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Adapting Strategic Niche Management for Evaluating Radical Transport Policies – the case of the Durham Road Access Charging Scheme

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ABSTRACT

Transport systems in the UK are facing severe problems of congestion, rising energy use and pollution. One response to this is the move from local authorities to gradually introduce Travel Demand Management (TDM) strategies, but these measures involve a complicated set of institutions, processes, people and procedures.

The old road-building transport policy regime involved a relatively simple system of actors and processes around which expertise, knowledge, and skills had built up over many decades. TDM policies involve a larger, different and more complex system of institutions, processes, people and procedures. The result of this is particularly evident for more radical demand management measures (such as congestion charging, workplace parking fees and high occupancy vehicle lanes), which often get held up or discarded due to controversy, disagreements, unanticipated problems, and a whole host of delaying factors. If they ever get implemented, they tend to be watered-down and consequently less effective.

One potential way to analyse these problems and identify possible solutions is the use of Strategic Niche Management (SNM). SNM is rooted in organisational innovation diffusion theory and provides a structure to evaluate and manage the introduction of new and innovative transport technologies. This paper introduces Strategic Niche Management and explores transferring this technique for evaluating TDM policy measures. The resulting technique is applied retrospectively to the case of the Durham Road Charging scheme, selected as an example for this paper.

Keywords: Transport Policy, Travel Demand Management, Road User Charging, Transitions, Regime Change, Strategic Niche Management, and Niche Formation.

1 INTRODUCTION

In 2001, the UK Commission for Integrated Transport published the report: ‘European Best Practice in the Delivery of Integrated Transport’ (CfIT, 2001) that showed the UK suffers from worse congestion, higher public transport fares, and the least financially supported transport network than any other EU-15 state (Ieromonachou, 2002). Moreover, despite policy initiatives by the Government, the perception is that car use continues to increase, traffic queues lengthen and public transport becomes even more unreliable with little hope of relief in the future. Indeed, perhaps the only light at the end of the transport tunnel is that some local authorities are considering more radical transport policy options to cut traffic levels, including options that have

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1 Travel Demand Management (TDM) is used as a general term for a variety of strategies that encourage more efficient use of transportation resources (road and parking space, vehicle capacity, funding, energy, etc). TDM aims for a transition to a more sustainable transport system. There are many different TDM policies, each making use of different concepts and resources.
been made available to them under the Greater London Act (HMG, 1999) and Transport Act 2000 (HMG, 2000). To date, only two cities have actually adopted these powers and implemented road user charging schemes – London and, almost five months before that, Durham.

The management of the transition to a more radical transport policy structure is a key process, and without an understanding of this process, the policies themselves could well fail. This is an issue that has been identified in a closely related context, that of introducing radical transport technologies. Few innovative concepts become established and successful. For the majority, there are a variety of reasons for their failure including: technological failures, policy barriers, uncertainties over benefits, underdevelopment of the market and the infrastructure. Usually past decisions and inertia inhibits change. Innovation is not dependent entirely on technology but on “other socio-economic factors, mental frameworks, individual behavioural and institutional/organisational patterns” (Weber et al., 1999).

A recent method that explores the processes and actors needed in shaping new technologies is Strategic Niche Management (SNM). SNM has been used to analyse the knowledge and experience of all the actors in a project and is proposed as a tool to assist the development of new and innovative transport technologies. SNM originates from organisational innovation diffusion theory and was developed through a major research project for the EC DG XII. This paper will explain the Strategic Niche Management concept and then apply the insights it provides in order to transfer the techniques from introducing new technologies to implementing transport policies. The aim of the paper is to demonstrate how Strategic Niche Management can be adapted for such use and the benefits an SNM-based tool would offer to smooth the implementation processes of TDM measures. This is achieved through the retrospective analysis of key issues in the Durham Road Access Charging Scheme. The SNM method was not used for planning the implementation of the scheme.

The paper is organised as follows. After introducing the subject of innovation and TDM policies, the SNM methodology is reviewed and the method’s suitability for policy analysis is established. It then explains how the technique can be adapted to evaluate and implement policies rather than technologies and introduces the evaluation technique SPNM (Strategic Policy Niche Management). Next, the Durham Road Charging Scheme is introduced as a case study, setting out the background on how the policy was implemented, and details how the case was constructed. Finally, the Durham case is analysed retrospectively using the SPNM technique and the policy niche formation theory is tested. Results and conclusions complete the study.

