LONDON SCHOOL OF ECONOMICS AND POLITICAL SCIENCE

Department of Psychological and Behavioural Science

How a consumer-driven approach could accelerate electric vehicle (EV) adoption

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Assignment:
You are a member of a group of experts [your working group] consulted, on an economic issue currently occurring ["the case"], by one of the major stakeholders (e.g. government, key industry player, consumer association…). Your working group must produce its report by early December in the form of a 5000 words report. 3 intermediary presentations of the progress of your work are planned with the stakeholder. The final report must be 5000 words max.

The final report should include a short background description of the case (1000 words max, not included in the 5000 words], a clear statement of the questions the group addressed in the report, a brief review of relevant literature in the domain of the case, a theory literature review presenting and discussing the theories most relevant to address the case (accounting for what happens) and how they apply. Finally, based on the literature above and justified by it explicitly, some recommendations for the stakeholder. These recommendations should foster sustainability.

The reference list (which must follow APA rules) is not included in the word count. The background description does not count (but must be less than 1000 words). Tables count. You can add supplementary material in appendix but no more than 20 pages.
The intermediary presentations in classes do not count for the final mark: they are part of the work and not intended for evaluation.

NB: This essay is the actual assignment piece produced by the group; before receiving marking and feed-back. It is not a report, does not commit the LSE, and is provided ONLY as an example of what is produced in the group work in PS465 for the benefit of future students. Remember they were written only in a couple of weeks during an already intense term, by students with no previous knowledge of the domain.
The assessment consisted of this group essay, of an individual MCQ and of an individual essay (this year, a reflexive piece on lessons learned in the group work).
The strategic appendix for the Industry client has been suppressed for confidentiality.
This essay received a very good mark in the (double, blind) marking.

How a more consumer-driven approach can accelerate the EV adoption cycle: A psychological analysis

1. Introduction

In the UK in 2014, approximately one-quarter of greenhouse gas emissions came from the transportation sector (Department of Energy & Climate Change, 2015). A broader adoption of electric vehicles (EVs) could lead to a significant reduction in greenhouse gas emissions and contribute to a new sustainable transport system. Although the market for alternatively fuelled vehicles grew by 40% from 2014 to last year, it still only made up 2.8% of all vehicles in the UK in 2015 (Murray, 2016). The problem seems even more alarming considering the current forecasts by the Department for Transport which claims that EVs are going to constitute only 4.5% of the vehicle market by 2020, compared to the targeted 9% recommended by the government's climate advisers (Harvey, 2016).

In spite of the fact that a sufficient EV technology already exists, the broader adoption of EVs by consumers is still lagging. According to a report released in September 2016, the most important factors deterring people from buying an EV are: recharging (mentioned by 45% of the respondents), the distance travelled on a battery (39%), cost (28%) and the lack of knowledge (13%) (Department for Transport UK, 2015). However, the same study indicates that the majority of people (55%) have not even considered buying an EV, even though several governmental incentives and financial advantages should justify viewing EVs as a viable option. As this does not seem to be the case, we suspect that there are more complex underlying psychological aspects that need to be considered, which are not accounted for in the general statistical data.

This paper aims to answer the research question: **How can a more consumer-driven approach accelerate the EV adoption cycle?** Our basic assumption is that the electrification of vehicles is only a matter of time, due to diminishing resources and improving EV technology. However, in order to avoid severe environmental and economic consequences, an 'e-revolution' of vehicles needs to happen as soon as possible. Our outside perspective enables us to have a bird's eye view on the EV ecosystem and analyse the motives, constraints and possible

influences of each stakeholder. Currently, the government is most invested in driving EV adoption; we believe a more consumer-driven approach will allow us to address less visible and powerful barriers. Through analysing various psychological theories, we propose suitable interventions for influencing two specific social groups, which we believe could give a significant push to EV adoption in the short run.

2. Stakeholder analysis

So far, different stakeholders have emerged to respond to the rise of EV technology and prepare for a new ecosystem. The biggest push for EV growth comes from governments that have set EV adoption targets to meet EU restrictions (McKinsey, 2014). Governments design and implement policy measures that compel car manufacturers to adopt new strategies and realise the potential of the evolving EV market (Accenture, 2014). In turn, electricity providers will benefit from this growth through an increase in electricity demand. As governments incentivize consumers to opt for electric mobility by offering tax breaks and other financial benefits, consumer acceptance remains relatively low due to perceived barriers such as a restricted range, high costs, and limited charging infrastructure (Egbue & Long, 2012).

