




Mobility and Transport Digital Wallet

Pilot Evaluation and Validation (Final Report)

Distribution	Public
Contractual Date of Delivery	31-07-2016
Actual Date of Delivery	19-09-2016 (Revised: 04-11-2016)
Deliverable Number	D5.1.2
Deliverable Name	Pilot Evaluation and Validation (Final Report)
Version	V1.1
Number of Pages	86
WP/Task related to the document	WP5/T5.1
Author(s)	Davide Moroni, Marco Tampucci, Elena Renda, Andy Parkinson, Scott Davidson
Partner(s) Contributing	INDRA, UC, AY DE SANT, BANCO SANT, TST, INTECS, CNR, ALEPH, GEST, COM. FIRENZE, TTR, WEST MID, DNET, JGSP NOVISAD
Document ID	ID
	<i>MobiWallet-T5.1-D5.1.2- Pilot Evaluation and Validation (Final Report)-v1.0</i>
Abstract	This final deliverable includes the evaluation and validation of each of the pilots deployed in MobiWallet project. Having the overall

methodology being described in in the interim version D5.1.1, in this final document, we discuss and motivate the changes and the improvements that were made in this period and, more importantly, we analyse the data that were collected. Several instruments including balances scorecards, pre- and post- trials surveys and focus groups are used to evaluate each pilot from different perspectives. As already stated, although each pilot has its own specificities and deploys somewhat different technologies, the monitoring framework is global and permits to understand pros and cons of the heterogeneous solutions that were experimented during the project.

Executive Summary

Work Package 5 primary goal was to evaluate the impact of the project itself, assessing first the starting point, then monitoring month by month the changes on the travel and purchasing habits with respect to public transport services and, finally, measuring the project outcomes, looking at them from different perspectives. Such perspectives range from impact on users' and citizens' travel and ticket purchasing behaviours to success and awareness raised in operators, city representatives and stakeholders, from success of dissemination in communities of professionals to the interest raised by large scale uptake and exploitations plans.

To this end, this final deliverable of WP5 includes the evaluation and validation of each of the pilots deployed in MobiWallet project, following the solid methodology and the roadmap defined and described in the interim version D5.1.1. In particular, in this final document we discuss and motivate the changes and the improvements that were made in this period and, more importantly, we analyse the data that were collected.

Main monitoring of the pilots was achieved by balanced scorecards, keeping track of a number of Key Performance Indicators (KPIs) month by month. Whenever possible, common and relatively high level KPIs were used across the pilots to give the possibility of comparison. Common KPI have been complemented sometimes by specific, more technical KPIs at single national pilot level, in order to better track some features of each pilot. KPI trends as recorded by the balanced scorecards showed an increased performance of the pilots with respect to all perspectives taken into account, that is i) financial, ii) customer, iii) internal business process and iv) learning and growth.

Impact was assessed at several levels. The main ingredient was pre- and post- trial surveys conducted by all the pilots and involving globally hundreds of users. Such surveys permitted to establish mainly the willingness of people to shift from private vehicles to shared journeys and public transport. Further, they permitted to evaluate the habit in ticket purchasing and in appreciating the shift promoted by MobiWallet towards new technologies and paradigms for Integrated Fare Management (IFM) and travelling. In all the pilots, most of the users reported that MobiWallet improved the way they travel. Further, the use of mobile payments including apps, QR codes and SMS ticketing became wider from the pre- to the post-trial with users actually making the best use of the solutions provided by the pilots. Surveys were also able to highlight deficits, showing that there is room for improvement in all the pilots. Two main axes can be delineated with this respect. One regards tuning of the services (more user friendly interfaces, support for more mobile operating systems, ...), which only require more time but exhibits no technological barriers; the second is linked to the extension of the services to wider areas, involving more operators and providing more favourable fares in case of multimodal or multiple journeys. This second point requires more actors to be properly addressed than those currently available in the project (since other operators and stakeholders controlling fares are to be involved to extend the services and offer discount policies on integrated fares) and thus must be assessed after the project timeframe and, in case, in other future regional or European initiatives.

Dissemination activities have also been evaluated, analysing access statistics to the web site and to social network. Good success was recorded in reaching a community of professionals, with project presentations and project tweets reaching more than 10 thousand visualizations.

Process and policy evaluation was also carried out by online surveys and focus groups. While reporting general satisfaction of the project outcome, these groups were useful in providing more insight in understanding where to improve the pilots, how to propose the most interesting exploitation plans and in focusing the barriers that need to be addressed by future IFM projects. Indeed, globally, it was possible to delineate two key learnt lessons. First, a standard low commission mechanism for enabling international financial transactions between transport users of one country and public transport operators of another country is necessary to address cross-boundary frictionless travel. Secondly, the standardisation of data standards across Europe would significantly reduce the work required in developing API's to allow different fare management systems to communicate with each other. Such points are considered to be of crucial importance to give the possibility to future projects and actions to overcome the current inherent limits of IFM in Europe.

Finally, a number of attachments that evidence the planning of monitoring and evaluation activities, their execution and their findings complement and are integral part of this deliverable.

Table of Contents

EXECUTIVE SUMMARY	3
TABLE OF CONTENTS	5
TABLE OF FIGURES	8
TABLE OF TABLES	11
TABLE OF ACRONYMS	12
1 INTRODUCTION.....	13
1.1 SCOPE OF THE DOCUMENT	13
1.2 APPLICABLE AND REFERENCE DOCUMENTS	15
1.3 REVISION HISTORY	16
1.4 ATTACHMENTS.....	16
2 MONITORING THROUGH BALANCED SCORECARDS.....	18
2.1 BALANCED SCORECARDS.....	18
2.2 METHODOLOGY	18
2.2.1 <i>Spanish Pilot</i>	20
2.2.2 <i>Italian Pilot</i>	21
2.2.3 <i>Serbian Pilot</i>	23
2.2.4 <i>UK Pilot</i>	24
2.3 BALANCED SCORECARD EVALUATION.....	25
3 IMPACT EVALUATION.....	27
3.1 METHODOLOGY	27
3.2 APPROACH	27
3.3 BASELINE DATA	28

3.4	PRE-TRIAL AND POST-TRIAL SURVEY	28
3.4.1	<i>Survey methodology</i>	28
3.4.2	<i>Survey campaigns and timings</i>	29
3.4.3	<i>Results of the survey</i>	30
3.4.3.1	Survey in Spain	30
3.4.3.2	Survey in Italy	33
3.4.3.3	Survey in Serbia	39
3.4.3.4	Survey in UK	43
3.4.3.5	Global findings and discussion	44
3.5	EVALUATION OF DISSEMINATION.....	46
3.5.1	<i>Website</i>	47
3.5.2	<i>Social media</i>	50
3.5.3	<i>Newsletter</i>	55
3.5.4	<i>Other national dissemination activities</i>	55
3.5.4.1	Local initiatives in Spain	55
3.5.4.2	Local initiatives in Italy	60
3.5.4.3	Local initiatives in Serbia	64
3.5.4.4	Local initiatives in UK.....	72
4	PROCESS & POLICY EVALUATION	73
4.1	METHODOLOGY	73
4.2	APPROACH	74
4.2.1	<i>Project partners and wider technical team</i>	75
4.2.1.1	What worked well	75
4.2.1.2	What worked less well	75
4.2.2	<i>Transport operators and city representatives</i>	76
4.3	FOCUS GROUP ANALYSIS.....	77
4.3.1	<i>System Users</i>	77
4.3.1.1	Pilot involvement / awareness	77
4.3.1.2	User experience.....	78
4.3.1.3	Suggested improvements.....	78

4.3.1.4	Satisfaction levels	78
4.3.2	<i>City Representatives and Transport Operators</i>	78
4.3.2.1	Pilot evaluation.....	78
4.3.2.2	Lessons learnt.....	79
4.3.2.3	Satisfaction levels	79
4.3.2.4	Legacy.....	79
4.4	STRUCTURED SYMPOSIUM ANALYSIS.....	80
5	CONCLUSIONS AND DISCUSSION.....	83
6	REFERENCES	86