2 STRATEGIC NICHE MANAGEMENT

The first issue to be explored is the method of analysis used. Strategic Niche Management is technically defined as: “The creation, development and controlled break-down of test-beds (experiments, demonstration projects) for promising new technologies and concepts with the aim of learning about the desirability (for example in terms of sustainable development) and enhancing the rate of diffusion of the new technology” (Weber et al, 1999). In other words, it is the orchestration of the development and introduction of new technologies through setting up protected experimental settings (niches) in which actors learn about the design, user needs, cultural and political acceptability, and other aspects (Schot and Rip, 1996). It is therefore a deliberate attempt to make visible and productive the co-production of technological options, use, policy measures and sustainable development. All parties in this way (including producers, users and policy-makers) are involved and can contribute to the diffusion process. SNM terminology defines experiments as “unique socio-technical laboratories for learning about the problems, shortcomings and barriers a new technology faces” (Hoogma, 2000). They are not commercial projects, and are

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2 Strategic Niche Management as a Tool for Transition to a Sustainable Transport System by Hoogma (1999).

3 Sustainable development has been defined as development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs. (WCED, 1987)

4 It is not known what a sustainable transport regime looks like but it is possible to assume some fundamental aspects of it like regulations, consumption patterns and user preferences. An SNM based approach can help in this direction by exploring future transport solutions in order to identify possible pathways towards a more sustainable regime. (Based on Hoogma et al, 2002, p.5-8)
often the only way to learn from users and to find out which modifications are required to make the technology viable. Recent examples are the fuel-cell bus demonstration projects in London and other major European cities (TfL, 2004; BPS Inc., 2004).

The management of the introduction of innovative transport developments is often a key weakness. Rather than simply reporting cases of success or failure in a transport innovation, it is possible to use the structured SNM framework to identify the processes involved. Only this will support the transfer of lessons between specific projects or situations. SNM was originally developed to understand technology shaping. Although this paper reports an adaptation of SNM for transport policy shaping, this section will first explain the original technology-shaping SNM approach.

Strategic Niche Management was rooted in organisational innovation diffusion theory that explored the processes and actors needed in shaping, and the application of, new technologies (Weber et al, 1999; Hoogma et al, 2002). Dissatisfied with existing approaches to technology diffusion such as ‘technology push’ and ‘market pull’ strategies, Schot and Rip (1996) explored another type of model that they called Constructive Technology Assessment (CTA). This attempted to shift the focus away from forecasting the impacts of new technologies towards broadening the design processes to include new social actors and factors with the aim to anticipate and accommodate social impacts within technology development. Schot and Rip suggested using Strategic Niche Management as a CTA strategy that encourages the idea of creating a protected space for the alternative technology (termed the ‘technological niche’) within which learning could occur (Schot and Rip, 1996).

The innovative feature of SNM for technology shaping involves the provision of a protected space to experiment with new solutions within the dominant technological regime. Technological regime is “the dominant social, technical and economic forces that support the technology and its physical and non-physical infrastructure” (Lane, 2002). Internal combustion-engine vehicles form an example of a technological regime, which encompasses not only the technology but the whole economic and social system linked to it. An example of a technological niche within this regime might be demonstration projects for electric vehicles or CNG-powered buses. The whole process of SNM can be viewed as a laboratory experiment where the niche is developed under special settings and step-by-step diffusion can take place into real-world conditions. If successful, the transition is made from technological niche to market niche. This meaning of transition differs from the usual definition of Technological Transitions whereby a transition is a process of change from one technology to another. Geels (2002) explained Technological Transitions through a number of empirical case studies and the fundamental changes that take place during a transition. SNM is interested not only in Technological Transitions but also at the socio-technical dynamics that bring about the change and the influence the outcome might have in creating a new regime. Transitions are societal transformations in which society or a complex subsystem structurally changes in a continuous, gradual way. Transitions are the result of a dynamic interplay among multiple factors, which mutually shape each other but at the same time have their own trajectory of development. In technological transitions technical change is a prominent element. They may also offer sustainability benefits and are therefore interesting for public policy (Kemp and Rotmans, 2001). Public policy is an important factor when influencing a change in a regime like transport (Simon, 1998).

SNM advocates the design and introduction of appropriate levels of niche protection. Too little protection and the learning process is precluded; too much and the risk of creating an expensive failure is increased. This is because the new technological options can only become competitive through exposure to increasingly demanding economic and regulatory environments. The goal is to successfully introduce the new concept and, after a period of niche protection (which usually includes financial and organisational support) expose it to real-world conditions where it should be able to survive. It is important to note that, once the protected space has performed its function, SNM demands the dismantling of the protecting factors in order that the new technology can be tested by real world conditions.

