CONCEPTUALISING BARRIERS TO TRAVEL INFORMATION USE

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Abstract

Since the 1998 UK government Transport White Paper which emphasized improving public transport and information for passengers, there have been considerable developments in the provision of travel information. Simultaneously, the use of the Internet and of mobile information and communication devices has increased tremendously. Various forms of travel information now exist which enable people to make better informed travel choices. In consequence, many people have the possibility of planning door-to-door multimodal journeys.

However, while certain information services are reporting annual enquiries running into the millions, there is still a high number of non-users. Lack of awareness is only one of a series of barriers to travel information use. For service providers to realise the full potential of their services it is important that such barriers are overcome, yet little is known about their precise nature.

The aim of this paper is to present a social-psychological theoretical framework (based on the *Extended Model of Goal-directed Behaviour*) that addresses barriers to travel information use. The model is founded on the notion that behaviours are selected because of their perceived usefulness in achieving a goal. Individuals develop a motivation to act (behavioural desire, such as using travel information) which is affected by: habit, attitudes, anticipated emotions (feelings that occur in the case of goal achievement or failure), perceived behavioural control (an individuals' confidence in undertaking a particular behaviour), and subjective norms (perceived social pressure exerted by important others to perform or not to perform a behaviour). Situational factors (such as characteristics of journeys and travel information services) are added to the model to account for the context in which a certain travel choice is made. Thus, barriers to travel information use might be tackled more effectively in the future by a better understanding of people's behaviour.

1. Introduction

Development and benefits of travel information services

Until roughly a decade ago, the main options for finding out how to get somewhere were to ask other people, to rely on printed information such as timetables and road maps, or to phone an enquiries line. With the rise of Information and Communication Technologies (ICT's) such as the Internet and the mobile phone, people's travel information sources have extended dramatically. Multimodal door-to-door travel information web services[1] have been established worldwide, such as 9292OV in the Netherlands, Transport Direct in the UK, Metlink Journey Planner in Melbourne, Australia, and 511.org in San Francisco, US. Currently, there are multiple ways people can pre-plan their trip or receive up to date travel information while travelling.

Several benefits of using travel information can be identified on the micro-level of individuals, the meso-level of organisations, and on the macro-level of society as a whole. For the individual, the benefits of using travel information (either pre-trip or on-trip) comprise better informed travel choices such as a quicker route, a more comfortable journey, or a cheaper trip. For public transport operators and information service providers, travel information use might mean an increased use of their services. All these benefits might ultimately lead to less congested roads and less pollution which is beneficial for society as a whole. Although the impact of travel information use on people's

[1] See: http://www.9292ov.nl/, http://www.transportdirect.info/, http://www.metlinkmelbourne.com.au/, http://www.511.org/

travel choices is as yet largely unknown (Chorus et al., 2006b), it seems plausible that if people do not consider travel information they are less likely to adapt their travel behaviour.

Growth of travel information use

Since the 1998 UK government Transport White Paper which emphasized improving public transport and information for passengers, there have been considerable developments in the provision of travel information in the UK. For example, National Rail Enquiries has recently introduced Train Tracker, a telephone information service that provides the latest departure and arrival times of trains. It is also possible to receive travel information (for example, up to date travel alerts) on handheld devices such as a mobile phone or PDA (Personal Digitalised Assistant). Web services such as Transport Direct and Transport for London (TfL) Journey Planner are experiencing substantial and growing levels of use. For example, the number of visitors per month to the TfL Journey Planner web site has risen from 300,000 in 2003 to more than one and a half million visitors in 2006 (Transport for London, data received upon request 26th of October 2006). This points towards a positive development in the policy goal of empowering people to make more fully informed travel choices. Figure 1 illustrates the increased use of the Transport Direct website since its start in December 2004. The rise in website visits for National Rail Enquiries is clearly demonstrated in Figure 2, simultaneously showing the decline in the number of telephone enquiries.

