Journal of Civil Engineering (IEB), 40 (1) (2012) 1-9

Journal of
Civil Engineering
IEB

Congestion charging scheme for the city of Manchester: Lessons learnt

Bashir Ahmed

Transportation Research Group, School of Civil Engineering and the Environment
University of Southampton, Highfield Southampton, SO17 1BJ, United Kingdom

Received 21 January 2011

Abstract

The growing concerns for tackling widespread growth of car and generating finance for public transport in Manchester, England, various methods had been considered by the local authority. Congestion charging was widely viewed as being amongst the most effective. The widely perceived success of the London congestion pricing scheme also led Manchester to follow suit. Legislation permits British cities to introduce congestion charging schemes, although they require approval of a higher authority to implement their proposals. A weekday, directional, peak-time only congestion charging scheme to tackle congestion at the time and in the place and direction where it is at its worst was considered in Greater Manchester from 2013. However, the proposal to implement the scheme was evaluated before implementation by a plebiscite. The proposal failed miserably, obtaining the approval of only about one-fifth of the electorate. This study examines the feasibility of the proposed scheme, potential benefits through case studies of similar schemes around the world, and tries to explore the reasons of low level of public and political support.

Keywords: Manchester, Congestion Charge, Public Acceptance, Referendum, Public Transport

1. Introduction

Traffic is a major problem in urban areas around the world, and Manchester is no different. Among various methods had been considered by the local authority to cut vehicle numbers, congestion charging was widely viewed as being the most effective. Because congestion charging is very powerful of the potential use of simple economic principles to control externalities, to reduce pollution and congestion, and to improve economic efficiency (Harsman and Quigley, 2010). To go for a congestion charging scheme require policies and legislations, adequate fund, technology and integrated approach. An important precondition for the successful implementation of the scheme is public and political acceptability (Schade

and Schlag, 2000). Better and attractive transport options other than car should be in place before implementing the scheme.

2. Methodology

This paper was based on case studies of similar schemes around the world and literature review. Data was collected from Manchester city council and World Wide Web. Justification was based on current practices around the world and recommendation of the experts.

3. Transport policy and current situation

3.1 Policy

A national policy framework exists to promote the development and eventual implementation of local congestion charging schemes that is embedded within regional and local policies and plans within England. Government is committed (DfT, 2004) to 'work alongside forward looking authorities and areas, to help them put in place packages of measures which tackle local congestion problems. Resources from the new Transport Innovation Fund (TIF) will be available to support packages which combine road pricing, modal shift, and better bus services'. The Transport Act 2000 provides local authorities with the necessary powers to implement congestion charging schemes subject to secretary of state's approval.

3.2 Funding

The Department for Transport (DfT) is providing funding to enable the development of congestion charging schemes in England. It has allocated up to £200 million per annum through TIF and this money is expected to be available to local authorities to tackle congestion in areas where congestion is a current or forecasted problem, with a view to establishing a major congestion charging pilot by around 2012 (CfIT, 2006).

3.3 Traffic growth

Figure 1 (GMPTA, 2008a) below shows forecasted traffic speeds and congestion in Greater Manchester for two economic growth projections, labelled HIGH and LOW. HIGH relates to the Greater Manchester City Region's aspirational accelerated growth scenario, while LOW refers to DfT's own economic growth projection.

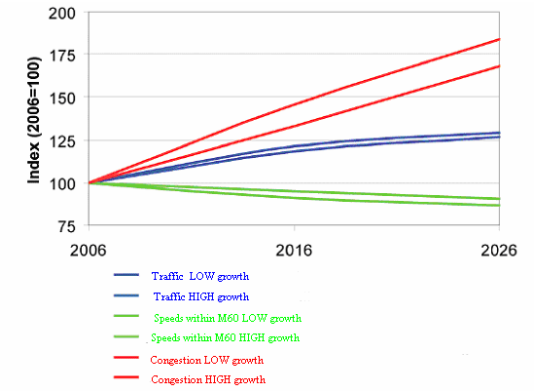

Fig.1. Trends in Key Transport Indicators in Manchester

3.4 Scheme considered

A weekday, directional, peak-time only congestion charging scheme to tackle congestion at the time and in the place and direction where it is at its worst was considered in Greater Manchester from 2013. The system was based on two rings. A vehicle would be liable to pay a charge if it would cross a ring heading towards Manchester on a weekday morning (7am – 9:30am) or outward away from the Manchester city centre on a weekday evening (4pm-6:30pm). The outer ring charging points would be located just inside the M60. The second set of charging points would be positioned to form an inner ring between the M60 and the centre of Manchester as shown in Figure 2 (GMPTA, 2008b).

