

ENEVATE WP3 Methodology

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Introduction

There are a range of Electric Vehicle (EV) experiments scheduled over the course of the next year, tasked with uncovering the best way to stimulate popular uptake of this e-mobility option. The ENEVATE project aims to collect data from a selection of these pilots, collating their insight so as to discern what incentives motivate potential EV drivers. In this document, we set out the methodology through which this research will be conducted. Under a process of triangulation, face-to-face interviews, electronic surveys and focus groups are combined to provide a multifaceted, comprehensive overview of these trials and their implications for future take-up of EVs.

Objective

What are the market drivers that will increase awareness and acceptance of the different EV concepts?

In order to determine the factors influencing public take-up of EVs, both incentives and stakeholder involvement are investigated. Following the insight of strategic niche management (Schot and Geels, 2008), this topic can be considered vital to the future of e-mobility ensuring that the EV niche is, first, protected and, thereafter, able to be transitioned into the mainstream. The ENEVATE project assesses attitudes to EVs, enabling a set of guiding principles to be devised. The subsequent findings allow considered recommendations to be made to encourage the development of widespread EV take-up.

Pilots

This study relies on the participants in a series of pilot EV experiments. As a sample, these seemed the most expedient group in order to uncover the potential effects and impacts of incentives and market drivers.

In a recent discussion of how to measure user acceptance of e-mobility, Peters and Hoffman (2011) have problematised the study of either existing and/or non-users as categories in and of themselves. On the one hand, customer surveys are not practical due to the small market share currently occupied by EVs. On the other hand, questioning those with no experience of EVs is problematic for the manner in which they are likely to base opinions on certain mainstream, 'old school' beliefs. They call for an approach that incorporates a range of informed insights. To these ends, the ENEVATE research will be conducted in each of the pilot areas.

These pilots are spread across five locations in North-west Europe:

- 1) Montbéliard, France;
- 2) Newcastle, United Kingdom;
- 3) Helmond, Netherlands;
- 4) Kassel, German, and;
- 5) Dublin, Éire.

The first pilot will take place in the French city of Montbéliard. This experiment is scheduled to involve the provision of five EVs for the purpose of car sharing within the locale. Due to its timing, the scheme will represent the testing ground for our research methodology. It is possible that we may be alerted to the need for revision and refinement of our techniques following this initial attempt. Indeed, it seems highly plausible to suspect that some manner of adaption will be necessary following this trial, if only because all the pilots are quite different in character. For example, the second experiment is due to be enacted in the British city of Newcastle. In contrast to Montbéliard, this pilot entails forty-nine EVs being leased to both organisations and individuals for periods of, at least, six months. Local context, then, will present the need for pragmatism in research design. Accordingly, the research methodology set out in this document is intended to be purposively broad; it can evolve as and when circumstances dictate.

Triangulation

The research methodology used in the ENEVATE project is fundamentally influenced by the social scientific principle of triangulation, as conceptualised by Denzin (1970) and developed by Bryman (1998). Triangulation refers to the process of using more than one approach in the course of conducting an investigation. The various outcomes which are generated can be compared and contrasted through a process of ‘cross-examination’. As a consequence, any relational inconsistencies should be recognised and rectified with such in-built checks acting to enhance the validity of the results obtained. By this line, a higher degree of confidence can be placed in any conclusions which are drawn and the due degree of academic rigour provides more weight to subsequent arguments. This tactic assists in seeking to influence policy and make recommendations for action.

Within the social scientific community, there is widespread support for using triangulation in research; triangulation is fundamental in overcoming the limitations of single-track approaches. By using multiple sources, Cohen and Manion (1986: 254) commend triangulation for the way in which it represents an “attempt to map out, or explain more fully, the richness and complexity of human behaviour by studying it from more than one standpoint.” Accordingly, the sheer depth and breadth of understanding thus provided leads Altrichter et al (2008: 147) to assert that triangulation allows a “more detailed and balanced picture of the situation”. Triangulation, then, creates the opportunity to capture something of the reality of the social situation.

