Cycling in 21st Century Europe: what the experts forecast

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Summary

There is a lack of information on cycling futures, yet we need to know the future to help us plan better for it. The paper reports on a research project about the opinions of the future of cycling held by recognised experts associated with cycle planning, manufacture and advocacy across Europe. It will allow those involved in cycling to evaluate the broader trends in relation to their own town or country.

The authors use the Delphi method, a qualitative technique well used in business forecasting, to achieve an expert group consensus about the future of cycling. The technique involves four stages:

1. The selection of experts in the field
2. The posing of questions about the future of cycling (for example, regarding the sales, or use of bicycles) to all members of the panel
3. The aggregate and individual responses are fed back to each panel member for further comment or adjustment.
4. The second round of forecasts is then combined into one probability distribution for each variable being measured.

Some of the key areas being investigated are:
The sales of bicycles
The distance and number of cycle trips
The use of bicycles for recreational purposes
The attitudes of municipalities towards cycling.

The result will be a definitive statement about the future of cycling in Europe.

1. Introduction

There is a lack of information on cycling futures, yet we need to know the future to help us plan better for it. But traditional extrapolations of past trends are of limited value if they take us in directions we do not want to go. However, the future is created by actions in the present, especially those by people whose influence on thinking, attitudes and behaviour is powerful. If we can interrogate them to discover an aggregate expert view of where current actions will take us if we continue them, we have an opportunity to start to change the future. We may thus contradict the established view that, in William Gladstone's words, "You cannot fight against the future".

The research discussed here is a survey of beliefs of major opinion leaders on the likely developments in cycling in Europe over the next ten years. The technique is one often used in marketing for forecasting futures and the idea is to identify a consensus as to what the new Millennium will bring in the way of cycle sales, use, planning, policy, strategy, image, status, attitudes and behaviour. The outcome is what the most significant people in the European cycling world think the future holds for cycling. This output will be a vital resource for all of those concerned with the role of cycling in future society.

2. The Delphi technique

The Delphi technique was established in the 1960s and has been utilized in a wide range of futures research where there is imperfect or limited knowledge. The technique seeks to achieve a consensus between experts on a number of factors about any given subject, but in particular it concerns the prediction of future events or scenarios (Green et al, 1990; Linstone and Turoff, 1975; Witt and Moutinho, 1995). Therefore, it offers a complementary technique to trend extrapolation, in which experts not only predict on the basis of current or past trends but also by using intuitive judgment (MŸller, 1998; Yong et al, 1989).

Past studies have asked experts in a particular field to form a judgement about the likelihood of specific future events occurring and the probability that these events will happen within a given time frame, most commonly within a five or ten year period (Johnson, 1976; Ng, D., 1984). The underlying assumption is that by adopting an iterative process the range of responses will stabilize and converge towards a mid-range of a distribution, measured in the form of the statistical mean, median or mode.

The determination of the research method in the Delphi study was the outcome primarily of a comprehensive literature search. The studies fall into two categories, those applying the technique to a particular forecasting task such as this and secondly, papers presenting an academic critique of the research method. Despite criticisms in the early literature, the Delphi technique is still considered to be a valid form of judgemental forecasting (Richey, et al, 1985).

The cycling Delphi study explores two additional aspects which have not been well covered in the literature. Firstly, it seeks to investigate whether consensus can be achieved across nationalities and different disciplines, in this instance at a European Union level. The second aspect relates to the means of communication in the collection of responses. Given the increasing availability of and access to the internet within organizations, the researchers wanted to test whether the use of electronic mail as a medium within a Delphi study could yield a similar response to previous exercises but within a shorter time frame.

3. The Research Method

The method involved five stages:

1. Initial in-depth discussions with experts in the field, design and pre-testing of the questionnaire
2. Selection of a Delphi panel for Delphi
3. First issue of the questionnaire
4. Second issue of the questionnaire
5. Analysis of the results

3.1 Formulation of the questionnaire: discussion with individual experts

The initial formulation of key areas to be investigated featured a review of the relevant literature and an internal research seminar at the Centre of Alternative and Sustainable Transport to discuss these. The core areas of discussion were translated into statements and questions which might be included in a Delphi survey questionnaire.