Table of Figures

Figure 1. Age distribution in the post-trial survey.....	31
Figure 2. Willingness to shift from private car to other transport modes according to Spanish pilot survey participants	31
Figure 3. According to post-trial survey, the most common trip lasts between 15 and 30 minutes....	32
Figure 4. According to the post-trial survey, MobiWallet bring an appreciable improvement to transport in Santander	33
Figure 5. Gender split is nearly optimal in post-trial questionnaire	34
Figure 6. Age distribution of Italian sample	34
Figure 7. Post-trial survey was also filled by 4 disabled people, at least one of them being visually-impaired,.....	35
Figure 8. Willingness of respondents to shift from car to other transport modes. More than one half of the people is willing to switch to bike	35
Figure 9. More than 75% of the survey respondents makes usual trips less than 30 minutes-long	36
Figure 10. Chart of principal difficulties encountered by respondents in the post-trial. Delays are the main concern, followed by insufficient comfort	37
Figure 11. Chart of most used payments in the post-trial. An increase of the use of apps was recorded from pre-trial to post-trial.	37
Figure 12. Use of payment technologies asked after the trial. QR codes, app on the smartphone and SMS were used respectively by 26%, 77% and 56% of respondents.	38
Figure 13. Overall improvement to travel experience thanks to MobiWallet	39
Figure 14. . Age distribution of Serbian sample set	40
Figure 15. Willingness of Serbian users to switch from car to alternative transport means, i.e. bus, car sharing and bicycle. Green denotes people strongly agreeing in changing.	41
Figure 16. Chart with distribution of travel times for Serbian respondents. Over 80% of the people take less than 30 minutes for their most common trip.....	41
Figure 17. Chart showing the use of payment technologies of Serbian pilot: QR code (first column), app on the smartphone (second column) and SMS (third column). Green represents yes, blue no and orange unsure.....	42
Figure 18. Access to MobiWallet Website statistics.....	47

Figure 19. Geographic access distribution 48

Figure 20. System statistic..... 49

Figure 21. Twitter analytics for impressions during September-October-November 2015 51

Figure 22. Twitter analytics for impressions during December 2015, January 2016 and February 2016
..... 51

Figure 23. Twitter analytics for impressions during March, April and May 2016 52

Figure 24. Twitter analytics for impression during June, July and August 2016 52

Figure 25. Analysis of MobiWallet followers' interests..... 53

Figure 26. Analysis of MobiWallet followers' origin 53

Figure 27. Views per month of MobiWallet presentations in SlideShare 54

Figure 28. Traffic that gave origin to visualization of MobiWallet presentations..... 54

Figure 29. SWIFT card video reached 1351 views at the time of writing..... 55

Figure 30. Sticker to identify MobiWallet vehicles 56

Figure 31. Facebook and Twitter account of MobiWallet Santander 56

Figure 32. Online Manual (<http://www.mobiwallet-project.eu/index.php?view=article&id=81>) 57

Figure 33. Volunteers in a workshop learning how to join and use the pilot 57

Figure 34. Santander City Council Web Page with information about the workshops..... 58

Figure 35. Tweet to advertise the workshops..... 58

Figure 36. Video broadcasted in the TV channel of all bus lines in Santander 59

Figure 37. Statistic of access to the Online Manual page of Spanish Pilot 59

Figure 38. One of the several emails written by volunteers to join the system 60

Figure 39. Number of likes featured in #mobiwith_it page. The number of likes has a strong peak at the beginning and then increased steadily without losing its impact (indeed, there are no negative values reported in the bottom chart) 61

Figure 40. Post showing Pisamo director, Pisa Mayor and the assessor to mobility inaugurating new bike sharing stations in Pisa. Bike sharing vouchers are one of the incentives made available by #mobiwith_it campaign..... 61

Figure 41. Post promoting the initiative and asking user to participate to the survey. A number of bikes were made available as prizes for users testing the system and letting the consortium know their opinion about the provided services..... 62

Figure 42. Tweet by Aleph promoting #mobiwith_it 62

Figure 43. Tweet by PisaBus promoting #mobiwith_it 63

Figure 44. Tweet by PisaBus promoting #mobiwith_it 63

Figure 45. Tweet by PisaBus promoting carpooling services made available by MobiWallet 64

Figure 46 Smart cities’ projects including MobiWallet initially promoted through the Totem “Smile of the City” on 29th December 2015 in the shopping Centre “BIG”. 65

Figure 47 Totem Smile of the City in Novi Sad promoting concept of Smart Cities and presenting active Smart Cities related projects (including MobiWallet) – Summer 2016 at Sport and Commercial Centre Vojvodina in Novi Sad..... 65

Figure 48 Various local dissemination activities organised by the City of Novi Sad and DunavNET 66

Figure 49 Smart cities workshop in Novi Sad presenting MobiWallet project in December 2015 66

Figure 50 Post about promotion of MobiWallet project at IoT Week in Belgrade in June 2016..... 67

Figure 51 Facebook posts promoting the Serbian pilot and parking service payment via mobile app. 68

Figure 52 Facebook posts promoting the latest novelties in MobiWallet app - Taxi service 68

Figure 53 Focus group with system users 69

Figure 54 Total number of Facebook likes 70

Figure 55 Post reach since starting the Facebook page 70

Figure 56 All published posts and statistics for each of them..... 71

Figure 57. Four elements of MobiWallet evaluation 83

Table of Tables

Table 1: MobiWallet objectives according to the DoW	14
Table 2: The four main elements in MobiWallet evaluation framework.....	14
Table 3: KPI grouping.....	19
Table 4. Spanish pilot KPI	20
Table 5. Italian pilot KPI.....	21
Table 6. Serbian pilot KPI.....	23
Table 7. UK pilot KPI	24
Table 8. Balanced scorecard analysis	25
Table 9. Phase 2 survey response rates	29
Table 10. Impact of MobiWallet on Objective 1	45
Table 11. Impact of MobiWallet on Objective 2	45
Table 12. Impact of MobiWallet on Objective 3	46
Table 13: Browser access statistics	48
Table 14: Geographic statistics.....	49
Table 15: Operating system statistics.....	49
Table 16. Statics about MobiWallet Newsletters.....	55
Table 17. Number of stakeholders from each audience group involved in each method of evaluation within each pilot	74
Table 18. Top three most successful aspects reported by each pilot.....	75
Table 19. Top three least successful aspects reported by each pilot.....	76
Table 20. Transport operators and city representative summary report	77
Table 21. Structured Symposium summary	80

Table of Acronyms

Acronym	Expanded form
API	Application Programming Interface
CMS	Content Management System
DoW	Description of Work
EU	European Union
FAT	Factory Acceptance Testing
IFM	Interoperable Fare Management
IFMS	Interoperable Fare Management System
IoT	Internet of Things
ISO	International Organization for Standardization
KPI	Key Performance Indicators
NFC	Near Field Communication
QR code	Quick Response code
SAT	Site Acceptance Testing
UK	United Kingdom
WP	Work Package

1 Introduction

1.1 Scope of the document

The main objective of Work Package 5 (WP5) is to evaluate & assess the data collected in the pilots undertaken in Work Package 4 (WP4). This document sets out an *integrated framework* for how this has been achieved and presents and analysis of the results.

Although MobiWallet is a complex project, with disparate technologies and approaches being tested and evaluated across 4 different European scenarios, a *common and shared methodology for evaluation* has been followed in order to appreciate the achievements of the target goals of the projects and to allow for comparison of the results.

In this way, the Consortium is able to get a neat and clear picture of the success and limits of the employed technologies, with reference to the local contexts and, in particular, user communities, regulatory aspects and stakeholder policies. The lesson learnt will be useful for exploitation and large take uptake actions also beyond the time frame of the project (as addressed in WP6) as well as in other European initiatives concerning sustainable mobility and integrated fare management.

The general objectives for WP5 are the following:

- To end up with an analysis which allow a detailed understanding of the effectiveness and potential for full-scale deployment in European cities of Interoperable Fare Management (IFM) systems and mobile payment solutions as those proposed by MobiWallet.
- To standardize the conclusions obtained across the four pilot sites.
- To review and assess the performance of each pilot whilst identifying best practices.
- To assess the most appropriate packages for the traveller (end user) of system features and modes as well as a definition of specific segments of the travelling population for whom IFM systems provide the most benefit.
- To understand wider stakeholder views on the process and impact of the trials – including operators, cities and technology companies.





To this end, WP5 also worked to monitor the tangible results foreseen in the project to give evidence of their achievements. As it was stated in the Description of Work (DoW), MobiWallet has indeed the following objectives (shown in Table 1):

Table 1: MobiWallet objectives according to the DoW

Objective	WP	Tangible expected result
O1	WP2	Definition of an interoperable framework based on the ISO24014 [8].
O2	WP3	Adaptation of technical solutions to the MobiWallet interoperable framework.
O3	WP4	Configuration and Deployment of four pilots.
O4	WP4	Providing a multimodal fare management service to a minimum of 700 European users across 4 countries.
O5	WP4	Involving at least 3 separate modes of travel per pilot.
O6	WP5	Mode-shift increase for users from private cars to public transport supported by the analysis of the evaluation transport and user data.
O7	WP5	Travel time reduction supported by the analysis of the evaluation transport and user data.
O8	WP5	Improved user satisfaction due to technological improvements supported by the analysis of the user evaluations.
O9	WP5	Test and validation of 4 different solutions for IFM.
O10	WP6	Dissemination of the Project at Local, Regional, National and European Level.