In the paradigmatic exposition of triangulation, Denzin (1970) distinguished four essential types:

- 1) Data triangulation – involving different research samples, located across time and space;
- 2) Investigator triangulation – entailing the participation of more than one researcher to collect the data;
- 3) Theoretical Triangulation – whereby several epistemological frameworks are deployed in interpreting the results, and

4) Methodological triangulation – referring to the use of multiple research methods to collect data.

The research that will be conducted in the course of this project makes use of all these strategies to some degree. The first two aspects occur organically, captured in the very nature of ENEVATE. As a transnational study, with pilots taking place in disparate locations as and when they are operational, both data triangulation and investigator triangulation are inevitable. The third component, theoretical triangulation, need be put to one side at this early stage. The analytical schema is yet to be finalised as, to some extent, it will be contingent upon the experiences gained in conducting the fieldwork. In these circumstances, it seems pertinent to give most consideration to the fourth and final part of the schema; methodological triangulation, and it is to these ends that the remainder of this document will focus on.

Methodological triangulation represents the most common usage of triangulation, ascending to an emblematic status as regards this approach to research. This may be considered somewhat surprising considering the manner in which methodological triangulation differs from the other varieties; rather than presenting a *within* method approach, it allows one that works *between* methods. This stance can be seen to lead to ‘multi-method research’ (Bryman, 2006). If a study were to use a single research method, it would be vulnerable to accusations of methodological bias. There might be some degree of measurement error meaning that such, ‘monomethod’, research will always be suspect.

Measures to overcome such constraints can be put in place with the adoption of multiple methods and, in particular, a mixed methodology combining both quantitative and qualitative aspects. On the one hand, quantitative research can be understood to involve some degree of empirical investigation, collecting statistics so as to generate models and measure trends, documenting particular circumstances. On the other hand, qualitative research may be seen to entail a more interpretive approach, seeking to reach explanation, expanding on the *what*, *where* and *when* of a situation by asking *how* and *why*. These two elements can act as a balance, each working to keep the other in order, regulating the results accrued.

It seems important to realise that adopting such a mixed methodology can move beyond a mere defensive measure used to deter critics (Olsen, 2004). Rather, mixed methodologies should be acknowledged as complimenting one another, with the potential to garner a more complete understanding of the situation than could be gathered from using one approach in isolation. While one approach may take primacy in any particular study, it seems likely that all research will be enhanced by the addition of other, differing, techniques to the arsenal of the researcher. The more nuanced research project will be that which seeks to combine a variety of insights, allowing itself the greatest chance of developing a thorough appreciation of the topic.

Fieldwork

In order to further knowledge, ENEVATE attempts to combine the forgoing good practice in this research. In order to achieve these aims, the fieldwork will involve

three components: initial interviews; follow-up surveys, and, where appropriate; closing focus groups.

Interviews

The interviews will form the principal element of this research. Following Briggs (1986: 1), it can be appreciated that:

“Research in the social sciences is the great bastion of the interview...90 per cent of all social science investigations use interview data.”

Accordingly, the validity of a large degree of our social knowledge may have its roots traced back to interviews in some form or other. In particular, the use of such data has come to dominate social research seeking to uncover attitudes, beliefs and motivations (Foddy, 1993: 1). It is in this spirit that interviews are tasked with obtaining the first impressions of these EV users. They will be conducted on the ground, immediately following the respondents' experience of driving an EV.

Each interview will be composed of three sections: demographics; attitudinal measures, and; open questions. The first two parts of the interview are written, the final section is oral. These two modes of administration can be characterised as *self-completion* and *verbal* (Bowling, 2005). There are benefits to be gained from deploying each style. Allowing respondents to read questions themselves will aid their comprehension while letting them record the responses makes them more comfortable with their answers. At the same time, reading questions for respondents will act to engage them more directly and writing down replies on the respondents' behalfs allows for greater levels of concentration on their answers.

