Usability is a policy issue: Minimising the "Hassle Factor" in mobile payment of the Central London Congestion Charge

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Abstract: *This paper presents a study of user responses to the implementation of a high-profile e-government system, the Central London Congestion Charge. The approach is multi-disciplinary, combining human-computer interaction (HCI) and socio-technical systems (STS) approaches to produce an analysis of usability in the payment interactions. Based on interviews with charge payers, we show that usability is an issue in the payment of the charge; this is compounded by the short time-scale enforced with penalties, and the resulting perception is of an adversarial system. SMS is a possible payment route, but currently social and policy reasons work against it. In some social contexts, the simplicity of SMS is appropriate, whereas in others, the familiarity and richer functionality of the Internet and phone are more usable.*

Keywords: usability, SMS, mobile interaction, road user charging, transport, discourse

1   Introduction

It has long been recognised that systems involving the mediation of computers involve the "*complex imbrications of technology and society*" (Sassen, 2004:77); layers of technical, social, organisational and political developments coalesce over time to create complex systems which, though certainly socially constructed, are recalcitrant and impose their ways of operating (Kallinikos, 2004). Where a system is not within an organisation but is an e-government system for use by the general public then this understanding is all the more essential. This paper presents the results of applying a Human-Computer Interaction (HCI) approach to investigate in practical terms the "cross-contextual system" (Kallinikos, 2004) of e-government, examining the implications for transport, government, and the many needs of citizens as service users.

1.1   Usability in e-Government: interaction beyond the interface

HCI traditionally focuses on the usability of user-system interactions, but some of the most relevant insights have come from other disciplines, such as Social Shaping of Technology (SST), sociology, and ethnography. HCI itself is increasingly aware of the need to incorporate knowledge and methods from other disciplines, and to look at the social and interactional dimensions as well as the interfaces (Thomas, 1995). For example, as Wilson's (2003) research illuminates, one of the ways in which users might respond to a computer system is by *resistance* to it; the user is not simply "*the hapless user inflicted with technology*" (Cooper & Bowers, 1995:58). Where the user is a citizen as service user and the interaction is part of a wider public policy, then resistance can lead to unintended consequences for the service provider and a negative view of government for the service user.

This paper analyses the discourses of the e-government users and of policy-makers as a contribution to understanding the usability of e-government systems, and in particular the usability of systems in which m-government combines with conventional e-government. This throws light on ways in which *active* users of an information system re-inscribe and perhaps resist technologies (Wilson, 2003), while avoiding preconceived models of the *user* and of the *user interface* (Cooper & Bowers, 1995).

1.2   The Central London Congestion Charge as pervasive government

The Central London Congestion Charge scheme was chosen to investigate these questions for a number of reasons. Firstly, as a very high-profile project, interview subjects would be familiar with it and with the issues surrounding it. Secondly, in a large city such as London, transport is a major area of public policy; traffic congestion together with the related issues of under-resourced public transport are widely

considered by both public and business as London's most pressing problem (GLA, 2001). Thirdly, the scheme as implemented relies heavily on e-government to function, using a combination of mobile, Internet, electronic devices in retail outlets, and the telephone; this makes it an excellent example of the intersection between many different electronic and non-electronic interfaces. Looking to the future, there are current and emerging electronic systems which could remove much of the reliance on user action inherent in the existing architecture.

The design of the scheme requires daily payments for most users, and it is this which gives rise to the interactions which are of interest here. Transport for London (TfL) is concerned that these very frequent and routine interactions should be as easy and fast as possible. Clearly, though, it is also necessary to consider whether a design which does not require daily interactions, or which allows daily payments to be made more easily or on a different time-scale, might overcome the usability problems. Making payment of the Congestion Charge as easy as possible is not simply a question of making it mobile; we have to consider how mobile payments connects with other forms of e-government, and with wider policy issues.

There are, then, three successive levels of interest:

1. What are the usability problems around mobile payment of the Central London Congestion Charge? Why do users choose to pay by the existing SMS-based mobile method, or to avoid it? What role does SMS payment play in overcoming usability problems with payment of the charge?

2. What determines users' choice of payment methods? Are some methods of payment not being used, and why? Would a changed payment regime improve the Human-Computer Interactions in this broader sense?

3. What are users' experiences with e-government interaction? Do these experiences contribute to, or do they arise from, positive and negative attitudes towards the Congestion Charge, and perhaps to government services in general?