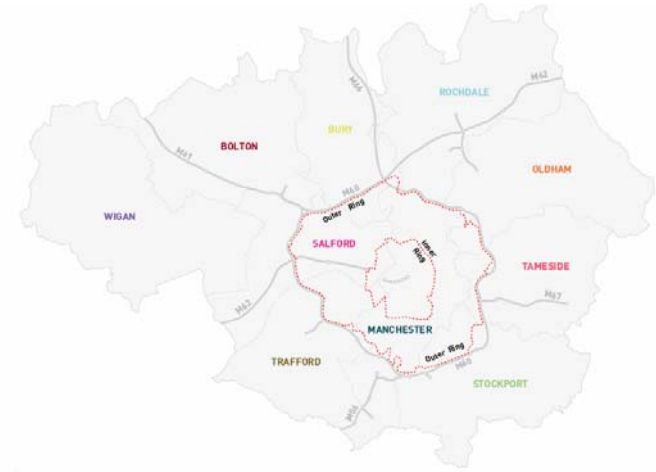

Fig. 2. Congestion Charging Proposed Outer and Inner Ring for Manchester

Tag and beacon technology with ANPR was justified. But 79% of voters of Greater Manchester voted against the plan which means scheme will not now go ahead (BBC News, 2008). Wider political issues and debate also influenced the result.

3. Technology

Technology has an influence on the feasibility of a scheme but suitable technologies are already available and have undergone testing in existing schemes and can therefore mean implementation could be completed in a shorter timescale.

4.1 Charge basis

Three types of charging are most common. These are: area/cordon/zonal charge, fixed length link/ urban corridors/ toll ring, and distance based charge. For local schemes cordon or area-licence could be considered as most effective according to the cases around the world as shown in Table 1. So choosing cordon charging for Manchester was appropriate.

Table 1
Types of Charging Considered around the World

	Area	Cordon	Distance
Local schemes			
England (congestion TIF)	√	√	√
London	√	√	√
Genoa		√	
Copenhagen		√	
Prague	√	√	
Helsinki			√
Stockholm		√	
Auckland	√	√	
Shanghai		√	
Hong Kong		√	
National schemes			
England			√
Netherlands			√

4.2 Enforcement

Available most common enforcement techniques are:

X-Wave Camera: Analogue, colour and used to give an image of the vehicle in the context of its surroundings.

CCTV Camera: Analogue, monochrome and provide images for reading number plates.

Automatic Number Plate Recognition (ANPR) Technology: All images are sent to the ANPR via a telecommunications system. This system is based on dedicated DWDM (dense wave division multiplexing) technology which links the central data hub with each of the network cameras over analogue video circuits. The ANPR creates a data block for each recognised number plate showing the time and date that the images were taken. These are then checked against a database to verify payment or eligibility for discounts and exemptions.

4.3 Charging mechanism

Most common charging mechanisms are:

Area Licensing Schemes (ALS): Need to buy and display coupon or license.

Electronic Road Pricing (ERP): Based on in-vehicle transponder units (IUs) that accept stored-valued smart cards for payment, each time vehicles pass through a gantry when the system is in operation, the ERP charges will be automatically deducted.

Electronic Toll Collection (ETC): Based on microwave technology and in vehicle tags. When a car passes tolled booths the system reads data about the car taking into account the time and place of the passing.

Initial Electronic Security Systems (IESS): Cameras record images of traffic and send them to a central processor to have their number plates read and checked against the list of vehicles that have been paid for.

Tag and Beacon Technology: Tag and beacon involves cars having an electronic tag on the windscreen, which emits radio signals when it passes a roadside beacon, automatically paying the congestion charge.

Global Positioning Systems (GPS): Motor vehicles have a tracking device which constantly records the time and location of the vehicle through satellite.

For local schemes tag and beacon with ANPR could be considered as most effective according to the cases around the world as shown in Table 2. So for Manchester these were justified.