Both means of interviewing also carry negative connotations, though. Each approach contains some degree of bias inherent within it. While self-completion questions can lead to greater cynicism from weary respondents, verbal questioning may entail the respondents displaying the self-conscious desire to please. As such, the two modes of administration benefit from being balanced. Employing each strategy in the same interview can act to counter the drawbacks of either in isolation, concomitantly bringing the attendant positive features of both into play.

The interviews will be conducted in the native language of the host pilot but will be overseen by the researcher conducting the first experiment. The sample size constitutes an as yet unknown variable and will be determined by the amount of time available to the interviewer and/or the throughput of suitable interviewees. Each and every participant will be required to provide written informed consent. This form will only be acceptable if the participant has first been provided with a, locally produced, information sheet outlining the details of the project in simple, non-technical terms easily understood by a lay person. We will work with partners in each pilot to produce this documentation on an ad hoc basis. Templates of both components are attached in Appendix A. This preliminary activity is crucial so as to ensure that adequate research ethics are operationalised with the participants; treating them with respect, protecting them from harm and outlining their rights under the data protection legislation in the

various local jurisdictions.¹ This reflects a principled approach to conducting social research, taking its cue from medical ethics (see Wiles, et al., 2005).

Having covered these fundamentals, the form will seek demographics by way of a simple introduction. Demographics capture standard information about those being interviewed. By collecting such detail, a respondent profile can be constructed. As such, this section allows for a comprehensive and detailed comparison of the more pertinent results to follow.

After demographics, the form will move onto more substantive questions; the attitudinal measures themselves. This section enables the habits, preferences and reactions of respondents to be drawn out. While the research would desire to elicit as much information as possible, at this stage, it is important not to ask too many questions. As a rule of thumb, Sheehan and McMillan (1999) suggest that the longer the questionnaire, the smaller will be the response rate. Long questionnaires are not generally appealing to respondents, it is better to make forms as short as possible. To these ends, the attitudinal measures are kept purposively succinct at ten questions.

In considering the structure of these questions, we had initially intended to follow a recent research study on support for sustainable transport (Xenias and Whitmarsh, 2011). These authors utilised the technique of analytic hierarchy process developed by Saaty (2008). This method involves paired comparison analysis, whereby respondents are invited to state preference for one item or another, ranking their level of feeling on a pre-determined scale. Though sophisticated and possessed of the ability to generate great insight into attitudes, this approach was not well suited to the nature of the ENEVATE project. It represents an impractical ideal. In order to reach its full potential, analytic hierarchy process requires a large size. That is not possible with regard to the various pilots in this project, for whom there are likely to be relatively small catchments. While the total number of respondents spread across the various locations may be considerable, there would be conceptual difficulties were these to be combined and conflated as one mass. Due to the significant regional variation that may exist, each pilot must be addressed in and of itself. As a result, a simpler collection tool was necessary.

Accordingly, the attitudinal measures will be captured by a series of agreement and ranking scales. The first eight questions use a Likert scale, to express the degree of agreement or disagreement with a proposition. After these comes a question that uses rank ordering, an ordinal level technique to grade alternative proposals. Finally, the form is terminated by a closed question capturing the essence of what has gone before. The complete document is attached in Appendix B.

On the respondents handing back the completed questionnaire, the researcher is then tasked with asking three open-ended questions. These are more conversational in tone. This, less formal, style is intended to deflate any feelings of burden or arduousness, differentiating these questions from the official, prescribed questions set out on the questionnaire. In this way, it is hoped that respondents might be encouraged into some manner of ‘chit-chat’, allowing for a fuller insight into their

¹ In France, the Data Processing Act 1978; in the UK, the Data Protection Act 1998; in the Netherlands, the Personal Data Protection Act, 2000; in Germany, the Data Protective Directive 2001, and; in Éire, the Data Protection (Amendment) Act 2003.

thinking. If respondents are caught 'off guard' in this way, they may provide alternative and/or additional content illuminating the answers previously offered. This tactic offers a useful corollary to obtain the knowledge.