The monitoring and evaluation activities include for this reason a wide set of topics ranging from system functionalities to impact on users and stakeholders’ communities, from interoperability levels to achieved modal shift and efficiency of the multimodal fare management services. In MobiWallet evaluation framework (Attachment E) such topics have been organized and addressed by singling out four distinct elements (set out in the Table 2).

Table 2: The four main elements in MobiWallet evaluation framework

 MobiWallet	1	Testing of System Functionality Assessed in the first version of this document D5.1.1 [5]
 MobiWallet	2	Monitoring (Balanced Scorecards) Section 2 of this document
 MobiWallet	3	Impact Assessment Section 3 of this document
 MobiWallet	4	Process & Policy evaluation Section 4 of this document

This document, which is the second deliverable of Task 5.1, aims at covering the last three elements, by exploring each of them in detail within sections 2-4 of this report. The first element was instead assessed in the first version of this document D5.1.1 Pilot Evaluation and Validation (Interim Version) [5], when all the pilots were tuning their functionalities and testing them. To this end, system requirements were defined and test plan were prepared by each pilot following guidelines provided

by the evaluation team. The results of such Factory Acceptance Testing (FAT) and Site Acceptance Testing (SAT) were reported as summaries by each pilot and included as Attachments B, C, D, E of [5] for and a set of tests for Spain, UK, Italy and Serbia.

In this second version of the document, having all the pilots successfully entered the deployment phase and having collected a good number of users, we focus on other features of the project, related to the impact towards citizens, commuters and tourists as well as operators and city representatives. The solid approach that was delineated in D5.1.1 [5] was followed, with only slight revision and adaptation, which appeared to be beneficial during project execution for making optimal use of the available resources and of the limited timeframe available for trial. Indeed, the original framework evaluation & monitoring plan was revised (see Attachment E), making it lighter in some aspects but keeping the overall spirit. For instance, the number of trial phases was reduced from three to two, but the target sample sizes of the final phases have been kept of the same magnitude. In addition, an intermediate though-trial questionnaire has been dropped, so as to avoid to stress excessively the users with too many forms during the limited duration of the trial; nevertheless, the pre- and post-trial surveys were conducted with full-fledged questionnaires covering all the aspects needed for evaluation, thus retaining all the elements to draw the necessary conclusions about the pilot. In summary, few intermediate phases have been dropped from the original plan, but the most important final steps have been kept.

The document is organized as follows. In 2, the methodology behind the use of balanced scorecards for monitoring is recalled. The process of revision of original KPI is described and the collected data from all the pilots are discussed. Section 3 focuses on impact evaluation which has been achieved by several methods. The main ingredients were the survey filled by users both before trying the system functionalities (pre-trial survey) and afterwards (post-trial survey). The data collected are discussed by highlighting the findings of the analysis conducted by WP5. In addition, dissemination activities are also evaluated in this section, by taking into account analytics from MobiWallet web site and several social media, also considering the local initiatives towards general public conducted in summer 2016. Section 4 is devoted to process and policy evaluation and takes into account data collected e.g. through focus groups both with i) system users and ii) operators and city representatives. Such focus groups were organized and run by local evaluation leaders, following common guidelines provided by WP5 leader. Section 5 ends the document with conclusion and discussion of the achieved results.

1.2 Applicable and reference documents

This document refers to the following deliverables:

- MobiWallet-T3.1-T3.2-D3.1-INT-UCA-DELV-PilotServiceAdaptation-part1 [1]
- MobiWallet-T3.1-T3.2-D3.1-INT-UCA-DELV-PilotServiceAdaptation-part2 [2]
- MobiWallet-T3.1-T3.2-D3.1-INT-UCA-DELV-PilotServiceAdaptation-part3 [3]
- MobiWallet-T2.2-D2.2-DNET-DELV-MethodologyDefinition [4]
- MobiWallet Deliverable D5.1.1 – Pilot Evaluation and Validation (Interim Version) [5]
- MobiWallet-T6.2-D6.1.3-CNR-DELV-DisseminationPack [6]

1.3 Revision History

Version	Date	Author	Description
0.1	25/07/2016	CNR	Preliminary TOC
0.2	29/07/2016	CNR, TTR	Revised TOC and assignments
0.3	14/09/2016	CNR, TTR	Draft of Sections 3 and 4
0.4	15/09/2016	CNR	Minor revisions and improvements.
0.5	17/09/2016	CNR, TTR	Revised draft of Section 4. Draft of introduction, conclusions and executive summary. Draft of Section 2.
0.6	19/09/2016	TST, UC	Document review
1.0	19/09/2016	CNR	First release of the document
1.1	04/11/2016	CNR	Document revised according to the remarks received after the Final Project Review held in Santander on September 28, 2016

1.4 Attachments

A number of attachments that evidence and prove the evaluation activities and their final findings complement the deliverable.

In Section 2, Balance scorecards are reported as the main monitoring framework in MobiWallet and therefore it has been decided to attach the final evaluation of scorecards across the pilots (Attachment A).


In the framework of Section 3 on impact evaluation, the surveys that have been designed for pre-trial (Attachment B) and post-trial (Attachment C) in all their local variants are included. These two PDF documents contain the printout of the blank survey forms that were proposed to hundreds of users across the four pilots. The languages used are Spanish, Italian, Serbian and English. Some slight adaptation of the questionnaires to each pilot can be appreciated.


A further attachment is represented by the Focus group summary report (Attachment D) which collects the summaries provided by each local evaluation leader to the D5.1.2 team after running focus groups.


As in the case of the SAT/FAT tests collected for the interim version of this document, the style to be followed while reporting was left free to each local evaluation leader, being however some guidelines in handling and managing the focus group being provided in advance by TTR.


Finally, the last version of the internal document that was prepared as evaluation plan is attached as a reserved (Attachment E).


In the following tables, precise references to the attachments are provided.

Attachment ID	Attachment A
Title	Balanced Scorecards up to 31/08/2016
	MobiWallet-T5 1-D5 1 2- Attachment_A_Balanced Scorecards.zip

Attachment ID	Attachment B
Title	Pre Trial Survey (4 languages)
	MobiWallet-T5 1-D5 1 2- Attachment_B_Pre Trial Survey.pdf

Attachment ID	Attachment C
Title	Post Trial Survey (4 languages)
	MobiWallet-T5 1-D5 1 2- Attachment_C_Post Trial Survey.pdf

Attachment ID	Attachment D
Title	Focus group summary report
	MobiWallet-T5 1-D5 1 2- Attachment_D_FocusGroupReport.pdf

Attachment ID	Attachment E
Title	MobiWallet Evaluation Plan
	MobiWallet-T5 1-D5 1 1- Attachment_E_Evaluation Plan.pdf

2 Monitoring through Balanced Scorecards

Since its genesis, MobiWallet project was focused on the provision of objective, quantitative evaluation of the results the activities want to target. This was especially useful since disparate technologies are involved and a common methodology and platform was necessary for comparisons. In particular, KPIs were identified in the early stages of the project in D2.2 – Methodology [4]. KPIs formed the basis for the development of MobiWallet balanced scorecards, which in turn provided pilot sites with a process to measure and monitor changes through pilot execution. In section 2.1 we recall balanced scorecard framework. Then in 2.2 the methodology used in MobiWallet is described while Section 2.3 presents the results of scorecards analysis.

2.1 Balanced scorecards

Balanced Scorecards are strategy performance management tools - structured reports (in MobiWallet using Excel spreadsheets), that can be used to keep track of the execution of project activities. This allows project monitoring and provides a comparison on progress and impacts at the four different pilot sites.

More in detail, Balanced Scorecard is a planning and management system, which aligns business activities to the vision and strategy of organization. The performance is monitored against strategic goals. It was first published in 1992 by Kaplan and Norton and a book followed in 1996 [9]. This system considered the traditional performance measurement that only focuses on external accounting data as obsolete and its main aim is to provide 'balance' to the financial perspective.

The main ingredients of the MobiWallet balanced scorecards are represented by the Key Performance Indicators (KPI) detailed in D2.2 – Methodology and subsequently revised and improved, by making them more consistent and comparable across pilots. Such KPIs outline the measures that each pilot site has evaluated during pilot execution. Indeed, the standard template of balanced scorecards incorporates on row for each KPI to be measured, as well as separate columns to detail period reporting: this helps to define changes and improvements with ease.