An evolving technological niche is defined by a series and/or set of similar experiments over time. To be complete, this definition of a niche by SNM must include a description of the protection measures used and the regulatory framework within which the experiment is situated. Indeed, the concept of a technological niche was initially employed by Van den Belt and Rip (1987; cited Hoogma, 2000, p.80) to analyse industrial innovation and government technology policy. This
suggests that not only can Strategic Niche Management be used to analyse, or plan, the introduction of new technologies, it can also be effective as a means to design and implement transport policies. Van den Belt and Rip illustrated firstly how Governmental policy (patent law) played a crucial role in the commencement of chemical technology and secondly, the relevance of the idea of a ‘nexus’ for contemporary politics and for steering chemical technology. Kemp, Schot, and Hoogma (Kemp et al., 1998) extended the concept of ‘nexus’ into niche management to provide a dynamic answer to the quest for sustainable development through technological innovation.

Hoogma et al. (2002) note that through experimentation and learning from a series of niche projects, the best can be selected for mainstream applications. An example of the creation of such niche projects might be the way that regulations and subsidy has created niches for a variety of alternative fuel vehicles. Through these we have learned which are the most feasible in terms of environmental performance, economic viability and user acceptance. In this new research, difficult concepts, like Travel Demand Management policies, are analysed as ‘niches’ to see how they develop and gain acceptance. Central to learning is an acknowledgement and discussion of the 'expectations' held by different actors. These are important in that they reflect the cultural values underlying the experiment (and the niche). They also reveal assumptions made which may subsequently undermine or advance the innovation at the diffusion stage.

Overall, an SNM approach involves setting up experimental demonstration projects (the sum of which comprise the 'technological niche') in which actors learn about a technology's design, user needs, cultural and political acceptability, environmental impact and other aspects (Schot and Rip, 1996; Hoogma et al., 2002). Most SNM studies to date have been a retrospective analysis of key factors behind successful, and unsuccessful, innovations of more sustainable transport technology projects. By understanding key components and relationships in such projects, SNM has been developed from a tool that analyses project management into one that can facilitate project management.

2.1 ADAPTING STRATEGIC NICHE MANAGEMENT FOR EVALUATING TRANSPORT POLICIES

Strategic Niche Management has been developed in the context of transport technology projects. However, behind these specific technologies has been some form of policy initiative. Hoogma et al. (2002, p 202) note the need for more research “on the relationship between SNM and state policies, and the relationship between SNM and planning. In general, SNM may be used to inform planning (both transport planning and town planning) while planning may be used to foster niche development processes”.

It appears that there is potential to analyse various transport policies such as Urban Congestion Charging, and Workplace Parking Charging mechanisms as well as employer-level TDM like travel plans, using a policy adaptation of SNM. This would be particularly appropriate for more radical policies that have proved to be difficult to implement or to transfer between situations as they challenge the dominant regime. The use of an SNM-type analysis would help identify critical information, processes and actors in the planning, introduction and implementation of the policy projects, the barriers that planners face during implementation (social, political, institutional, financial), and the different information needs for each step in the process. Consideration could also be given to whether policies require more protection than already provided by the regulatory framework. Experiments with new urban transport policy instruments do occur, but they are not used to systematically learn about possible new linkages between technology, information needs and issues of social and political acceptability. For example, Parkhurst (2000) noted the way in which lessons for Park and Ride schemes were not transferred and each repeated mistakes of earlier schemes. This particularly applied to the issue of abstraction of patronage from existing bus services.

In the parallel context of transport technologies this was highlighted by Grablowitz et al. (1998), who noted that there was never a shortage of possible solutions, but that learning between experiments was weak, so 'jeopardising their potential to solve [...] problems and the financial and personal resources spent on their development’. Kemp et al. (1998) reinforced this point, quoting evidence that learning tends to be technologically specific and does not cover linkages between technologies. Lessons from past experiments are little more than partly understood.
There is also a problem with experiments providing poor feedback to the implementing agencies and network actors trying to develop generic tools. Schot and Rip (1996, p261) noted the need in such situations for ‘a process of learning and constructive assessments and reassessments of the various actors involved’. A tool based on Strategic Niche Management that incorporates such knowledge could well ease the implementation process by identifying these issues of concern and barriers that inhibit this.