The respondents will be asked the following three questions:

- 1) Why did you take part in this electric vehicle pilot?
- 2) What did you think about driving the electric vehicle?
- 3) How do you feel about driving an electric vehicle in the future?

The responses will either be recorded on auditory equipment or directly transcribed by the researcher. In this manner, we could obtain quotes of dialogue, vignettes to supplement the figures derived from the previous questions. This would act to put the 'meat on the bones'.

Follow Up

The second part of this research entails follow up surveys with some of the original respondents. During the initial interview, email addresses will be collected and respondents asked to provide their consent for being contacted in the future. In the weeks that follow the pilots, these respondents will be sent an email detailing further questions on their attitudes to EVs.

Email surveys represent a highly efficient way of managing social studies (van Selm and Jankowski, 2006: 437-439). They present few challenges in terms of time or cost being relatively simple to administer. There is little effort exerted in production, dissemination or collection. Responses can be managed and monitored in a simple and straightforward manner. Crucially, though, email surveys are also relatively undemanding and uncomplicated for respondents.

Due to the increasingly routine nature of email correspondence, there is the potential that a large amount of the original respondents may be willing and/or able to participate. It has been noted that surveys sent by email have a relatively high, and ever growing, response rate, trumping those achieved by traditional postal questionnaires (Selwyn and Robson, 1998). This trend will likely be exacerbated by the penning of personalised emails, with pre-notification playing a disproportionately high role in influencing response rate (Crawford et al., 2001). Regardless, we will err on the side of caution and suggested that it is not appropriate to anticipate a complete, or even majority, take-up of this survey.

All the same, any responses will be useful in illuminating the data collected previously. As only those particularly interested in EVs are likely to respond, there is the scope to obtain more detailed and thoughtful responses. The respondents will also have had longer to consider their thoughts on the pilot experience, forming more sophisticated opinions. The medium of electric surveying lends itself to these ends for the manner in which it provides time and space for greater deliberation.

At present, the surveys are not completed. It is intended that the questions asked be informed by the tentative results of the initial interviews as well as contemporaneous studies conducted by academics (Peters and Hoffman, 2011), public authorities (Thornton et al, 2011) and manufacturers (Turrentine et al, 2011). The type of questions asked are those which would benefit from more background knowledge of the respondents being obtained, factors such as their typical transport habits or political views. These subjects can be better explored and drawn out in this type of survey, with more open questions, free from time constraints. In their review of email surveys, Sheehan and McMillan (1999) found that respondents seemed to be much more willing to reply to open-ended questions in an email format than in traditional surveys.

The type of questions pursued might include the following:

- 1) What further experiences have you had with electric vehicles since taking part in the pilot?
- 2) In what ways have your opinions changed about electric vehicles since you experienced driving one?
- 3) What news or comment features have you seen on electric vehicles over the past few months?
- 4) If you are considering purchasing a new car in the near future, what thoughts have you given to taking on an electric vehicle?
- 5) What advice would you give to us to help our future attempts at encouraging greater electric vehicle usage?

In this manner, the questions will cover a wide range of possible EV incentives to augment that of the initial interviews.

Focus Groups

The third and final component of the research with these respondents involves conducting focus groups with some of the original intake. For Powell and Single (1996: 499), define a focus group refers to:

“A group of individuals selected and assembled by researchers to discuss and comment on, from personal experience, the topic that is the subject of the research.”

Focus groups require interaction between participants. This entails organised discussion and collective activity, as the researcher guides respondents through a set of pre-specified topics and plays off the ensuing social interaction. This method is particularly valuable for research such as that offered in this project, whereby respondents' possess prior experience of the subject to be debated. In publically discussing personal experiences in this way, Gibbs (1997) suggests that focus groups:

“Draw upon respondents’ attitudes, feelings, beliefs, experiences and reactions in a way which would not be feasible using other methods, for example observation, one-to-one interviewing, or questionnaire surveys.”

In this manner, focus groups are especially useful as a component of triangulation (Morgan, 1997).

