12 TRANSFERABILITY

12.1 INTRODUCTION

Transferability may be defined as covering all issues related to how evidence gained about the performance of road pricing systems in one situation may be applied to others. It should be defined to incorporate evidence from both real and synthesised implementations and to include the full range of themes that are considered important in assessing the success of schemes.

Transferability of experience from one city to another will be affected by a wide range of factors, including city size, density and transport supply and demand; cultural impacts on user response and acceptability; the detailed design of the scheme, any complementary policies and the ways in which revenues are used; and, fundamentally, the objectives of a given scheme. It is difficult enough to assess how the performance of a given type of scheme, designed to meet a given set of objectives, will transfer to another city with the same objectives. It is altogether more complex to assess transferability where the two cities have differing objectives.

12.2 WHAT IS THE IMPORTANCE OF THE THEME?

Transferability is extremely important for advancing knowledge about the potential of road pricing schemes to achieve their objectives in alternative situations. An urban road pricing policy is very unlikely to be formulated in isolation of activities elsewhere and the processes of setting objectives, designing measures, predicting their impacts and winning acceptance are all likely to be affected by perceptions of experience gained in other cities.

For example, much of the current impetus for cities to consider pricing may relate to the perceived success of the London Congestion Charging scheme and ongoing events in Stockholm may further inspire Europe's urban transport planners.

It is, therefore, essential that we understand which aspects of implemented or synthesised schemes may be expected to be repeated in other locations and which may not. We also need to understand which variables are likely to be important in determining the extent to which evidence can be transferred between situations.

In the findings of the User Needs Assessment Questionnaire, transferability was considered to be the least important of the nine themes presented to respondents from 21 cities. This may appear to conflict with the statements made above about the importance of the theme. However, it may also be the case that it is simply a reflection of the perspective of policy-makers and planners from individual cities, who are primarily focussed on their local situation rather than on the wider picture. In that case, transferability may be perceived as a more remote "high level" theme, while many key transferability issues may be assumed to be part of other themes that are closer to hand. For example, the accuracy of model predictions may be critically dependent on relationships that are being driven by parameters derived from other situations, rather than from specific local data. Thus, the transferability theme may naturally be seen as more important by academics and higher level planners, responsible for advising cities on transport policy issues, than by the city planners themselves. Of course, an alternative explanation could be that city planners judge that they can learn the appropriate lessons from elsewhere easily, but have greater concerns about developing a scheme that fits their own circumstances. If this is the case, then it may be that the complexity of transferability is in danger of being underestimated.

The link between transferability and objectives is not simple. From an academic perspective, similar to prediction, transferability has a tangential relationship to the objectives of road pricing schemes, because it exists to aid understanding of how the performance of proposed schemes against their objectives may vary dependent on a broad range of geographic,

economic, social and temporal factors that are unique to each situation. However, as will be seen during the discussion of previous work, from a practical perspective transferability may be seen as a high level objective in its own right, motivated by the desire to repeat the perceived success of policy innovations that have been introduced elsewhere. At the individual scheme level, the relationship between transferability and objectives may focus on: (i) the extent to which predicted and actual achievement of objectives in other places at other times is useful as an aid to decision-making; and (ii) the contribution that scheme outcomes can make towards enhancing general understanding of factors that affect achievement of objectives. Thus, in addition to there being an important relationship with the objectives of a road pricing scheme, there is also a significant link between transferability and evaluation (a topic covered briefly covered in Chapter 7 and in Work Package 3 of CURACAO).

12.3 WHAT IS KNOWN ABOUT THE THEME?

12.3.1 How is Transferability defined?

In general academic literature, a distinction tends to be drawn between the concepts of *generalisability* and *transferability*. *Generalisability* is normally defined as the extent to which data obtained from a particular population, under unique study conditions, at a particular point in time and space can be applied more widely to other populations, conditions, times and spaces. So, in the case of road pricing, assuming that the results of a limited trial provide data that can be used to predict impacts elsewhere, be it expanding the trial to the full city / region or to another country, would be classed as generalisation. *Transferability* is normally seen as a subset of generalisability, which applies to more specific occasions where we may be attempting to generalise research results to a context in which they were not studied. This is most commonly found in the desire to generalise results from one location to another (e.g. between cities and countries), but it could potentially apply to any critical dimension that limits the meaning of research findings. The main point is that transferability analysis focuses on identifying contextual differences and understanding / dealing with their impacts.