In order to use the concept of SNM to analyse policy implementation some adaptation to the structure of technology implementation is needed, but the main conceptual structure of supporting niches within the existing regime in order to create a shift towards a more sustainable system remains the same. An SNM-type analysis would consider protection measures like financial incentives and other actors’ goals but in addition social and environmental benefits would need to be incorporated in the early stages of the project. Participating network actors would need to be analysed by their enthusiasm and benefit they derive from the scheme. In the case of designing long-term policy strategies using SNM, development of sustainability-oriented niches will not only depend on actors but will also require a strong public role in leading the transition process. According to Hoogma (Hoogma et al., 2001), numerous studies of product innovation and failure have shown that involvement of users is an important factor for successful market introduction, while a lack of user involvement is a major cause of failure. Creating a niche with one or more interrelated demand management policies will facilitate the process of societal embedding as well as overcoming several other barriers including institutional arrangements or regulatory frameworks in favour of the established regime (Kemp et al., 1998). At the same time, barriers have to be overcome in order to find partners willing to support the new concepts and provide alternatives that will encourage their acceptance.

Overall, many of the project management aspects in the structured SNM framework relate to processes that also apply to developing urban policy instruments. Factors such as enabling learning, support measures; motivations of key actors, the evolution of expectations, barriers, acceptance and relationship to the existing regime can all be applied to policies as well as technologies. So could innovative policy instruments be viewed in the same way as technologies, such that there is a ‘policy niche’ in the same way as SNM has a ‘technology niche’? For example, road pricing could be viewed as having developed in a number of protected niche environments around the world (Singapore, Bergen, Oslo and London).

### 2.2 POLICY NICHE FORMATION

Experiments and in effect niches are born through networks of organisations and people interested in the development of a specific application (Weber et al., 1999). Figure 1 explains the process of niche formation and development as adapted for TDM policies and forms the basis for the creation by this paper’s first author of the Strategic Policy-Niche Management (SPNM) methodology. The stages (a) to (f) show graphically the necessary steps towards regime change. The first stage (a) is where a series of measures are put together to create a specific ‘case’ of a TDM policy. For example, it may be the measures needed for a road user charging, road space reallocation or a Travel Plan. These cases are within the current regime, and are exceptions to it (i.e. it is not normal in the UK to have area-based road user charges). A central aspect to SNM is the use of appropriate levels of protection designed and introduced for each specific case, for example, providing exemptions or free permits for key groups in an area charging scheme or enhancing and/or subsidising a bus service into the charge zone. These help nurture and motivate the experiment during its starting period.

**FIGURE 1 ABOUT HERE**

The situation may then evolve into a number of TDM cases within the regime (b). These may have developed separately but eventually links will start to build up. This will be particularly so if the applications take place nearby (e.g. several travel plans by employers on adjacent sites or on the same estate). Alternatively several authorities implementing a similar policy (e.g. road user charging) may network to share lessons or standardise on best practice, support measures, technologies etc. Once co-operation between experiments begins, this group of experiments could be considered to represent a single large niche (c). So, for example, several cities implementing road user charging may establish a network of co-operation and methods of practice. Another example is the way in which travel plans were initially developed by some pioneering companies
and have now reached stage (c) with travel plan networks to support the development and implementation of policy.

The question is to what extent are the protection measures needed for the initial stages of policy development? Can they be withdrawn as the policy becomes established? Technology SNM requires the niche to be tested under real-world market-conditions. Only in this way can a market potential materialise. It is at this stage that protection measures should be lifted. This is when a technology niche can evolve into an unprotected market niche. But can such a concept apply to a policy version of SNM? There is no direct policy equivalent of a market niche therefore the term ‘adoption niche’ will be used instead.

The transition from a policy niche to an adoption niche (d) occurs when the removal of protection factors does not have an adverse effect on the cases, and their development continues (e.g. A company or group of companies accept travel plans as normal business practice and not as a regulation to follow. Equally, employees accept travel plan measures as normal and to be part of what their employer provides). The final stages (e) and (f) would result when the market niches become so widespread that a regime change occurs. For example, when a generalised road-user charging scheme becomes national policy, or travel plans become a standard part of business operations (like providing car parking is today).

Policy regimes are not transformed overnight; rather they tend to evolve over time. New policies are created and added to the existing ones, but this cannot be described as a regime shift. Sudden policy regime shifts occur very rarely and when this does happen it is attributed to equally important changes like wars, extreme natural destructions etc. A change of government for example or the announcement of new legislation does not of itself change the existing regime. If the Durham Congestion Charging scheme is viewed as a policy example it is clear that it consists of an ‘experiment’ and a ‘niche’. It would only be viewed as part of a regime change if there will be enough similar ‘niches’ to achieve a change in the existing transport regime. It is much easier to visualise a regime shift in the technology area where objects are evident and any change is easily identifiable (e.g. shifting from horse power to the internal combustion engine). A change in the regime would take place over decades following the introduction of a new policy.