2.2 Methodology

As explained in D2.2 [4], the KPI to be used during the pilot implementation process were chosen to be SMART i.e. Specific, Measurable, Action oriented, Realistic and Time bound. The KPIs for assessing the pilot performance were targeted at reflecting the goals and objectives of the pilot. Initially, it has been decided to have a number of KPI per pilot around 10 and 20 entries.

KPIs were grouped around four categories and with respect to four different perspectives as illustrated in Table 3.

Table 3: KPI grouping

Perspective	Generic Measurements
Financial	Return of Capital Employed, Economic Value Added, Sales Growth, Cash Flow
Customer	Customer Satisfaction, Retention, Acquisition, Profitability, Market Share
Internal Business Process	<p>Includes Measurements along the internal value chain for:</p> <p>Innovation – measures of how well the company identifies the customers’ future needs</p> <p>Operations – measures of quality, cycle time and costs</p> <p>Post sales service – measures of warranty, repair and treatment of defects and returns</p>
Learning and Growth	<p>Includes measurements for:</p> <p>People – employee retention, training, skills, morale</p> <p>Systems – measure of availability of critical real time information needed for front line employees</p>

In the interim version of this deliverable the plain KPI coming from D2.2 – Methodology Definition [4] were used to prepare the scorecards, which were collected on a two-monthly base since pilot deployment until November 2015. Afterwards, it has been realized that KPI had to be re-aligned among the pilots for optimal usage. Indeed, there were too many differences among the various pilots that make very difficult to compare their outcome. In addition, the language used was not uniform, leading to possible confusions. Therefore, a re-alignment process was scheduled and presented at the Second Review meeting held in Brussels in March 2016 and therein approved. The revision process took some time and eventually lead certainly to more uniform high-level and informative KPI among the pilots; each pilot was left free to increase the number of KPI by adding some specific parameters for tracking and monitoring its own peculiarities. For instance, since many kind of tickets are made available in the Italian pilot, the number of purchases through MobiWallet services of each kind of tickets was included. This was useful to assess the success of each single transport mode. Reviewing of the KPI had as drawback an increase in the effort spent by partners on this respect and some delays in the technical acquisition of the data. Nevertheless, all the partners were able to provide their scorecards (see Attachment A), sometimes with some measures being “non applicable” or “non measurable” during some periods.

2.2.1 Spanish Pilot

Current KPIs used in Spain are reported in Table 4.

Table 4. Spanish pilot KPI

Key Performance Indicators		Units	
Financial	F1	Number of tickets purchased	Number
	F2	Sales growth (per month, compared to previous month)	%
	F3	Total money transferred to operators	Local Currency
	F4	Number of top-ups of Virtual Wallets	
	F5	Total credit charged in Virtual Wallets	
Customer	C1	Number of registered users	Number
	C2	Number of active users	Number
	C3	Payment delays	%
	C5	Customer satisfaction	%
	C6	Number of disabled users registered	
Internal Business Process	I1	ISO24014 coverage/integration level	1 to 15 - 1 for each measure achieved
	I2	Service stability	%
	I3	Ticket fulfilment	%

	I4	Service up time	%
Learning & Growth	L1	Future needs and pilot enhancement	%
	L2	Customer confidence levels in using system in the future	%
	L3	Number of trainings done with transport operator	Number
	L4	Number of trainings / workshops done with users	Number

2.2.2 Italian Pilot

Current KPIs used in Italy are reported in Table 5.

Table 5. Italian pilot KPI

Key Performance Indicators			Units
Financial	F1	Number of tickets purchased and shared journeys	Number
	F2	Sales growth (per month, compared to previous month)	%
	F3	Total money transferred to operators	Euro
	F4	Number of tickets purchased in Florence for Public Transport	Number
	F5	Number of tickets purchased in Pisa for Public Transport	Number
	F6	Number of tickets purchased in Florence for Parking	Number
	F7	Number of shared journeys via car pooling	Number

Customer	C1	Number of registered users	Number
	C2	Number of active users	Number
	C3	Payment delays	%
	C4	Customer satisfaction	%
	C5	Customer satisfaction in using Pisa Bus app	1 (Poor) to 5 (Good)
	C6	Customer satisfaction in using Mobitickt app for bus	1 (Poor) to 5 (Good)
	C7	Customer satisfaction in using Mobitickt app for parking	1 (Poor) to 5 (Good)
Internal Business Process	I1	ISO24014 coverage/integration level	1 to 15 - 1 for each measure achieved
	I2	Service stability	Number of crashes
	I3	Ticket fulfilment	%
	I4	Service up time	%
Learning & Growth	L1	Future needs and pilot enhancement*	%
	L2	Customer confidence levels in using system in the future	%
	L3	Number of trainings done with transport operator	Number
	L4	Number of trainings / workshops done with users	Number

2.2.3 Serbian Pilot

Current KPIs used in Serbia are reported Table 6.

Table 6. Serbian pilot KPI

Key Performance Indicators			Units
Financial	F1	Number of tickets purchased	Number
	F2	Sales growth (per month, compared to previous month)	%
	F3	Total money transferred to operators	Local Currency
Customer	C1	Number of registered users	Number
	C2	Number of active users	Number
	C3	Payment delays	%
	C5	Customer satisfaction	%
Internal Business Process	I1	ISO24014 coverage/integration level	1 to 15 - 1 for each measure achieved
	I2	Service stability	%
	I3	Ticket fulfilment	%
	I4	Service up time	%
Learning & Growth	L1	Future needs and pilot enhancement	%
	L2	Customer confidence levels in using system in the future	%

	L3	Number of trainings done with transport operator	Number
	L4	Number of trainings / workshops done with users	Number

2.2.4 UK Pilot

Current KPIs used in Spain are reported Table 7.

Table 7. UK pilot KPI

KPI		Units	
Financial	F1	Number of tickets purchased through remote fulfilment	Number
	F2	Sales growth (per month, compared to previous month)	%
	F3	Total money transferred to operators	£
Customer	C1	Number of registered users - total registered swift users	Number
	C2	Number of active users	Number
	C3	Payment delays	%
	C5	Customer satisfaction	%
Internal Business Process	I1	ISO24014 coverage/integration level	1 to 15 - 1 for each measure achieved
	I2	Service stability	%
	I3	Ticket fulfilment	%
	I4	Service up time	%
Learnin	L1	Future needs and pilot enhancement	%

L2	Customer confidence levels in using system in the future	%
L3	Number of trainings done with transport operator	Number
L4	Number of trainings / workshops done with users	Number

2.3 Balanced scorecard evaluation

We summarize and discuss the findings of balanced scorecards evaluation in the following table. The data that lead to this analysis were drawn from Attachment A.

Table 8. Balanced scorecard analysis

Main findings of balanced scorecards analysis and comparison	
-	It is important to note that the KPIs selected for this project could not be universally monitored for all of the four projects. This reflects the challenges and barriers that each pilot faced during the project and also, the different nature of how each pilot city approached the project, both in terms of the technology that was implemented and the level that each city was at in terms of their experience in the smart ticketing field (i.e. Centro had already got a smartcard (Swift card) before they joined the MobiWallet consortium).
-	As MobiWallet technology was implemented, a noticeable and gradual increase across pilots was witnessed. Overall, 45,699 validations or tickets were purchased throughout the MobiWallet project. This number is distorted by the UK who already has a well-established smartcard ticketing scheme and it is unclear from the data available from the UK of what impact the NFC technology / best fare selector engine has had in terms of an increase in overall sales. This is due to a third party holding the key data and who are proving to be challenging partners for Centro in terms of their willingness to share data. Taking the UK out of the picture (who had 43,994 validations), then the three other pilots had 810 (Spain), 684 (Italy) and 411 (Serbia) validations in total, which means that on average, 3,6 validations for each active users were done inside the three pilots.
-	The number of registered users across three pilots totals 806 and the number of active users totals 534. In particular, 70 users were enrolled in Spain, of which 54 have been active (77%). Italy had 510 registered users, of which 254 were active (49.8%). Serbia featured 226 users, all of them being active (100%). Data for the UK is missing.
-	The average score of ISO 24014 coverage/integration across the four pilots is 12 out of 15. This suggests that interoperability is high but there is still room for pilot enhancement,

which is reflected by an average score of 89% for future pilot enhancements across the four pilots.