1.3   Contribution of this research

Discourse was collected from a number of sources: from published documentation, from political sources such as manifestos and minutes of committee meetings; and from interviews with transport and other organisations as well as with newsagents and others involved in collecting the charge. The main discourse, though, which forms the basis of this paper, was from standard interviews with fifty charge payers.

In addition, interviews were held with policy and implementation staff at various levels.

There are three key findings:

1. The use of SMS as a payment method is largely deterred by elements outside the interface of the SMS technology itself, particularly by users' unfamiliarity with it and by the need to register;

2. Some users have a negative view of the payment of the Congestion Charge, which tends to colour their attitude towards the charge more generally, whereas for others it is simply a "nuisance";

3. A combination of factors - the need for daily payments, the need for the payer to remember to take action to pay, and the payment deadline *together with* the Penalty Charge - is felt by some to be unnecessarily restrictive and contributes to negative perceptions of the Congestion Charge.

The next section gives a brief background to the Central London Congestion Charge, highlighting particular technical and policy considerations which have usability implications. This is followed by findings from discourses of charge payers and policy-makers, showing, with illustrative examples, how these usability issues are worked out in practice. Following this, it is possible to make recommendations for enhanced usability of payment for the Central London Congestion Charge. Finally, implications are drawn for usability in e-government more generally.

2   Background to the Central London Congestion Charge

The Central London Congestion Charge was introduced in February, 2003. It is the largest congestion charging scheme in the world according to its implementers, but not unique. Other cities use a charge to enter an urban area (Trondheim, Oslo, Bergen, Durham), other road pricing schemes such as toll express roads (Melbourne, Toronto), or mixed schemes (Singapore) (Commission for Integrated Transport, 2004). The introduction followed several years of discussion and research (Government Office for London, 2000). Enabling legislation to allow local authorities to charge road users was proposed in the 1998 Transport White Paper and implemented in the Greater London Authority Act (Department for Transport, 1998).

Unlike many other congestion charging and road pricing schemes in the world, the system does not work using electronic tags or other vehicle modification, but on the basis of camera recording of number plates (Automatic Number Plate Recognition, ANPR) at entry and exit from the zone and while driving in the zone (TfL, 2005b). The basic charge of £5 per day[1] is good for any number of vehicle movements, entries, and exits during the day.

The charge has to be paid on the day or up to 65 days previously: if paid after 22:00 on the day, it rises to £10 (TfL, 2004;TfL 2005b). There are high penalties for those who fail to pay the charge by the deadline of midnight on the day of entering the charging zone; initially, a Penalty Charge Notice of £100 is issued, reduced to £50 if paid within fourteen days. If the penalty charge is not paid within 28 days, a £150 *charge certificate* is issued. Continued failure to pay might result in registration of the debt with the County Court and possibly the appointment of bailiffs to recover the debt; in cases of failure to pay three or more penalty charges, a vehicle may be immobilised or impounded, in which case charges are made for its release, or it may be disposed of (TfL, 2004; TfL, 2005b).

The charge can be paid (TfL, 2003) by post (a very small number of actual payments), online, at selected newsagents, convenience stores and petrol stations (however, some chains of petrol stations do not have payment points), TfL information centres, using self-service machines in car parks, by phone to a call centre, and by SMS message from a mobile phone, which requires pre-registration (part of *Fast Track*).

2.1   *Mobile interactions in payment of the Central London Congestion Charge*

The existing London scheme is a *licence* scheme (TfL, 2004:article 6(1)(a)); that is, with certain exceptions, road users must purchase, in advance or on the day, a licence (represented by an entry in a database and possibly a receipt) to use a vehicle on the roads within the charging zone during the charging times. A licence scheme presents a need for interactions in the purchase of the daily licence (the licence can be purchased in "bulk" but is still essential daily[2]). This contrasts with a billing scheme; the onus is on the road user to ensure that they pay, or risk a penalty charge. Electronic road pricing requiring devices fitted to vehicles (*Tag and Beacon*), as has been proposed in London and as is used in some other cities, would allow for automated collection (Department for Transport, 2004). Such systems also allow for far greater flexibility, for example the ability to vary the charge depending on the actual level of congestion at any time.

Mobile interactions are implicated in payments of the Central London Congestion Charge in at least two ways: firstly, and currently, as a suitable means of payment using technology such as mobile phones or mobile PDAs; and secondly, potentially using on-board units or other devices to enable faster or more flexible charging in future.