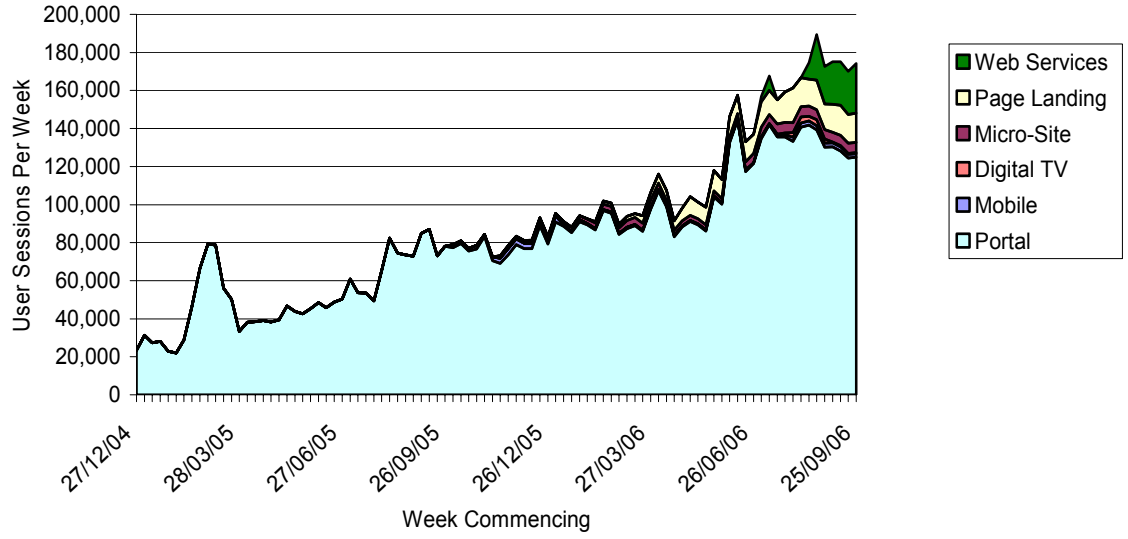

Figure 1 Transport Direct Portal – Weekly user session breakdown (Source: Transport Direct)

Relatively low level of awareness and use of travel information

For the majority of trips travel information is not needed, because they are familiar, local, and not time-sensitive (Peirce & Lappin, 2004; Lyons, 2006). Still, there is an unrealised potential of travel information use for an important minority of trips. For example, more than a billion trips by train are made per year (ATOC, 2006), however, only for a fraction of these trips is travel information being sought either by telephone or online. Even though certain information services are reporting annual enquiries running into the millions, there is still a high number of people who hardly ever consult travel information. Thus, the increasing levels of travel information use risk masking a potentially much higher level of non-use. Such research as exists concerning awareness of and use of travel information services reveals typically that only a proportion of the population (sometimes the minority) are aware of a given service. For example, a study commissioned by the Welsh Assembly Government showed that more than half (58%) of the 707 respondents had not heard of Traffic Wales before and that the majority of those who had heard of it appeared not to have a clear understanding of its function (Atkins, 2006).

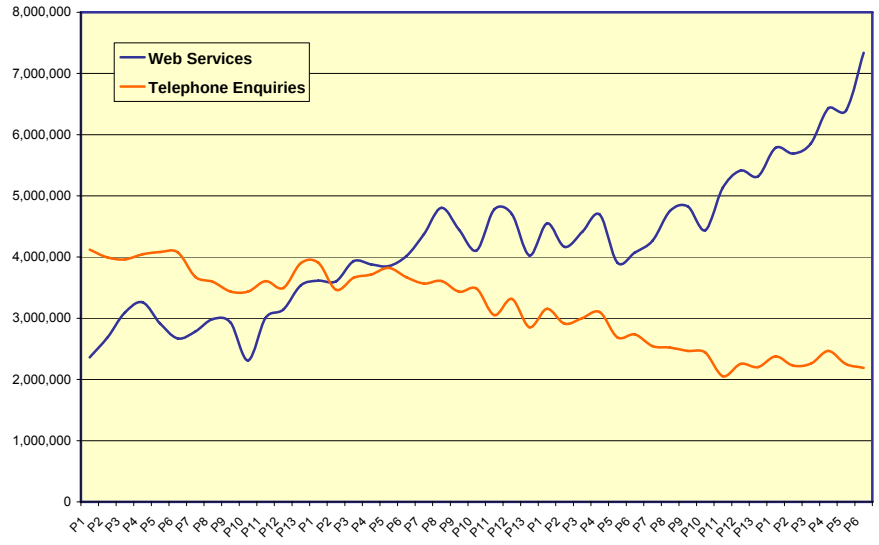

Figure 2 National Rail Enquiries - Telephone enquiries vs. Web Visits, Monthly figures for April 2003 – September 2006 (Source: National Rail Enquires)

Generally speaking, there still seems to be a relatively low awareness of travel information sources in the UK, despite the huge investments in and extensive development of travel information services in recent years. Figure 3 shows how many people have heard of various travel information services, based on a representative sample of 2009 British adults interviewed face-to-face in June 2006 (GfK, 2006). Half of the respondents were apparently unaware of the telephone service provided by National Rail Enquiries, while only one-third knew of its website. That half of the British population makes a train journey less than once a year (ONS, 2006) may help explain this.