- Service up time, once respective pilot technologies had been implemented, was 100% across the four pilots. There were a number of crashes reported during the introduction and trialling of the technology; however, after this warming up period which is normal in a pilot, there were no reported crashes in the latter months of the project.
- The number of training workshops done with transport operators and users is 50 in total, which shows a good level of engagement with key stakeholders in the MobiWallet project. The UK pilot on the other hand did 0 training and workshops and feedback from their system user focus groups – users were not sure how to use NFC technology (see section 4 of D5.1.2) – would suggest that training workshops are a critical part of the project to ensure that users know how to and are confident in using the new technology.
- Overall, customer satisfaction levels are high; 80% of users across the four pilots said they would recommend the MobiWallet system to others and 5 out of 7 is the average score across the four pilot sites for user confidence in using the system in the future. Additionally there was a 9% increase in customer satisfaction levels across the four pilots, from pre-trial to post-trial impact evaluation levels.

3 Impact evaluation

MobiWallet impact evaluation has concentrated on evaluating the impact of the following five project objectives:

1. Mode-shift increase for users from private cars to public transport supported by the analysis of the evaluation transport and user data.
2. Travel time reduction supported by the analysis of the evaluation transport and user data.
3. Improved user satisfaction due to technological improvements supported by the analysis of the user evaluations.
4. Benefits for non-user stakeholders: operators, cities and technology providers.
5. Dissemination of the Project at Local, Regional, National and European Level.

Notice that objectives 1 – 3 are user behaviour satisfaction objectives, the fourth is for wider stakeholder satisfaction and objective 5 relates to MobiWallet dissemination.

In this Section, the methodology and the approach followed during the project is recalled by revising the original plan that was presented in D5.1.1 and the results that were collected analysing data, questionnaires and reports from all the pilots are discussed. Dissemination is also evaluated in Section 3.5.

3.1 Methodology

A number of approaches have been introduced to collect quantitative user behaviour data before, during and after the trials. Each system user participant has been asked to respond to a series of surveys which include pre-trial and post-trial questionnaires using the online tool Survey Monkey [7]. Pilot Site Evaluation leaders and pilot partners were responsible for the collection of this data under the coordination of TTR.

3.2 Approach

The approach towards the data collection of the impact evaluation comprised participants answering a series of surveys. There were two stages of data collection:

- Pre-trial surveys.
- Post-trial surveys.

Each survey has been developed by TTR, translated by local evaluation leaders and circulated using Survey Monkey. The same approach of data collection has been used for each trial phase. In addition, collection of pre-existing baseline data has been taken into account as reported in D5.1.1 [5]. With

respect to this deliverable, it was agreed to drop the intermediate though-trial questionnaire that was initially planned; indeed, since the trial timeframe was quite short it would have been difficult to coordinate such collection, which could have been cumbersome or burdensome for most participants, that might eventually opt not for filling the final questionnaire, which was of utmost importance.

In all the phases, evaluation pilot site leaders were responsible for the collection of post-trial data and ensuring the online survey (should it be used) was translated appropriately.

3.3 Baseline data

Pre-existing baseline data that has been carried out by other studies or surveys have been provided (where possible and available) by each pilot site to use for the setting of localised user behaviour statistics and for modal shift comparison purposes. In addition to pre-existing data or where pre-existing data does not exist baseline data was gathered at the beginning of the pilot and in the first phase of user testing as a benchmark.

Other baseline data, where available, that would assist the benchmarking exercise includes:

- Timeliness.
- Passenger satisfaction levels.
- Mode choice.

Such baseline data has been used to drive impact evaluation, discovering where to focus attention for instance in the pre- and post- trial surveys. The collected baseline data were reported and analysed in detail in D5.1.1 [5] and are not included again in this final version.

3.4 Pre-trial and post-trial survey

3.4.1 Survey methodology

Pre and post-trial surveys were circulated to all participants in order to develop an initial understanding of participant's experiences of the mode of transport and payment process and repeated after the trial to understand whether participants felt the process had been improved.

After the completion of the first phase of the trial, the surveys were revised and rework to go to the second and final phase that is reported here.

Brief details about the method of data collection are provided below.

Pre-trial Survey

A pre-trial survey was used to gather pre-trial data from system users. This form supports the findings of the pre-existing baseline data and helps to build up a current picture for user behaviour and likelihood of modal shift from car to public transport. Data was collected for every system user participating in the trial via a trial registration form, which included questions on:

- Name (or unique identification number) / Age / Gender.
- Need of special assistance or disability.
- Mode of transport regularity / preferred mode of transport.
- Willingness to use public transport or carpooling.
- Experiences of transport payment methods.
- Current transport provision payment methods.
- Difficulties encountered with current transport provisions.
- Length of current journey.
- Transport application usage.

Post-Trial Surveys

Following the trial all participants were then asked to complete a post-trial survey. The survey contained more in depth questions than pre-trial snapshot and also identified additional feedback concerning MobiWallet services and the willingness of users to continue using them and recommending them to their acquaintances.

The pre-trial and post-trial surveys used in the second phase are attached to the present deliverable as Attachment A and Attachment B respectively.

3.4.2 Survey campaigns and timings

Two main phases of pilot impact evaluation were conducted as part of the overall programme evaluation that was drafted in Spring 2015 and refined tough the project lifetime.

The first evaluation phase was run from October to January 2016 with sample sizes of around 15-20 users in each pilot. Pre and Post trial surveys were translated for each of the four pilot sites and uploaded to the project online survey platform. Such surveys were presented in the previous version of this deliverable D5.1.1 [5] Italy completed phase 1 achieving the sample size targets in both the pre and post-trial survey. Such phase was meant as a sort of dry run for the second evaluation phase.

The second evaluation phase, which targeted significantly larger sample sizes with the same surveys, up to the end of July to allow sufficient time to analyze and report on pilot impacts. Eventual phase 2 survey response rates are reported in Table 9:

Table 9. Phase 2 survey response rates

Pilot	Pre-trial responses	Post-trial responses
Italy	215	149
Serbia	54	35
Spain	42	31
UK	138	139

In some countries, the targets for user participation in evaluation activities were not fully met. Proactive work was undertaken to address this as far as possible thanks also to a number of contingency plans that were devised; however, the fixed project timeframe and schedule (with core actions scheduled during summer) limited the extent to which that could be achieved. Nevertheless,

the feedback received from users and operators allowed us to obtain valuable information as explained in the section below.

3.4.3 Results of the survey

In this Subsection, we focus on the analysis of the surveys collected during the second phase of evaluation. In particular, we first analyze the data from pre- and post- trial survey from each pilot, highlighting -when available- appreciable changes in users- attitude towards public transport, carpooling and new payment and ticketing options. Finally, we compare the results of the various pilots and analyze them with respect to the first three objectives of impact evaluation described in the introduction to Section 3.

3.4.3.1 Survey in Spain

In Spain 42 and 31 responses were registered to the pre- and post- trial survey respectively. The number is somewhat below what initially expected, despite the efforts and a number of recruitment actions from the pilot evaluation leaders. The main reasons for this are due to the somewhat stringent implementation schedule imposed by the project timeframe and, as a consequence, limited time for user recruitment. Nevertheless, although the following analysis cannot be considered statistically significant, it does provide a snapshot of a certain demographic and is therefore useful for comparing pilot against pilot performance.

About demographic, the composition of the respondents is not consistent from pre and post-trial surveys:

- Male in pre-trial is 54%, whereas in post-trial it is 38%.
- Female in pre-trial is 46%, whereas in post-trial it is 62%.

Such disparity can be apportioned to the low sample size but it might not hamper the results. The respondents belong to different age groups but with low representations of the youngest (just 1 respondent in both surveys). The age group with highest representation is 26-34 in both pre-trial (41%) and post-trial (47%). The age of respondents in the surveys suggests that the team have almost met the user profiling as outlined in the Evaluation plan (Attachment E), which outlined that the user profile should have a lower age owing to the number of students that lived around.