SNM analysis identifies strategic factors that are likely to have an impact on regime shift. These include the niche formation, partner interaction, expectations/motivations, societal embedding and learning. Within this strategic framework, SNM maps the way in which specific concepts develop and evolve. A number of alternative measures may be tried and the ones that are best suited to the different areas, conditions and users, would most likely gain user acceptance and remain in place after the removal of the protection that was originally applied. This is the equivalent of creating a commercial market niche for technology SNM (e.g. reaching the point where people buy alternative fuel vehicles even after subsidies are withdrawn). For a TDM policy this would arise when, for example, the long-term benefits come to be widely acknowledged (as for example, is the case with shopping street pedestrianisation and home zones in Europe).

Just like there may be competition between different environmental technologies, there should be competition between different TDM policy measures and packages to understand their potential for success. Practices would be pushed to exploit all available options in order to match the sustainability targets of the new substitutes.

### 3 Durham’s Road Access Charging Scheme

In order to explore how the SNM framework might be adapted to implement TDM policies, a case study of a ‘radical’ TDM policy was retrospectively analysed using the SNM methodology. This was the design and introduction of Britain’s first road user charging scheme. Information for the case study was gathered using three techniques. An initial appraisal of Durham County Council’s cabinet reports, local and national newspaper articles and other grey literature helped form an understanding of the case, structure the initial questionnaire survey as well as identifying suitable contacts for interviews. The questionnaire survey, conducted by email, was sent to key partners and actors on the scheme. The response rate of the survey was 50%. This was followed up with three focused interviews undertaken in Durham in September and December 2002. Two interviews were conducted with a Durham County Council official who was the project manager of the scheme. The third interview was with two employees of Durham University’s Estates Department,
one of the most important actors of the scheme as they own a large part of the charging zone. (See acknowledgements for contact details). The interviews utilised in this research were semi-structured, so they retained their open-ended nature but followed a set of questions and a timeframe to retain focus. Further inquiries into certain issues were triggered by personal views and opinions of the respondents and new sources were often provided in this way. Triangulation between these data gathering methods was used to enhance reliability and ensure validity.

3.1 Background

The City of Durham in the northeast of England was the first UK city to take advantage of powers to introduce Road User Charging, granted to local authorities by the Government (1998 Transport White Paper, Greater London Authority Act 1999 and Transport Act 2000). The charging zone - introduced on the 1st of October 2002 - covers the Durham Peninsula accessible only by Saddler Street (see figure 2). This narrow road leading from the Market Place to Palace Green provides the only vehicle access to some private residences and small businesses as well as the World Heritage sites of the Durham Cathedral and Castle. With high levels of vehicular and pedestrian traffic, there were areas of conflict in which pedestrians often felt threatened and vulnerable. The first attempt to implement restrictions on the Peninsula was by the County Council in 1988. The measures they proposed were very radical at the time, involving suggestions for pedestrianisation and a complex mix of time and vehicle size loading restrictions. There was no consultation with local traders and other landowners on the peninsula, who opposed the scheme. They felt it would adversely affect their businesses and in the end the proposed measures were turned down. Nothing happened for a while, then in 1994 the Council organised a public consultation and suggested the experimental implementation of a number of far less radical parking and loading restriction measures. The 1994 scheme was a response to the failure of the Council to impose radical measures in 1988. In practice the 1994 scheme proved to be insufficiently effective and, in particular, enforcement was problematic. The traffic and pedestrian safety problems remained, as shown in figure 3.

3.2 The Scheme

The charge zone incorporates several large and important institutions of the area, including the Cathedral and Castle, the University of Durham, a number of colleges, the Chorister school, large and small shops, other trading and servicing establishments and a small number of residents. The Cathedral is a major driving force for the scheme; it draws around 450,000 visitors a year. Local people are proud of the Cathedral and the heritage associated with the Peninsula in general.

The Charging Order, which was approved in September 2002, introduced a charge of GB£26 for motorists accessing the zone, payable Monday to Saturday 10am to 4pm. Motorists are not

5 by Colin Buchanan and Partners

6 (=US$3=EU€3)
charged to enter the Peninsula but payment is required to exit the area. Controlling the exit was considered more appropriate for the site, as it allows free flow of vehicles into the area. It was designed so that faulty equipment or drivers unwilling to pay would not create a bottleneck affecting the nearby A690 through road that passes by the charging zone entry point.

[INSERT FIGURE 4 ABOUT HERE]

The exit, visible in figure 4 above, is controlled by an automatic telescopic bollard that is raised during the period of charging and drops when payment is made. A CCTV camera provides monitoring and offenders are required to pay a fine plus the charge. The exit charge also allows visitors, if exempted, to obtain their permits from the establishment they are visiting, e.g., visitors/volunteers to the Cathedral, parents of schoolchildren under nine from the Chorister school, etc. A number of exemptions were provided after consultations with the major stakeholders on the Peninsula. These were:

- Residents and their visitors
- Riders of mopeds, motorcycles and bicycles
- Disabled persons’ vehicles (with pre-arranged parking spaces)
- Those attending business in establishments where off-street parking is available

The majority of permits are Residents permits. There are also permits for business, carers and medical practitioners, regular visitors and visitors scratch cards for use for guests in hotels and Bed and Breakfast accommodation.

