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Public acceptance towards congestion charge: a case study of Brisbane

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Abstract

This paper investigates public acceptance towards congestion charge in Australia by taking Brisbane as a case study. Public acceptance to congestion charge has often been investigated in the literature. However, few were in the context of an Australian city. This paper fills the gap. A face-to-face survey was conducted to solicit public opinions on the congestion charge, should a congestion charge scheme be implemented in the Brisbane City area. The survey data were analysed to pinpoint important factors relevant to people's attitudes towards congestion charge and to measure their relationships. Main findings from our analysis are: (1) the residents' attitudes towards congestion charge differ by genders and by user groups of transport modes; (2) for each of the three groups (i.e., the auto users, the transit riders, and the whole participants), a positive and stable correlation was found between a participant's attitude towards congestion charge and the effectiveness of congestion charge on reducing traffic congestion. A negative and stable correlation was also found for all three groups between a participant's attitude towards congestion charge and congestion charge's negative impact on the attractiveness of working in the city; (3) the auto users tended to be more sceptical about the service capacity of existing transit systems in coping with extra passengers induced by the implementation of congestion charge; and (4) for people with high income, introducing the congestion charge may have no impact on their travelling to the city.

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1. Introduction

As an epidemic caused by the transport systems, traffic congestion is worsening in most urban areas, in particular megacities. For example, Bureau of Transport and Regional Economics estimates the 'avoidable' cost of congestion for Australian capitals were approximately \$9.4 billion in 2005, which is comprised of \$3.5 billion

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in private time costs, \$3.6 billion in business time costs, \$1.2 billion in extra vehicle operating costs, and \$1.1 billion in extra air pollution costs (BTRE 2007). Besides the enormous economic cost, it was found that stop-and-go driving, a typical phenomenon in traffic congestion, increases the odds of being involved in a crash (Zheng et al. 2010). Researchers also revealed significant linkages between pollutants from traffic congestion and adverse birth outcomes (Wilhelm et al. 2011), breast cancer (Nie et al. 2007).

As a potentially powerful tool for alleviating traffic congestion, congestion charge is a policy designed to encourage the usage of alternative transport modes or routes, by surcharging people who travel in certain congested areas with private vehicles. There is a well-established economic rationale for congestion charge, going back to the work of Adam Smith in *The Wealth of Nations*. Since 1950s, unstoppable congestion has attracted more and more attention from professionals and experts including many notable economists, e.g. William Vickrey (Nobel Prize laureate), Alan Walters and Milton Friedman (Noble Prize laureate) (Richards 2006). When a driver makes the decision to use private transport by comparing the marginal private costs and benefits, the driver typically excludes from the analysis any external costs that the driving may impose on others. One way to avoid this is to introduce congestion charge.

Besides reduced traffic congestion, benefits resulting from implementing a congestion charge scheme include revenue increase, transit ridership increase, improved transit service, travel time savings because of the improved traffic conditions, and other derived benefits on environment and public health. Overall, benefits of implementing a congestion charge scheme are generally reported to outweigh the associated costs (i.e., the initial and operation costs) (Leape 2006; Eliasson 2009).

Despite a well-established rationale for congestion charge and mature technologies, few cities or states have attempted or actually implemented such a scheme because of social, political or legal issues. The two major challenges for implementing a congestion charge is public and political acceptabilities rather than technical or administrative issues (Jones 2003). With neither a strong political nor a strong public support, congestion charge simply cannot be implemented in most countries with a democratic political system, which is confirmed by the failed attempts in several cities (e.g., New York City, Edinburgh, and Manchester) (Hårsmann & Quigley 2010).

Meanwhile, as a nation well-known for its sustainability consciousness, Australia is becoming an exemplary green country by making progressive sustainability-oriented policies. With the rapid growth of traffic congestion in large Australian cities (e.g., Sydney, Melbourne, and Brisbane), introducing congestion charge in big Australian cities is often discussed, although no such scheme has been implemented in any of the Australian cities (The Centre for International Economics 2010). However, as discussed above, to successfully implement such a scheme, gaining public acceptance is critical. Although public acceptance to congestion charge has often been investigated in the literature, few were in the context of an Australian city.