| Stakeholders	Required action to promote EV adoption	Motives	Constraints	Problems
Car manufacturers	- Invest in R&D to produce EVs that consumers want to buy **- Marketing EVs** **- Investment in access-based consumption**	- Sell cars - High market share on the vehicle market - Profit	- Regulations to become more environmentally friendly - Cost (big investment is required, return on investment is uncertain) - Technology (battery size & durability)	- Consumers not ready - Market not ready - Early movers may lose
Electricity providers	- Fulfill the electricity demand **- Openly promote low carbon emission and its environmental effect** **- Guarantee the use of green energy for charging**	- Sell electricity - Prepare for change in the industry (high demand due of EVs)	- Lack of infrastructure - Scarcity of EV's (i.e. number of vehicles)	- Dependency on other stakeholders - Lack of influence
Station providers	- Increase the infrastructure **- Make stations more visible, accessible and convenient**	- Make profit by increasing the number of charging points	- Lack of demand - Technology (long charging time)	- Undeveloped market

Government	- Incentives (taxes, grants) - Penalties - **Making incentives more visible, popular**	- Reduce greenhouse gas emissions (to meet EU restrictions) - Help households to make better financial decisions	- Budget	- Lack of power to influence the manufacturers - Lack of power to influence the consumers
Consumers	- Adopt EVs - Create a demand for EVs - **Create a norm for driving EVs**	- Buy a convenient and affordable car - Protect the environment	- Uncertainty - Risk - Cost - Time - Knowledge/information - Convenience	- Bounded rationality - Range anxiety - Availability bias
Public transport	- Change conventional buses to EVs - **Promote green energy and EVs**	- Provide reliable transportation for people	- Cost - Budget - Safety (sound, trust in the technology)	- Slow and lengthy process despite government prioritisation

The low acceptance rate of EVs in the current state of the market can be analysed using Lewin's theory of change (1999); favorable decisions, in this case, of EV adoption, can be encouraged by removing "counterforces within the individual rather than by applying outside pressure" (p. 209). Outside pressures, in this case the financial incentives provided by the government, do not drive EV adoption on a large scale since stakeholders are resistant to change. An additional force is required to break this resistance.

What could this additional force be? At the moment, EV adoption is mostly regulation-driven, by means of rewards and punishments ('carrot-and-stick approach'). We propose that in addition to these outside forces, EVs should be made more accepted by the wide public through a change in the representation of vehicles and transportation in general. In the next section, we define a target group with two specific social groups that we believe to be particularly critical in driving the adoption of EVs in the short-run. We will focus on these two groups throughout our paper to explain in depth our analysis and proposed interventions.

3. Defining a target population

In our current society, the representation of a car is a vehicle with four wheels and an internal combustion engine (ICE) that ensures mobility. We envision a future where all vehicles are electric and the new social representation of a car will include a battery. When considering this shift, it is important to note that representations of a car and the object itself, follow a co-evolution process; representations are constructed through the interaction between consumers and the object in question (Lahlou, S., 2011a). At the moment, different social groups have different representations of EVs. For some, it is a reality, while for others it continues to be a foreign concept or distant future.
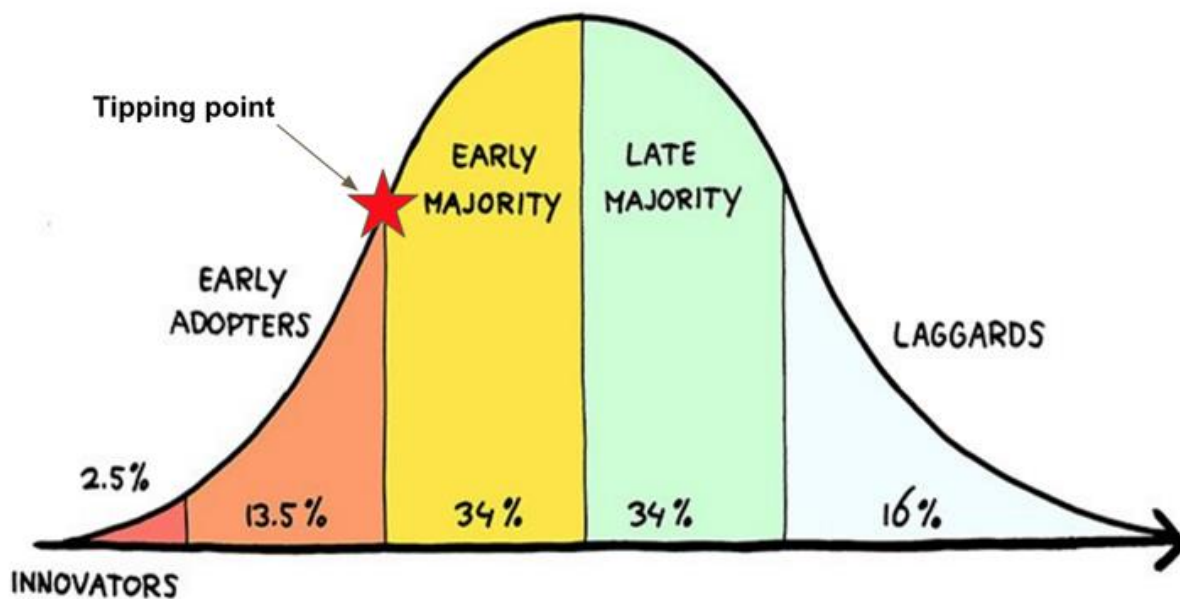
Source: Steve A. Morris. (2015). Why every Innovator needs the Chasm Model in their toolkit. https://www.linkedin.com/pulse/why-every-innovator-needs-chasm-model-toolkit-steve-a-morris

