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Appreciated – but with a fading grace of novelty! Traveller’s assessment of, usage of and behavioural change given access to a co-modal travel planner

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Abstract

Potential increases in transport system efficiency by introducing systems for traveller information is dependent on the uptake of the travellers. A co-modal travel planner, combining both private and public modes of transport, was introduced in Stockholm, Sweden, in 2009. The results of two consecutive surveys to travellers show that the information provided by the travel planner was trusted but the perceived value of the service decreased over time. The service had been re-used by less than 40% of the respondents. Nine per cent of the travellers claimed to have increased their use of public transportation as a consequence of their access to the travel planner. At the same time only one individual stated to use the car less often.

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1. Introduction

The area of transportation presents great challenges as mobility demands increase, energy prices are on the rise and spatial limitations in urban areas stay definite. These challenges will not be met by a single adjustment of the transport system but have to be addressed in a multiple of ways. Some of the proposed solutions are based on the notion that information can lead to increased knowledge and change of attitudes which will, in turn, result in behavioural changes.

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Traveller information services, in particular ICT-based solutions, are considered as economically feasible alternatives to support changes in travel behaviour (cf. Council, European Parliament 2010) and different types of ICT-based services have been introduced in cities worldwide. Examples include real-time systems, providing information on next departure as well as on disturbances, and different types of travel planners which provide information on how to travel from a to z by public transport (e.g. Transport Direct, GB; Rutebok, NO; TransPOR, PT). The latest type of travel planners is the multi- or co-modal travel planner, combining private and public modes of transport, e.g. private car and/or cycle and/or bus.

A number of studies have been carried out in order to investigate different aspects of ICT-based traveller information. Most are, however, concerned with travellers’ attitudes towards such services and only a few have been dedicated to finding out if a traveller actually makes use of the information and if there are any the effects on the traveller’s planning and execution of journeys in general and by public transport specifically. The studies conclude that there are benefits – perceived or actual. Investigations of real-time information have e.g., shown effects such as shorter waiting times at the bus stop (Dziekan and Vermeulen, 2006; Infopolis2, 1998; Sekara and Karlsson, 1997; Sekara and Karlsson, 1998), increased acceptance of waiting (Infopolis2, 1998, Sane et al., 1999), overall reduced uncertainty when travelling (Sane et al. 1999; Sekara and Karlsson, 1997; Sekara and Karlsson, 1998) as well as feeling safer when travelling (especially at night) (Infopolis2, 1998; Sekara and Karlsson, 1997; Sekara and Karlsson, 1998). In addition, has an overall more positive attitude towards public transport been noted (Infopolis2, 1998).

Studies addressing the effects of multi-modal travel planners appear more scarce but e.g., a study by Laine et al (2003) indicate positive consequences in that travellers have found faster routes and the information have made the journeys more comfortable. Few investigations indicate, however, an increase in the number of trips by public transport as a result and then in terms of two or three percent of travellers who report an increase in the use of public transport (Laine et al. 2003; Sekara and Karlsson, 1998). There is, however, little evidence to suggest that the provision of information has been effective in promoting modal shift.

2. The case

In January 2008, a project with the intention to create a new type of travel planner for the Stockholm area (Sweden) was initiated (in time for the 16th World Congress for ITS Systems and Service in 2009). The project partners, i.e. the City of Stockholm, the Swedish Transport Administration for the Stockholm region and Stockholm Transport Travel Planners, meant to demonstrate possibilities of cooperation between public and private institutions in the area of ITS (Sundberg, 2009; Ahlberg, 2007). In addition to suggesting travel routes combining different travel modes (e.g. providing information about a trip consisting of one part biking, one part bus ride and a last part walking), the planner also presents information on estimated travel times, greenhouse gas emissions, and monthly travel costs for each combination. Search results are shown as a list of travel options complemented by a map. The intention of the project was to support well-informed travel decisions in the hope that the travel behaviour of the users of the planner would change to quicker, cheaper way of travelling with a reduced environmental impact.

