Design considerations for a Mobility as a Service (MaaS) application – based on analysis of utility

Jisun Kim, Henrietta Howarth, Joy Richardson & John Preston

Transportation Research Group, University of Southampton, UK

SUMMARY

This study discusses how a MaaS app could be designed and optimised to maximise acceptance by users. Design considerations are suggested based on the analysis of the utility of eleven mobility apps for the general public focusing on the main content and features.

KEYWORDS

Mobility as a Service app, Interface design, Utility and User acceptance

Introduction

Mobility as a Service (MaaS) is an innovative mobility solution aiming to offer seamless transport. It suggests alternatives to private car use and encourages users towards more sustainable mobility decisions (Pangbourne et al. 2018). It was initially defined as a digital system that provides users with a comprehensive array of mobility services by transport operators (Heikkilä, 2014). It was further identified with the highlighted role of the interface: as a distribution model that suits users' travel needs by offering a tailored mobility package integrating various travel modes through a single interface (Hietanen, 2014). Employment of a single app was proposed as one of the core elements of MaaS along with technological integration for planning, booking, paying and provision of multi-modal real-time transport information (Arias-Molinares and García-Palomares, 2020). In this sense, developing a useful MaaS app that facilitates the full deployment of MaaS would be a precondition for successful roll out and uptake of MaaS (Davis, 1989). However, few studies have discussed how a MaaS app should be designed despite the importance of the role of the app in MaaS implementation. Hence, this study aims to address design considerations for developing and optimising the potential MaaS app. It pays particular attention to utility as it is a factor affecting usefulness alongside usability in the user experience area that may link to acceptance of the app (Nielsen, 2012). Utility is defined as the extent that the app assists users' tasks to achieve their main purposes (Hoehle and Venkatesh, 2015). It relates to whether the app has the feature the users need (Nielsen, 2012) and the content that is most relevant to them (Hoehle and Venkatesh, 2015). It was investigated by evaluating eleven mobility apps for the general public considering them as a decision support tool in the multi-modal trip context focusing on planning, booking and payment.

Method

Competitive benchmarking of the main content and features was done for eleven mobility apps available in the Southampton area. The decision to assess those apps was made as they will be the competitors of the MaaS app once launched in the region. Users are familiar with the content of the apps, thus their strengths and weaknesses were worth benchmarking. They contained a navigation app (Google Maps), bus apps (First Bus, Bluestar, Unilink), rail apps (National Rail Enquiries, Trainline, South Western Railway), e-scooter app (Voi), taxi apps (Uber, Cab My Ride) and an active travel app (Komoot). Analyses were conducted as follows. First, high-level content was identified by examining sitemaps comprised of the first level (main) and second level (secondary) content and features. Second, functionalities linked to route planning, booking and paying were evaluated. Lastly, strengths and weaknesses of the features were assessed in a comparative manner.

Initial results and recommendations

Results showed that information provided on most of the selected apps was not sufficient to support fully integrated multi-modal mobility services. Rather, they offered operator and/or mode specific mobility information. For example, they offered routing and booking/ticketing features for its own service (e.g., Unilink, Uber, Cab My Ride). Google Maps supplied higher level of multi-modal information that included public modes, cycling, driving and micromobility for routing, but it did not contain shared modes or ticketing feature. This showed the users' need to use several apps to resolve their information needs for door-to-door route planning, booking and paying. Route search results and ticket selection for purchase were not linked well on a few apps (e.g., Unilink, Bluestar, First Bus). This required users to remember the searched route and the fare zone to find a suitable ticket on a ticket selection screen. The Trainline app offered ticket splitting that suggested cheaper tickets which was not available on South Western Railway or National Rail Enquiries. Regarding instructions, Voi and First Bus apps suggested instructions on how to use the services.

Design considerations for the potential MaaS apps are as follows. For routing, full integration of all the modes (public, private, shared, micromobility, active travel) available in the area should be attained for complete end-to-end routing. Route search result screens should be designed carefully to help users find an optimal travel option while minimising complexity of information. For booking, assistance may be needed for ticket selection that helps reduce users' cognitive load to remember the planned route and to identify suitable options. Moreover, the app should be able to suggest economical tickets or bundles. For novice users, offering guidance on how to use the app at an early stage of MaaS launch could be helpful. A home screen comprising high-level content needs be designed to show important task-based menus to create entries to key functions to facilitate users' easy access to the main MaaS features, mental model construction about the app and more accurate anticipation about what will happen in response to their actions.

Impact

The findings of this study will contribute to the development and optimisation of the MaaS app with enhanced utility, usefulness, and in turn public uptake.

Acknowledgements

This study was funded by DfT as part of the Solent Future Transport Zone programme.

References

- Arias-Molinares, D. and García-Palomares, J.C., (2020). The Ws of MaaS: understanding mobility as a service from a literature review. IATSS research.
- Davis, F.D. (1989) 'Perceived usefulness, perceived ease of use, and user acceptance of information technology', MIS quarterly, pp. 319-340.
- Heikkilä, S. (2014) Mobility as a service-a proposal for action for the public administration, case Helsinki.
- Hietanen, S., 2014. Mobility as a Service. the new transport model, 12(2), pp.2-4.
- Hoehle, H. and Venkatesh, V., 2015. Mobile Application Usability. Mis Quarterly, 39(2), pp.435-472.
- Nielsen, J. (2012) Usability 101: Introduction to Usability Available at: https://www.nngroup.com/articles/usability-101-introduction-to-usability/ (Accessed: 10 Feb 2022)

Pangbourne, K., Stead, D., Mladenović, M. and Milakis, D., 2018. The case of mobility as a service: A critical reflection on challenges for urban transport and mobility governance. In Governance of the smart mobility transition. Emerald Publishing Limited.