More than half of the respondents were unaware of travel information services provided by National Express (travel by coach), AA and RAC (travel by car), and more than 80% had not heard of multimodal travel information services such as Transport Direct, Traveline, and Transport for London. Consequently, it is not surprising that the same study found that 47% of the respondents had never used any of the travel information services listed in Figure 3 (GfK, 2006). Slightly more than a quarter of the respondents (28%) had ever used a telephone based travel information service, while 39% had ever used a web-based service (ibid). These figures show that online travel information services seem to be more popular than telephone services (ibid).

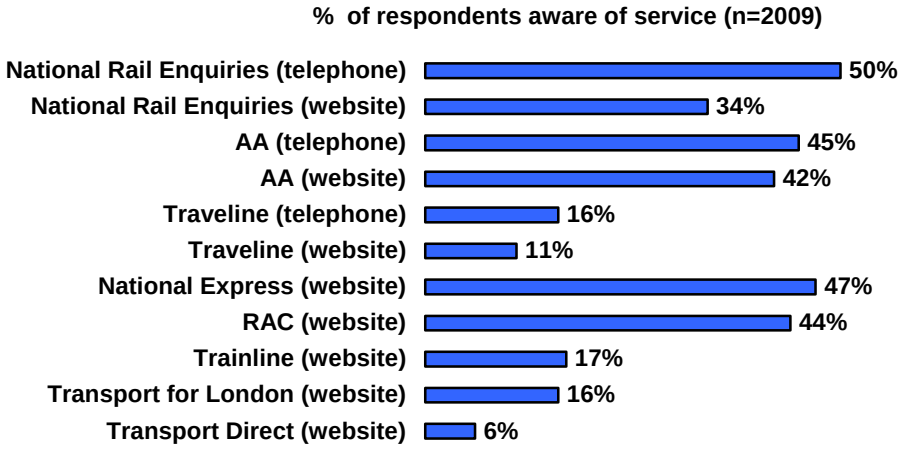

Figure 3 Awareness of travel information services (Source: GfK, 2006)

Lack of awareness is only one of a series of potential barriers to travel information use. A distinction can be made between barriers that are related to the performance of delivery organisations, such as public transport operators and information service providers, and barriers that are related to the individual. An example of the first type of barriers is the quality of information provision (Peirce & Lappin, 2004). Individual barriers to travel information use might be a lack of: means to access information, motivation to acquire travel information (e.g., caused by habits and attitudes), understanding and trusting the information (Verplanken et al., 1997; Hato et al., 1999; Lyons, 2001). These two sets of barriers are interrelated. For example, the quality of travel information is likely to affect people's trust in the information. Also monetary and non-monetary costs (e.g., time, effort) of gathering information might form a barrier (Lyons, 2001). Finally, travel characteristics such as journey type, familiarity, urgency, and distance might also affect people's propensity to acquire travel information (Emmerink et al., 1996; Hato et al., 1999; Petrella & Lappin, 2004).

Although the barriers themselves can be listed, it is as yet unclear what their *relative* importance is and how they *interact* with each other. Until now, very little research has been carried out to assess barriers to travel information use. Existing empirical studies are often descriptive rather than explanatory (e.g., Peirce & Lappin, 2004; Petrella & Lappin, 2004). Moreover, the majority of these studies only take sociodemographics into account in relation to the individual, although they could be mere proxies for underlying behavioural and attitudinal characteristics of individuals which determine travel information use (Emmerink et al., 1996; Chorus et al., 2006b). What seems to be lacking is an approach that integrates various factors (e.g., habit, attitudes) into one coherent theoretical framework. Moreover, there has hardly been any attention for the social context in which individuals operate. For instance, it is not explicitly recognized that often people do not make decisions entirely alone, but are influenced by the opinions of others who are important to them.

This paper shows how a social-psychological theoretical framework based on attitude theory could be helpful in explaining barriers to travel information use. The Extended Model of Goal-directed Behaviour (EMGB) is based on the utilitarian notion that people act because they ultimately would like to achieve certain goals (Perugini & Conner, 2001). It has been successfully applied in the past to explain dieting, studying, and the decision to buy products via the Internet or in a brick-and-mortar store (Perugini & Conner, 2001; Farag, 2006). Applying this model to travel information use could provide more insight into the reasons why people are inclined to acquire travel information or not under certain circumstances.

Travel information use is defined as seeking, finding, and consulting travel information (or trying to consult in the case of inadequate information). Note that consulting travel information does not imply that the information is also acted upon. The potential effects of travel information use on people's travel behaviour is also outside the scope of this paper.

In the next section a short overview is given of existing empirical findings and various theoretical approaches regarding travel information acquisition. Section 3 describes how the EMGB incorporates most of these approaches in a single theoretical framework and demonstrates how it could be applied to explain the willingness to use travel information or not. Finally, the paper concludes with a discussion of the implications for future research.