This paper fills the gap. More specifically, a face-to-face survey was conducted to solicit public opinions on the congestion charge, should a congestion charge scheme be implemented in the Brisbane City area. The survey data were analysed to pinpoint important factors relevant to people's attitudes towards congestion charge and to measure their relationships. Findings from this paper can help transport policy makers in Australia to make sounder and more effective strategies to promote congestion charge and to increase public acceptance towards congestion charge.

The remaining of the paper is organized as follows. The next section reviews two successful congestion charge schemes and a failed attempt by underscoring the importance of gaining public acceptance; Section 3 describes the data collection activities; Section 4 discusses data analysis; and finally Section 5 summarizes major findings and discusses future research needs.

2. Literature Review

2.1. Stockholm

The congestion charge system in Stockholm has been argued and abandoned politically in the last two decades. In 1991 the Social Democrats and a local Green Party cooperated with the elected alliances and initiated a comprehensive investment of toll system “Dennis Agreement”, which was not implemented because of political changes until the local Green Party again won sufficient seats during the election in 2002 and then forced Social Democrats to agree to an experiment in congestion charge. With the enhancement of public transport services, a full-scale, seven-month trial was conducted from January to July, 2006 and a comprehensive investigation ensued to determine the facts behind the plebiscite and the relationships among factors relating to travel behaviour and decision making (Bhatt et al. 2008). It was reported that residents who resided in the charging zone, who were college-educated, of a working-age, or believed time saving from the toll system were more favourable of the congestion charge system. In contrast, the residents who were immigrants, male, resided outside of the charging zone, or paid more for the congestion charge system were less likely to favour the congestion charge system (Hårsman & Quigley 2010).

Interestingly, different public acceptances of the congestion charge in Stockholm were found before and during the congestion charge trial (Eliasson et al. 2009; Schuitema et al. 2010). More specifically, in autumn 2005, 55% of residents in the city of Stockholm stated that implementing a congestion charge scheme was a “very or rather bad decision”. However, in April 2006, 53% of residents stated that the trial was a “very or rather good decision”. The acceptance increase was driven by benefits (e.g., less congestion, more parking space) induced by the congestion charge scheme that were larger than what the residents expected and by the fact that the participants were generally more concerned with the effectiveness of the congestion charge rather than its personal cost (Schuitema et al. 2010). With the continuing worsening traffic congestion, and encouraged by the success of the trial as well the widely discussed success of the London congestion charge scheme, Stockholm eventually decided to adopt the congestion charge scheme by referendum in 2007 (Hårsman & Quigley 2010).

2.2. London

Congestion charge was first studied in central London in the early 1970’s and did not get much attention because of the significant spare capacity on public transit at that time. However, the discussion and debate on congestion charge continued and were further developed over time because of the rapid population growth, the growing concerns on traffic congestion and environment deterioration in London. As a result, London City was authorized in 1990s to introduce congestion charge with the ownership of the revenues. In 2000, Ken Livingston was elected as the first Mayor of London with a concentration of power, which made the political concerns less important, and implemented a congestion charge scheme to central London on 17 February 2003, after an 18-month period of extensive public consultation (Bhatt et al. 2008).

Although the congestion charge in London was initially criticized by different stakeholders and interest groups for its negative impact on economy, a survey on a business group which accounted for 22% of the city’s GDP, found that the majority (over 90 %) of the members felt either no impact or positive impact on their business, and only 9% reported negative impact on their business (Litman 2006). Furthermore, Bhatt et al. (2008) found the level of acceptability towards London congestion charge increased from about 40% before the congestion charge scheme to above 50% after eight months of the introduction of congestion charge. The awareness of the traffic congestion problem is another main contributing factor to the implementation of London congestion charge. Bhatt et al. (2008) reported that in 1999, 90% of residents thought there was too much traffic in the capital and that 41% of the survey participants believed that the best way for funding the public transport improvement in London was through congestion charge.

In conclusion, high levels of both public acceptability and political commitment had contributed to the success of the congestion charge implementation in London.

2.3. New York City

Some civil and advocacy groups have been working on the New York City (NYC)'s transportation congestion charge since the 1980's. After the congestion charge success in London in 2003, more groups joined to advocate the congestion charge in NYC, among which a Partnership for New York City became the key proponent (Schaller 2010). Meanwhile, NYC is consistently ranked as one of the most congested American cities and it was reported that the traffic demand would exceed the capacities of almost all of the city's subway, river crossings, and commuter rail lines by 2030 (Clee 2007).