The introduction of the co-modal travel planner in Stockholm created an opportunity to investigate travellers’ attitudes towards this new type of information solution, as well as the perceived effects on individual behaviour. The aims of the study were, thus, to investigate (i) travellers’ attitudes towards and assessment of travel planners in general and the described travel planner in particular, and (ii) if access to the travel planner resulted in any changes in the travellers’ travel behaviour in terms of e.g. choice of travel modes.
3. Method

3.1. Sample and Procedure

An initial assumption was that the travel planner would be assessed and used differently depending upon the type of user/traveller and his/her situation. An electronic questionnaire was sent to 172 individuals that had registered an interest in answering questions about travel planners in the region of Stockholm. These were considered to belong to a group denominated ‘early adopters’ (cf. Rogers, 2003). Invitations to an identical questionnaire were also handed out to 105 individuals that were to be subject to a move of office address within the next six months. These were considered to belong to a group with a special need of the type of service offered by the planner. They could therefore be assumed to have a higher likelihood of adapting their travel behaviour to the information presented by the planner.

When the questionnaires were distributed, the planner had not yet been publicly advertised and the contacted individuals were given a universal resource locator and were encouraged to visit the planner before answering the online survey. The potential respondents were at the same time also given the chance to visit an instructional movie describing the functions of the travel planner.

The individuals that answered the first questionnaire were after nine months sent an invitation to a similar questionnaire in order to investigate if there were a change in attitude, trust or usage of the travel planner. Seventy-one individuals answered also this second questionnaire.

3.2. Instruments and Measures

In addition to collecting demographical data (gender, age, occupation and distance to workplace/study place), the questions asked in the surveys covered the following topics: the travellers’ assessments of the type of service offered by the travel planner (ease of use, usefulness, etc.); the travellers’ trust in the information provided; usage; and the anticipated and actual effects on personal travel behaviour.

Attitude towards the service was measured using a five point Likert scale where the respondents indicated to what degree they agreed with the statement ‘This type of services (services like this travel planner) is generally not valuable to me’. Also the respondents’ trust in the information provided by the travel planner was measured by a Likert scale and the respondents were asked to indicate their agreement with altogether three statements, such as e.g. “The environmental/travel time/cost information given is...”.

A slightly modified van der Laan acceptance scale (van der Laan et al., 1997) was used to measure the respondents’ acceptance of the service. The scale provides an assessment in two dimensions where practical aspects are said to be reflected in a ‘usefulness’ score, while pleasantness is mirrored in a ‘satisfaction’ score. The instrument consists of nine items assessed on a five-point semantic scale ranging from +2 to -2. One of the nine items in the original questionnaire, the semantic pair ‘assisting – worthless’, was exchanged for ‘valuable – worthless’ as this was deemed more suitable for a co-modal travel planner.

Effects on behaviour were measured in two ways. The respondents were asked about their expected as well as their perceived change in behaviour as a consequence of having access to the planner and they were also asked about the frequency of use of different travel modes in both surveys making it possible to compare this behaviour with the perceived change in behaviour.
3.3. Statistical analysis

Data from the first and second surveys formed the basis for the analysis, all responses were included after excluding those who stated to have, or have had, a professional interest in travel information systems. Data processing was done using PASW 18.0 (release 18.0.3). The Wilcoxon Signed Ranks Test (Siegel & Castellan, 1988), asymptotic significance, 2-tailed, was used for testing if there were statistical significant differences between the two surveys for all questions where the respondents were asked to rank alternatives, this for trusts in information; assessment of the type of service, and assessment of the specific travel planner. Statistical significant effects regarding travel behaviour were analysed using McNemar's chi-square (Siegel & Castellan, 1988). The cut-off level for significance was in all cases set to p<0.01 and for trends p<0.10. Due to the limited number of respondents, only very limited analyses were carried out on a sub-group level.

4. Results

The first questionnaire was (after one reminder) answered by 115 respondents resulting in a response rate of 51% (n=277). Out of these 115, 71 answered also the second questionnaire. Only 17 of the respondents that answered both questionnaires were subject to a move of office why the low response rate in this category made any sub-group analysis unfeasible. Furthermore, the results presented below are based on those individuals stating no professional interest in products or services related to travel information. Twelve respondents were excluded on this basis.