2. Existing understanding of travel information use

Obtaining travel information can have three main purposes: it might generate new travel options that an individual was not yet aware of (e.g. in mode, route, destination), it might help an individual who has incomplete knowledge concerning the characteristics of known travel alternatives to assess these characteristics (e.g. comparing the journey time between different modes), and it might help an individual to complete a journey successfully (Chorus et al, 2006a; Lyons, 2006). The first two purposes are related to journey planning, while the latter purpose is related to journey execution.

Similar to this distinction, information can be consulted pre-trip or in-trip. Furthermore, concerning the content, information can be static (the information remains the same over longer periods of time, e.g. bus timetables) or dynamic (the information changes quickly, e.g. updates about congestion) (Van der Horst, 2006). So-called 'real-time' information is by its nature dynamic (Lyons, 2006). Travel information can also be descriptive (telling the traveller what is happening) or prescriptive (telling the traveller what to do) and is either sought actively or consumed passively

(Van der Horst, 2006). Finally, a number of information delivery systems exist that can be classified as either collective (equal for all travellers) or individual (tailored to the wishes of a traveller) (Van der Horst, 2006). Examples of collective information delivery systems are radio broadcasts, signs, and announcements, while individual information delivery systems encompass the telephone, Internet, and wireless devices (such as mobile phones, laptops, and PDA's).

Empirical findings about travel information use

In the past decade, numerous studies have empirically investigated various forms of travel information use and different types of information delivery systems. The results show that professionals, people on a higher income, younger persons, and frequent public transport users are more likely to be aware of travel information sources than others (Goulias et al., 2004; Petrella & Lappin, 2004; Chorus et al., 2006b). Not surprisingly, overall, these types of people also use travel information services more often, together with highly educated individuals and males (Emmerink et al., 1996; Goulias et al., 2004; Chorus et al., 2006b). Recent studies concerning travel information use that have been carried out in the UK found that the majority of users were persons aged between 25-44 years and urban residents (MORI, 2006; TTR, 2006).

It is recognised that people are more likely to consult travel information for unfamiliar trips (Atkins, 2005; Lyons, 2006). Empirical research shows that travel information is mostly acquired for arrival time-sensitive trips, such as business trips, and for longer distance trips (Emmerink et al., 1996; Peirce & Lappin, 2004; TTR, 2006). The willingness to consult travel information increases the more uncertain the trip context is (e.g., expectation of bad weather or of volatility in travel times, congestion, travelling during peak hours) (Hato et al., 1999; Petrella & Lappin, 2004; Chorus et al., 2006b). Other trip purposes for which travel information is often consulted are visiting family/friends and going on holiday (Petrella & Lappin, 2004; MORI, 2006; TTR, 2006). Overall, people make limited use of travel information to generate new travel alternatives (Kenyon & Lyons, 2003; Petrella & Lappin, 2004; TTR, 2006). Rather, they look up information about travel modes they are familiar with and have access to (Van der Horst, 2006). This finding implies that the potential of a modal shift from car to public transport due to travel information use might be limited.

Overall, it seems that persons who are less likely to be aware of or use travel information are: women, older people, lowly educated persons, and persons on a low income. For leisure trips (e.g. visiting a cinema) and shopping trips travel information is less often consulted (Petrella & Lappin, 2004; MORI, 2006; TTR, 2006). Thus, whether travel information is obtained depends on characteristics of both the traveller and the trip. Related to lifestyle and travel needs, certain types of people are less likely to use (certain types of) travel information services. Additionally, only for a small segment of all journeys travel information is likely to be consulted (Peirce & Lappin, 2004; Lyons, 2006).

However, life style, sociodemographics, and trip context do not sufficiently explain why some people use travel information for their journeys and others do not. Even among people with the same sociodemographic characteristics and lifestyles a very different use of travel information could exist, ranging from infrequent to frequent use. As mentioned before, this might be the case because sociodemographics often are proxies for underlying behavioural and attitudinal characteristics of individuals. As will be shown later on, a social-psychological approach takes these characteristics into account.

Common approaches to explain travel information use

Several perspectives on travel information acquisition, such as maximizing and satisficing decision strategies, have in common that they frame travel information use as a cost-benefit decision (Chorus et al., 2006b). Maximizing refers to finding and choosing the best alternative available, while satisficing occurs when individuals look for and choose alternatives that are good enough, rather than the best possible (e.g., Ben-Akiva & Lerman, 1985; Johnson & Raab, 2003). The effort/accuracy perspective states that both of these decision strategies might be valuable to adopt, depending on the type of individual and context (Payne et al., 1996; Chu & Spires, 2003). Based on a trade-off of the perceived effort and accuracy of various decision strategies, individuals will consider which decision strategy they want to use. In their consideration, they might want to minimize anticipated regret (Chorus et al., 2006a). For maximizers, regret means that the alternative they choose turns out to be not the best alternative available. For satisficers, regret means that the chosen alternative is not satisfactory.