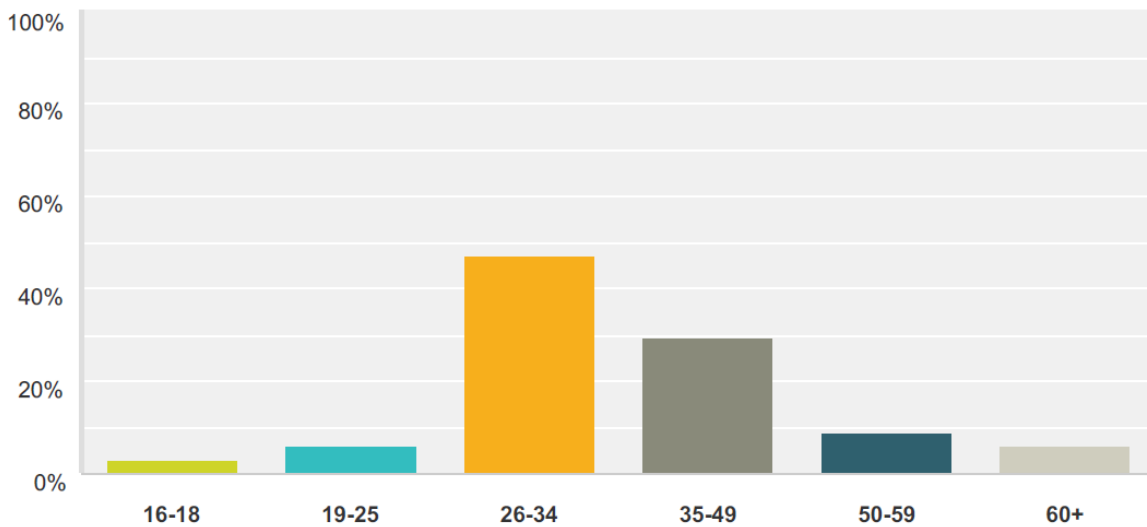


Figure 1. Age distribution in the post-trial survey

Concerning access to car and habits in transit, most of the respondents had access to a car, although the Spanish pilot reported the lowest number of people with access to a car. 72% of pre-trial respondents reported having regular or occasional access to a car (which increased to 78% in the post-trial), whilst 22% said they did not have a car in the post-trial (decrease from 27% in the pre-trial).

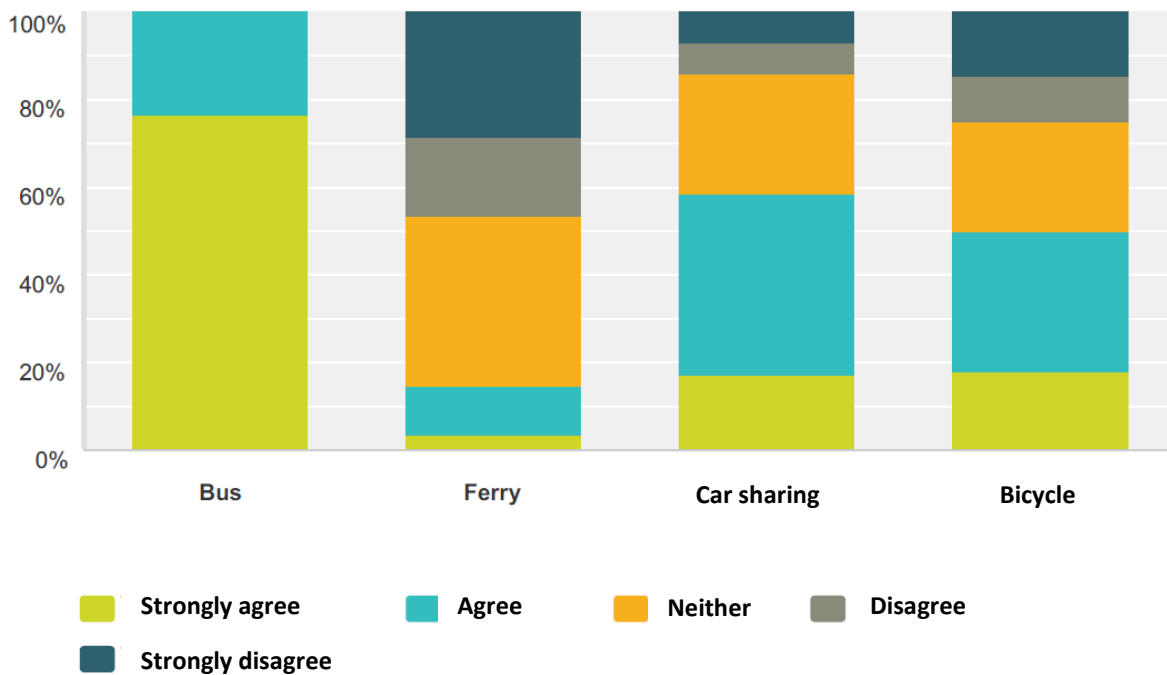


Figure 2. Willingness to shift from private car to other transport modes according to Spanish pilot survey participants

A large percentage of people (91% pre-trial; 100% post-trial) was found to agree that they are thinking about switching their regular car journeys to bus. Despite the size of the sample set, this is a quite neat answer from the target population. Cycling and car sharing were the next most considered forms of transport, with car sharing receiving a 23% increase in respondents who agreed that they were considering switching single occupant car journeys to carpooling. This data witness the willingness of

people in Santander to access to new paradigms for travelling in the direction of those proposed by MobiWallet. The highest percentage of respondents who disagreed was with the ferry; indeed, although ferry is a transportation mean in Santander, it is mostly used in summer and not thus for commuting or reaching schools and universities.

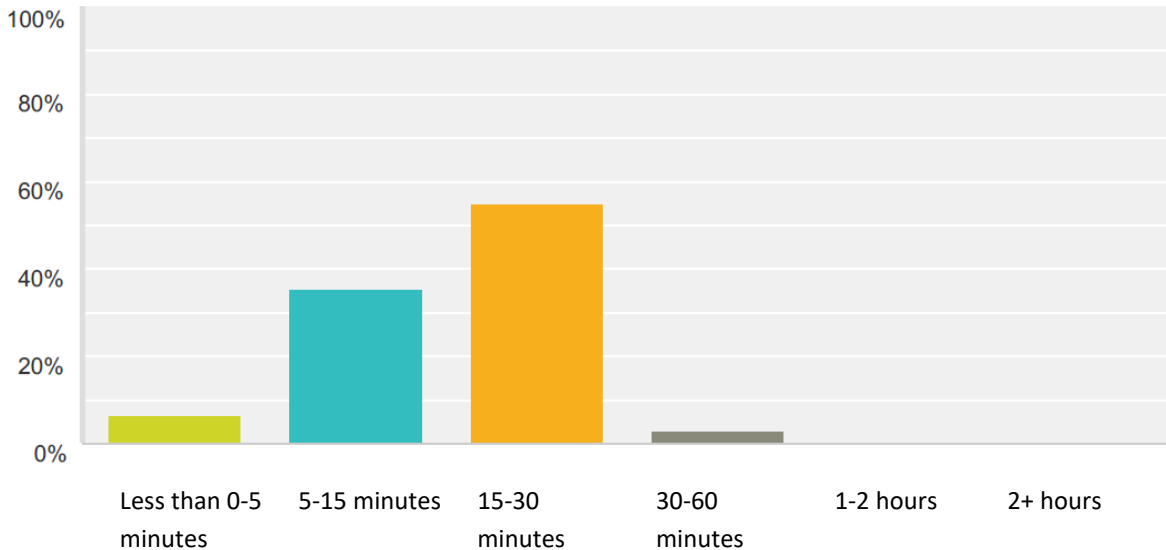


Figure 3. According to post-trial survey, the most common trip lasts between 15 and 30 minutes

About the most used transport modes, the two surveys did not highlight an appreciable change. Indeed, most trips are made by car or bus for whichever purpose and form of transportation like ferry, park and ride and cycling resulted to be the most unpopular, at least as number of rides every week, in both surveys. For instance, 65% used car for reaching work and 58% bus, thus some people tend to switch the way they reach their work place or to use more than one transport modes. Carpooling is most used in trips having leisure as purpose.

About journey experience, highest satisfaction rates are for bus (average 7.5), with car coming a close second (this stays the same in pre and post-trial). From pre- to post- trial it was possible to appreciate an increase of 12% in carpooling satisfaction. Other means of transport saw instead a decrease of satisfaction level from pre- to post- trial, such as Park & Ride (-26%) and train (-19%).

Respondents were also asked about the difficulties the usually experience when travelling with public transport or carpooling. Frequency of rides was one of the major concern (51% in pre-trial and 64% in post-trial), followed by length of journey and cost of journey.

During the trail and according to survey responses, there were an increase of 31% in the tickets purchased from kiosk / store and a small decrease in number of on board payments– from 27% to 23%.

Some respondent during the trail started to buy tickets online. In addition, 6 respondents stated that they used the MobiWallet app as their usual method of payment.

Satisfaction with MobiWallet as current transport payment was assessed in the post-trial, scoring a 7.9 average rating out of 10, which is a very positive value.

Going more in detail, satisfaction with ticket selection and purchase process though MobiWallet was good, featuring the following values:

- 81% satisfied with purchasing ticket via website.
- 61% satisfied with Purchased ticket using Smartphone app.
- 58% satisfied with process of uploading ticket from Smartphone to Smartcard using NFC.