12.3.2 What Approaches to Transferability have been adopted in previous studies?

Transferability has regularly been addressed as a theme within individual transport research projects and has sometimes been a significant focus of the work undertaken. However, there have also been research projects which have investigated the potential for implementing road pricing schemes that have not considered transferability in any significant or formal manner. Therefore, experience in this area is somewhat variable.

The most significant work on transferability within transport policy may be that carried out by the TRANSPLUS project, which built on work carried out by Rose (2001) to produce a series of guidelines for how cities might best learn from previous experience. The concept of transferability was subdivided into three typologies:

- *territorial transfers*, described as “horizontal” and covering the full range of situations where experience may be transferred between different locations
- *transfers between institutions at different levels*, described as “vertical” and covering issues relating to the scaling up or scaling down of policies
- *transplanting of institutions and related competence instruments*, covering situations where changes of institutional structures may be required

While the first of these areas may be the one most commonly associated with road pricing schemes, the role of institutions and institutional structures in the successful implementation of urban road pricing has also been seen as important. For example, in the AFFORD project, it was concluded that urban road pricing schemes are likely to be easier to implement in cities where decisions about the transport system are taken primarily at the urban regional level rather than rather than based on negotiations between smaller urban districts (Milne *et al*, 2001). The subsequent experience of the political processes in Stockholm and Edinburgh may tend to support this idea.

The practical consideration of transferability within the TRANSPLUS project focuses primarily on mechanisms for fostering the transfer of desirable innovations, so turning transferability into an explicit objective of transport policy rather than a technical feature to be studied and understood. It identifies four levels of activity in the transfer of innovations from one location to another: collaboration, networking, dissemination and osmosis. This appears to assume implicitly that territorial transfers dominate and underlie most institutional issues. It proposes knowledge sharing, through mechanisms such as benchmarking, as potential approaches for increasing the transfer of desirable innovations.

The DANTE project, which was primarily based on interviews with decision makers and implementers in nine case study cities, considered transferability as part of assessing the potential for implementing travel reduction strategies. Most of this work involved identifying and categorising barriers and considering the extent to which they could be overcome. Five explicit categories of barriers were defined:

- resource barriers
- institutional / policy barriers
- social / cultural barriers
- legal barriers
- side effects

Pricing and taxation measures were considered to have the greatest probability of barriers occurring but, interestingly, one of the lowest levels of seriousness in terms of issues that may not be able to be overcome. In contrast, barriers to land use planning measures, which were also considered to have a high probability of occurring, were considered the most difficult to overcome. The approach to transferability involved simply creating a checklist to help identify the most appropriate choice of measures and to assess the barriers that may arise. As in the case of TRANSPLUS, transferability is seen as being a high level policy objective, rather than an outcome.

In the UK, The Commission for Integrated Transport commissioned a report focussing on transferability issues in European best practice, affecting the delivery of integrated transport (W S Atkins, 2001). However, this comprises little more than a very general consideration of barriers and an assessment of the extent to which they may prevent certain perceived transport policy success stories being repeated in the UK.

Most of the key research studies about urban road pricing involving particular cities that have been carried out to date (eg TRANSPRICE, CUPID / PROGRESS, EUROPRICE) have provided little more than an informal commentary on transferability issues. Consistent with the above discussion of the importance of the theme, these studies have tended to focus very much on the individual perspectives of cities and have been considerably weaker on generalisation issues. However, some more academic studies (eg IMPRINT-EUROPE) have given explicit consideration to barriers, which suggests that they may have considered transferability issues implicitly when comparing different locations / contexts.