The perceived value of travel information depends, among other things, on its perceived potential to reduce this anticipated regret (ibid). It also depends on the availability of attractive alternatives,

the quality of the travel information, and the perceived level of knowledge individuals have about their travel options (Emmerink et al., 1996; Petrella & Lappin, 2004; Chorus et al., 2006a). Only when individuals feel that their current knowledge is insufficient to make the right choice are they likely to consult travel information. Thus, perceived knowledge levels might be an important barrier to travel information use. The higher individuals perceive their knowledge level to be, the less likely they are to consult travel information.

Finally, another perspective that might explain travel information non-use looks predominantly at habit (e.g., Verplanken et al, 1997; Aarts & Dijksterhuis, 2000; Fujii & Kitamura, 2003; Gärling & Axhausen, 2003; Kenyon & Lyons, 2003). A habit is a learned act that becomes an automatic response to a situation and can be functional in obtaining certain goals (Verplanken et al, 1997). Through habits, the search for information about alternative choices are minimized.

Most of the elements that have been discussed above are taken into account by adopting a social-psychological perspective to explain travel information use. How such a theoretical framework could be useful will be shown in the next section.

3. Theoretical framework

The Extended Model of Goal-directed Behaviour (EMGB)

The Extended Model of Goal-directed Behaviour (EMGB[2]) has its roots in attitude theory, more specifically in the Theory of Planned Behaviour (TPB) (Ajzen, 1991). This theory states that intention is a direct determinant of behaviour and that intention in its turn is determined by attitudes towards the behaviour, subjective norms, and perceived behavioural control. These psychological constructs will be clarified later on. In the course of time, several researchers have sought to extend the TPB by introducing new predictors of intentions and, in turn, behaviour. For example, the TPB does not consider the interaction between goal and behaviour, because it assumes that the influence of goals on behaviour is fully mediated by other psychological constructs (Perugini & Conner, 2000). However, a goal can be realised in various ways through performing different behaviours. For example, if your goal is to reach a certain destination, there are probably various ways you could get there (e.g., by car or public transport). Therefore, a distinction between goal and behaviour is needed, as well as their simultaneous analysis (ibid).

The EMBG is premised on the notion that the choice of behaviours is based on utilitarian considerations (Perugini and Conner, 2000). Behaviours are assumed to be selected because of their usefulness in achieving a goal. Thus, this social-psychological approach resembles the mainstream approaches to travel information use described earlier which frame it as a cost-benefit decision. If the behaviour is important in itself (that is to say, if it is an end in itself and not a means to an end), considerations related to pleasantness or ease could be more important in selecting a certain behaviour than utilitarian considerations. For example, one could travel for the sake of travelling itself, like walking or cycling for recreational purposes rather than for reaching a particular destination. However, most people who travel do so to fulfil certain needs by performing activities at their destination. It is fairly unlikely that a person will consult travel information as an end in itself. Therefore, it is plausible to assume that people who consider using travel information will do so out of utilitarian considerations to reach a certain goal. People can have all sorts of goals in life which can vary from concrete goals, such as making a journey to meet friends, to higher level ends, such as a feeling of wellbeing acquired by socializing. It is important to note that behaviour in this paper refers to travel information use (encompassing seeking, finding, and consulting travel information), rather than to travel behaviour itself, such as mode or route choice and journey execution.

[2] The EMGB extends the Model of Goal-directed Behaviour (MGB) by adding goal-related variables to the model (Perugini and Conner, 2000).