Associated with the charging scheme was the introduction of the ‘Cathedral Bus’ service (see figure 6). This was in order to provide an alternative for car users accessing the charge zone. Two buses link the charge area to the bus and rail stations and a park and ride site. Each service runs every 20 minutes and tickets cost GB£0.50 for adults and half price for children and senior citizens.

Before October 2002 about 4,000 vehicles a day entered Saddler Street, a single carriageway road that serves as the only way into the Peninsula for vehicular traffic. Of these vehicles, 50% just used the road to drop passengers to either go to shops or banks while the driver turned around at Palace Green (a square in front of the Cathedral and Castle). These ‘serial parkers’ tended to use the road as a mobile parking area thus contributing to congestion by slowing down traffic. The traffic lights controlling flow in the narrow street could not discourage the build up of congestion because of the sheer number of vehicles and pedestrians. Traffic congestion in the area often led to vehicles becoming trapped in the narrower sections, which could result in queuing extending onto A690. The charging period is the busiest time for car as well as pedestrian traffic. There are many thousands of pedestrians along Saddler Street during this period; the number increases during weekends and holidays. There have been a number of slight injuries as well as an unfortunate fatality during the last few years.

Following the introduction of the road user charge, early estimates of an almost 90% cut in traffic (LTT, 2002) were confirmed by a Durham County Council monitoring report that showed an 85% reduction in traffic flow (DCC, 2003). The Durham Road Access Charge Scheme can only be viewed as a success, but what factors and processes were behind this achievement? Key factors included:

(a) Strong political leadership from both the elected representatives and the officials of Durham County Council, who have championed the scheme for many years – a task made easier by the political control of the administration remaining the same over this period.

(b) The traffic problem in the area was well recognised by most people in the city, who were thus easy to convince that serious action was needed. This was helped by the nature of the site.

7 (≈US$0.75≈EU€0.75)
(with the World Heritage Site of the Cathedral and Castle), which provided an added incentive for action to restrict traffic.

(c) The access charge was proposed as an alternative to a total ban on vehicular access, and can thus be seen as a comparatively benign measure. Milder measures had been attempted and had clearly not worked. The access charge ended up being just the latest in a whole series of measures aimed at gradually restricting traffic access to the peninsula.

(d) The small size and scope of the scheme (with the charge only applying to a single road) made it technically simple to introduce with relatively few people directly affected.

(e) The charging policy was preceded by improvements to public transport access to the area that have been clearly linked to the implementation of the scheme.

(f) Finally, the active involvement, and empowerment, of a number of project partners, once again over a number of years, combined with a widespread consultation process and publicity campaign ultimately helped the County Council achieve consensus and support for charging. However, it should be noted that the success even of such a limited scheme was still uncertain, despite these conditions being in place. Comprehension of the Durham scheme by some is taking time, with many people in nearby towns and cities still believing that the charge is applied across more of the city than is the case.

Durham is a very small congestion-charging scheme, but its development does contain lessons for elsewhere in the UK and abroad. In the first instance, the Durham experience shows that congestion charging can be a better alternative to conventional traffic and parking management programmes. A fiscal mechanism can be far less bureaucratic and more effective than the conventional regulatory approach of traffic restriction orders, exemptions, and parking restrictions. It is also much easier and cheaper to enforce because of the small area and the single point charge. Much attention has been paid to congestion charging in a big city context, but the Durham scheme shows that it is a flexible tool with much wider applications.

4 APPLYING STRATEGIC NICHE MANAGEMENT TO POLICY – THE CASE OF THE DURHAM ROAD ACCESS CHARGING SCHEME

Using the Durham case as an example, the following section explores how the SNM framework could be used retrospectively to explore how this radical policy was organised, implemented, barriers overcome and how it might be sustained in the future.