To mitigate NYC's notorious congestion and as part of NYC Mayor Michael Bloomberg's comprehensive sustainability plan, Bloomberg in 2007 proposed to charge a fee for vehicles travelling into or within the Manhattan central business district, which is the first area-wide road pricing scheme proposed for a major North American city. If this proposal had been implemented, NYC would have been the first American city and the fourth big city worldwide that charges for driving into the central city.

The Mayor introduced the congestion charge proposal in the State Legislature in June 2007. The City and the Metropolitan Transportation Authority (MTA) applied for funding from the U.S. Department of Transportation and were awarded \$354 million in August 2007, conditional on the implementation of the congestion charge system by March 31 2009. The Traffic Congestion Mitigation Commission held 14 public hearings and modified Bloomberg's original plan, which obtained a wide range of support. For example, in late March 2008, public opinion polls showed that NYC residents supported congestion charge by a 67-27% margin (Schaller 2010).

However, although both proponents and opponents of NYC's congestion charge scheme agreed on the importance of achieving the goals of congestion reduction, cleaner air and increased funding for mass transit improvements, it eventually failed as it was never put to a vote on the New York State Assembly. The most vocal opposition came from elected officials and civic groups in four New York City boroughs outside Manhattan, which were more auto-dependent than neighborhoods that were closer to Manhattan and did not have the rapid or convenient transit access to Manhattan jobs. They questioned whether funds would be spent effectively on transit service improvements and regional equity issues of not paying congestion fees. Despite the support from the majority of the residents and the politicians, a relatively small group of people (5%) was able to block the proposal through the Assembly (Schaller 2010).

In summary, the successes in London and Stockholm and the failed attempt in NYC clearly reveal the importance of gaining a strong public acceptance and a strong political support in implementing a congestion charge scheme. Thus, it is critical to accurately measure and understand people's attitudes towards congestion charge before any Australian city implements such scheme. The remaining of the paper presents how we conducted a survey and analysed the survey data to understand public acceptance towards a congestion charge scheme in Brisbane. Note that understanding political support to congestion charge in Australia is beyond the scope of this study.

3. Survey

3.1. The Survey Questionnaire

The survey questionnaire was designed to solicit the participants' opinions about the congestion charge implementation in the Central Business District (CBD) of Brisbane City. Note that the questionnaire is not included here due to the page limitation. On the introduction page, congestion charge is briefly explained to help participants to better understand this concept because it may be the first time for some participants to hear this term. Four screening questions were designed to ensure that participants were from the targeted population. More specifically, one who satisfies any of the following conditions was not eligible to participate in the survey: a tourist; a person who rarely travels to the Brisbane City (Once a month or less); the participant or anyone in the household who works for a car manufacturer, a public transport provider, a city rail company or the city transport department; anyone who is younger than 16. To avoid confusion, and to minimize the re-coding workload, the

questionnaire only contains closed questions. In addition, AU\$10 cash reward was provided to each eligible participant as an incentive. The length of the questionnaire was approximately 10 minutes.

The questionnaire consists of two sections. Besides the screening questions, the first section includes questions on the socio-demographic characteristics (e.g., gender, annual income, education, employment status, car ownership, etc.), questions on primary transport mode for travelling to the Brisbane city, questions on congestion charge from different perspectives, such as revenue, benefits on reducing congestion and protecting environment, impacts on economy, public transit, and the participant's travel behaviour. The last question (Q15) in this section explicitly asks how strongly the participant supports the idea of implementing a congestion charge scheme in the Brisbane City area. The second section is a set of stated-preference choice exercises of the transport mode to pinpoint impacts on participants' transport mode choice decisions of some important factors (i.e., the amount of congestion charge, fuel cost, journey time, and bus fare). In each choice task, two alternatives (i.e., car or bus) with specific attribute levels are available. Participants were asked to answer two questions in the context of each choice task: how strong would they support the congestion charge and how likely would they take the bus instead of driving. An orthogonal fractional factorial design using a commercial survey design package (i.e., Ngene (ChoiceMetrics 2012)) was generated, consisting of nine choice tasks in total. Two attributes for car were considered (Note that numbers in parentheses are attribute levels): Fuel cost & journey time reduction in percentage compared with what was for the most recent trip (-10%, -30%, -50%) and congestion charge (AU\$5, AU\$10, AU\$15); one attribute for bus was considered: fare reduction in percentage compared with what was for the most recent trip (-10%, -30%, -50%). Rather than randomly choosing choice tasks from the full factorial that often generates a huge number of choice tasks, orthogonal fractional factorial design is a method for designing choice tasks in such a way that the attribute levels are orthogonal (i.e., no correlations between the levels of the two attributes), and thus the workload can be substantially reduced without significantly compromising the survey design's quality (ChoiceMetrics 2012). Note that data from the stated-preference choice exercises were also analysed and results are presented in a different paper (Zheng et al. 2013).