In both surveys 30% of the respondents were women and 70% were men. Their ages ranged from 27 to 78 with a median age of 50 years. Eighty-five per cent stated to be gainfully employed and 14% stated to be retired (n=85). Seven per cent stated to have less than three kilometres to work, 15% less than five kilometres, 25% less than 10 km, 25% between 10 and 20 km, and 48% more than 20 km (n=85).

A majority, 76% of the respondents stated to travel by car more than three days per week, 19% to travel by car between one and three days per week, and 14% to travel by car less often than once per week (n=101).

4.1. Attitude and acceptance

The type of service offered by the travel planner was initially well received by the respondents but changed somewhat after nine months. Their average agreement with the statement “This type of services (services like this travel planner) is generally not valuable to me” changed from “somewhat disagree” to “neither agree/disagree” (n=58, p=0.035).

The travellers’ acceptance of the travel planner itself was positive and, on average, the total score remained the same after nine months (Fig. 1). However, the score of some of the individual sub-items in the assessment changed over time. Statistically significant changes were found for the rating of ‘valuable – worthless’ and ‘desirable – undesirable’. Both these changes were negative as the score for value and desirability of the planner decreased, from a median value +1 to 0 (n=34, p=0.007 and p=0.004 respectively). Negative trends (0.01>p<0.10) were also found for the rating of ‘useful – useless’; ‘good – bad’; ‘effective – superfluous’; ‘likeable – irritating’; ‘raising alertness – sleep-inducing’.
4.2. Trust

The respondents claimed to trust the information provided by the travel planner and this trust remained throughout the nine months period. The respondents’ average judgement of the information on green house gases was ‘neither correct or incorrect’ and regarding travel times ‘more or less incorrect’ in both surveys ($n_{\text{survey I}}=97$; $n_{\text{survey II}}=22$). Hence, information on green house gas emissions and travel costs seemed to be the more trusted whereas estimated travel times were somewhat questioned. Still, less than one out of ten respondents stated travel times to be ‘more or less incorrect or ‘completely incorrect’. Regarding yearly travel cost the average response in the first survey was that the information was ‘more or less correct’ and in the second survey ‘neither correct or incorrect’ but the change is not statistically significant.

4.3. Usage

Even though the respondents in general were fairly positive towards the idea of the type of, as well as towards the specific service, their reported usage of the travel planner differed. A majority, or 62% ($n=58$), of the respondents reported not to have visited the planner at all since the first questionnaire whereas 38% reported to have visited the travel planner at some time over the nine months period. On the other hand, a majority of the latter claimed to have visited the planner at least once per month.

4.4. Expected and actual outcomes

In the first survey approximately 10%, or 10 respondents indicated that access to the co-modal travel planner would affect their travel behaviour (Table 1). In the second survey only one respondent stated that continued access to the travel planner would further affect his future travel behaviour.

In the second survey, 12% or 7 respondents stated that access to the travel planner had had an effect (of some kind) on their travel behaviour (Table 1). Nine per cent reported that access to the travel planner had made them travel more with public transport specifically but, at the same time, only one individual reported a decrease in the number of days per week when he chose to travel by car. None of these respondents belonged the group subject to a move of offices. No statistically significant changes could be found regarding the respondents’ reported choice of travel mode or the number of days per week or month that that individual travelled by car or public transport or car. This was true also for those that had
reported that they believed that access to the co-modal travel planner would have an effect on their travel behaviour. No correlation could be found between an individual’s reported belief that the planner would affect travel behaviour and any reported effect nine months later.

Table 1. Stated belief in consequences of access to co-modal travel planner (n\textsubscript{survey I}=101) and reported consequences of access to co-modal travel planner (in percentage of n\textsubscript{survey II}=58). The respondents could choose more than one alternative. McNemar's chi-square statistic suggests that none of the changes are significant.