Table 2
Technology Considered for Congestion Charging around the World

	ANPR	Tag and Beacon	GPS type
Local schemes			
London	√	√	
Genoa	√	√	
Copenhagen	√	√	
Prague	√	√	√
Helsinki			√
Stockholm	√	√	
San Francisco	√	√	√
Seattle	√	√	√
Auckland	√	√	√
Shanghai	√	√	
Hong Kong			√
National schemes			
England			√
Netherlands			√

4. Public acceptance

The introduction of any congestion charging policy by itself is unlikely to engender public support. The motivation and focus for many congestion charging publicity campaigns, therefore, is on public education, explaining why some sort pricing solution is required in the face of increasing traffic congestion. These campaigns can be time consuming and resource intensive. But even with publicity campaigns and driver education initiatives in place, road pricing may remain unpopular. There is important evidence (Bain and Plantagie, 2003; CfIT, 2006) as shown in Table 3 that public opinion can change over time.

Table 3
Changes in Public Opinion

%	London		Stockholm		Trondheim		
	Before scheme	One year after	Before scheme	One year after	Before scheme	One year after	Five years after
Against congestion charging	50	34	55	46	72	48	36
For congestion charging/ don't know	50	66	45	54	28	52	64

There is some debate regarding the need of a referendum on the congestion charge. Table 3 shows that opposition to congestion charging proposals is higher before implementation than after it, thus it would be better to undertake a referendum after the scheme has been in place. Political issues and debate could also influence the public acceptance.

But public opinion will remain a major factor behind the more wide spread deployment of road pricing, and the extent of public support will be an important consideration for politics. In the past, technology issue were defined as the major barrier to rolling out congestion charging schemes. This is no longer the case, and the emphasis has shifted to public and political acceptability as the key constraints.

5. Political barrier

Politics, not technology, remains the real barrier to the widespread introduction of charging. Some countries have made a start. But politicians are still terrified that their car-owning voters will savage any Government that tries to introduce direct measures of restraint. For example, during the initial steps for national road pricing in the UK after online petition Government's comment (Tony Blair, 2007) "We have not made any decision about national road pricing. Indeed, we are simply not yet in a position to do so" shows how nervious politicians could be. Most road pricing projects that have been fully implemented have had one or more strong public champions. Given that setting up a congestion charging system can take several years and there will likely be a lengthy transition period after initial launch where reactions may be the most acute and unforeseen issues arise, the need for long-term political support and leadership would seem essential. For example in "London the Mayor, Ken Livingstone, had a key role in driving forward and implementing Road Pricing" (CfIT, 2006). According to MetroVancouver (2007) "Success in congestion pricing will depend on politics, good assessment, public consultation, planning, advocacy, and implementation. It will also depend on the prudent boldness of good leadership. Politics is by far the greatest challenge…".

6. Integration

To make congestion charging scheme successful integrated actions needed. One of them is to providing better public transport. Better means cheaper than cars, reliable and frequent, integrated and well connected between all modes for door to door service (Campaign for Better Transport, 2008). The collected revenue through congestion charging policy should be used to improve public transport and other travel demand management measures. But best result will be achieved by further integration with land use planning, park and ride schemes, improving walking and cycling facilities, providing efficient information systems, ensuring better connection with other modes and easy accessibility. Around the world congestion charging was considered alongside a package of other measures to improve the transport system. Among them improving public transport and travel demand management are very common as shown in Table 4. Improving public transport was one of the main objectives of Manchester congestion charging scheme.

Table 4
Congestion Charging as an Integrated Package Considered around the World

	General Transport Infrastructure	Local Travel Demand Management	Local Public Transport
Local schemes			
England (congestion TIF)		√	√
London		√	√
Cardiff		√	√
Rome		√	
Genoa		√	√
Barcelona		√	
Prague	√		
Helsinki		√	√
Stockholm	√	√	√
New York			√
San Francisco		√	√
Seattle		√	√
Auckland		√	√
Shanghai		√	√
Hong Kong		√	
National schemes			
England		√	√
Netherlands	√		

7. Benefits

The role of congestion charging in travel demand management is to control rising congestion levels, deter further growth in car use, and to address the negative impacts of traffic and congestion on transport efficiency and the environment. Table 5 (Bain and Plantagie 2003 and CfIT 2006) below briefly describes the gained benefits from congestion charging schemes around the world. Most of the emerging congestion charging schemes have multiple objectives, though with tackling congestion as the primary objective in all. Congestion charging schemes can raise significant revenues (Replogle, 2006) that can be reinvested to further improve the transport network, such as public transport provision.