According to Rogers' Innovation Diffusion Theory (1962), every new innovation proceeds through different stages of adopter groups, namely Innovators, Early Adopters, Early Majority, Late Majority, and Laggards. Statistics suggest that EVs continue to be in the early adoption stage, despite the fact that this innovation has been around since the early 1980s (Welzel & Schramm-Klein, 2013). Thus, our target group are the early EV adopters. Rogers

states that the innovation adoption "takes-off at about 10 to 25 percent" (1983, p. 11). The 'tipping point', where adoption speeds up drastically and the innovation becomes widespread, tends to lie right between the early adopters and early majority stages.

Next, we will define the target group who we see as having the most potential to become early adopters and push the EV adoption closer to its 'tipping point' in the short-term, by changing their consumer perceptions and experiences of EVs. We see these consumers as being educated, middle-class, Western and living in urban areas, since some of the barriers mentioned above - the comparably high purchasing price of EVs, their dependency on the charging infrastructure, and their restricted driving range - will affect them the least, compared to e.g. rural populations.
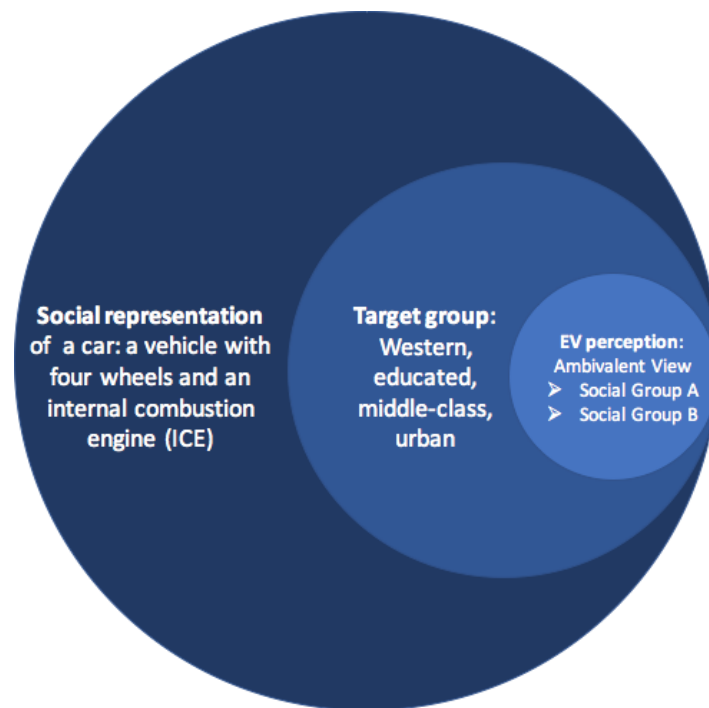
Even more specifically, our focus will be on consumers with an "ambivalent view", meaning they aware of the existing EV technology but have no prior experience with it and are sceptical about its current viability (Burgess et al., 2013). Given the fact that the majority of people do not yet consider EVs a viable transportation option (Department for Transport UK. 2015), targeting this group will be a more effective strategy than targeting consumers who are more resistant to change, lacking knowledge as well as experience with EVs ("traditional view"), or consumers who are already convinced of EVs ("positive view") (Burgess et al., 2013).

3.2 Two social groups within the target group

Within this defined target group, we see two distinct social groups that will view car ownership and usage differently now and in the future. Social Group A is comprised of individuals between the age of 35 and 55, with a family and the means to afford a car. The norm for Group A is car ownership, which in turn is a way of signalling power and status (Steg, 2005). This norm leads to social pressure to own a car; members who do not own one are considered outsiders. Possible concerns of this group about the environment often do not translate into behavioural change at an individual level, due to the attitude-action gap (Kollmuss & Agyeman, 2002). Thus, other, more relevant factors need to be found to convince this social group to adopt EVs.

