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

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Abstract

A new advanced real-time multimodal travel planners (RMTP) is under development 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. The system will draw information directly from all relevant traffic providers and authorities, and integrate them on one platform. Among the functionalities on the new multi-modal travel planner are: real-time information including all transport modes, parking information and payment integration, integration of CO2 emissions data, registration option to create a customized account with preferred travel plans, vocal guidance, loyalty program and bonus based on environmental factor, bicycle and parking real-time availability and advance booking possibilities.

The solution is envisioned to create a better transportation experience for users through intrinsic value. The value could be classified into three categories: "DO & FEEL BETTER" –by increasing the trip efficiency in terms of travel time, travel cost and time/effort to look for information, "BE BETTER"- by promoting more environmental friendly travel behavior and "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 travelers.

This study focuses on socio-ecological motivators for RMTP use. Specifically, we focus on the question "how do user's personal values, affinity to information systems and social-institutional trust affect the use of the advanced real-time multimodal information system?"

Since RMTP enables sharing information related to environmental friendly behavior and gaining rewards (i.e. bonus points, CO2 saved), the study considered its functionalities related to "LOOK BETTER" as symbolic attributes which reflect the (positive or negative) outcomes of the use of the system for one's (self-)identity and social status. Theories and research in social psychology, sociology and marketing suggest that products have symbolic attributes that are likely to affect their purchase and use (e.g., Belk's (1988) theory on the extended self; Dittmar's (1992) theory on the meaning of material possessions; Park et al.'s (1986) theory on brand concept management; Sirgy's (1986) self-congruity theory). We hypothesized that there are

different personal values regarding the use of travel information systems and each of them uniquely contribute to the prediction and 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 its adoption through their direct effect as well as on the personal values.

Affinity for or aversion to technology can be critical for the marketing of the new information system and its future usage. Therefore, we also examined how affinity to information and communication systems, hereafter technophile, predicts the adoption.

A technology-use preference survey was designed to collect data for the analysis while translate the behavioral 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 822 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 travelers to use the RMTP, namely "DO & FEEL BETTER" "BE BETTER "LOOK BETTER" concepts 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 results have shown that using RMTP relates positively with participants who are technophile, put more value and importance on the quality of the system for trip efficiency and show responsible behavior to involve in transport related local issues and community planning. A sample including people of different individual and travel characteristics showed how the perceived values largely cut across the demographics, home and work place locations, commute characteristics, travel and information use habits.

The results have shown that search time/effort, travel time and cost savings are the motivational factors driving commuters to use RMTP. These motivations relates negatively to age, higher education and work place being in suburbs and rural locations rather Copenhagen. The results indicate a match between lifestyle and development of this personal value, namely older people and people with higher education, who work in suburban and rural locations, there is no perceived problems with congestion; develop weaker value of using the new system for trip efficiency.

The implementation of the system does not promote sustainable travel behavior in a daily basis by means of modal shift and the selection of greener travel modes. The ineffectiveness of RMTP to support modal shift can be attributed to strong habitual mobility behavior which hider modal shift. The information can play a role in shifting modes only if it becomes meaningful enough to provide users with significant reasons to break away from their routine.

Furthermore, the symbolic attributes of RMTP did not encourage the participants to use the system. The reasons could be several; arguably travel information sharing features of the system did not match the expectations of the participants (e.g. collected bonus points or CO2 saved are not of importance to others), the offered incentives were not of interest and, the perceived difficulties of using the system outweighed its perceived value (e.g. battery consumption due to running the app, loyalty program registration, privacy concern etc.).

The study aims at providing insights that help transport academics and policy makers appreciate the potentials and limitations of information provision as a means to support sustainable mobility in urban realm. Based on the main findings of this study, it appears that the strategy of "BE BETTERE" and "LOOK BETTER" may be optimistic for travel behavioral change and a larger adoption of sustainable mobility choices. The desired functionalities of the new system for travelers are search time/effort, travel time and cost savings, which influence its adoption. Thus, it is critical to address the relevant users' requirements. Traveling by different means of transportation places various requirements on the design of the system due to complex needs for information. The user requirements can be classified into general travel-related (e.g. temporal and spatial information), travel task-related (e.g. planning, purchasing a ticket or renting a vehicle), transport related (e.g. schedule information, possibility of bike and car sharing) and app-related (e.g. interface, user friendly). The future study could focus on identifying the users' requirement and tailoring the new system information content to the needs of specific target groups in order to increase acceptance among the population and its adoption.

***Key words*:** multi-modal travel planner; real-time information system; Symbolic motivation, community resilience.