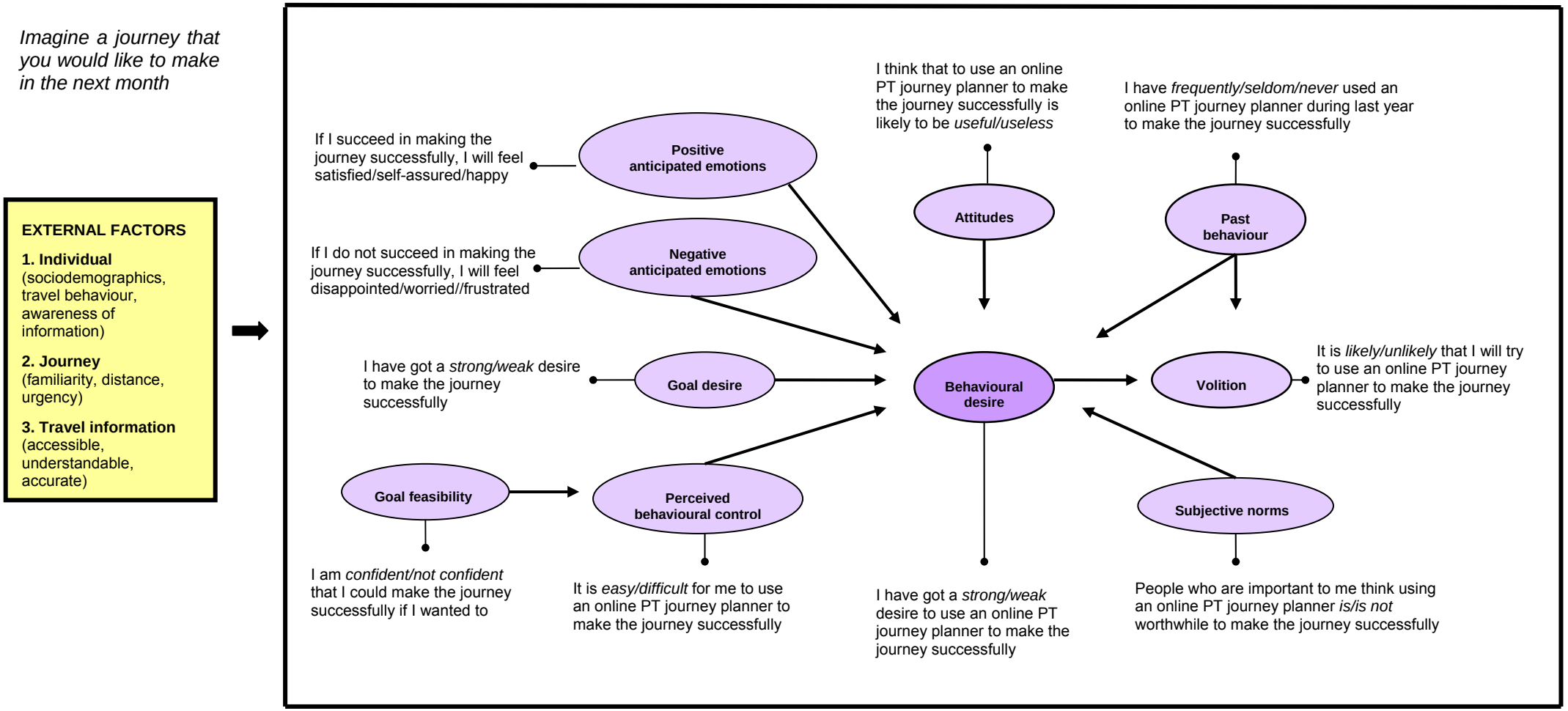

Figure 4 The Extended Model of Goal-directed Behaviour (EMGB) (Perugini & Conner, 2000) expanded with external factors and applied to travel information (non-)use

In order to demonstrate how the EMGB might be useful in explaining travel information (non-)use, the construct of the model will be examined with reference to an example which deals with the pre-trip (non-)use[3] of an online public transport journey planning service. The questions that need to be resolved are what type of people are less likely to use an online public transport journey planner to help them make their journeys and why. For now, any type of journey can be kept in mind that one wants to make within the next month. As will be explained later on, the travel context (including journey characteristics) might also play an important role in the level of people's use of an online public transport journey planner. In the next subsections the EMGB (see Figure 4) will be applied using this example, after defining each variable.

Goal desire, behavioural desire, and volition

Goal desire refers to the strength of an action's end state or the personal value that is attached to a certain goal outcome. In this example, goal desire refers to the value you attach to making a certain journey successfully. The definition of making the journey 'successfully' will differ per journey and per individual. For some, it might mean the journey is conducted cheaply, whereas for others it might mean the journey is made quickly, or comfortably, or by a combination of all these (or other) factors. Not getting lost or reaching the destination with little mental effort might also be examples of a 'successful' journey completion. The level of goal desire to make the journey successfully can vary from weak to strong. For example, two persons might both want to make the journey quickly, but the value they attach to this might differ.

Goal desire affects the *behavioural desire* to use an online public transport (PT) journey planner to make the journey successfully[4]. Behavioural desire is a crucial construct in the EMGB and defined by Perugini and Conner (2000, 706) as: "…the motivational state of mind wherein appraisals and reasons to act are transformed into a motivation to do so." Since behavioural desire directly affects the intention to act, it is important to know what influences this, which is the reason for applying the EMGB to the problem of understanding the (non-)use of travel information.