Members of Social Group B, on the other hand, are younger, probably aged between 20 and 35, without a family and currently without the means to afford a car. The social norm here is not to own a car. While the majority uses public transportation or bicycles, for a small part of this group it is already a norm to use the sharing economy. While there is underlying social pressure not to purchase a private car, unlimited mobility (in the form of easy, around-the-clock access to one) is essential. These dispositions make Group B a promising consumer segment in regards to the use of electric mobility. In the next section, we will go into detail on how we think expanding this group might lead to an increase in the EV adoption rate.

The following image depicts our approaches for the two defined social groups: changing the current situation of having ICE cars as a shared social representation into two desirable future states. As can be seen below, we believe different interventions need to be designed for the two groups; to change the social norm for Group A and expand Group B. In order to do so, we will use Installation Theory.

Present — Future

Overall social representation: Internal combustion engine (ICE) car

Group A: Social norm: owning a combustion engine car

Group B: Social norm: using a combustion engine car/public transport

X Test drives

Changing the social norm

Providing experience & visibility

Gradual generational shift

Sharing economy using EVs

Expanding the group

GROUP A Social norm: Owning an EV

GROUP B Social norm: No ownership

25% of greenhouse gas emissions coming from the transportation sector

Timeline

Reduced greenhouse gas emissions without reduction in mobility

4. EV usage as an installation

In our subsequent analysis of the EV adoption cycle, we will use Installation Theory as our framework. According to Lahlou (2008a, 2011), an installation is "a socially constructed system locally guiding a specific activity, by suggesting, scaffolding and constraining what society members can/should do in this specific situation". Based on this theory, individual behaviour is elicited, directed, and constrained by three layers; objects installed in the physical environment, social representations installed in human minds, and institutions installed in society (Lahlou, 2011). Using Installation Theory as a framework, allows us to examine each layer separately, to identify the complex interactions between them, and see which components are missing to make EV usage a stable installation.

The **physical layer** refers to the material aspects of the environment that provide affordances for human activity; limiting some behaviours while evoking others (Lahlou, 2011). In the case of EVs, the physical layer evolved first; car manufacturers produced the first EV models, electricity suppliers provided the necessary fuel, and station providers built visible charging infrastructure. In some places, the state has already provided EV carpool lane access

and free-parking opportunities (Searle & Lutsey, 2014), which are non-monetary incentives that can be built on. However, the physical layer by itself will not result in widespread usage, unless consumers have adequate cognitive skills to interpret it and there is an institutionalised ecosystem that supports the usage of this new technology (Lahlou, 2008b).

The **embodied layer** refers to internal interpretative systems carried by individuals, which include the actor's mental models, representations, skills, knowledge, as well as the dispositional properties of the body such as drives or reflexes (Lahlou, in press). When analysing this layer, we must take into account the individual's ambiguous perceptions of EVs, focusing on two theories: bounded rationality and the availability bias, along with the lack of skill and experience.

Bounded rationality captures the idea that individuals, regardless of intellectual acumen, have limited computational abilities to perceive and comprehend information (Simon, 1972). This results in an inadequacy to process all available information about alternatives and possible consequences. Together with a short-term memory and selective perception, consumers tend to use 'satisficing methods', (Simon, 1990) meaning they choose the option that is 'good enough'. Given the uncertainties and perceived lack of information about of EVs, consumer preference might still go to conventional cars. Creating 'embodied interpretative systems' of an installation enables individuals to interact and plan behaviours (Lahlou, 2015). Applying this theory to EV usage, information and communication about EVs (e.g. driver manuals, public campaigns) should be easy to understand and people should get hands-on experience driving EVs. As a result, consumers will be more likely to embrace the innovation and overcome the uncertainties (range anxiety, practicality concerns and unfamiliarity with charging infrastructure), which continue to impede EV adoption.

Another explanation why consumers underestimate the current viability of EV technology is the availability bias, which refers to judging the plausibility of events by relying on 'the ease with which they come to mind' (Kahneman, 2011). In many instances, people may not readily be able to recall examples of installed public charging stations or people driving EVs. This could be based on a lack of exposure to EVs and charging stations in a particular area, but it may also come from being unaware of EVs in the close surroundings.