3.2. Survey Conducting

Several pedestrian streets in the Brisbane CBD were selected to conduct the survey. A detailed description on survey locations and numbers of participants on each day is provided in Table A1 of Appendix A. Pedestrians were randomly selected and approached. During the survey process, it was found that the majority of participants took transit. To balance transit riders and people who drive to the Brisbane CBD, some car parks in the Brisbane CBD were selected to survey more people who drive to the city. However, approvals from the company head offices for conducting the survey in these car parks were difficult to be granted. The same issue was encountered for conducting the survey on King George Square and Queen Street Mall (Two big open areas in the Brisbane CBD). We were eventually forced to choose the car park on QUT Gardens Point campus to survey private vehicle users. Because private vehicle users who park in the city and those who park on campus share similar characteristics such as income and educational background, it is reasonable to assume that no significant bias was introduced into our survey data. The survey started on June 29th and ended on September 27th 2012. In total, 150 valid responses were obtained, which consisted of 55 auto users and 95 participants who either take transit or use active transport (See Table A2 of Appendix A).

4. Data Analysis

4.1. Preliminary Analysis

- (a) Different mode users' attitudes towards congestion charge

Among 150 participants, excluding the participants who car-pooled or used active transport for travelling to the Brisbane CBD, 52 auto users and 92 transit users were considered in the analysis. Their attitudes towards congestion charge were clearly different, as depicted in Figure 1. Figure 1 indicates that only 23 percent of the auto users are in favour of implementing a congestion charge scheme in Brisbane CBD and that 60 percent of them do not support it. In contrast, more than 50 percent of the transit users either support or strongly support a congestion charge scheme in Brisbane CBD and only 25 percent of them report a negative attitude.

This finding is not surprising because generally implementing a congestion charge has less negative impact on transit users than on auto users. It is also consistent with the literature that transit-users are more supportive than auto-users.

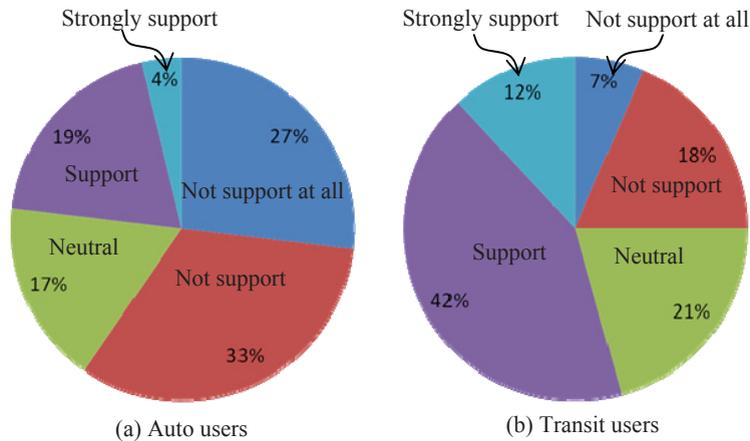


Fig. 1. Attitude towards congestion charge across different transport mode users

(b) Different genders' attitudes towards congestion charge

Gender may have significant impact on people's attitudes towards congestion charge. Among the participants, 58 are males and 92 are females. As shown in Figure 2, only 36 percent of the male support the congestion charge in Brisbane, while almost 50 percent of the female participants support the congestion charge.