These values were possible also thank to the services provided by MobiWallet. Indeed, satisfaction of MobiWallet in comparison to previous method of transport found 84% of the people claiming that there had been an improvement or significant improvement and only 9% saying they didn't perceive any change. No one said that the system had got slightly worse / worse or significantly worse. Similarly, most of the people were confident in recommending MobiWallet to their acquaintances, with 84% committed, 6% non-committed and 10% unsure.

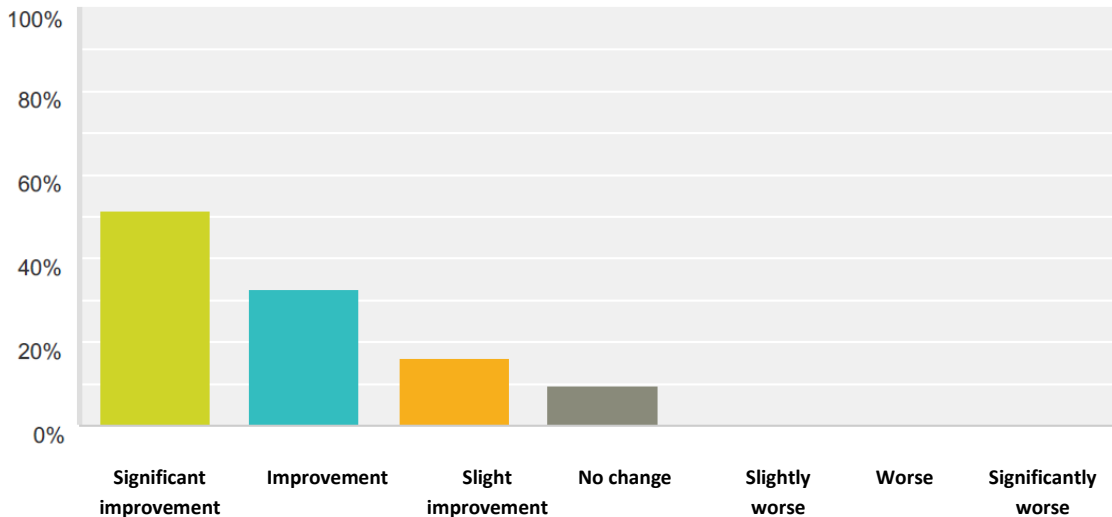


Figure 4. According to the post-trial survey, MobiWallet bring an appreciable improvement to transport in Santander

Confidence in using the system in the future has an average rating of 6.1 (out of 7) which is positive and shows that people would be willing to use the system in the future.

Respondents were also able to suggest some improvement to the system and services proposed by Spanish partners. The most important is enhancing compatibility with all phones. This is indeed a complex task, but thanks to the availability of NFC stickers, the member of the consortium already found workaround to lack of built-in NFC, at least for smartphones running Android. Integration of more transport modes into the app and a more user-friendly interface were required by some participants as well.

3.4.3.2 Survey in Italy

Surveys in Italy reach a number of participants greater than expected with 215 responses to the pre-trial survey and 149 to the post trial one.

The demographics of the respondents showed a good gender split (in the pre-trial 58% of respondents were female with this number decreasing to 50% in the post-trial). A few number of people in the age group 19-25 was found, especially in the post-trial (from 5.21% to 2.78%) while the age group with highest representation is 35-49 in both pre-trial (39.34%) and post-trial (43.75%). The low number and

the drop in the 19-25 group might be explained with the season: Pisa is indeed a university city, attracting students from all over Italy; nevertheless, during summertime most of these students go back to their homeland and could not contribute to the trial activity. Due to this issue, the user profiling as outlined in the evaluation framework (Attachment E) was not fully met, despite several actions have been performed to enrol university students (for instance by means of the #mobiwith_it campaign, during which an itinerant desk was organized moving along university departments and canteens; see Section 3.5.4.2 and Deliverable D6.1.3 [6]).

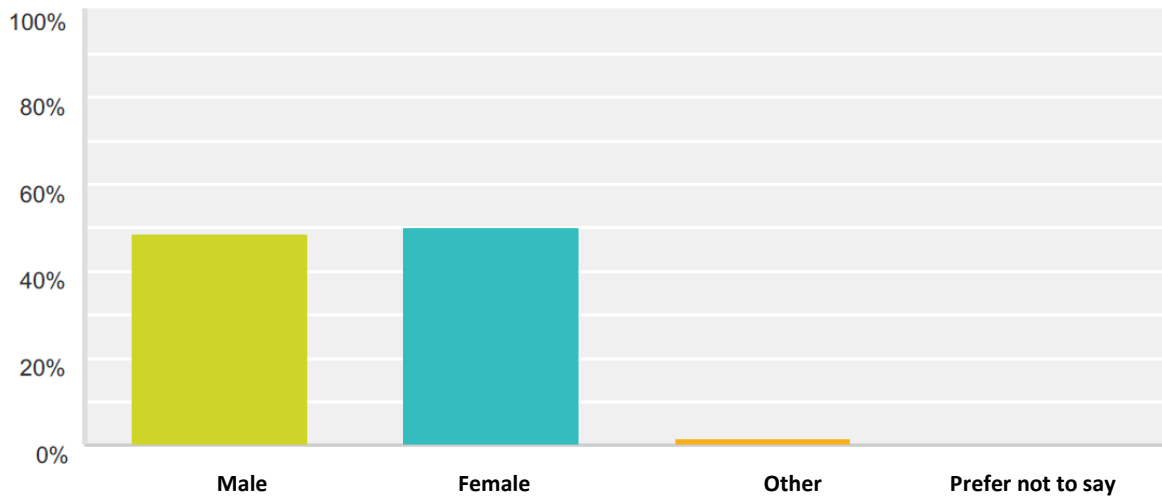


Figure 5. Gender split is nearly optimal in post-trial questionnaire

Concerning access to a car, respondents mainly had access to a car. 84% of pre-trial respondents reported having regular or occasional access to a car, whilst only 16% said they did not have a car. This is mirrored in the post-trial survey where 11% of respondents said that they did not have access to a car.