The **social layer** of the installation refers to the rules and norms made by a community, organisation or institution that correct people's behaviour in case of potential misuses of the

installation (Lahlou, 2009). The nature of these social rules can differ based on the stakeholder that enforces them. In the case of EVs, global institutional and organisational rules, as well as local guidelines can put pressure on individuals to act in a more socially desirable manner. For our subsequent analysis, we will mainly focus on rules that govern behaviour on a communal level, also known as social norms.
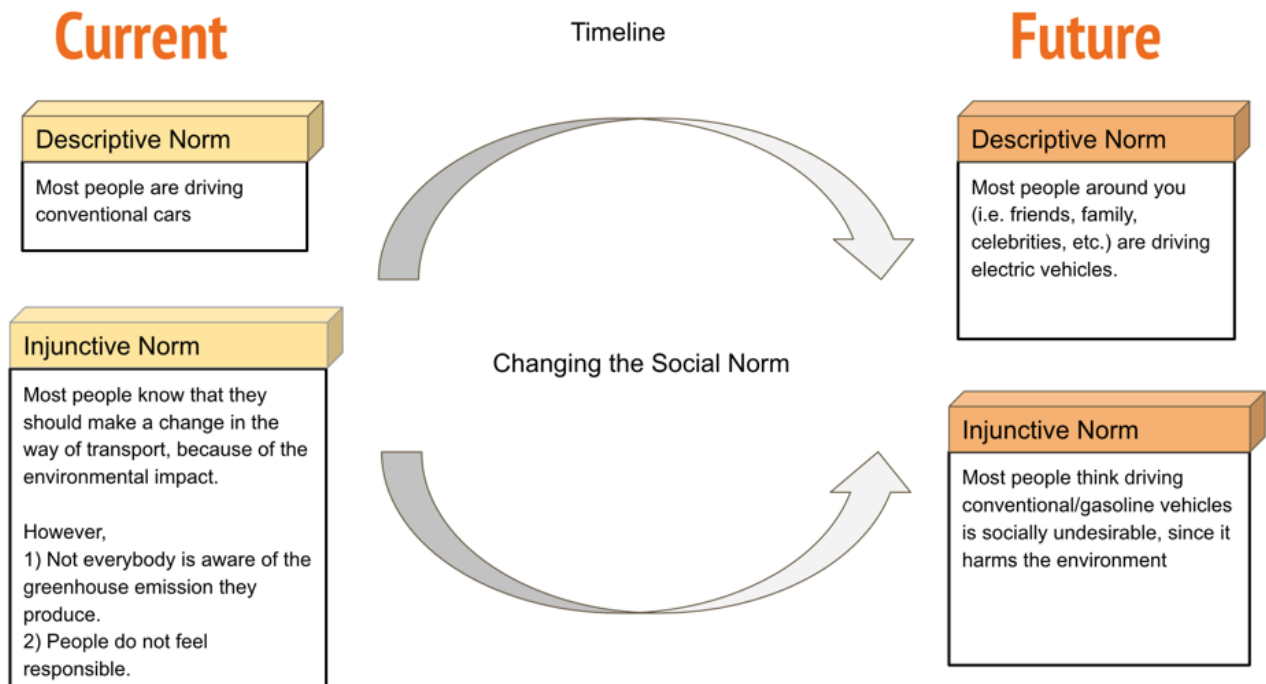
5. Norm psychology

People's attitudes and decisions are not only driven by regulations and institutions, but also by their perception of the social context and social affiliations (Barth, Jugert & Fritsche 2016). Group membership is seen as an important determinant of behaviour (Bearden & Etzel, 1982) and people are motivated to act in accordance with the groups to which they belong (Merton and Rossi 1949). However, as people cannot be aware of the actual rate of others' behaviours, they use social norms as an explanatory and predictive device to guide behaviour (Cialdini, Reno, & Kallgren, 1990).

When considering the normative influence on behaviour, it is crucial to differentiate between descriptive norms and injunctive norms since each refers to a different kind of normative information (Cialdini et. al 1990). Descriptive norms apply to what group members commonly do (e.g., "in our neighbourhood, parents typically drive electric vehicles"). Injunctive norms represent what is morally accepted or unaccepted by a group, identifying desirable group attitudes or behaviours (Cialdini et. al, 1990). They signify a perceived consensus about proscribed or prescribed behaviours (e.g., "in our neighbourhood, you should not drive an ICE vehicle as it harms the environment").

According to Tankard and Paluck (2016), perceptions of norms guide people's behaviours. Influencing these perceptions is one way to create social change. However, this requires an understanding of how people perceive norms in the first place (Tankard & Paluck, 2016). Tankard and Paluck (2016) identify three sources of information that people use to understand norms: (1) individual behaviour, acquired by direct personal observation (2) group summary information, indicating received statements about the group and (3) institutional signals, referring to public regulations, punishments and rewards, as well as public messages from institutions like NGOs. Another important aspect to consider is that individuals take a particular

group as a reference for complying with social norms. In the case of Group A this can be their neighbours or coworkers, and in the case of Group B, other students at university.