4.2. Regression Analyses

Linear regression analysis is employed to quantitatively investigate the relationships between people's attitudes towards implementing a congestion charge in Brisbane CBD and potentially significant factors (e.g., gender, education, etc.), as elaborated below.

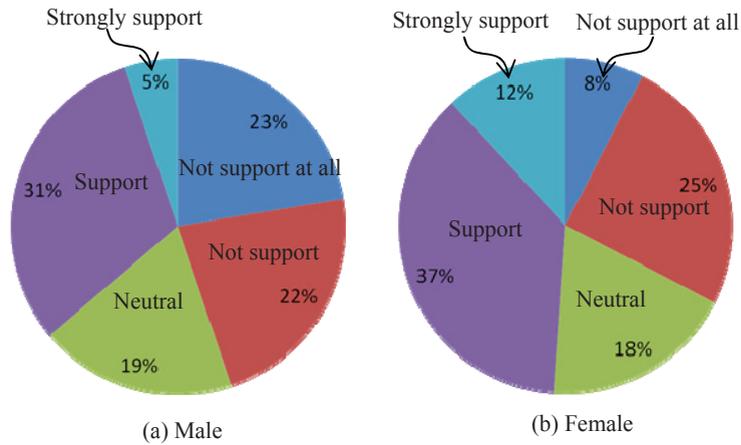


Fig. 2. Attitudes towards congestion charge across genders

(a) Analysis for all participants

Question 15 is about how strongly a participant supports the idea of implementing a congestion charge scheme in the Brisbane City area, which was used as the dependent variable in the models developed in the paper. A series of models were developed by considering different independent variables and by considering the theoretical soundness and the model's parsimony. Outputs of the selected model for all the participants are presented in Table 1.

As shown in Table 1, the overall performance of the model is good as indicated by its R^2 and F value. All the independent variables in the table are significantly associated with people's attitudes towards implementing a congestion charge in Brisbane CBD at a 95 percent confidence level.

A stronger support for implementing a congestion charge from the female and from the transit users is confirmed by the regression analysis as indicated by the positive coefficients of gender and transport mode. Table 1 also implies that participants' attitudes towards implementing a congestion charge scheme in Brisbane CBD are closely related to their attitudes towards how to use the revenue raised by implementing the congestion charge, the effectiveness of this scheme on reducing traffic congestion, impact on economy, capacity of the existing public transport systems, impact on their transport mode choices, and impact on the attractiveness of working in the city.

More specifically, by controlling other factors, participants who more strongly agree with either of the following statements are more likely to support implementing a congestion charge in Brisbane CBD: (1) revenue raised from implementing a congestion charge should be used to improve the environment; (2) implementing a congestion charge can help reduce traffic congestion; (3) the existing public transport systems can cope with the increased volume of passengers caused by implementing the congestion charge; and (4) The congestion charge would make me use public transport more often for travelling to the city. In contrast, by controlling other factors, participants who more strongly agree with either of the following statements are less likely to support implementing a congestion charge in Brisbane CBD: (1) implementing a congestion charge is not good for the economy because people would travel to the city less frequently; and (2) Working in the city would be a less attractive option to me because of a congestion charge.

Table 1. Linear regression analysis for all the participants; number in the parentheses is the question number in the questionnaire

R Square	Adjusted R Square	Std. Error of the Estimate		F	P
0.614	0.592	0.783		28.074	<0.001
		Coefficient	Std. Error	t	P
Constant		0.438	0.524	0.835	0.405
(Q7) Gender		0.365	0.137	2.666	0.009
(Q13.a) Transport mode		0.179	0.074	2.405	0.017
(Q14.b) Revenue for environment		0.179	0.062	2.903	0.004
(Q14.c) Reducing congestion		0.407	0.072	5.657	<0.001
(Q14.f) Economy		-0.286	0.07	-4.109	<0.001
(Q14.g) Transit ridership		0.184	0.061	2.991	0.003
(Q14.h) Transit usage		0.127	0.06	2.136	0.034
(Q14.k) Working in city		-0.23	0.061	-3.789	<0.001

(b) Analysis for the auto users

Experiences from other countries suggest that acceptance of auto users is often critical for the success of implementing a congestion charge because they are likely major opponents (Schaller, 2010), which is confirmed by results from the preliminary analysis and from the linear regression analysis above. Thus, understanding the auto user's acceptance to congestion charge is important for developing effective strategies to promote such a scheme.

