



Konstantinos Kamargiannis, Dimitrios Pappelis, Simon Stebbins, Fangqing Song, Ioannis Tsouros, Francesca Fermi, Francesco Chirico, Davide Fiorello, Amalia Polydoropoulou, Athena Tsirimpa, Maria Kamargianni

**Advancing travel demand surveys using a new generation smartphone-based platform: Applications and users' experience**

**Results**

**INTRODUCTION**

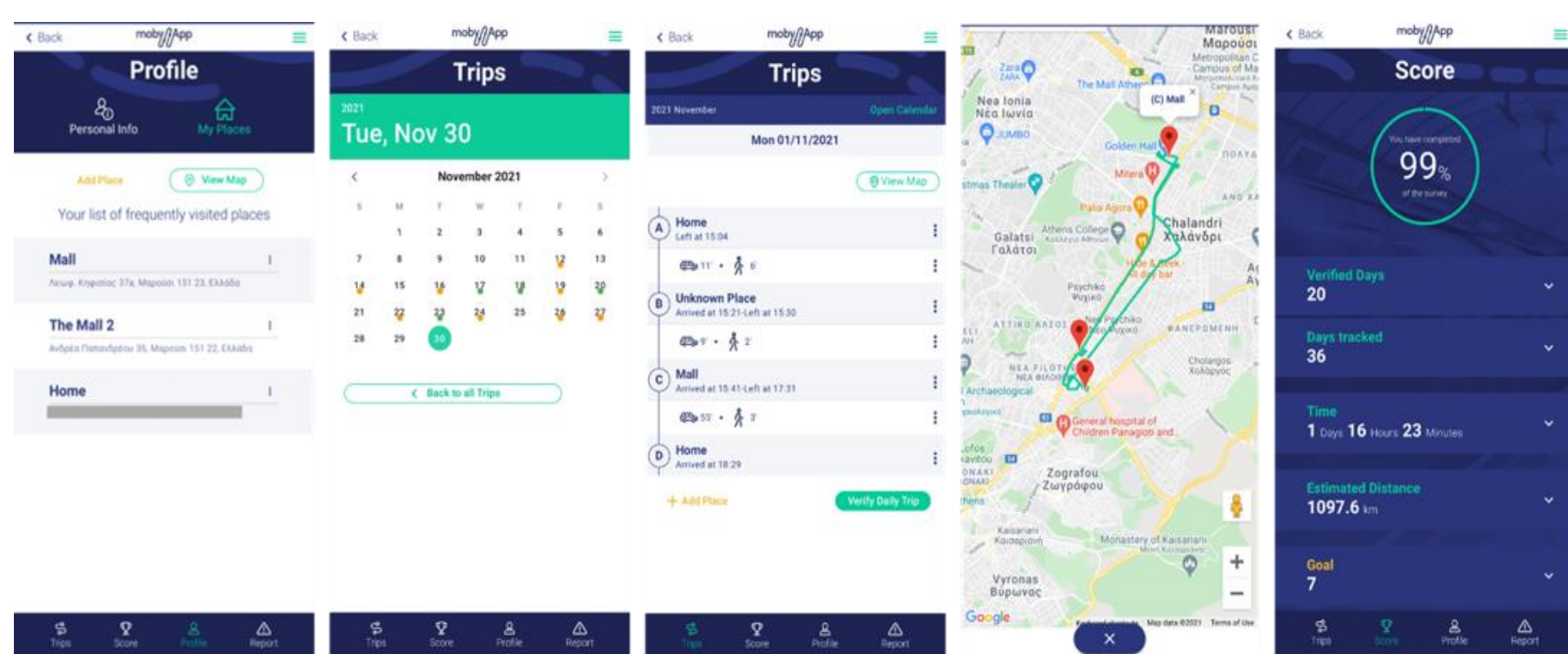
MobyApp was developed during the H2020-funded project HARMONY (N°815269). It is a survey platform designed to collect detailed multi-day data on travel and activity patterns for use in urban and transport planning, modelling, and analysis. At the same time, it can be further customised to explore consumer behaviour in different settings. It collects trips under-reported in travel demand surveys-especially multimodal trips & active transport trips. It can be personalised to the needs of any city to collect the travel demand data they need to prepare their SUMP. The platform also offers unique capabilities that personalise the context of the survey and questionnaires for each individual, making the collected data more accurate and precise.

