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Identifying reasons for historic car ownership and use and policy implications: An explorative latent class analysis

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ABSTRACT

The number of historic vehicles is steadily increasing. Although, these vehicles are part of our cultural heritage with respect to road transport and mobility, they present (future) environmental concerns, which is a relevant development from policy perspective. Yet, as far as the authors are aware, there is hardly any academic literature addressing this issue. This study aims to provide a first exploration of historic cars and reasons for ownership and use and policy implications. To this end, a large explorative survey is conducted among HV owners of 15 European countries. Focusing on passenger car owners only, a latent class analysis is performed to identify possible segments among historic car owners. Seven latent classes are identified: recreational owners, reserved owners, repair men, die-hard fans, next generation fans, frequent drivers and collectors. Overall, the results indicate that there is large diversity in the ownership and use of historic cars and the reasons behind ownership. However, in general, historic cars are used much less than modern cars. Only the group of 'frequent drivers' (8% of the sample) represent a potential concern regarding emissions from a policy perspective. Finally, policy recommendations are provided for decision makers regarding historic cars.

1. Introduction

Historic vehicles[1] (HVs) form a specific category of transport, either on-road or in preserved off-road conditions that represent a historic era in the evolution of the vehicle industry. HVs are becoming increasingly popular among owners, enthusiasts and also the wider public, which makes the area of historic vehicles relevant from a social, cultural (heritage) and economic point of view (Tam-Scott, 2009).

Based on a broad survey among individual enthusiasts, traders and HV clubs, Frost et al. (2006) conclude that, within the European Union, there are roughly 786,000 club members, belonging to nearly 2000 clubs and owning some 1,950,000 historic vehicles (Frost et al., 2006). In addition, Frost et al. (2006) estimate that over 55,000 people earn some or all their living serving the historic vehicle movement and that historic vehicle related activities are worth over €16 billion to the EU annually. This latter figure refers to the quantifiable benefits of these vehicles and does not include the non-monetary and non-instrumental gains for individuals resulting from owning, repairing, driving and/or admiring historic vehicles.

The number of HVs (1.9 million) accounts for only a small percentage, roughly 1%, of all vehicles registered in the EU (Frost et al., 2006). Furthermore, HVs account for an even smaller percentage (0.07%) of the total distance travelled by all vehicles (Frost et al., 2006). However, the number of HVs can be expected to rise for at least two reasons: a) increasing numbers of cars are being manufactured, globally. Car production has increased from 41 million in 2000 to 67 million in 2014 (Statista, 2015) and b) the average life expectancy of cars is also increasing. For example, in the EU, the average age of cars has increased from 8.4 years in 2006 to 9.7 in 2014 (ACEA, 2015).

While in terms of CO_2 emissions the (relative) impacts of HVs are (still) rather low, older cars are generally more polluting in terms of other pollutants, in particular hydrocarbons, nitrogen oxides and particulate matter (PM). For example, in terms of particulate matter, the emissions (per kilometre driven) of cars manufactured before the introduction of the Euro 1 norm, introduced in 1992 in the EU, may be at least 30 times higher than a new car with a Euro 6 norm (Dieselnet, 2015). Motivated by the goal to improve local air quality, authorities in a number of European cities have implemented regulations to ban older vehicles from their (inner) city areas. These areas are normally referred to as "Low Emission Zones".[2] However, policies across

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[1] In this paper, historic vehicles are defined as vehicles older than 30 years. Historic vehicles are sometimes called 'classic vehicles', however, we stay with the term historic rather than classic, since latter can entail broader meanings for a vehicle.

[2] These areas can be found at the official website affiliated to EU commission: http://urbanaccessregulations.eu/

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different countries regarding HV admission to urban areas have not been always congruent. For example, in London, HVs are exempted from paying the extra charges for entering the 'Ultra Low Emission Zone'. Also with respect to road taxation, exemptions for older cars are sometimes made. For example, in the Netherlands cars older than 40 years are exempted from paying road taxes.

Given the relevance of HVs from the perspective of cultural heritage, the economic and non-instrumental benefits to owners and the general public and also (future) environmental concerns for transport policy makers, it is surprising that there is hardly any academic literature addressing this topic.

Moreover, some studies (Steg, 2005; Schwanen and Lucas, 2011) discusses non-instrumental factors such as feeling of sensation or showing status, emotions or even attitudes for car use. However, this mentioned literature mainly considers modern cars and not HVs. Given that HV ownership and use could be an expensive hobby and considering that these vehicles have lower safety and handling performance than modern ones, it is expected that non-instrumental factors play an important role in HV ownership and use, which requires further exploration.

The primary aim of this study is to provide a first exploration on the policy issues regarding pollution caused by historic cars[3] and in addition, investigate the non-instrumental factors influencing ownership of such cars. These two objectives are approached empirically, in this study. Specifically, we aim to answer the following questions: What kind of people own historic cars? How many cars do they own on average? To what extent do they use their car(s) for regular transport (and thus contribute to air pollution)? What are their motivations to own historic cars? To what extent are they member of HV clubs? To what extent are they engaged in attending historic vehicle events? How much do they spend on the ownership and maintenance of their cars? Which non-instrumental factors are relevant for historic car use and ownership? The answers to these questions provide some indications on the role of non-instrumental factors in owning and using historic vehicles as well as an assessment of the extent in which historic vehicles (indeed) represent a relevant target group for environmental policies.

