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Title: Motivating the use of real-time multimodal travel planners: the role of users value, technophile and community resilience

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Abstrakt

Advanced traveler Information systems (ATIS) have the potential to improve travel experience, enhance personal mobility and productivity, since they allow travelers to make better informed travel decisions. However, understanding the motivators underlying individuals' intentions to use the system is essential to evaluate the effectiveness of this solution for promoting sustainable travel trends. The aim of this paper is to find the drivers that influence decisions in using such systems on an individual level. Perceived values developed by using the new system, technophile and community resilience constructs are incorporated in the framework in order to better explain user-sided heterogeneity observed in individual behavior. The case-study focuses on a new ATIS in Copenhagen. It questions 822 Danish citizens by distributing a technology-use preference survey. Structural equation models revealed that the drivers are specific to individual users and depends on wide ranging factors that go above traditional economic and socio-demographic methods. The results show a) different value dimensions perceived by individuals for the new information system and different effects on its adoption b) a relation between different community resilience constructs and value dimensions c) a stronger appeal of using the system to individuals who are technophile and value the usefulness of the new information system to increase trip efficiency.

1. Case study

A new advanced real-time multimodal travel planners, we called it "iGo", is under investigation for Copenhagen traffic management enhancement. The idea behind the system is to integrate traffic information

and journey planning to include all modes of transport. This system will incorporate real-time information about traffic, congestion, available car parking spaces, as well as weather, air pollution etc. Among the functionalities on the new multi-modal travel planner are: real-time information including all transport modes, parking information and payment integration, vocal guidance, bicycle and parking real-time availability and advance booking possibilities. Furthermore, "iGo" provides the users with information about CO2 emissions produced/saved by taking different travel options and the amount of calories burnt by taking active modes. It is also possible to monitor CO2 savings and calorie performances over time. "iGo" enables its users for registration to an environmental friendly loyalty program: "the more environmental-friendly itinerary they take, the more bonus points they earn". The collected bonus points and travel information could be shared on social media. For the registration, people need to create a user account, provide the system with some personal information, and allow the system to record their travel behavior.
The solution is envisioned to create a better transportation experience for users through intrinsic value. The value could be classified into three categories: "BE BETTER" –by increasing the trip efficiency in terms of travel time, travel cost and time/effort to look for information, "DO BETTER"- by promoting more environmental friendly travel behaviour and "FEEL & LOOK BETTER" – by sharing travel information as symbols to communicate meanings about themselves to others and gaining social recognition. To the City of Copenhagen, the new system will provide a better traffic and pollution monitoring and forecast information and a future possibility to implement traffic management rules to reduce congestion and pollution. The implementation of the new system is also anticipated to support a larger adoption of sustainable mobility choices by urban travellers.

2. Research objectives and theoretical framework

A deeper understanding of individual's tendency to use and consult with ATIS is a main contribution to develop these systems and consequently to promote change to sustainable mobility decisions, behaviourally. The present study aims at identifying the driving forces behind individual decision to use a travel planner in which nudge principals are integrated. We look through the lens of psychology and social science to understand individuals' attitudes, values or motivation towards the acceptance and usage of "iGo". We argue that individual motives including perceived values developed by using the system and technophile attitude as well as the social dynamic outside the system condition are important determinants for its acceptance and adoption. The main contribution of this study is to better explain user-sided heterogeneity observed in individual behaviour, and to effectively evaluate this technology for possible adoption. How ATIS have an influence is highly dependent on how users interface with the system. Noticeably, this process is not distinctly technological, but has a social dimension, which forces a socio-technical evaluation (Dickinson et al., 2015). Specifically, we focus on the question "how do user's perceived values, affinity to information systems, and social-institutional trust and place attachment affect the use of the new advanced real-time multimodal information system?"
Past research ascribes the effectiveness of ATIS on mobility behaviour to user specific inclination to accessing travel information. Searching for and acquiring new information is inhibited by habits (Kenyon and Lyons, 2003), thereby counteracting individual use of ATIS. There is a lack of understanding about which support travellers need for information due to, for instance, user-sided heterogeneity observed in individual mobility behaviour. We address this issue by investigating individual perceived value associated with using "iGo" for daily commute. We hypothesized that there are different dimensions of perceived values for using "iGo" (i.e. "BE BETTER", "DO BETTER" and "FEEL & LOOK BETTER") and each of them uniquely contribute to the explanation of its adoption
The concept of community resilience, originally developed by Leykin et al. (2013) for community disaster management, entails constructs about leadership, collective efficacy, preparedness and place attachment. Understanding the notion of community resilience could help in alleviating social-institutional trust barriers to technology use. We hypothesized that the community resilience plays a significant role in the adoption of the new information system.
Affinity for technology, hereafter technophile, can be critical for the marketing of the new information system and its future usage. Previous studies showed the potential target groups for technological innovations (e.g. electric bike and electric vehicles) are among people who are technophiles (Wolf &

Seebauer, 2014; Hackbarth & Madlener, 2016). Therefore, we also examined how technology affinity predicts the adoption of "iGo".

3. Methodological approach

A technology-use preference survey was designed to collect data for the analysis while translate the behavioural framework into a concrete framework that can be empirically validated. We collected the data in the greater Copenhagen area via academic, municipal and social networks targeting 658 people. The survey elicits various groups of explanatory variables. The first group consists of socio-economic information (e.g., age, gender, income, education, family status, and, place of residence) and current travel habits (e.g., habitual travel mode and travel information use habit). The second group comprises of the three distinct perceived values that motivate travellers to use "iGo" as well as technology-related self-concepts of technophile. The last groups contain the community resilience constructs after adapting it to the context of on-line travel information provision. The questionnaire items and the observed individual characteristics lead to the formulation of a structural equation model (SEM) to test the hypothesized behavioural framework.

4. Results

The results show that the three values of using "iGo" relate to use intention and their influence are situation dependent. It suggests that acceptance and use of such travel planner is associated not only with its functional value but also with psychological motives such as social interaction, enjoyment, normative etc. The specific results show that the value of "BE BETTER" is positively related to adoption intention and situational use (i.e. trip purposes), indicating functional usefulness as the fundamental value in adopting the new travel planner. Trip efficiency improvement appears to dominate the adoption intention indicating the importance of the functional values of the system for users' attraction and engagement. "FEEL & LOOK BETTER" and "DO BETTER" also frame and guide the use intention; however individuals are drawn to the corresponding motives depending on trip purpose.

The results also show that use intention and users' values correlate positively with stronger technophile. It suggests those people with higher affinity to information technology on one hand, perceive more important the values of "iGo" and on the other hand, are more likely to use the travel planner, clearly characterizing technophiles as the key target group of this new generation of travel information systems. However, the system attributes and functionalities should be designed aligned to the needs of both groups of technophiles and technophobes. On one hand, the entry threshold for unwilling users should be lowered (e.g. easy and understandable feature design) and on the other hand, tech-lovers should be appealed (e.g. providing the possibility of participatory design).

The results support that institutional-social trust and place attachment, as the social dynamic behind the system, influence on users' attitude and behavior. It indicates that public engagement is important in ensuring the success of the system implementation. It is essential to develop a meaningful dialogue between decision makers and the public as to create its public acceptance. The public dialogue should be rest on – and accompanied by – a robust communication strategy to understand citizens travel needs and expectations, clarify the need for change in their travel behavior and underscore the importance of their contribution.

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