An exception here is the SPECTRUM project, within which transferability was a significant theme. This work, drawing upon Richard Rose and TRANSPLUS, emphasized the nature of transferability as a learning process. In particular, it distinguished between two approaches to studying transferability:

- an *ex-ante* or *prospective* assessment of transferability, which attempts to anticipate under what circumstances, and to what extent, a programme or policy that “works there” will also “work here” (Timms *et al*, 2005)
- an *ex-post* or *retrospective* assessment of transferability, involving an historical account of how policies were identified in exporter jurisdictions as worthy of emulation, and how they were applied in importer jurisdictions (Timms *et al*, 2005)

While it may be inevitable that current studies about urban road pricing schemes will tend to focus on the ex-ante perspective, due to the general lack of operating schemes and the future-orientated nature of such projects, the ex-post approach should not be forgotten and may provide valuable insights as opportunities emerge.

The analysis of urban transferability issues in SPECTRUM was undertaken by comparing predictive case studies carried out during the project with results from CUPID / PROGRESS, via construction of a *logical framework*, that attempts to encapsulate the features of instruments tested and the characteristics of cities. However, in practice, the scope of the exercise was quite limited. While it is encouraging to note that the results from SPECTRUM tend to be consistent with the recommendations from the PROGRESS cities, the analysis is ultimately rather vague and unable to lead to many powerful conclusions.

The METEOR project has addressed transferability issues for the full range of policy measures, including road pricing, being considered by CIVITAS cities. Similar to TRANSPLUS and DANTE, the focus has been on attempting to improve transferability and overcome barriers. The subtext within METEOR appears to be an assumption that many transferability problems originate from a failure to understand and follow best practice, so the emphasis is on defining logical steps and guidelines for decision-makers to follow. It is suggested that any transferability process must go through four phases:

- a *demonstration phase* where best practice is identified in the originator city;
- a *transferability phase* where the compatibility of the best practice in the receptor city is appraised
- an *assessment phase* where the specific barriers amenable to change and factors of success are identified in the receptor city; and
- an *implementation phase* where the good practice is implemented in the receptor city.

Linked to these phases, ten logical steps are defined for actions in receptor cities:

(i) diagnosis of the problems requiring action;
(ii) characterisation of the city context;
(iii) analysis of the city context and of implications these may have for problems identified in (i);
(iv) search for similar contexts;
(v) selection of examples of sources to transfer from;
(vi) identification of measures with potential to transfer;
(vii) packaging and dimensioning of measures to be transferred;
(viii) ex-ante assessment of measures;
(ix) identification of need for adjustments; and
(x) implementation of measures.

METEOR goes on to consider issues of packaging for specific policy measures, identifying public transport measures and clean fuel technologies as areas that have the potential to enhance the ability of road pricing to meet its objectives. A detailed assessment of drivers of and barriers to policy implementation is also carried out, during which road pricing is presented as particularly sensitive to political, institutional, technological and acceptability related contexts. The relationship between transferability of policy measures and a range of other contextual variables is considered, including city size, degree of urban sprawl, level of public support, the quality and density of public transport networks etc. The emphasis of the METEOR approach is on identifying relevant contextual variables, understanding the nature and strength of the relationship with transferability and, if possible, making contextual adjustments to improve the transferability relationship. However, all the discussion is very general and little evidence is provided to demonstrate how this may lead to positive outcomes in practice.

Thus, while a number of studies have developed approaches for addressing transferability and have considered it in the context of urban road pricing, this is an area that is still in its infancy and there is currently no single accepted methodology. Those approaches that have been tried have tended to focus on attempts to improve transferability in practice rather than on increasing academic understanding of the processes at work. Even so, what has been

achieved to date appears to consist more of tentative ideas and well meaning words than hard evidence and purposeful actions.

12.3.3 What Evidence Exists About Transferability from Real Urban Road Pricing Applications?

Beyond the environment of research projects, a number of common observations have been made about the transferability of evidence from real urban road pricing applications. In summary:

- **Singapore:** It is widely understood that the city-state and island geography of Singapore has made adopting road pricing much simpler than in other locations, where competition from neighbouring cities may be a significant factor. In addition, the unique cultural setting is regularly cited as having reduced resistance compared to what might be expected in Europe.