The EMGB uses a wider definition of intention, namely *volition*. It encompasses a direct assertion of one's intention, an expression of commitment and of effort needed to enact the behaviour, and a statement of engagement in plans to perform instrumental acts in the service of goal pursuit (Perugini and Conner, 2000). This means that the concept of volition explicitly adds to intention the dimensions of making time and effort, and of planning. If your behavioural desire to use an online PT journey planner is weak, your volition to use it will also be weak. This ultimately might lead to the journey being made without using such a planner. The next subsections will describe how various psychological constructs could have a positive or a negative effect on behavioural desire and, thus, on volition. A weak or strong volition to use an online PT journey planner in order to find out how to make the journey will affect the actual level of travel information use.

Goal feasibility, perceived behavioural control, and anticipated emotions

Goal feasibility is defined as the ease or difficulty of reaching the end state. In this example, it is about how easy or difficult you think it will be to complete the journey such that it is deemed successful. As mentioned before, in this example, 'successful' is taken to encapsulate the range of individual interpretations of what a successful journey might be. It is the only construct in the EMGB that does not affect behavioural desire directly.

Goal feasibility affects *perceived behavioural control,* which stands for the confidence an individual has to undertake a particular behaviour in a particular situation. However, the relationship between goal feasibility and perceived behavioural control (and, ultimately, behavioural desire) is not very clear for travel information use. Even if you are not confident that you could make the journey successfully, you might find it easy to use an online PT journey planner. Nevertheless, the way

[3] Either with the purpose of generating new travel alternatives (e.g., train, coach, bus) or assessing characteristics of known alternatives.

[4] Note that we have taken an online PT journey planner as an example and that people's behavioural desire to use this form of travel information might differ from, for example, a telephone PT information service, or from other travel information services that are available online. The type of information that is being consulted (e.g., about mode or timing) could also be taken into account. However, the level of preciseness does not matter for demonstrating the build of the model.

perceived behavioural control relates to behavioural desire and volition is as the EMGB predicts: the less confidence one has in performing a certain behaviour in a certain situation, the less willing one is to actually perform that behaviour. For example, if you think it will be difficult to use an online PT journey planner to make the journey, this will negatively affect your willingness, intention, effort, and plans to use it.

Anticipated emotions represent positive or negative emotions in respectively achieving or not-achieving a certain goal for which the behaviour is instrumental. They are goal-related variables, since they express how people would feel if they achieve their goal or fail to do so. If not making the journey successfully would cause you to feel disappointed or worried, you are more likely to use an online PT journey planner - you may apply more effort to ensure that you can make the journey successfully. Similarly, if making the journey successfully would cause you to feel happy, this may positively affect your behavioural desire and volition to use an online PT journey planner. However, if you would not care very much about making the journey successfully (i.e., you would not feel particularly happy if you succeeded or particularly unhappy if you failed), your behavioural desire to use an online PT journey planner to make the journey successfully would be weak. Thus, the weaker the emotions you think you will experience if you make the journey successfully or not, the weaker your behavioural desire and, ultimately, volition to use an online PT journey planner. As will be discussed later on, various external factors could influence this relationship.

Subjective norms, attitudes, and past behaviour

Subjective norms is defined as the perceived social pressure exerted by important others, such as family and good friends, to perform or not to perform a behaviour. For example, if your family thinks it is useful to consult an online PT journey planner you might be more willing to do so. However, if they think that consulting an online PT journey planner is unreliable and useless, you might be less inclined to use it to make the journey.

Attitudes are tendencies to evaluate an entity with some degree of favour or disfavour, which disposes a person to behave in a certain way towards it (Eagly & Chaiken, 1993). If you think that using an online PT journey planner to make the journey will be useless or ineffective, you are less willing to consult it than when you think it might be useful and effective.

Finally, *past behaviour* refers to the number of times in the past a particular behaviour has been performed. The more often it has been performed (implying a known degree of success in doing so), the more likely an individual is willing to execute the behaviour again. For example, if you have used an online PT journey planner successfully in the past to make the journey, you are more likely to do so again. However, if you have never used an online PT journey planner before, it is less likely that you will do so this time. The concept of past behaviour is limited to the behaviour under study, which is in this example using an online PT journey planner. It does not encompass the level of experience with travel information services in general.

Limitations of the EMGB: the need to introduce external factors

Although the EMGB might prove to be a useful model in explaining travel information (non-)use, it has a few limitations. First, it assumes implicitly that the psychological mechanisms work in the same way for every individual across different geographical and social contexts. However, external and internal constraints could affect these mechanisms by constricting the opportunity set and moulding the formation of preferences. For example, someone who does not have Internet access at home may be less willing to use an online PT journey planner compared to someone who does have Internet access at home. Thus, intentions are only partly explained, since a conceptualisation of the constraints within which intentions and behaviour occur is largely omitted in attitude theory. Constraints could, however, play an important part in an individual's choice process. Therefore, it is important to add external factors to the EMGB.