Similarly, the linear regression analysis was applied to 52 auto users. Performance measures and outputs of the model are summarized in Table 2. As shown in this table, the overall performance of the model is good as indicated by its R^2 and F value. All the independent variables in the table are significantly associated with the auto user's attitudes towards implementing a congestion charge in Brisbane at a 99 percent confidence level. Note that only four independent variables were simultaneously considered in the model because of the small sample size.

Similar relationships are found between the auto user's attitudes towards congestion charge, gender, belief on congestion charge's effectiveness to reduce traffic congestion, belief on the capacity of the existing public transport and belief on the less attractiveness of working in the city because of congestion charge.

(c) Analysis for the transit users

The linear regression analysis was also applied to 92 transit users. Performance measures and outputs of the model are summarized in Table 3. As shown in this table, the overall performance of the model is good as indicated by its R^2 and F value. All the independent variables in the table are significantly associated with the transit user's attitudes towards implementing a congestion charge in Brisbane at a 99 percent confidence level. Again only four independent variables were simultaneously considered in the model because of the small sample size.

Consistent with results in Table 1, by controlling other factors, the transit users who more strongly agree with either of the following statements are more likely to support implementing a congestion charge in Brisbane CBD: (1) revenue raised from implementing a congestion charge should be used to improve the environment; and (2) implementing a congestion charge can help reduce traffic congestion; In contrast, by controlling other factors, the transit users who more strongly agree with either of the following statements are less likely to support

implementing a congestion charge in Brisbane CBD: (1) implementing a congestion charge is not good for the economy because people would travel to the city less frequently; and (2) Working in the city would be a less attractive option to me because of a congestion charge.

Table 2. Linear regression analysis for the auto users; number in the parentheses is the question number in the questionnaire

R Square	Adjusted R Square	Std. Error of the Estimate	F	P
0.566	0.529	0.818	15.327	<0.001
1				
	Coefficient	Std. Error	t	P
Constant	-0.838	0.721	-1.162	0.251
(Q7) Gender	0.908	0.253	3.592	0.001
(Q14.c) Reducing congestion	0.598	0.105	5.678	<0.001
(Q14.g) Transit ridership	0.389	0.109	3.556	0.001
(Q14.k) Working in city	-0.327	0.098	-3.335	0.002

Table 3: Linear regression analysis for the transit users; number in the parentheses is the question number in the questionnaire

R Square	Adjusted R Square	Std. Error of the Estimate	F	P
0.497	0.474	0.808	21.499	<0.001
	Coefficient	Std. Error	t	P
Constant	2.148	0.558	3.852	<0.001
(Q14.b) Revenue for environment	0.205	0.083	2.482	0.015
(Q14.c) Reducing congestion	0.463	0.098	4.733	<0.001
(Q14.f) Economy	-0.279	0.092	-3.049	0.003
(Q14.k) Working in city	-0.228	0.082	-2.787	0.007

4.3. Discussion

Outputs from the models for all the participants, for the auto users, and for the transit users are summarized in Table 4. Several observations from this table are discussed below.

Meanwhile, factors shared by both of the whole group and the auto users include gender and the concern of the service capacity of the existing transit systems in coping with extra passengers induced by the implementation of congestion charge. However, the coefficient of gender for the auto users is much larger, which indicates that the female are more supportive of the congestion charge than the male, particularly among the auto users. Also a larger coefficient for the auto users of the capacity of the existing transit service is consistent with the literature that auto users tend to be more skeptical with the transport services, as most of them are less likely to try to accept it and lacking experience of using it (Schaller 2010).

Table 4: Comparison among different groups in the linear regression analyses; number in the parentheses is the question number in the questionnaire

Model	Coefficient		
	Whole Group	Auto-users	Transit-users
Constant	0.438	-0.838	2.148
(Q7) Gender	0.365	0.908	/
(Q13.a) Transport mode	0.179	N/A	N/A
(Q14.b) Revenue for environment	0.179	/	0.205
(Q14.c) Reducing congestion	0.407	0.598	0.463
(Q14.f) Economy	-0.286	/	-0.279
(Q14.g) Transit ridership	0.184	0.389	/
(Q14.h) Transit usage	0.127	/	/
(Q14.k) Working in city	-0.23	-0.327	-0.228

Finally, for the auto users, no connections are detected between attitudes towards congestion charge and each of the following two statements: (1) The congestion charge would make me use public transport more often for travelling to the city; and (2) implementing a congestion charge is not good for the economy because people would travel to the city less frequently. This is not surprising because people who can afford frequently driving to the city are those with high incomes. Therefore, they are unlikely to be forced to give up driving to the city or to travel to the city less frequently by introducing the congestion charge.