This was followed by consultation with a small number of experts. The latter involved a series of in-depth discussions with a range of practitioners from across Europe, some of which were conducted at Staffordshire University in the UK, and the remainder were augmented by telephone interviews. The purpose of this initial scoping exercise was to confirm the key issues, trends and factors which are likely to affect cycling as transport in the future. It was decided that the forecast period be 10 years, because:

* the most significant change of thinking in cycle planning has been in the last ten years, so this is was felt to be a period with which respondents could identify in terms of magnitude of change;
* it is a sensible planning timeframe
* a shorter period may be dominated by continuance of existing trends: 10 years allows time for trajectories to alter.

The key issues, trends and factors were drawn up as a draft questionnaire. This comprised eight areas:

Indicators
Here the research team wished to establish the experts' forecasts as to likely changes in base-line indicators for cycling over the survey period. This included questions related to number of cycling journeys, cycling trends among various societal groups and sales of bicycles and equipment.

Journey purpose
This section comprised questions designed to elicit views about cycling for different utilitarian and discretionary purposes, such as respectively cycling to work or cycling for leisure.

Expert opinion
Using a somewhat different approach, this set of questions asked the panel whether they thought that cycling would become more or less important in the eyes of various decision-makers and opinion-formers, such as politicians, advocates, planners etc.

Policy issues
Here the panel was asked to judge to what degree pro-cycling policy would be affected by various future issues, such as awareness, attitudes, healthy living and traffic congestion.

Funding
The experts were asked how, if at all, the financial resources for cycle facilities such as parking and on- and off-road routes would change by 2010.

Infrastructure
In this section, the intention was to find out whether a consensus existed on the degree to which infrastructure for cycling in Europe would be better or worse by 2010. It included questions on route networks, integration with public transport, facilities at the workplace, and so on.

Policy options
This question set was directed to policy for cycling. The panel was asked to indicate whether the application of policies such as provision of infrastructure, car restraint, land use planning and public education campaigns were likely to produce increases or decreases in cycling.

Social context

Broad societal trends in areas such as congestion, health, status, image and the economy were presented to the experts in order to predict the likely effects on levels of cycling.

Safety trends
Questions in this section sought to elicit views on the extent to which changes were likely in a variety of traffic safety issues.

Cycling trends
Finally, the panel was asked their opinion on future cycling trends, such as the change in the percentage of cycle trips or the length of cycle routes.

Within each area of discussion a series of statements of opinion were presented and respondents asked to indicate their view on the subject by choosing a point on a Likert type scale, as illustrated in Table 1.

Table 1
A sample of the Likert scale used in the questionnaire

5. FUNDING: How, if at all, will the financial resources for the following cycling facilities change in Europe by 2010?

	1 substantial decrease	2	3	4	5 substantial increase
Cycle parking facilities					
On-road bicycle routes					
Off-road bicycle routes					
Facilities for cycle carriage on public transport					

Any comments

An option of indicating "don't know" was also included for respondents who genuinely felt that they had no view on a particular statement. The questionnaire was then piloted with a view to checking the clarity of the questions, and a number of revisions were made to ambiguous questions or where unintentional bias may occur. This was especially important given that many of the respondents would be reading and responding to the questionnaire in a second language.

3.2 Selection of the panel

Several previous studies indicated that in areas requiring professional judgement the most critical factor lies with the selection of panel members, because the reliability and quality of the results will reflect the quality of the experts (Martino, 1983; Preble, 1984; Taylor and Judd, 1989).

The initial preparation of the list of experts was obtained by reviewing published academic and practitioner papers on cycling from both journals and conference proceedings as well as from major EU research projects. This enabled a selection on the basis of people who are formally known for their work in urban environment, recreation or transport fields, but not necessarily in cycling per se.

The second source of information was by recommendation of the group of experts selected at the first stage to assist in the formulation of the key areas of discussion and questions. This begs the question of selection bias. There is always a potential problem of bias in bringing together a group of respondents through known contacts. By using the criteria of formal recognition in the field through publication and by referral, it was possible to widen the potential universe of respondents and then to select at random in each country from this list.