4.1 Niche Formation

The policy implementation process contains a number of factors that can be analysed using an SNM policy framework. The road-user charging scheme represents the case to be examined and is itself the pioneering niche for this policy in Britain. In SNM theory, a policy niche is characterised by a policy, a specific application for the policy, a specific site for the implementation of the policy, a network of partners and actors involved in managing the introduction and protecting it from opposition and finally the technology if this is required. The specific site where the policy is implemented does not restrict the boundaries of the policy niche. Widespread adoption of the policy would lead to the creation of an ‘adoption’ niche and probably contribute to a regime transformation. Therefore the real boundaries of a policy niche are defined by its legal and social basis rather than geographically. In this example, the policy concerned was Road User Charging (RUC), consisting of restriction measure for the use of a specific road in the heart of the City of Durham. The network involved with this policy application consisted of Durham County Council, who managed the whole project, several supply partners, who provided services and technologies, as well as a number of groups that were consulted and helped in designing the measures that were implemented (see Figure 5).

4.2 Partner - Actor Networks

Despite being a small and (for Road User Charging) a relatively uncontroversial case, there were a variety of groups involved in the Durham scheme of which only the County Council was responsible for the overall decisions on implementation. Figure 5, shows the organisation of the scheme at the project level. Adapting SNM to analyse the introduction of policies has produced a distinction
between partners (actively involved in the planning and management of the project) and actors (affected groups that took part in the consultations that helped form the various measures). This distinction was not defined in the original SNM theory.

[INSERT FIGURE 5 ABOUT HERE]

The Road Access Charge scheme took place under the authority of Durham County Council that cooperated with ATG Access to provide the technology needed and National Car Parks (NCP) to manage that technology. These bodies also actively interacted with a number of actors including stakeholders of the charging area and affected groups like businesses, residents and the mobility impaired. A network of promoters and users that wanted a solution of the traffic problem that existed therefore protected the scheme. Key players were:

(a) Durham County Council (DCC) was motivated to introduce access charging to the peninsula area of the City of Durham in order to reduce congestion and pollution caused by an increasing number of vehicles. The Council departments of Environment and Technical Services and Transport were involved. Part of protection measures included the introduction of a new subsidised bus service providing access to the charging zone.

(b) The Department for Transport (DfT) supplied funds for the implementation of the policy through the Local Transport Plans scheme.

(c) ATG Access provided the technology for enforcing the charging; it produced the system to the designed specification. The company was motivated as they are interested in developing such technology for similar projects elsewhere.

(d) Permanent residents within the charging area supported the scheme in order to reduce congestion and improve the environment on the historic Durham Peninsula.

(e) The Durham Access Group, representing the mobility impaired, gave up its members parking bays in the area so that they would help the scheme operate more efficiently, in return for a mobility scheme designed for their needs.

4.3 Expectations - Motivations

Partners in the Durham scheme had a commercial or clear interest in the case succeeding. Durham County Council was interested in obtaining funds to subsidise alternative transport thereby reducing congestion and pollution while improving accessibility in the peninsula area of Durham City. This small-scale case could then allow the Council to assess whether an extended charging scheme in a wider area would offer more benefits. ATG Access agreed to produce a specific design access control system for the Durham scheme, as it would be interested in becoming established in this product area. Building a good reputation from the first road-charging project in the UK would offer ATG the advantage over other competing companies. NCP who provided management for the access-control system including the operation of an intercom and a CCTV, was interested in expanding its traditional off-street parking expertise with an on-street management division in order to provide integrated solutions to public and private sector customers. The bus operator JSB Travel benefited from the subsidised contract through the Council’s Local Transport Plan fund for buying and operating the new Cathedral buses (see image in figure 6). Although this was a normal service contract, it emphasised that expanding bus services was a serious council policy with potential longer term benefits for JSB.

[INSERT FIGURE 6 ABOUT HERE]

The actors in the Durham RUC scheme, on the other hand, did not have any direct commercial interest, but they expected and received benefits. The central benefit for both the shops and cathedral was a considerably more pleasant street environment for their customers. A crucial aspect of the Durham scheme was how adverse impacts were treated. The consultation process both identified possible problems, and resulted in the actors having a direct involvement in the design of the protection measures such as the permits, bus provision and shopmobility service. For many other TDM schemes, the tensions produced by the mix of benefits to some actors and adverse impacts on others can be very problematic. In Durham, user involvement and understanding appears to have succeeded in minimising problems and maximising actor benefits producing a win-win solution.
4.4 Regional Context - Societal embedding

The Durham charging scheme took place in the Peninsula area because of its importance as a World Heritage site. As such it needed protection from the pollution caused by the increasing number of vehicles accessing the area and at the same time required to provide a safe and relaxing environment for the thousands of daily visitors. Apart from providing information transferable to other similar projects (scale and location), the Durham Access Charge scheme could also be used as a benchmark to measure their success.

The scheme can also contribute to a regional acceptance of policies like road user charging. The project was publicised extensively by Durham County Council who also worked towards its success while having in mind not only the benefits for the Council and the scheme, but also for the partners and actors involved. The Durham scheme, as insignificant as it may seem in terms of scale, has perhaps broken the logjam that characterised the introduction of radical and controversial demand management transport policies not only in that specific region but the whole of the UK.