The current implementations of mobile payment for the Central London Congestion Charge, however, are very limited, being restricted to use of SMS text for single daily (or weekly, in the case of residents

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[1] This will rise to £8 from July, 2005. At the same time, the Congestion Charge for fleet vehicles will rise from £5.50 to £7 (that is, it will become lower than the non-fleet charge), and discounts in the form of charge-free days for monthly and annual payments will be introduced (GLA, 2005); these changes are intended to make payment easier for businesses and frequent drivers, but do not address all of the issues raised in this paper.

[2] This will be partially offset, from July 2005, by discounts for annual and monthly payments, but these must be for consecutive chargeable days

paying the discounted charge) payments, for the current day or week. Our research identified a number of problems with this in terms of 1) the functionality of the payment system; 2) difficulties of use; and 3) concerns about the use of SMS for making payments generally.

To register for SMS payment, the customer first registers and is given a unique customer number and *Fast Track* card. Registering for SMS payment is an option for registered customers; this can either be done immediately following registration or by logging-in later, supplying a PIN and confirmation of Post Code. It is also possible to register for *Fast Track* and SMS payment via the call centre.
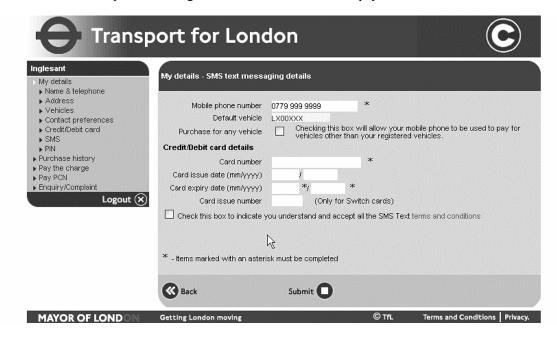

Figure 1: Registering for SMS payment – adding phone and card details to the customer registration

3   Discourses of the Central London Congestion Charge

Data collection and analysis was based on a view of discourse as 'the practices that systematically form the objects of which they speak' (Foucault 1972:54), as expressed the policies of government, in exchanges in public fora such as meetings of committees, and in the discourses of citizens as service users.

3.1   Data collection

Fifty charge payers were interviewed between mid-January and mid-February 2005 using a structured interview, followed by ten in-depth interviews from a mixed sample including drivers and non-drivers.[3] Payers were asked about changes to their travel patterns before and after the introduction of the charge; whether they pay the charge daily or for longer periods, and *why*; any problems with payment of the charge using their preferred method of payment; whether they had ever registered for SMS or *Fast Track*, and whether they had actually paid using SMS, and if not, why not.

The results are felt to be valid, because they identify discourses which were not anticipated in the structured interview questions and which were common across several interviewees. A relatively small sample size is commensurate with a discourse rather than a quantitative approach (Potter & Wetherell, 1987). However, there are some groups of users under-represented in the sample, notably people who *never* drive in Central London during congestion times; this is an area of ongoing research.

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[3] A large amount of this data from charge payers was collected by undergraduate students at UCL as part of a final-year project, and the authors of this paper gratefully acknowledge their contribution.

3.2 Findings

Recall that the specific interest, which throws light on the wider question, was in mobile payments, and in particular in why users do, or do not, pay the charge using the only mobile payment method currently available, which is SMS. The wider interest was in users' positive or negative experiences with paying the congestion charge using their existing payment methods, and in the ways in which this might impact their views of the charge generally.

The first finding is that the process of paying the charge is considered to be a nuisance, but, for this sample of drivers whose main reason for payment of the charge is for work, this nuisance is not sufficient in itself to cause them to make major changes to their travel habits.

Secondly, the need for user action to make payments, combined with the need in most cases for daily payments and the enforcement of a deadline on a short time-scale with heavy penalties, leads in some cases to negative views of the charge as a whole.

It follows from this that there is a need for improved usability in payment of the charge. One possibility for improving usability could include changing the payment *regime*, by extending the midnight deadline or in other ways.

A second option, not necessarily exclusive of the first, is to create a fast and easy form of payment, using mobile or pervasive technology. However, it seems unlikely that SMS alone is the best mobile payment method to provide this enhanced usability. This is largely because of social, rather than interface, problems with the SMS mobile system as implemented. These problems include

1. users' lack of awareness of availability of SMS payment,
2. users' unwillingness to spend time on exploring new payment methods, and
3. the need to register before making payments by SMS.