To answer the formulated research questions, a large survey is conducted among HV owners of 15 European countries. Using the data from this survey, we apply an explorative probabilistic clustering technique, namely latent class analysis (Vermunt and Magidson, 2002), to identify distinct segments in the population of HV owners. We use the total mileage on historic passenger car(s) and other indicators to reveal the shared characteristics of each latent class. The environmental impacts of HVs form the main concern for policy makers in terms of setting regulations in use or restrictions on HVs. Therefore, we use the annual mileage as an approximate determinant of the pollution emitted by HVs.

The remainder of this paper is structured as follows. In Section 2 we provide a brief literature review on the topic of HVs. Section 3 discusses the method and data and Section 4 presents the outcomes of the latent class analysis. Finally, Section 5 summarizes the conclusions and discusses several policy outcomes and practical implications.

2. Brief literature overview

As mentioned in the introduction, the literature on motivations of HV ownership is scarce. As far as the authors are aware, there are only a handful of papers addressing the topic of historic vehicles. They generally adopt a qualitative research methodology and focus on the question why owners are so passionate about their historic cars.

One of the earliest investigations is the study of Dannefer (1980). Dannefer adopts a sociological approach to understand owners' passionate commitment to historic cars. According to Dannefer the logic of the car enthusiast resembles Weber's notion of *wertrationalitat* (value-rationality). Hence, the car is no longer a way to achieve an end (e.g. getting from A to B) which would reflect the idea of *zweckrationalitat* (instrumental rationality), but has become an end, something to be valued in itself. In this respect, it is interesting to note that, while enthusiasts differ in their specific motivations of owning historic car(s), many owners prefer the car to be in original condition, or to be restored to its original specifications. It is this common goal that creates a sense of community (Dannefer, 1980).

That being said, the specific motivations to own a historic car may differ strongly and can even contradict. For example, some primarily own such vehicles to participate in shows and events. Such use of the car may conflict with the purpose of touring with the car, which generally negatively affects its presentation (Dannefer, 1980). Still others mainly own these vehicles to restore them or to build up a collection.

Tam-Scott (2009) draws attention to the sustainability aspects of HV ownership. According to this author, the passionate commitment to a car means that owners tend to keep and maintain the car(s) for prolonged periods, which reduces negative environmental impacts. According to Tam-Scott (2009, p. 124)," the permanent and enduring relationship of classic car owners with their vehicle is an example of how should people redefine their consumption patterns when it comes to durable products such as cars."

Nieuwenhuis (2008) adopts a similar perspective. According to Nieuwenhuis (2008), the ownership/use of historic vehicles should be seen as a form of sustainable consumption. This means that consumers go beyond the intended lifetime of the products (such as cars) by consuming the products responsively, thus reversing unsustainable consumption behaviours.

Not only driving cars but also producing cars consumes energy. Based on literature Van Wee et al. (2000) conclude that about 15–20% of the life-cycle energy requirement of new cars in the Netherlands (1990 – 1994) relates to car production, maintenance and disposal. Probably, production and disposal is by far the largest category within those 15–20%. In the case of HVs, the additional (marginal) energy use for production and disposal approaches zero. On the other hand, HVs are less fuel efficient than modern cars. Regarding the CO_2 emissions of historic vehicles compared to modern vehicles, based on data from the German car fleet between 1960 and 2011 as published in Knörr et al. (2012), Araghi and Van Wee (2015) conclude that during these years the CO_2 emissions have declined by 10–20%. Therefore, they conclude that the additional energy use per kilometre due to the lower energy efficiency of HVs is in the same order of magnitude as the reduction in the energy use due to production and disposal. Note that the reduction of emissions of pollutants such as NO_x and PM_{10} are considerably larger, in order of 6 times and 2.5 times respectively (see: Araghi and Van Wee, 2015).

Finally, it has been argued that historic vehicles help to create "contextual ties" between people and their culture and social identity. The difference in technology and appearance of German, British or Italian historic vehicles are sometimes used to point out subtle differences between people of these nations and explain some social constructs of these societies; for example: German cars being "well-built" and "reliable" and Italian cars being "expressive" and "temperamental" (Tam-Scott, 2009, pp. 120–121).

To summarize, unlike the general literature on car ownership, which primarily focuses on the instrumental use of the car, the limited literature on HVs mainly focuses on social, cultural and sustainability aspects of HV ownership. According to Steg (2005) and Anable and Gatersleben (2005), non-instrumental and affective motivations play an important role in car use and ownership. However, with respect to historic cars, little empirical evidence is available related to these motivations. Based on the studies reported above, it can be expected

[3] In this study, we will consider historic passenger cars rather than all types of HVs, since they are by far the most common type of historic vehicles.