From car to E-bike?

Farideh Ramjerdi* (fra@toi.no), Bjørn Gjerde Johansen, 1, Paul Koster2,3

*Corresponding author

1Institute of Transport Economics, Oslo Norway
2VU University Amsterdam, The Netherlands
3Tinbergen Institute Amsterdam, The Netherlands

The Norwegian National Transport Plan requires the future increase in traffic to be accommodated by public transport, cycling and walking. It emphasizes the promotion of cycling by investments in cycling infrastructure and facilities. Environmental concerns and health benefits of cycling are the main arguments for this plan. The share of short trips using bicycle as the main mode of transport is much lower in Norway than most European countries. The low level of provision of cycling infrastructures, cold, wet, and long winters and hilliness of urban areas are potential reasons for the low share of cyclist in Norway. Norwegians usually buy their bikes more for sport rather than for transport. Hardcore cyclist often dominate the Norwegian urban areas.

The electric bike (E-bike) first became popular in China, where the government made developing E-bikes an official technology goal in 1991. E-bike market in China began to grow at an exponential rate during the first decade of the 21st century. While E-bikes have been present in urban areas in China for quite a while, E-bikes recently has become popular in Europe. The global pattern for sales of E-bikes in 2013 has China in first place, at about 32 million, followed by Europe at 1.8 million. Among the European countries with the largest share of E-bike sales are Germany (45%), Netherlands (21%), France, Italy and Austria, (each with about 5%) (Source: The Association of the European Two-Wheeler Parts and Accessories’ Industries, COLIPED).

A range of factors has contributed to the emergence of E-bikes with satisfactory range and improved performance. While E-bikes were originally targeted at the middle- and older age cyclists, the market is expanding to other segments of the population. Those with longer commuting distances increasingly use E-bikes to travel to work. However, the market for E-bikes in Norway is in its infancy. The volume of the bicycle market is estimated at 400 000 unit per year. The current sales of E-bike is estimated to stand at 12 000 to 15 000 unit per year or a share of 3-4%.

The potential market for E-bike can be quite large in Norway. E-bike can potentially increase the cycle mode share in urban areas in Norway. It better meets the Norwegian climate and topography than an ordinary bike for most part of the population. Politicians are debating the removal of VAT on E-bikes like on electric cars in order to promote cycling. Many of the large sporting goods chains in Norway are planning campaigns for E-bikes.

This paper reports the results from the project InnoBike, financed by TRANSNOVA with aims at promoting new clean transport technologies and increased use of climate friendly means of transport. One of the aims of the project is to evaluate the potential...
demand for E-bikes and measures to increase market shares of E-bikes in Norwegian urban areas.

To measure the demand for E-bike, a stated preference (SP) study was developed. The SP study comprise of a vehicle type choice experiment among ordinary bike and E-bike, a mode choice experiment among car, public transport and cycle, and two route choice experiment for cycle that focus on the valuation of parking facilities for cycle, cycle paths and shower and changing facilities at work or school.

The vehicle type choice experiment includes the price for E-bike, the battery recharging time, the battery range, the battery life time and the battery replacement costs, whereas for an ordinary bike only the price is included. Furthermore, an outside alternative is included that represent not buying a bike. The mode choice experiment the attributes for cycle includes travel time and parking cost, the attributes for car include travel time, parking cost and variable car cost, whereas the attributes for public transport are in-vehicle time, costs, walk and wait time and number of transfers. Common attributes (context variables) in each choice set are weather type and hilliness.

The route choice uses a similar configuration where we pay special attention to weather and hilliness and cycle infrastructure variables. To enhance realism, the levels of the attributes are pivoted around reference trips of the respondents.

In the first part of the questionnaire, the respondents report their travel behaviour to work or school (for students and employed), their use of different modes of transport in their daily activities, in addition to a set of questions that explores respondents habits, attitudes and values. The SP experiments are followed by questions related to the socio-economic, demographic and locational variables. The data was first analysed using a factor analysis to identify different classes of travellers. Latent class models are applied to the four SP data in the study.

Respondents were recruited from an e-mail database and the survey was conducted on internet in the summer of 2014. Net respondents were about 1100 with a response rate of about 22%.

The results of the study will help to identify the key driving forces behind the adaptation of E-bikes and can be used for evaluating the policies such as subsidies for the purchase of E-bikes.

The paper presents the design of the study, the estimation results and a discussion of the results in relation to policies to promote E-bikes.