<table>
<thead>
<tr>
<th>Respondents claiming to believe that …</th>
<th>Survey I (%)</th>
<th>Proportion of respondents reporting that …</th>
<th>Survey II (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I will travel more often by public transport</td>
<td>8</td>
<td>I travel more often by public transport</td>
<td>9</td>
</tr>
<tr>
<td>I will travel less often by public transport</td>
<td>0</td>
<td>I travel less often by public transport</td>
<td>2</td>
</tr>
<tr>
<td>I will travel more often by car</td>
<td>1</td>
<td>I travel more often by car</td>
<td>2</td>
</tr>
<tr>
<td>I will travel less often by car</td>
<td>3</td>
<td>I travel less often by car</td>
<td>0</td>
</tr>
<tr>
<td>I will travel more often by bicycle</td>
<td>6</td>
<td>I travel more often by bicycle</td>
<td>3</td>
</tr>
<tr>
<td>I will travel less often by bicycle</td>
<td>0</td>
<td>I travel less often by bicycle</td>
<td>0</td>
</tr>
<tr>
<td>I will travel more often by motorcycle</td>
<td>1</td>
<td>I travel more often by motorcycle</td>
<td>0</td>
</tr>
<tr>
<td>I will travel less often by motorcycle</td>
<td>0</td>
<td>I travel less often by motorcycle</td>
<td>0</td>
</tr>
<tr>
<td>I will walk more often</td>
<td>4</td>
<td>I walk more often</td>
<td>2</td>
</tr>
<tr>
<td>I will walk less often</td>
<td>0</td>
<td>I walk less often</td>
<td>2</td>
</tr>
<tr>
<td>There will be an effect (of any kind)</td>
<td>10</td>
<td>There has been an effect of some kind</td>
<td>12</td>
</tr>
</tbody>
</table>

Furthermore, no correlation could be found between the respondents’ assessment of the travel planner and their reported change of travel mode (i.e. more by public transport/less by car) as a consequence of access to the travel planner. No correlation could be concluded between how the respondents assessed the travel time/emission/cost information provided by the planner (‘very valuable – totally worthless’) and stating to travel more by public transport/less by car as a consequence of access to the travel planner. However, at the same time there were few individuals who claimed to have made any changes.

5. Discussion and conclusion

5.1. Attitude, assessment and usage

A first aim of the study was to investigate travellers’ attitudes towards and assessment of travel planners in general and the described travel planner in particular. A positive attitude is assumed to result in acceptance and usage whereas a negative attitude is assumed to result in the opposite. The total number of respondents was small (n\textsubscript{survey I}=107; n\textsubscript{survey II}=71) why it is evidently not possible to generalize across the larger population. There are, nevertheless, some interesting implications. For instance, over time (i.e. the nine months) there were some changes in the respondents’ assessment of the planner and the provided service. It was rated as less useful, less effective, less likeable and less stimulating. This change cannot, however, be fully explained by the respondents gaining further use experience of the service. Less than 40% of the respondents reported to have returned to the travel planner after their initial visit. On the other hand, this limited usage does not appear to be caused by an initial very low assessment or acceptance of the service, the overall assessment was instead fairly positive.

As the travel planner did not change in terms of content or user interface design, etc. over time, a
possible explanation is that, the initial somewhat more positive assessment of the planner and the service it provided might be linked to the respondents’ idea of a co-modal travel planner rather than the actual travel planner itself. A travel planner is, in principle, considered ‘a good thing’, something beneficial and in agreement with societal norms (cf. Ajzen and Fishbein, 1975), even though the individual does not use the service or make use of the information provided. Faced with questions regarding their usage of the specific service, the respondents may have reassessed the assumed benefits, or values, and found them questionable – as they had not used the service.

One reason for the limited use could be that even though the information provided (i.e. the cost of commuting, the greenhouse gas emissions, and the travel times) might change drastically with a change of personal behaviour, little new information will be provided if one uses the planner repeatedly without an intention to change travel mode, route or times, i.e. without a “new” question being posed by the traveller. A general interest in the travel planner as an example of a new information service may be motive enough for visiting the website and finding out more about it – but not sufficient for continued use. Moving from one address to another could, on the other hand, be expected to give rise to an actual need for further information on the specific issues, but even though this category of travellers could be considered the main target group for the service, neither their responses to, nor their use of the service differed in any way from the former category. Hence, the explanation must be sought elsewhere. (It must be noted, though, that the number of respondents from this category was very small.)