Empirical research has shown that adding external variables such as sociodemographics, residential area, ownership of technical means, skills, and personality traits have an impact on the antecedents of behavioural desire and volition such as subjective norms, perceived behavioural control, and past behaviour (Farag, 2006). Important external factors could be the quality of travel information and the perceived level of knowledge about travel options (e.g., these might affect attitudes), or the means to access information, such as Internet access (e.g., this might affect perceived behavioural control). Also, arrival time-sensitive trips might affect anticipated emotions. Other important external factors might be: experience with travel information services in general, journey characteristics (e.g., familiarity, urgency, and distance), and the frequency of public

transport use. In Figure 4 only three types of external factors are mentioned (related to the individual, journey, and travel information), but there can be more.

Expanding the EMGB with external factors, when empirical data are gathered to apply the model, makes it possible to 'trace' via which psychological constructs these factors affect the desire to use travel information or not. For example, if men are more likely to use travel information than women, this might be because of their attitudes, their past behaviour, their perceived behavioural control, or because of a combination of all three. Thus, more insight is gained into why people with certain sociodemographic characteristics, or under certain journey circumstances, are less likely to consult travel information.

Another limitation of the EMGB (related to the one mentioned above) is that it does not account for the fact that individuals' behavioural desire can also be determined by other behavioural options available to them. This means that the psychological mechanisms might not be primarily responsible for people's travel information (non-)use, but the alternative options they have with which they can also meet their goal desire may be instead (for example, making the journey by car or finding out about public transport from other offline sources such as word-of-mouth or a telephone service). Behavioural desire is probably affected by the number of behavioural choices that are available. Again, by incorporating relevant external factors into the model this can be taken into account.

Despite its limitations, an important benefit of the EMGB is that it integrates and extends various concepts that have been used in other approaches explaining travel information use. For example, anticipated emotions extend the notion of minimizing expected regret (Chorus et al., 2006b). This notion does not take explicitly people's goals into account. The EMGB integrates important psychological constructs into one coherent framework, thereby providing a more complete view on decision-making. For example, an individual could have a strong desire to make a certain journey, but have little prior experience with consulting online travel information services and perceive using them as difficult. However, he or she might have at the same time positive attitudes towards such services, and a good friend or partner that recommends using them. How the 'scores' on these various concepts ultimately balance out (towards using or not using an online travel information service) will differ per individual.

4. Conclusions

Although recent developments in travel information provision and availability have been extensive, the level of use of information services suggests that many people are still failing to take advantage of them to better inform their travel choices. Various barriers to travel information use (e.g., quality of information, awareness, habit, trust) have been identified, but what remains unclear is their *relative* importance and how they act *together*. This paper has demonstrated how the Extended Model of Goal-directed Behaviour (EMGB) (Perugini & Conner, 2000) might be a useful approach to explain travel information (non-)use.

However, the EMGB lacks a conceptualisation of the constraints within which intentions and behaviour occur. Consequently, it is important to add external factors (e.g. quality of information provision, Internet access) that could act as constraints on behaviour. An important external factor might be car ownership. Empirical research that has been carried out in the Netherlands found that owning more than one car reduces the tendency to search pre-trip public transport information for recreational trips (Van der Horst, 2006).

Nevertheless, the strength of the EMGB is that it could provide more insight into why these car owners are less likely to consult travel information. Is it mainly because they have more negative attitudes towards travel information use compared to others, do they have less experience with using travel information, or do they experience more social pressure to use their cars? Perhaps the answer would be a combination of all these factors, in which case analysis could show which relationships are the strongest.

Several implications of applying a social-psychological approach such as the EMGB to travel information use can be distinguished for future research. First, it shows the need for understanding people's travel goals. If more importance is attached to a certain goal, this might positively influence people's motivation to use travel information. The plausibility of this assumption is illustrated by the fact that people often use travel information for arrival time-sensitive trips (Emmerink et al., 1996; Peirce & Lappin, 2004; TTR, 2006). Related to this, a second implication is to address the unrealised potential of travel information use by distinguishing several types of journeys that might be both important to people and where travel information use might be beneficial. For example, unfamiliar trips are a small, but important segment of people's journeys, as people are likely to prepare them by consulting travel information (Lyons, 2006). A third implication is that future research should address the travel information (non-)use of various types of persons, since different people have different goals. Even people with the same sociodemographic characteristics that face similar trip contexts (e.g. business travel) can make very different decisions regarding the acquisition of travel information. Individuals belonging to one particular population segment (e.g., business travellers, students) could be compared with each other, in order to assess why some use travel information more often than others, despite the same social and geographical background.

More insight is needed in the behavioural determinants of travel information use, if the current level of such use is to be increased. Expanded with external factors, the EMGB could be a powerful theoretical framework to explain travel information (non-)use, since it takes behavioural and attitudinal factors explicitly into account.

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