

The Drive to Drive Electric: A Combined Approach toward User Motivation and Adoption of Plug-in Electric Vehicles

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Introduction

While plug-in electric vehicles have existed for quite some time, until now technological limitations and high costs have prevented large-scale adoption by the general public. In the past few years however, we've seen an increase in ecological awareness. Along with soaring oil prices, this has propelled large automobile constructors to introduce hybrids and even the first plug-in electric vehicles (P(H)EVs). This raises questions concerning drivers and barriers surrounding electric vehicle usage.

Theoretical Framework

Successful user adoption of such vehicles isn't self-evident. First of all, plug-in vehicles are more expensive than their internal combustion engine (ICE) equivalent, requiring long-term use to reap the economic benefits of cheap electricity. Also, development of support infrastructure requires enormous investments in terms of capital and research. This development of accompanying services is however crucial in order to provide the needed additional value to promote P(H)EVs.

Secondly, P(H)EVs are a hard sell due to the loss of some use comfort and mobility compared to ICE vehicles. In spite of technological advances, P(H)EVs still have a reduced range and long charging times. This necessitates a change in use patterns which should be facilitated.

Finally, an important argument in favor of electric vehicles is an ecological one. This benefit lies at the heart of P(H)EVs and can mainly be described in terms of societal gain rather than personal gain. This eco-mindshift is key to provide sufficient motivation for long-term, sustained P(H)EV use.

Taking into account these elements, we believe that the motivation towards adoption

of electric vehicles lies in a combination of adoption diffusion studies and theoretical insights into behavior motivation.

Adoption diffusion according to the tradition of Rogers proves valuable in assessing product features and introduction strategy of P(H)EVs as a technological innovation. User segmentation according to the tendency to accept and adopt a specific technology can prove to be very useful.

On the other hand, in order to study behavior motivation, Self Determination Theory (SDT) provides us with a fitting framework. According to SDT, autonomous motivation (ecologic or hedonic, e.g. an internalized ecological conviction) would be more successful in causing a lasting change in behavior than external motivation (e.g. a monetary reward). This change would be needed to sustain the shift to electric driving. In practice, this means breaking the association between ecological behavior and reduced pleasure or gain.

Research Objectives

Noting the different factors involved, we believe a combination of models is required to adequately describe all involved elements. Within an interdisciplinary partnership, we launched a broad online survey aimed at Flemish drivers, of which the data will soon be available. We measured product specific adoption potential based on P(H)EV and smart charging service features, and combined these data with user motivation and attitude measurements concerning electric vehicles. In using this inclusive approach, we aim to sketch not only the technological drivers and barriers which determine user interest in P(H)EVs, but we also aim to confirm the value of models describing the different user motivations for P(H)EV adoption and long-term use.