- **Norwegian Toll Rings:** The longstanding history of toll payments for using transport infrastructure in Norway is widely considered to have helped achieve acceptance for the principle of urban toll rings. In addition, the sole objective of raising revenue for transport infrastructure projects has allowed policy-makers to sidestep many of the controversial issues relating to demand management and justify the tolls on the basis of new infrastructure that travellers benefit from. So, acceptability experience may not be so easily transferable, although the Norwegian cities have been facing a unique acceptability problem when the initial infrastructure funding justification for pricing has run out!

- **London:** It is generally accepted in the UK that London's size, the scale of its public transport network and the very high proportion of journeys to central London by rail (around 70% prior to the implementation of congestion charging) make it atypical. On the one hand congestion is seen to be more serious there, making the case for charging stronger. On the other, it was much easier to accommodate the diverted journeys on bus and rail services. The dominance of central London's economy will also have diluted the threat to economic activity (May, 2006).

- **Durham:** At the other end of the spectrum, the single road scheme in Durham is also atypical, though there is some interest in replicating it in rural tourist attractions (May, 2006).

Of course, just because a road pricing application has certain features that are atypical does not mean that little can be learned from it or that experience in other areas cannot be generalised. The comprehensive monitoring of impacts that has been carried out in London has provided probably the best real evidence to date about many aspects of urban road pricing, including effects on travel behaviour and network conditions, impacts on economic activity within and beyond the charged area, and the logistical effort and costs involved in operating the system (TfL, 2007). Experience in Stockholm will add to this knowledge base and may have the advantage that, so far, no major reasons have been put forward to argue that it is unique.

General conclusions that may be drawn from the small number of urban road pricing schemes that have been implemented include the fact that none of them has, so far, been viewed widely as a failure because they have all gone a significant way towards achieving their principal objectives. Given that experience covers a range of situations and objectives, even such a limited sample suggests that pricing policies can be a useful tool and have the potential to be applied more widely. However, following the discussion of comparisons between predicted outcomes and actual experience in chapter 6, experience from both London and Stockholm suggests that behavioural response relationships used in models (eg values of time, elasticities etc) may be subject to significant transferability issues, regardless of whether values are being transferred from another time / location or surveyed locally in a

context where the introduction of road pricing is an unknown and a controversial topic to respondents.

12.4 WHAT ARE THE POLICY IMPLICATIONS AND IMPLICATIONS FOR OTHER THEMES?

12.4.1 Policy Implications

Success in implementing road pricing in one city does not imply success in implementing it elsewhere, even within the same country. This is particularly evident comparing the London implementation vis-à-vis the failure in Edinburgh, despite the fact that some of the key design elements, including the use of ANPR technology and revenue earmarking, were similar in both cities. To identify and understand the reasons for success and failure will require significant interactions between transferability and the other themes considered in this report.

In a recent paper reviewing policy insights from urban road pricing case studies, de Palma *et al* (2005) raised the following points that may limit the transferability of experience of road user charging:

"Since charging is meant to deal with the externalities of transport, the physical impacts of externalities themselves depend on location specific factors such as geography, weather etc. Willingness to pay to reduce externalities is a function of socio-demographic characteristics. This implies congestion cost and the optimal level required to internalise them vary widely across urban areas."

This is consistent with other work which has concluded that the effectiveness of road pricing schemes and their optimal network designs are sensitive to the topology of the network (May and Milne, 2004). Thus, all aspects of the geography of a city may need to be studied and taken into consideration during scheme design, prediction and acceptability activities in order to reach sound conclusions on whether ideas taken from other situations have the potential to succeed in a particular city.

12.4.2 Implications for Other Themes

The concept of transferability may be seen to cut horizontally across the other themes being considered in CURACAO, having potential implications for all of them. In summary:

- **Objectives:** Transferability issues will be important in determining the extent to which objectives of road pricing may be met in different situations. The objectives set for schemes may also differ between situations, which may have knock-on effects for other themes (e.g. scheme design and acceptability), impacting significantly on how evidence from schemes may transfer. As identified in the TRANSPLUS project, increasing transferability may potentially be seen as an explicit high level transport policy objective.
- **Scheme design:** The most appropriate scheme design may be expected to vary between situations due to transferability issues (an example may be the effects that network topology may have on determining the best locations for charging). In addition, the finer details of a scheme may be expected to have significant impacts on its performance, meaning that understanding the impacts of those details may be critical for assessing the success with which it may be transferred to other locations.
- **Technology**: The most appropriate road pricing technology to adopt in different situations may vary for many reasons, including the prevailing technological base, local geography, legal and institutional issues, variations in politics and culture etc.
- **Business Systems :** There is still very little information on the business systems applied to different contexts. Given this, it is too early to consider the transferability of such models.