At this juncture, details of the focus groups are hazy. To a large extent, the implementation of any such group will rely upon the take up respondents at each of the previous two stages in the research. We would expect lesser numbers as the process moved on but, were at least five respondents to remain interested in the project in any single pilot area then a focus group there becomes a viable possibility. However, with that proviso met, another situational consideration would come into play; the budgets possessed by partners in individual pilot areas.

In order to encourage respondents to take part in focus groups, there will need to be some manner of inducement (Thompson, 1996). The nature and extent of this would be left to local decision-makers. However, it may take the form of a cash payment, at the rate of, perhaps, fifteen to twenty Euros for a one to two hour session. However, more imaginative alternatives could be devised taking into account that these respondents are already motivated by an interest in electric vehicles or related issues. These possibilities include information sheets and/or guide maps detailing the distribution of public charge points (acting to particularly address popular concerns around ‘range anxiety’) or a voucher entitling the user to a free charge (encouraging the assumption that they would be interested in following up their interest in electric vehicles).

It is anticipated that, at least some, projects will be able to cover such expenses. This may involve some creative thinking in utilising budgets but will hopefully be considered legitimate use of funds. If this was realised then the finances would be very well spent as these focus groups would be of great benefit in allowing a thorough exploration of issues that had arisen along the way. The topics may include:

- 1) An attempt to pool the common experiences of the EV pilot, asking; how was it for you?
- 2) Encouraging respondents to draw up a list of appropriate incentives, then agreeing a ranking between them.
- 3) Asking respondents to use their imaginations and work out the future of the private car market in five, ten and fifteen years time.

By providing the opportunity to expand on the most pertinent issues, these focus groups may allow us to reach some level of closure as regards the participants in the EV experiments.

Stakeholders

As the pilots progress, we are also interested in utilising the perspectives of the various stakeholders. In addition to surveying potential users, Peters and Hoffman

(2011) have suggested that it is crucial to also involve expert opinion in any survey into EV acceptance. Accordingly, utilising the relevant stakeholders might provide a valuable adjunct to the central study. This would involve engaging car manufacturers, energy suppliers and public bodies drawing on their knowledge and experience to add another angle on market drivers. We intend to schedule a series of interviews with such partners in order to discern both their own views on incentives and gain their feedback on the tentative results obtained from respondents using the EVs. This would help to meet the remit of ENEVATE in using the concept of strategic niche management to bring together distinct and isolated insight and integrate it into a more valuable whole.

The subject matter covered in these discussions will include: EV usage, experience and predictions; types of EV vehicle, including materials and innovations; perceived advantages and disadvantages of EV, and; future business models for the EV market.

This, fully rounded, approach would benefit all interested in the future of EVs in the marketplace. In this manner, we hope to obtain a wide-ranging, more complete overview than otherwise possible.

Summary

In order to realise the potential of ENEVATE, it is important that the project works to maximise the knowledge being produced as a result of the upcoming EV pilots. Adopting triangulation, utilising a range of methods across a variety of sites, creates the prospect that we can produce a valuable contribution to the field and properly inform future decisions made into EVs. It is intended that the study proposed in this document allows for a range of insights to be captured meaning that, on completion of the project, ENEVATE will be in a position to properly inform debates around EV market drivers and offer concrete proposals on what incentives could and should be pursued further so as to progress e-mobility.

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Appendix A – Information Sheet/Consent Form

Template Information Sheet

Study title

The title need be simple and self-explanatory to a lay person.

Invitation paragraph

This will explain that the individual is being asked to take part in a research study.

What is the purpose of the study?

The background and the aim of the study will be provided in this section.

Why have I been invited to participate?

This will explain how the individual was chosen to take part in the study.

Do I have to take part?

The individual will be informed that taking part in the research is entirely voluntary.

What will happen to me if I take part?

This will explain the methods of data collection and how long it will take.

Will what I say in this study be kept confidential?

This will detail that all information collected about the individual will be kept confidential (subject to legal limitations), describing how privacy and anonymity will be maintained in collection, storage and publication of research material.