In summary, from the evidence here, the major usability issues around payment of the Central London Congestion Charge, as currently implemented, are not at the interface but social, in the interaction more widely.

In the following subsections, the key findings are expanded on and illustrated by discourse samples.

3.3 A nuisance

Charge payers themselves widely expressed the view of the payment process for the charge, not as a central factor in their travel decisions but rather as a "*nuisance*"; there is a difference, then, between a "*nuisance*", and the "*hassle factor*" which in itself might be a sufficient deterrent to driving:

> *I just find it a nuisance, having to go and pay*

> Interviewer: Is it more about *having to pay* or about *the way in which it's hard to pay, you find it difficult ...?*

> *Um, .. having to pay is quite annoying, really*

But travelling in London entails many nuisances, summed up by the phrase "put up with":

> *I think people just sort of, put up with cars, and because it's .. you have to pay it, and they need to get into work, and sometimes the public transport isn't that good either, that's why it .. stayed the same really.*

On this evidence, the interviewees' main reasons for travelling are, and were before the charge, for work; the question is not whether they have been deterred from travelling for visiting or for shopping, but whether they have changed their work travel patterns; for those who feel that they have no option but to continue to drive for some work-related reason, the "nuisance" might contribute to negative views of the Congestion Charge as a whole.

3.4 Hassle factor

For the politicians, on the other hand, there is much discussion as to whether the usability issues around payment of the Congestion Charge, summed up by the construction of the "*hassle factor*", are leading to changed travel habits since the introduction of the Congestion Charge.

For Steve Norris, the Conservative candidate in the 2004 mayoral election, the "*hassle factor*" is "*a key reason why people are now staying away from central London ... not the actual level of the charge*" (Conservative, 2004). A promise to reduce the "*hassle factor*" was one of the key points of the manifesto of Ken Livingstone, the elected Labour Mayoral candidate (The Labour Party, 2004). However, Livingstone strongly resists suggestions that the "*hassle factor*" is part of the basis for the way the Congestion Charge works:

> *I have a strong and moral aversion to having an aspect of public policy work on the basis that you make it unnecessarily difficult. ... you are more likely to make it difficult for the people who have limited literacy and numeracy skills ....* (Livingstone, speaking to GLA Transport Committee, 2005)

In this sense, the "*hassle factor*" is not specific to any particular payment problems. The politicians' view of the "*hassle factor*", though, is less concerned with the payment interface than with social factors and in particular the payment deadline, and, as is discussed below, this is a view which is largely shared by the charge payers.

3.5 Overcoming the hassle factor: mobile payment using SMS

A central question asked of all respondents was about their use of SMS to make payments, currently the only mobile form of payment of the Congestion Charge available. The SMS payment options are limited, and, as for the other payment channels, it relies on the user to initiate payment; nevertheless, with increasing use of mobile communications and widespread availability it might be expected to be a popular option. Figures from TfL indicate that around 22% (TfL, 2005a) of payments are made in this way. This might seem like a reasonably high percentage, but TfL says that payment by SMS text message is the quickest way to pay (TfL, 2003), and the question for this paper is to consider the role of mobile payment in overcoming the overall usability problems of the charge payment system. Most charge payers are paying in other ways, and the discourses help to understand why this is so.

One reason given is that charge payers see no reason to change from their current payment method (online or at a shop), preferring to pay "*using it how I know*":

> *well, I find it easier online, using it how I know, 'cos I just haven't tried any new methods*

One respondent suggests that there could be an age-related factor in the use of SMS for payment. That is, payment using SMS is not referred to specifically but is constructed as part of "*those sort of things*"; on this understanding, this user does not use SMS in general so is unlikely to use it for congestion charge payment:

> *Oh, no, I don't use any of those sort of things .. I'm too old-fashioned*

However, SMS could be useful, not as the preferred method of payment, but at times when the preferred method is not possible for some reason:

> *sometimes it's hard to find a shop. They don't have the shops all around the, you know places, here, but everyone's got their own mobile, you know*

There is a second, related, factor deterring payment by SMS; this is that it requires pre-registration. The necessity to pre-register in order to use it is one of the issues discouraging its use, as several of the interviewees clearly expressed:

> *I pay when I come in. It's not worth .. registering with anything*

Registering is also perceived by some users as difficult, and not well-explained. There is also some confusion between registering for SMS payment and for *Fast Track*, and lack of awareness of the SMS payment in general:

I gave up on it in the end .. at least it's free on the Internet, and I had to find the information on how to do it on the Internet, so it's quicker just to .. carry it on ... yeah, 'cos I didn't know how to do it by text anyway

However, some said that the registration was fairly easy:

yeah, but I had a few problems to begin with .. I just .. unsure what to do at certain points

There were other issues noted by some interviewees. These include the what some saw as the *unfairness* for charge payers of having to bear the cost of sending SMS messages: "*at least it's free on the Internet*"; some said that security is a problem, but on the other hand regular SMS payers did not see this as an issue.