Transport modes	Number of trip segments by mode (%)	Total travel time by mode	Activity	Origin activities	Destination Activities	Percentage (%)
Transport modes	Percentage (%)	Time used (h)	Home	4810	5278	33,87
Foot	41,51	3304,6	Work/Education	2561	2617	16,80
Bicycle	2,09	149,7	Meal/Restaurant	893	934	5,99
Scooter	0,03	2,3	Shopping	1171	1199	7,69
Motorcycle	0,31	31,2	Social engagement	758	833	5,35
Car/Van	41,40	4226,9	Recreation/Sports	383	411	2,64
Bus	1,74	161,0	Doctor/Medical	142	140	0,90
Taxi	0,00	0,0	Personal Errand/Task	477	501	3,22
Metro / Urban Rail	0,72	71,3	Pick up/Drop off	692	713	4,58
Intercity rail	0,26	42,5	Other	2816	2956	18,97
Running	0,59	0,0				
Still	11,34	0,0				
Airplane	0,00	0,0				

**MOBYAPP PLATFORM**

MobyApp platform consists of three key technology components: i) Admin App, which creates and sets up all the surveys based on the needs of the client; ii) Client App, which provides a survey management tool to those who organise the survey (the clients of MOBY X) to supervise the progress of the survey and check key statistics of the collected data via infographics; iii) Mobile App (Android and iOS) that collects raw data, such as GPS, GSM, Wi-Fi and accelerometer

Apart from the trip diary, the platform offers the opportunity to host ad-hoc questionnaires similarly to the travel demand surveys. The platform allows each questionnaire to retrieve information from the others, as well as tracked trip diary, thus generating a context that is customized to the behavior and reality of each participant. In this way, the context of the survey is personalized, while more precise and accurate data may be retrieved for transport planning purposes. The trip diary and the ad-hoc questionnaires are all linked to each individual's account and can be accessed via the smartphone app.



**FEEDBACK QUESTIONNAIRE**

After the completion of the main data collection, the users answered to a brief feedback questionnaire about of their experience on using MobyApp environment as a survey platform. From the 585 of the participants the 482 were responded. The results are presented in the bellow table:

Questions	Completely disagree (%)	Disagree (%)	Agree (%)	Completely agree (%)	Mean
I prefer the app-based format of this survey to traditional paper-based ones	9	14	50	28	2,96
I found the statistics for my mobility patterns in the app insightful	12	28	51	9	2,58
I found the tracking of my trips helpful for recording my travel diary	14	33	43	10	2,49
I found it easy to reply to the hypothetical questions	16	30	45	10	2,48
I was able to fully understand the tasks I was given to complete	10	22	52	17	2,77
I considered dropping out of the survey many times because of fatigue	20	33	35	12	2,38
The app support was prompt and helpful for any concern during the survey process	8	20	56	16	2,80
I noticed a significant change in the battery life of my smartphone while using the app	12	26	37	26	2,76
I am willing to participate in similar surveys if I am offered incentives	6	10	50	34	3,12
My overall experience of using the app for this survey was great	10	24	54	12	2,69

4-point Likert scale: 1= Completely disagree, ... 4= Completely agree

**DATA COLLECTION**

The data collection in Turin Functional Urban Area was conducted in February 2022 with the involvement of 585 individual participants. The sampling strategy that was followed for the passenger surveys in Turin was stratified. The minimum requirements of the survey were determined as follows: the participants have to track and verify their travel patterns for at least four days, while they are called to respond to two stated preference (SP) questionnaires.



**CONCLUSIONS**

MobyApp, utilised to collect revealed and stated preferences in Turin Functional Urban Area (Italy). The developed tool advances the experience of survey participants and decreases the response burden. At the same time, it offers the capability to researchers to design and launch a series of surveys in a personalised context and download the data in a format that reduces the data cleaning and handling time.