- **Prediction**: Transferability and prediction are inextricably linked, because the basis of the transferability theme is the need to assess the extent to which evidence gained in one situation can be used to predict what may happen in another. For example, the accuracy of model predictions of the performance of road pricing schemes may be critically dependent on the transferability of traveller response information obtained for different schemes and / or in different cities. Even where most model parameters are based on local data, it is still likely that some of the higher level conceptual features of any modelling framework may be based on (and potentially constrained by) expectations related to other previous situations.
- **Appraisal:** The link between transferability and appraisal follows directly from the relationship with prediction, as the appraisal process is critically dependent on predicted outcomes.
- **Economy:** Impacts on the economy may not always transfer easily between different situations, because they may be critically dependent on local issues, some of which may be difficult to measure. In particular, the economic impacts of road pricing on the charged area may depend on issues such as prevailing economic strength, the extent of competition from other locations, the impacts of planning processes on relocation decisions etc.
- **Environment**: Impacts on the environment should be transferable provided that vehicle fleets and built form are similar. However they are dependent on the environmental management measures adopted and the perception of impacts may vary from one culture to another
- **Equity:** Perceptions of equity may differ between cities, regions and countries based on demographic comparisons and/or political cultures, meaning that the basis for assessing equity implications of road pricing schemes may vary by situation and may not always transfer easily.
- **Acceptability:** The acceptability of road pricing may differ between locations for many reasons, including the level of familiarity with alternative transport pricing / travel demand management approaches, prevailing perceptions of transport problems, the history of local transport planning processes (including previous occasions where road pricing may have been considered), issues of political trust etc.

12.5 WHAT THE RESEARCH GAPS AND PLANS FOR FUTURE RESEARCH?

The transferability of road pricing schemes is an area that has generally been under-researched, at least partly due to the limited opportunities that have existed previously to compare expectations with actual outcomes. The range of work covered in this chapter suggests that most considerations of transferability issues to date have been very informal, lacking both scope and structure. The exception is the emerging area of work from Rose and TRANSPLUS that has been taken a little further within SPECTRUM.

The challenge for CURACAO will be to build on a fairly small volume of previous work, most of which has been of limited scope, to try to produce a more formal and rigorous analysis of transferability issues.

The approach adopted should cover transferability of both predicted and actual outcomes of road pricing systems. It also seems likely that a simple methodology which focuses on issues that are likely to be appreciated as useful by end users will prove best.

Following on from the review work of the SPECTRUM project, it would perhaps be interesting to adopt an ex-post assessment of how experience gained in London may have transferred to Stockholm and how it may be impacting upon other cities considering road pricing schemes.

It may also be useful to distinguish key issues that affect transferability in the context of urban road pricing schemes, such as:

(i) the attributes of people and their perceptions;
(ii) the nature of public transport;
(iii) the nature of the road system and traffic;

(iv) political perspectives and engagement; and
(v) forms of institutions and governance.

This chapter has summarised previous work undertaken to explore the transferability of experience of the real and synthesized outcomes of transport innovations from one situation to another. It has identified that the theme of transferability is significantly under-researched and that it has a dual identity, being both a technical theme (to improve understanding of the features that underlie success and failure) and a high level objective (to maximise the success of achieving desired outcomes by learning from experience). Transferability has implications for all the other themes considered in this report, but the closest link is with prediction because this is where the performance of road pricing scheme proposals are assessed taking account of relevant features, potentially making use of relationships transferred from other situations. There is also a clear link to the interface between prediction and evaluation, as understanding the reasons for discrepancies between predicted and actual outcomes of a road pricing scheme may be extremely valuable for informing the development of future proposals. Thus, consideration of transferability within CURACAO will be critically dependent on the work being carried out on evaluation, which is being covered by Work Package 3.