3.6   Usability as a policy issue: extending the payment deadline

There is a continuing discussion among politicians around the suggestion that the payment period could be extended; according to some politicians, it is the need to pay by midnight on the day of travel, rather than the demands on charge payers in interaction with the payment system, which is the greatest "hassle" (GLA Transport Committee 2005). Extending the deadline would, though, add another piece of complexity for the payer.

However, the charge payers in this research constructed the question of the midnight deadline rather differently. The issue is not *only* the deadline, but the penalty and the sense of not being treated as an "honest" person:

sometimes you just, it slips your mind, it's so easy, and then you think at midnight you think, oh, damn, I haven't paid the congestion charge, and you know you're going to get a £40 fine or something ... I can see why they do it but .. like for the actual honest person that doesn't like .. it is frustrating

For some interviewees, this is just "frustrating", or part of the "nuisance" of payment in general. For others, though, it gives rise to negative constructions of the Congestion Charge more generally. One interviewee expressed similar ideas to the previous example, but rather more explicitly:

I think, it's just there to catch people out rather than to catch offenders

Another interviewee was even more negative, to the point of being "*cynical*", and, explicitly, not only about the payment but about the "*whole exercise*":

I do, I think, um, a lot of people are quite cynical about the whole exercise, and I think the main reason for that is the deadline, ... you get fined, and, I mean, it's quite, sometimes I won't get back until after midnight, you know, if there's a problem

The same interviewee, when asked for suggestions for ideas to make payment easier, again expressed negative views, not only of the charge but beyond that to the rather confrontational construction of the "*congestion charge or the mayor of London type*" who "*would not like that*", tending towards a strongly negative construction of the charge as a whole

I think a top-up system would be a lot better. Obviously I don't think the congestion charge or the mayor of London type would like that, because .. people aren't going to forget and have to pay a fine later on, so it, I mean, call me cynical, but I doubt I'll ever see that come in ...

4   The Congestion Charge as mobile HCI (revisited in the light of the discourses)

It is important to consider whether the "*hassle factor*" is a central or peripheral consideration in people's travel behaviour in Central London; interaction with the payment systems for the charge must present as few obstacles as possible for the payer. The evidence from this study does not suggest that Norris is correct in his view that the "*hassle factor*" is a "*key reason*" deterring driving in Central London, but nevertheless we have to take seriously Livingstone's "*moral aversion*" to making payment "*unnecessarily difficult*".

We have seen that despite the availability of the current mobile payment system using SMS text messages, there remain usability problems with charge payment. SMS payment is not as widely used as it could be, and the question is to consider why this is so, and what might be appropriate ways to overcoming obstacles to payment.

4.1   *SMS is not the (only) solution*

As we have seen, factors deterring SMS payment are the need to register, preference for sticking to existing payment methods, and simply not knowing about it. These factors are linked: the need to register discourages switching to SMS as a payment method; lack of clarity means that some people are not sure how to register for SMS, or not sure of what payment options are possible with SMS.

Lack of clarity about how to use SMS payment, as well as the need to register, also tend to negate its usefulness as a *secondary* payment method; that is, several interviewees suggested that while online payment or, perhaps, payment through the call centre or at a shop may be their preferred method of payment, there could be occasions when this is not possible, and that SMS payment is a useful stand-by for such times.

If it is to reduce "hassle", if it is to attract payers from their existing payment methods which have not shown major usability problems and with which they are familiar, and if it is to attract payers who might not use SMS for other applications, then it must be simpler to use, or quicker, or easier, than other payment methods.

However, if SMS payment were possible without the need to register, then this would imply other options being enabled via SMS: at a minimum, allowing the users' credit card details and vehicle registration to be entered. As well as greater complexity for the user, this would introduce security risks.