Taking these three points into account, social norms could influence the decision to adopt an EV if an individual perceives that a majority of the reference group has adopted the technology (descriptive norm) or the reference group expects them to adopt it (injunctive norms) (Barth, Jugert & Fritsche 2016). In the next section, we are introducing one of our primary interventions "social norm marketing" and describe how these three sources of information are used to shift the current social norm.

Current   Timeline   Future

Descriptive Norm

Most people are driving conventional cars

Injunctive Norm

Most people know that they should make a change in the way of transport, because of the environmental impact.

However,
1) Not everybody is aware of the greenhouse emission they produce.
2) People do not feel responsible.

Changing the Social Norm

Descriptive Norm

Most people around you (i.e. friends, family, celebrities, etc.) are driving electric vehicles.

Injunctive Norm

Most people think driving conventional/gasoline vehicles is socially undesirable, since it harms the environment

6. Social Norm Marketing Intervention: Shifting the norm of Group A

A shift from the current norm of owning a combustion engine car to the future norm of owning an EV within the previously described social group would be a powerful tool to increase consumer demand and drive EV adoption. This social norm shift could be targeted with social norm marketing, defined by Paluck and Ball (2010) as "traditional marketing techniques, including mass media and face-to-face campaigns, that are designed to alter individuals'

perceptions about which attitudes and behaviours are typical or desirable in their community" (p. 2).

At the moment, existing EV promotions are aimed at the individual's attitudes and focus on promoting the advantages of EVs. Promotional information includes messages such as "the adoption of EVs can help you save money and protect the environment". A different approach would be to design a campaign that aims at changing the group members' perceptions of the desirable behaviour, i.e. to focus on the 'injunctive norm'. Campaigns carrying messages such as "members of this community care for their environment and drive EVs" might provide a new way of pushing the EV adoption.

Social norm marketing can be a compelling method for changing the perceived social norms of a group, as it manipulates all three sources of information. Although this method concentrates mostly on the group summary information (2) by presenting the expectations of the community towards the members to adopt an EV, as can be seen by the examples above, the other two source of information can be utilised as well.

Individual behaviour (1) can be used as a source of information by including social referents in the campaign. Celebrity endorsements in EV campaigns can be a very effective tool, as widely known individuals with whom the community identifies have greater influence over the perceived norms than other members of a community (Paluck & Shepherd, 2012). Institutional signals (3) coming from organisations such as the government, local offices, NGOs or private companies can also influence the perception of norms directly, assuming signals are clear. As a result, individuals can make a direct inference about the norms in question.

When considering the motivation of following desirable group behaviour, underlying symbolic and affective values of car ownership (Steg 2005, Noppers 2015), like masculinity, power, and high social status, should be taken into account. Griskevicius and colleagues (2010) found that status motives can notably increase the desire for green products, especially when the purchasing decision takes place in public and when these green products cost more than their non-green counterparts (Griskevicius, Tybur & Van den Bergh, 2010). For members of Group A, who have financial means and seek status, owning an EV can potentially signal that they are "voluntarily willing and able to incur the cost of owning a product that benefits the environment (and society) but that may be inferior for personal use" (Griskevicius et. al, 2010, p. 392) or less luxurious. Based on these findings, social norm marketing campaigns of EVs should establish a

clear link to status (e.g. by means of celebrity endorsements and prestigious events), which is especially relevant at this point in time, while EVs are still relatively expensive due to high battery costs.

In terms of timing and choosing the most suitable location for interventions, Paluck and Ball (2010) argue that "messages aimed at norm change should be salient in the situation where they are relevant for behavior" (p. 15). In other words, the context of the intervention determines the facilitation of the new normative behaviour. Literature on habit formation supports this claim, which is important in our case, since driving a car is as much a habit as it is a norm for our target group. According to Verplanken & Wood (2006), interventions that aim to alter old habits and establish new ones should include two critical components. Firstly, the intervention must include changes in the old performance environment that disrupt existing habits (Verplanken & Wood, 2006). Secondly, the intervention should provide experiences that 'encourage performance of the desired response' (p. 99).

Based on these insights, the right time for an intervention to change normative behavior and habits around cars, would be when a person is actively looking to purchase a car, moving to a new place, or identifying with a new social group that endorses environmentally-friendly practices. Thus, social norm marketing campaigns might be the most effective 1.) at car dealerships, to target consumers that are making a purchasing decision or have come in for their yearly car inspection, 2.) on roads, trains or bus stations, to target consumers using some form of transportation 3.) at community meetings, where the injunctive norm of driving EVs could be targeted through statistics, or 4.) in registration offices, where new members of a community could be given information and incentives for EV usage. In addition, to ensure a sustainable social norm shift and habit change in the long run, we argue that direct experience with EVs is vital. Therefore, this is the approach we have adopted for our proposed interventions in the next section.

