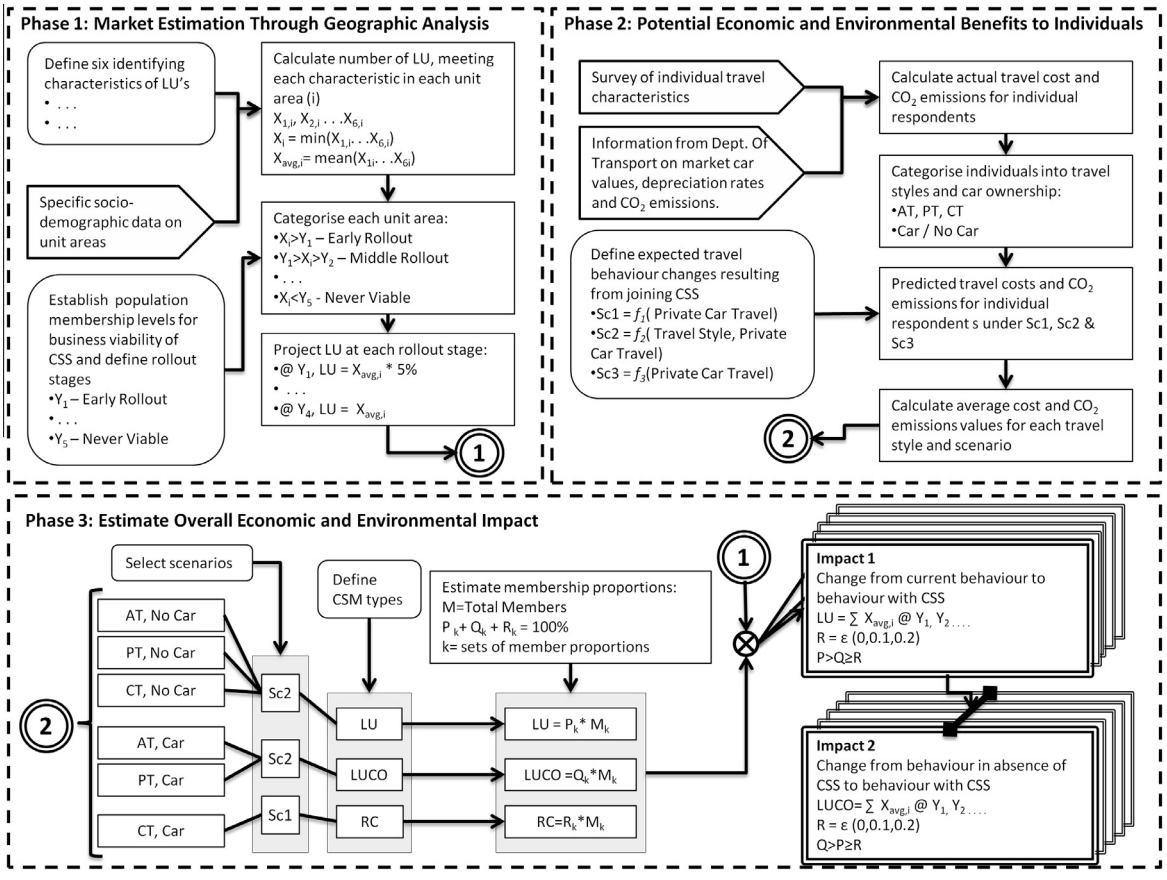

Fig. 1. Schematic for estimating the potential impacts of CS adoption.