The current SMS payment method allows only payment for the current day (or current week, for residents claiming the discount); even the flexibility which is already enabled, the option to pay late and the option to pay for a vehicle other than the one registered, adds a level of complexity and does not seem to be well known to charge payers, from the evidence here. Although a number of payers said that they would welcome the possibility of greater flexibility in SMS payment, either to pay for other vehicles (which can be done already) or to pay in advance or for longer time periods, this would, of course, add further complexity. The point is not that this complexity would detract from the simplicity of the existing SMS interface, because this could be an option for the user, but that it is important to consider whether SMS is really a suitable medium for complex transactions.

4.2   *Combining SMS with other communication*

Registration effectively removes the complexity and security risk of sending credit card and other details from the mobile (SMS) communication to the relatively secure Internet or phone environments; the interaction is separated into complex and more routine elements. Internet or phone environments are increasingly likely to be mobile themselves, so the question is no longer whether to use mobile or static payment, but whether there are usability advantages in continuing to separate the interactions into (relatively) "rich" information media capable of handling the more complex transactions such as registration and ad-hoc payments, and the use of SMS to handle transactions, such as daily payments, which rarely change. This leads to a consideration of which is the most *appropriate* interface for simple transactions, and which for relatively complex transactions, as well as of different contexts.

Evidence from this study suggests that registration is *itself* seen as a "hassle". This might seem to indicate that there is little enthusiasm among users for the SMS/registration combination; however, this could change if either the registration process were better publicised or made simpler; for example, there is confusion between the registration for SMS payment and registration for the *Fast Track* payment.

Moreover, this is happening in a time of rapid technological change; there is not a dichotomy between rich and simple media, but a spectrum of user interface categories from "economy" (basic mobile phone) to broadband Internet using PC and i-TV, and the merging of different media (3G and4G, as well as SMS with i-TV in gaming, for example (Cereijo Roibás, 2004)).

4.3   Rethinking the hassle factor: beyond interaction

When interviewees were asked about their ideas for easier payment, their suggestions included automatic deduction from a bank account or from a prepaid balance. These users have understood that the Congestion Charge could, with suitable electronics, be paid automatically in various ways. Other schemes around the world, as has been discussed, use variants of smartcards and tags to operate automated road pricing.

This is where the significance of the London scheme as a *licence* scheme becomes apparent; this is not a billing scheme; it requires some action on the part of the payer in order to make the payment, and this is enforced by penalties. There is a spectrum of possibilities for options which would reduce the need for user action; for example, this does not exclude a licence scheme, since a licence could be enforced electronically by a tag on the vehicle (Government Office for London, 2000).

It is the *combination* of the need to pay daily, the short time-scale, and the high penalty if this is not done, which leads to the very negative discourses of unfairness, of being treated as dishonest, or, in some cases, of cynicism towards the Congestion Charge as a whole. The increase in the charge if paid after 22:00 is also related to the much more severe penalty if the charge is not paid by midnight, since its aim is to discourage late payments.

5   Conclusions

This paper has shown that public policy decisions can have an impact on usability of the systems with which they are implemented; the usability issues raised here are not in the interfaces, but are in detailed design of the interactions and in policy considerations. Usability issues arise not from one aspect of the policy, but from the interaction of several policies. In a similar way, overcoming these usability issues could be addressed by a combination of policy and implementation changes. With such a large and complex system, thoroughgoing policy changes are likely to be difficult and expensive to implement; smaller policy changes and consideration of the most appropriate *combinations* of payment channels seems to be the most practicable path in the medium term; SMS may be a part of this, but it is questioned whether SMS is the most suitable mobile technology. At the same time, social interventions such as widespread advertising to remind drivers of the need to pay can be, and are being, applied, as well as discounted period payments for regular drivers; these go some way to addressing the usability concerns within the present constraints.

Usability failings, in turn, have an impact on public policy. Usability problems which stem from public policy decisions, particularly the reliance on a penalty model combined with a time-scale for payment which is seen by some as unnecessarily short, can be expressed as negative attitudes to the Central London Congestion Charge as a whole.

In the longer term, core policy changes to enhance usability will have to fit within the political, contractual, and practical constraints on such a large and time-critical system in a dense urban context. The existing contract for operation of the Congestion Charge payment scheme remains until 2009; there are unlikely to be major changes, such as allowing a customer account, auto pre-payment, or billing system or introducing *Tag and Beacon* other than on a trial basis, before this time (TfL, 2005c). These policy options, too, will introduce new usability issues, which will have to be carefully considered.[1]

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