Table 5
Benefits of Congestion Charging Schemes around the World

Location	Year of Launch	Benefits
London, UK	2003	Congestion reduced by 30%, traffic entering zone reduced by 18%, bus passengers entering the zone during the morning peak period increased by 29000.
Durham, UK	2002	85% reduction in vehicle trip.
Singapore	1975	Traffic in the zone reduced by 13% during charging periods, average traffic speed increased 20%
Rome, Italy	1998	Car traffic reduced 15-20%, public transport increased 5%.
Oslo, Norway	1990	Reduction am peak traffic 10% (region) and 20% (ring area), growth in public transport 6-9%.
Stockholm, Sweden	2005 (trial), 2007 (permanently)	Traffic reduced by 25%, train and transit passengers increased by 40,000 per day.
The Netherlands	2012 (heavy good vehicles), 2016 (all vehicles)	40% less congestion expected
Helsinki, Finland	2011 (proposed)	Congestions will be reduced 2/3, average speed will be increased by 5-7km/h (expected)

Rejected congestion charging scheme in Manchester also had multiple objectives (Manchester City Council, 2008). But main objectives were improving public transport and tackling congestion. It would deliver a range of benefits both in terms of enhanced public transport capacity, quality and connectivity and in terms of improved road journey times and reliability. The scheme would increase economic and social inclusion benefits whilst also contributing the environmental benefits of reduced air pollution and lower carbon emissions. The final key factor relates to this congestion charging scheme was significant investment of congestion charging revenues in public transport. This could ensure that a transformational change in the quality and capacity of Greater Manchester's public transport, thus providing a real and practical alternative to the car.

8. Conclusions

Technology and funding is not a barrier in advancing congestion charging in the developed countries but acceptability, both public and political, is now the key hurdle to overcome when developing the scheme. But England, with two operational schemes, has a clear advantage in demonstrating the benefits and gaining public and political acceptance. So congestion charging scheme was feasible and could be implemented in Manchester. It was the unacceptability of the congestion charge to the residents of Manchester which stopped the

policy to go ahead. But a after scheme referendum could change the result. Because, a well-designed experimental policy of congestion charging to reduce congestion may help citizens to recognize the practical benefits of the scheme. It is also important for the public transport measures, associated with the congestion charge package, to be implemented simultaneously with, or before, the scheme. It will increase public and political support.

References

Bain, R. and Plantagie, J. W. (2003). "The Credit Dynamics of Congestion Charging", Financial Report, New York: Standard and Poor's, USA.

BBC News (2008), "Voters Reject Congestion Charge", UK. Available from: http://news.bbc.co.uk/1/hi/england/manchester/7778110.stm [Accessed April 2009].

Campaign for Better Transport (2008). "Public Transport", UK. Available from: http://www.bettertransport.org.uk/campaigns/public_transport [Accessed April 2009].

CfIT - Commission for Integrated Transport (2006), "World Review of Road Pricing: Phase 2- Final Report", UK. Available from: http://www.cfit.gov.uk/docs/2006/wrrp/wrrp2/index.htm [Accessed April 2009].

DfT - Department for Transport (2004). "The Future of Transport", Transport Policy, White Paper, UK.

GMPTA – Greater Manchester Public Transport Authority (2008a). "Why the Transport Innovation Fund", Greater Manchester Future Transport, Manchester.

GMPTA – Greater Manchester Public Transport Authority (2008b). "Greater Manchester Future Transport", Transport Report, Manchester.

Harsman, B. and Quigley, J. M. (2010). "Political and Public Acceptability of Congestion Pricing, Ideology and Self-Interest", Journal of Policy Analysis and Management, 29 (4), 854–874.

Manchester City Council (2008), "TIF Funding and Finance Strategy", Transport Innovation Fund Package, Manchester, UK.

MetroVancouver (2007). "Road Pricing: an Overview of Current Practice", Road Pricing Report, UK.

Replogle, M. (2006), "Road Pricing and Congestion Charging", ITDP and Environmental Defense, Washington.

Schade, J., & Schlag, B. (2000). "Acceptability of urban transport pricing", VATT Research Report 72, Government Institute for Economic Research (VATT): Helsinki, Finland.

Tony Blair, Prime Minister, 2007 (The Guardian, 'Road pricing is not a stealth tax, says Blair', 21st February 2007).