4.5 Learning

There are a number of key lessons from the Durham Road Access Charge scheme. The first is that radical TDM policies, e.g., in this case RUC, are possible solutions when there is real cause for such measures (congestion, pollution, etc). The County Council's determination on making the measures acceptable was another important factor. Equally central are the partnerships set up between the implementing host and the various partners that provided technologies and services necessary for the operation/enforcement of the policy, as well as the rest of the actors in the scheme. The involvement of actors and not just partners from an early stage was particularly important. The actors' perceptions had changed over time in Durham as they learned more about the scheme, its widespread benefits and the positive changes it would bring. Good publicity, consultations and revising of the proposed measures in view of grounded opposition tailored the scheme to the needs of most groups' objectives without it becoming less radical or less successful.

The way in which the scheme was carried out represents the idea of SPNM (Strategic Policy Niche Management), the SNM framework for policies, put into use. The analysis using SNM was done retrospectively but shows the applicability of such an approach. A wider analysis of radical TDM policies using the SPNM framework could help develop a tool for successful policy implementation.

5 CONCLUSIONS

Transport planners and policy makers are becoming aware of the need for radical policy measures to tackle transport's environmental impacts and congestion. These measures need to be delivered rapidly, yet the introduction of such instruments is fraught with difficulties and liable to delays. Transport planning has a crisis of managing policy development and implementation. The new policy agenda requires a more complex and integrated process than have hitherto been adopted. This paper illustrates that a modified form of SNM – namely SPNM, could provide such a process and could take the form of an evaluation tool for the agency or host of actors involved in the introduction of demand management policies.

From the case study analysis some findings may provide a new vision for work with SNM. When investigating SNM through the original case studies that helped develop SNM for transport technologies, it was clear that in most examples the success of an experiment and a subsequent niche creation depended on the existing technological regime. That technological regime was in all cases impossible to alter just by introducing a new technology because the existing technology was supported by the existing policy regime. That regime emerged at the time when the technology could not provide any other viable alternatives. It is becoming apparent that policy measures depend on many technological innovations to introduce and then manage the policy successfully (i.e. RUC and automatic toll collection technology, emissions reduction and green technology vehicles, bus priority and traffic signal coordination). It appears that, a policy implementation tool based upon SPNM could be very useful.

Developing SPNM to help planners implement policies is obviously a useful exercise in itself. It is also clear that while technological developments occur more effectively when supportive
policies are in place, the converse is also true. In the longer term therefore, the way forward may well be to merge the new policy element with the more established technology function. Such an integrated approach, in which simultaneously introduced policies and technologies support each other, could lay down the conditions for a regime shift that could lead to a more sustainable transport system. It has to be emphasised that the development of the SPNM framework is still at this stage viewed as an experimental framework. When further cases are examined and more conclusions drawn, the SPNM framework should be applied to a new project. It is only then that it will be possible to compare it with other existing and established policy evaluation tools. This research work currently aims at studying SNM and developing SPNM as an experimental alternative for analysing policies.

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Growing ‘Adoption’ Niches become dominant regime

*b*Adoption* niches from different TDM policies but with common goals become the dominant regime replacing the existing practices.

When a regime shift occurs traditional policies together with other alternatives can continue to co-exist along the long-term benefit solutions.

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**Table 1: Niche Formation -** The transition from specific policy case applications to the development of Adoption Niches and the Regime transformation.

(a) New policies allow the formation of specific application cases

(b) Several cases can exist within a specific policy area

(c) Cases merge to form Policy Niches

(d) ‘Adoption’ Niche Formation

(e) Growing ‘Adoption’ Niches become dominant regime

(f) Regime transformation

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The application of SNM requires the design and introduction of appropriate levels of protection.

The cases are still managed independently but with common goals and procedures and cooperation between them.

The policy niche will be dismantled when the protected space is removed. If successfully tested in real-world conditions ‘adoption’ niches will be formed.

Not all but several cases will have common links (location, type of measure) that will help them merge to create policy niches.

Cases are managed independently and irrespective of each other at these stages.

A series of measures form the conditions within which the policy will be applied.

Theoretical boundary of the existing transport policy regime

‘Case’ refers to the focus of the specific application of a TDM policy and the area where it’s being implemented.
Figure 2: A map of Durham with the charging area highlighted
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Figure 4: The exit from the Durham Charging Zone and the point of Charge with the rising bollard preventing vehicles exiting without paying – Insert: The Charging Mechanism
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