5.2. Effects on travel behaviour

A second aim was to investigate if access to the travel planner resulted in any changes in the travellers’ travel behaviour – in terms of e.g. choice of travel modes. Some changes in travel behaviour were reported: nine per cent of the respondents – or 5 individuals – who answered the second questionnaire claimed to travel more often by public transport than earlier. On the other hand, only one individual also reported to have decreased the number of days per week that he travelled by car. None of the respondents expected a further decrease in car usage or an increase in public transport usage given access to the travel planner. That nine per cent had changed (or rather stated to have changed) their mode of transport may not appear as a drastic impact. However, a more frequent use of public transport among nine per cent of travellers in general would be significant indeed. Given the actual number of respondents it is not possible to generalize across a larger population but other studies addressing the impact of information on changed travel behaviour refer to between three (Laine et al. 2003) and 30% (Infopolis 2, 1998), the higher percentage though the effect of a number of changes to the public transport system. Hence, it is feasible that a certain change may have occurred. Nevertheless, an increased use of public transport is not in itself positive if not accompanied by a decrease in the use of less sustainable travel modes, such as private cars.

Travel information, dynamic as well as static, is an important part of the public transport service, e.g. for reducing travellers’ uncertainty when planning and undertaking the trip (e.g. Karlsson et al. 1994; Dziekan & Dicke-Ogenia, 2010; Sekara & Karlsson, 1997; Sekara & Karlsson, 1998). As stated in the introduction, travel information is also considered an important means for changing people’s travel behaviour and regarded a key component in managing the uncertainty associated with such changes. It is here argued that it is important to differentiate between different situations and time horizons in order to address and assess the possible impacts. A public transport user searching for information on what route to choose for a new, unknown destination or a car user investigating the possibilities to take the bus home from a night on the town can both use a service providing information on how to travel from a to z, as well as comply with its directives. In such a situation there is a clear motive, an established intention, and a short-term perspective. However, if the purpose of the service is not only to reduce any uncertainty associated with travelling ‘here and now’ (short-term) but also to accomplish a long-term shift from less
to more sustainable modes of transportation, there is no ‘match’ between the two travellers’ need for information and the information provided. A match exists only if a traveller uses the service with the specific purpose of finding information to support such a change. It can be assumed that this situation emerges less often than the former. Without the question being posed, the service is not useful, or used. What could be discussed is therefore if an increase in usage requires a more proactive approach in that the traveller could subscribe for the information or links to the service could be included on the websites of e.g. estate agencies, events, and athletic facilities.

Accomplishing changes in people’s travel behaviour is difficult (e.g. Verplanken et al., 1997). There are several co-operating factors that determine how the individual perceive his or her ‘action space’ and the choices that are considered possible. These factors include the design of the transport system but also the household’s socio-economic situation, distances to services, etc. as well as motives, attitudes, knowledge, and not least habit. Routine habits, such as commuter journeys, are most often accomplished without further thought or reflection why questions regarding what mode to choose, or why, may simply not emerge in the person’s everyday life. There are consequently no motives for searching for and accessing an information service, such as the traffic planner. Searching for information on a trip from a to z and receiving this, as well as other information on e.g. green house gases and monthly costs, cannot be expected to result in instant and dramatic changes in travel pattern. However, also a single change in the choice of travel mode is a change, single journeys may accumulate to chunks, and the information may still contribute to the changes desired by society. Information of the kind presented by the travel planner might consequently have an effect on travel patterns, in particular when combined with other improvements of the public transport system, but these changes must be assessed in a longer-term perspective (cf. Bamberg et al., 2003).

6. Conclusions and implications

In summary, the travellers’ assessment of the travel planner was initially fairly positive but decreased over time in terms of e.g. ‘value’ and ‘desirability’. In addition, the travellers’ attitude towards the travel planner became less positive – but not negative – over time. Furthermore, the travel planner was used only to a very limited degree – even though the information was trusted. A positive attitude towards a service does not ensure usage. A lack of motivation, or perceived need, to use the service, rather than e.g. lack of trust or a negative attitude, could explain the outcome. Motivating usage of an information service, such as a travel planner, is thus a challenge why a more proactive approach and promotion should be discussed. Even more challenging is changing people’s travel behaviour. Nevertheless, even though a majority of the travellers did not report a change their travel behaviour, a small minority claimed to have done so as a consequence of having access to the planner. Thus, the study implies that travel planners could have an effect on people’s travel behaviour. Further studies are however needed in order to determine what the effects really are and what is required from a travel planner in order to increase travellers’ usage of the service.

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