At the outset, it was clear that a consensus-building exercise such as Delphi could not work if applied to both 1st and 3rd world countries. Generally, cycle use in 1st world countries is low but planner's attitudes and current trends are very positive; usually the opposite is true to each of these variables in the 3rd world. In these circumstances, achieving any consensus view of the future - which is what Delphi is based on - would not be possible, as a bi-polar distribution of responses would be a more likely outcome. Thus it was decided to focus on 1st world countries and specifically on Europe, partly for practical reasons (speed and availability of email), but much more a question of the dichotomy between experiences, planner's attitudes and current realities between Europe and other countries of the 'North'. Europe was defined as the 15 countries of the EU.

The survey team was also aware of the need to balance the composition of the panel and to encourage participation across a wide range of professionals and from all countries in the EU. It was hoped that this would also help to reduce a convergence of opinion simply because of gathering like-minded schools of thought, such as advocates perhaps, or engineers. In this respect, it was also important to achieve a balance between the north of Europe and the south, as cultural and climatic conditions could well affect cycling and opinions regarding its future. Thus, experts were prospected from the following professional groupings:
academics
engineers
producers/sales
advocates
planners/policy makers
urban visionaries

3.3 First issue of the questionnaire

One of the core limitations of the Delphi technique (and one of its major strengths) is the attrition of the expert group to those who are truly expert and who are willing to commit time and valuable expert opinion, albeit on an anonymous basis. Therefore, it is likely that some experts refused to co-operate for lack of time or because they felt that they lacked the expertise.

In this study another key reason for refusing to join the panel was possibly that the survey was conducted in English. Experts were selected because they had either published or presented a paper in English, or communicate in it as part of their working life. Thus, the researchers concluded that they would be sufficiently fluent to understand and respond to the questionnaire. It is possible that this requirement reduced membership of the panel. In order to mitigate this requirement it was agreed that where experts felt the need to comment on the questionnaire, they could do so in French, German or Spanish if they preferred. However, the lack of resources and a limited timescale meant that translation of entire questionnaires and responses to and from several languages was not feasible. In the end, the great majority of comments were in English.

A small number of potential respondents made contact to advise that they would not be participating in the study. A variety of reasons were given such as: they felt they were not suitably knowledgeable on the subject, people did not have time to answer such detailed questions, or there was a staff shortage.

On the covering letter there was the opportunity to nominate someone else to fill in the questionnaire. A few people took this option and the questionnaires were then returned by people who did not initially appear on the database.

Overall, 220 questionnaires were sent out and a total of 86 were returned. This is a wholly acceptable and expected ratio.

3.4 Second issue of the questionnaire

The second round questionnaire included the provision of the questionnaire grid with the mode score for each particular statement as an indication of consensus. If the panelist had provided a score which was different to the consensus of opinion as reflected by the modal response they were asked to consider changing their response accordingly in light of the feedback. The mode was selected as the appropriate indicator for respondents because the most frequently occurring value is an easily understood measure. For the final analysis the researchers also calculated the arithmetic mean, median and standard deviation as measures of consensus.

If the expert wished to maintain a different position from the mode he or she was requested to comment as to why they wanted to retain their opinion. This enabled the researchers to augment the statistical analysis by the inclusion of explained reasoning by the expert and thus to extend the analysis by giving consideration to written comments rich in detail (Nelms and Porter, 1985). During both the first and second round, experts were also offered the opportunity to make additional comments regarding any aspect of the survey and this encouraged a considerable comment which supports the overall pattern of decision making of respondents.

An initial analysis of the data suggested that there had been a considerable degree of convergence of opinion on some of the issues and less so on other subjects. However, the reasoning advanced by many respondents in the comments sections suggested that stability of opinion had been reached and that another reiteration would probably lead to either a heavy drop out of experts or a forced degree of convergence which is a potential limitation of the Delphi method. Thus, it was decided to stop the process at this stage and analyze the results after two rounds. The total number of replies for the second round was 60.

3.5 Analysis

The responses are being collated on an SPSS file and analysed. One of the limitations cited in the early literature is that the Delphi technique does not allow respondents to articulate new ideas, or constrains them by way of the structured nature of the questionnaire. In this study, respondents were given the opportunity to comment about all aspects at all stages and this is reflected in the rich detail of the qualitative comments. These comments will also be analysed and reported in the findings.

The findings will be available shortly. Out of courtesy the summary results will be given to the participants in the survey first. Later, full results will be available from the authors at CAST. These will allow all of those involved in cycling to evaluate the broader trends in relation to their own town or country or activity and thus to adopt the most appropriate response.

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