5. Conclusions

Most big cities are suffering the worsening traffic congestion because of the increasing cost of travel time, extra vehicle operating cost, air pollution, and etc. To alleviate traffic congestion, congestion charge has been widely studied to encourage the usage of alternative transport modes by surcharging the auto users who travel into the congested city area in a certain time period. By reviewing successful and failed congestion charge proposals in international cities, we found that the major challenges for implementing a congestion charge scheme are public and political acceptabilities rather than technical or administrative issues.

Like most of other big cities overseas, cost caused by traffic congestion in big Australian cities is rapidly increasing. However, none of the big Australian cities has implemented congestion charge. To understand residents' attitudes towards congestion charge in Australia, Brisbane has been selected to conduct a case study. Based on the data collected from a face-to-face survey, our analysis shows that the residents' attitudes towards congestion charge differ by genders and by user groups of transport modes. More specifically, the female tended to be more supportive to congestion charge than the male, while the transit users favoured the congestion charge system more than the auto users. Furthermore, regression analysis was applied to three participant groups: the transit user group, the auto user group, and the whole participants. Results indicate that for each of the three groups, a positive and stable correlation was found between a participant's attitude towards congestion charge and the effectiveness of congestion charge on reducing traffic congestion. However, drivers were more concerned about congestion charge's positive impact on road conditions as they would benefit most from the improved road conditions. A negative and stable correlation was also found for all three groups between a participant's attitude

towards congestion charge and congestion charge's negative impact on the attractiveness of working in the city. However, the auto users were more concerned about this negative impact than the other groups as they would be forced to pay more for driving into the city to work.

Meanwhile, the auto users tended to be more sceptical about the service capacity of existing transit systems in coping with extra passengers induced by the implementation of congestion charge. And our analysis implies that for people with high income, introducing the congestion charge may have no impact on their travelling to the city.

Findings from this paper are consistent with the literature and can help transport policy makers in Australia to make sounder and more effective strategies to promote congestion charge and to increase public acceptance towards congestion charge.

Currently validating findings from this study using data collected from other big Australian cities (e.g., Melbourne) is ongoing. In future research, as another important issue in implementing congestion charge, political support needs to be studied in the context of an Australian city.

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Appendix A. Details of the Survey Process

Table A1. Locations, dates and number of copies of the survey

Date	Day	No. of Copies	Locations
29/6	Friday	1	Turbot St & George St
02/7	Monday	8	King George Square
03/7	Tuesday	12	South Bank
05/7	Thursday	11	King George Square
06/7	Friday	1	King George Square
09/7	Monday	9	QUT Gardens Point Campus
16/7	Monday	5	Margaret St & George St
18/7	Wednesday	3	Margaret St & George St
19/7	Thursday	4	Margaret St & George St
		2	QUT Gardens Point Campus
24/7	Tuesday	2	Margaret St & George St
26/7	Thursday	7	Margaret St & George St
27/7	Friday	12	QUT Gardens Point Campus
31/7	Tuesday	5	QUT Gardens Point Campus
20/8	Monday	8	QUT Gardens Point Campus
21/8	Tuesday	5	QUT Gardens Point Campus
22/8	Wednesday	6	QUT Gardens Point Campus
10/9	Monday	8	QUT Gardens Point Campus
11/9	Tuesday	12	Turbot St & George St
13/9	Thursday	12	Elizabeth St & George St
20/9	Thursday	4	Elizabeth St & George St
21/9	Friday	10	Elizabeth St & George St
27/9	Thursday	3	Elizabeth St & George St

Table A2. The mode user distribution

Mode	Number of Users
Drivers	52
Carpooling	3
Public Transport	92
Riding Bike & Walking	3
Total	150