7. Experiencing EVs Intervention: Targeting both Group A & B

Since we are focusing not only on driving the demand for EVs, but in general on the acceptance and adoption of EVs as a social norm, the goal that we want to reach with our interventions is a significant increase in the number of people who have *experienced* an EV. According to Peters and Dütschke (2014), the lack of opportunity to practically test and evaluate

EVs is a significant barrier to widespread EV adoption. Further research suggests that experience with EVs improves people's attitudes towards them (Jensen, Cherchi & Mabit, 2013), decreases their perceived disadvantages (Bühler et al., 2014), and lowers range anxiety (Rauh et al., 2015). Burgess and colleagues (2013) conclude that "as a result of personal contact, members of the public came to see EVs as real; 'normal' in appearance and performance; and viable as a functional means of transportation, rather than a 'gimmick'" (p. 42).

Taking these insights into account, we propose a larger-scale intervention called "The Electric Driving Festival." This festival would be a large public promotion event in a city centre, supported by local authorities and advertised in advance on TV, radio, and social media. The festival would be sponsored by various car manufacturers, offering test driving options for their newest EV models, along with energy suppliers, promoting their products and presenting their approach to carbon reduction. In addition, other stakeholders would be included as well. Car sharing and electricity providers could use various methods that drive hands-on experience with EVs, for example longer-term test drives offered through special promotions when customers use their electric cars instead of their conventional ICE cars. To attract visitors, we would ensure celebrity attendance (e.g. by starring James Corden and his "Carpool Karaoke") and the sponsors would be giving out promotional merchandise or 'freebies'. In addition, EV experts would provide information to interested consumer and customer experience insights would be captured by asking people to fill out feedback questionnaires after their test drive. Finally, there would be media coverage of the event, including a short movie of various celebrities participating in, and endorsing, EVs as well as a newspaper article with photos and statistics on opinions of EVs after the test drives, assuming these would be mostly positive.

All in all, the campaign builds on the consistent literature finding that experience has a positive effect on the perception of EVs, reducing the perceived barriers mentioned earlier. The event described above provides stakeholders with the incentive to promote EVs and consumers with the idea that EVs are an advanced technology, a viable transportation option, and a desirable innovation. Interventions that provide hands-on experience with an EV further establish the embodied layer of the installation of EV usage, making it more stable for both Group A and B.

8. Sharing economy

A recent development that has gained an increasing amount of attention over the past years is the sharing economy, which is defined as the activity of obtaining, giving, or sharing the access to goods and services on a peer-to-peer basis (Hamari, Sjöklint & Ukkonen, 2015). This activity of sharing has been commercialised leading to the concept of 'access-based consumption', where consumers gain access to the products they seek, without any transfer of ownership taking place (Bardhi & Eckhardt, 2012). Several companies have incorporated this new mode of consumption into their business models, giving rise to car sharing programs such as ZipCar, DriveNow, and Car2Go. As these initiatives are becoming more widely accepted by the public, we see these sharing platforms as a powerful tool to increase EV acceptance among the members of our previously defined target groups.

Two commonly noted reasons for engaging in access-based consumption are the economic benefits associated with short-term access and the ability to experience something outside of the norm *(*Lawson, Gleim, Perren & Hwang, 2016*)*. In addition, this type of consumption provides consumers product benefits without ownership and the ability to use unique products (Akbar, Mai & Hoffmann, 2015). For these reasons, we believe that this alternative type of consumption is particularly appealing to members of Group B, who, as stated above, might not have to means to afford a car but place a high value on unlimited mobility. Car sharing provides Groups B with a form of consumption that is more economically savvy and flexible than ownership, reducing expenses and increasing convenience (Bardhi & Eckhardt, 2012).

We recommend car sharing providers to increase the number of EV models in their fleet, as has already successfully been done by DriveNow, a cooperation by BMW and Sixt, who added the BMW i3 model to their fleet last year (Walden, 2015). Since most providers, including DriveNow, offer a mix of conventional cars and electric vehicles, this business model attracts both consumers who are prone to using EVs, as well as those remaining sceptical about them. All in all, through the use of access-based consumption, the potential early adopters of both groups will have the opportunity to gain high utility and more direct experience with EVs, which will help to make the unfamiliar familiar (Moscovici, 2000), lower the barriers of uncertainty and create more positive attitudes towards EVs.

9. Conclusion

As the transportation sector remains a major contributor to the global carbon footprint, electric vehicles present a promising means to revolutionise transportation, making it more sustainable without limiting mobility. Nevertheless, the EV market is a complex ecosystem and the widespread adoption of EVs will require the action of all stakeholders. Through our analysis, we identified the **key players** (car manufacturers, electricity providers, station providers, the government, public transportation, and consumers) as well as their **motives**, constraints and influences on the EV market. There continue to be several **barriers** to EV adoption, some of which will resolve themselves with technical developments, however, the most important barrier is the fact that a majority of consumers does not yet consider EVs a viable option.