What will happen to the results of the research study?

The individual need be told what will happen to the results of the research.

Who is organising and funding the research?

The identities of those with an interest in the research should be fully disclosed.

Contact for Further Information

This will provide the individual a contact point for further information.

Thank you

The individual will be thanked for their time.

Date

The information sheet must be dated.

CONSENT FORM

Full title of Project:

Name, position and contact address of Researcher:

Please initial box

1. I confirm that I have read and understand the information sheet for the above study and have had the opportunity to ask questions.
2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving reason.
3. I agree to take part in the above study.

Please tick box

4. I agree to the interview / focus group being audio recorded.
5. I agree to the use of anonymised quotes in publications.
6. I agree that my data gathered in this study may be stored (after it has been anonymised) in a specialist data centre and may be used for future research.

Yes

No

Name of Participant

Date

Signature

Name of Researcher

Date

Signature

Appendix B – Initial Interview Questionnaire

ENEVATE Market Drivers Survey

General Information

Name (optional):

Email Address (optional):

Age:

- | | | | |
|----------|-----------------------|---------|-----------------------|
| Under 25 | <input type="radio"/> | 25 - 35 | <input type="radio"/> |
| 36 - 45 | <input type="radio"/> | 46 - 55 | <input type="radio"/> |
| 56 - 65 | <input type="radio"/> | Over 65 | <input type="radio"/> |

Sex:

- | | | | |
|------|-----------------------|--------|-----------------------|
| Male | <input type="radio"/> | Female | <input type="radio"/> |
|------|-----------------------|--------|-----------------------|

Education:

- | | | | |
|------------|-----------------------|-----------|-----------------------|
| Degree yes | <input type="radio"/> | Degree no | <input type="radio"/> |
|------------|-----------------------|-----------|-----------------------|

Occupation:

- | | | | |
|--------------|-----------------------|-----------|-----------------------|
| Professional | <input type="radio"/> | Skilled | <input type="radio"/> |
| Unskilled | <input type="radio"/> | Homemaker | <input type="radio"/> |
| Part Time | <input type="radio"/> | Student | <input type="radio"/> |
| Unemployed | <input type="radio"/> | Retired | <input type="radio"/> |

Post Code:

Car Ownership:

- | | | | |
|-----|-----------------------|----|-----------------------|
| Yes | <input type="radio"/> | No | <input type="radio"/> |
|-----|-----------------------|----|-----------------------|

Make and Model:

I would be more likely to consider buying an electric vehicle in the future if...

there was a purchase tax reduction

Strongly Disagree Disagree Agree Strongly Agree No opinion

the initial cost was subsidised

Strongly Disagree Disagree Agree Strongly Agree No opinion

road tax was reduced

Strongly Disagree Disagree Agree Strongly Agree No opinion

there were more facilities for charging

Strongly Disagree Disagree Agree Strongly Agree No opinion

there was priority car lane usage and/or parking spaces

Strongly Disagree Disagree Agree Strongly Agree No opinion

there was comprehensive information on the location of charging points

Strongly Disagree Disagree Agree Strongly Agree No opinion

a public body such as national or local government was involved

Strongly Disagree Disagree Agree Strongly Agree No opinion

a large private organisation such as an energy supplier or car manufacturer was involved

Strongly Disagree Disagree Agree Strongly Agree No opinion

Car Purchasing

When buying your next car, how would you rank the following factors in terms of importance, with 1 being the most important and 5 being the least important:

| | 1 | 2 | 3 | 4 | 5 |
|-----------------------|---|---|---|---|---|
| Environmental Factors | | | | | |
| Performance | | | | | |
| Purchase Costs | | | | | |
| Running Costs | | | | | |
| Functionality | | | | | |

Having now experienced driving an electric vehicle, do you consider yourself more or less likely to try to drive another?

- More Likely Less Likely No opinion

Additional Feedback

Please share any additional comments.

Follow Up

Would you be willing to participate in a follow up survey by email?

- Yes No