While the government is currently the main force driving EV adoption, we propose a more consumer-driven approach targeting precisely those ambivalent consumers that could potentially expand the group of early adopters and ensure wide acceptance of the innovation. In our paper, we define **two specific groups** that can have a significant impact on early EV adoption, if a shift in **social norm** takes place (Group A) or the group itself expands (Group B).

To attain a systematic view of the current state of EV adoption we used **Installation Theory**, which helped us identify which aspects (i.e. layers) are still missing in order to turn EV driving into a stable installation. By utilising different theories around social norms, image and user experience, we propose two interventions that we believe will make a significant change in EV adoption. Research shows that these interventions have high potential in supporting a social norm shift for Group A (ownership of EVs) and in growing Group B (usage of EVs), thus significantly increasing the overall number of early EV adopters. The **sharing economy** can also play an important role in increasing EV acceptance among our target group, especially Group B, as it gives customers access to experience new, unique products without the responsibility of ownership.

Rogers (1962), as part of his Innovation Diffusion Theory, identified five dimensions that determine the speed of an innovation adoption: complexity, trialability, observability, relative advantage, and compatibility (Welzel & Schramm-Klein, 2013, p. 3). As we have seen throughout our research, these relate closely to the consumer barriers of uncertainty, convenience and cost, which must be overcome by interventions that promote clear information about EVs (reducing complexity), offer opportunities for test drives (improving trialability), and make EVs

more visible (greater observability). The last two dimensions, meaning relative advantage of EVs compared to conventional cars and everyday usage without restrictions (compatibility) (Welzel & Schramm-Klein, 2013), will undoubtedly come with technological advances.

10. Limitations and Further Research

Going back to Lewin's force field analysis (1999), negative forces against EV adoption that should not be underestimated come from the "losers" of this new automotive industry, namely oil and gas companies. We assume that these players have a significant lobby that can considerably impede EV adoption. The government, on the other hand, as one of the strongest positive forces, has been described very generally by us. A more in-depth stakeholder analysis focusing on the country, state and city level is needed. In addition, further electrification of public transport is required, as it will also be regularly used by early adopters, especially Group B, who do not own a private vehicle.

Another limitation is the definition of our **target group**. Using Roger's Innovation Diffusion Theory, we focus only on the early adopters, while it would surely also be beneficial to look at the other adoption stages and possible interventions, to ensure complete and sustainable EV adoption in the long-run. To focus our interventions, we narrowed our scope to two social groups (A & B), however another important target group of early adopters might be older drivers, who are less status oriented, value low running costs and are looking for small, reliable cars. Here, it is also important to note that we focused our research on fully electric cars, without looking more closely at alternative vehicles like hybrids or plug-ins.

In terms of **shifting social norms** around car usage, we realise that it is necessary to get to a point where conventional ICE cars are stigmatised and EVs are considered the new 'normal'. However, this is very challenging since the negative consequences of driving ICE cars are not as tangible as they are for other examples such as smoking or not wearing a seatbelt. Furthermore, regarding incentives for social norm change, we need to account for the "boomerang effect"; providing the descriptive norm might lead people to adjust their behaviour to the required level, in some cases even lowering it, if they are previously above the described level (Schultz et. al, 2007).

A further limitation is the link between **status, affordability** and the **sharing economy**. On the one hand, we argue that turning EVs into a status symbol will ensure a widespread EV

adoption. However, we also support the idea that EVs should be both affordable and easily accessible (e.g. by widely integrating them into the sharing economy). The question arises how EVs can simultaneously signal status and be accessible to all. One possible solution could be premium pricing or membership-only restrictions for more luxurious EVs within car-sharing models. Further research will have to investigate the effectiveness of such methods.

Regarding our **proposed interventions**, we are aware that some of our predictions – about the timing of EV developments, specific target groups, the impact of social norm marketing, etc. – might not hold, and that further development and specification is needed to put them into practice. In order to achieve the biggest impact with social norm marketing, a smaller, more homogenous group needs to be defined, based on additional attributes of the social norm, such as its central tendency, dispersion and uniformity. These specific details depend strongly on the strategy of the stakeholders carrying the costs. The distribution of the costs between the stakeholders is outside of the scope of our analysis but we are curious to see who will get involved, how quickly EV adoption will proceed, and which methods will end up being the most effective to accelerate this process.

Appendix I - Insights for XXX - Considering the questions raised at our meeting

[Appendix suppressed here for confidentiality reasons]

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