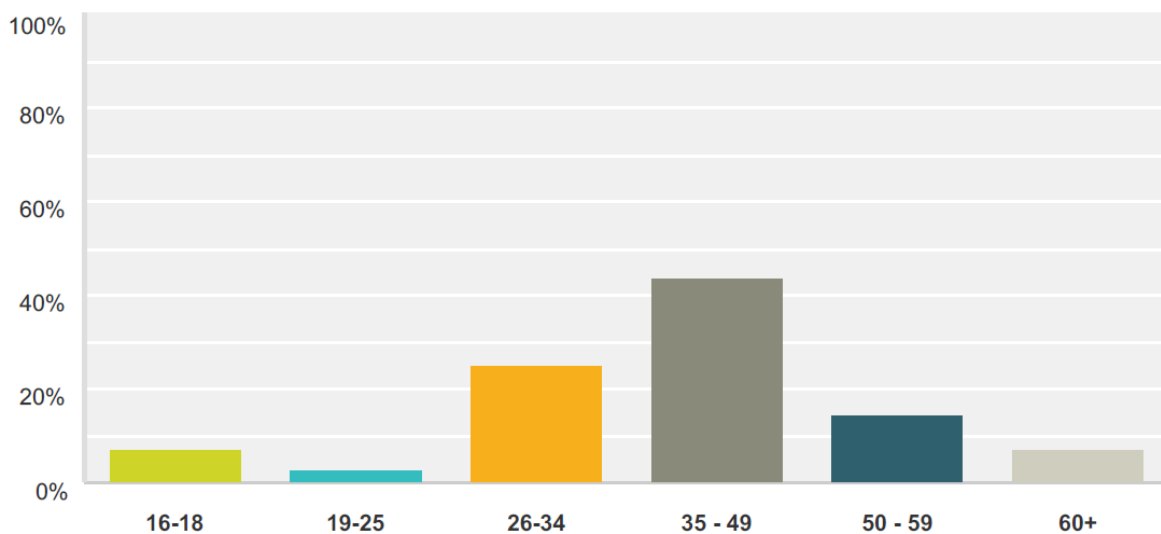


Figure 6. Age distribution of Italian sample

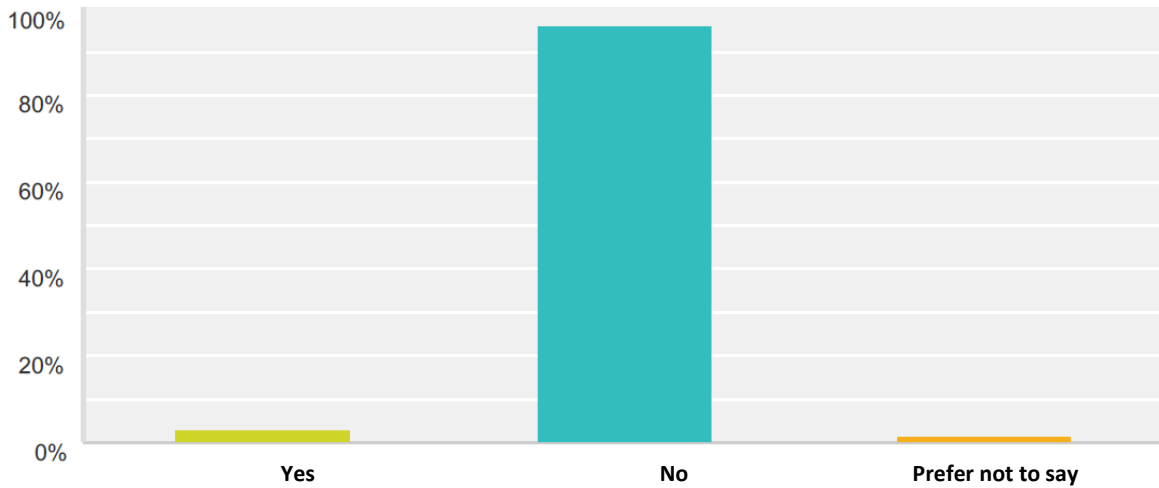


Figure 7. Post-trial survey was also filled by 4 disabled people, at least one of them being visually-impaired,

About behaviour change, large percentage of people (40% pre-trial; 57% post-trial) strongly agree that they are thinking about switching their regular car journeys to cycling. Besides cycling (which is very popular in Pisa), bus and tram (only in Florence) were the next most considered forms of transport.

Car-pooling, which is one of the functionalities provided by Italian pilot, saw an increased favour from the pre-trial to the post-trial. This could be due to a change in post-trial survey where more information is given on car sharing / pooling or due to the success of the MobiWallet campaign in terms of raising awareness. This should be tempered by a large amount of respondents (higher than the amount of people who agreed) who disagreed that they would change their behaviour in switching to carpooling.

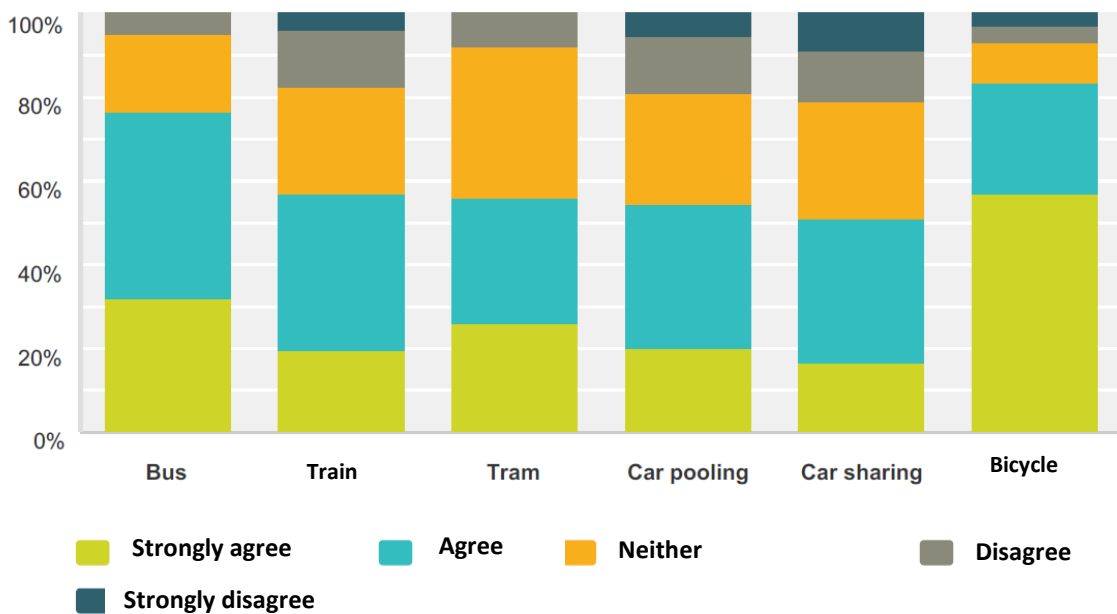


Figure 8. Willingness of respondents to shift from car to other transport modes. More than one half of the people is willing to switch to bike

Furthermore, it should be noted that many respondents were not willing at all to switch to train, tram and car sharing. Therefore, there are perhaps some intrinsic barriers (or very quality level of service) that prevent people to think about switching to these travel modes for daily travel.

According to the respondents, the most used mean of transportation to reach work is still private car, followed by bus. No one seems to use bicycle hire or taxi to reach work in the pre-trial. For education, there is a mix of car (63%), cycling (47%) and bus (45%) in the post-trial (but with similar values were recorder during pre-trial). Shopping saw again a predominance of the private car (95%) but also the use of bike (86% in the post-trial, against 37% in the pre-trial). Cycling incremented from the pre- to the post- trial also for what regards education, increasing from 64% to 92%.

In summary:

- Most trips are still made by car for whichever purpose.
- Cycling is done a lot for leisure/recreation and shopping, with a significant increase from pre- to post-trial surveys.
- Most unpopular forms of transport are taxi, car sharing and bicycle hire.

This love for cycling is also reported by the satisfaction level of journey experience. Highest satisfaction rates are for cycling, with car coming a close second (this stays the same in pre and post-trial). Lowest satisfaction rates were with carpooling, car sharing and bicycle hire. This could be possibly due to the schemes being in their early infancy and/or low awareness of the schemes.

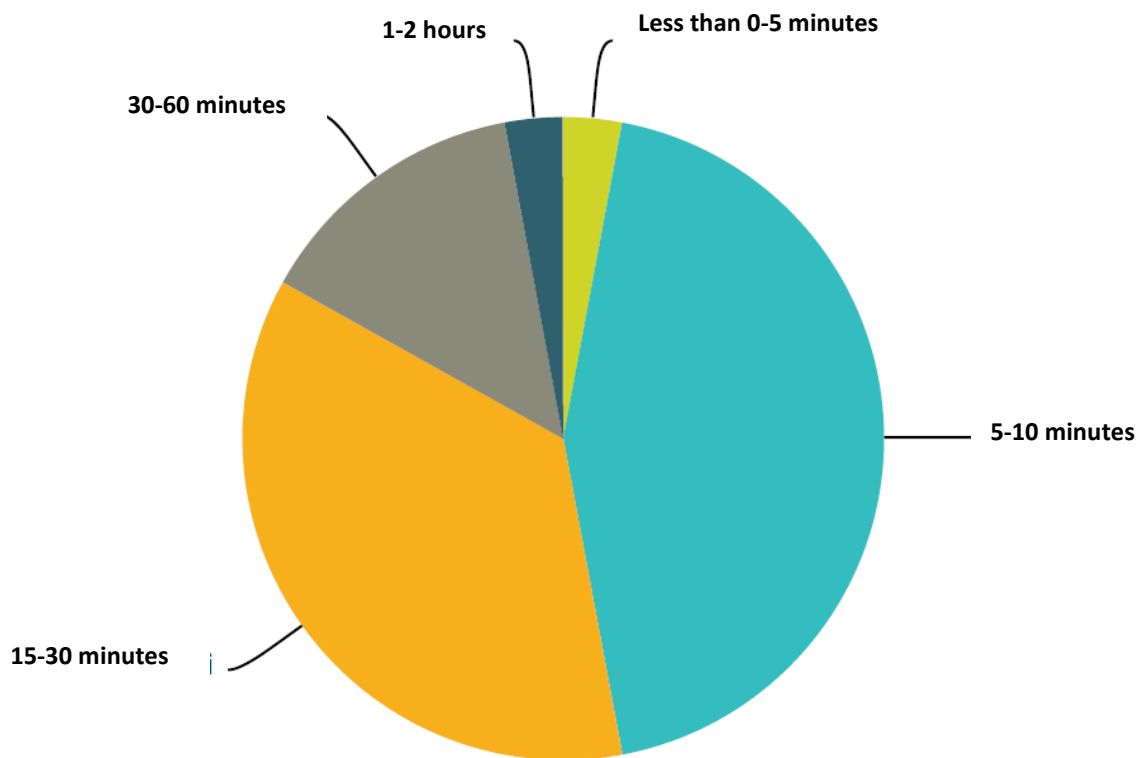


Figure 9. More than 75% of the survey respondents makes usual trips less than 30 minutes-long

Most of the respondents complain about ride delays (59% in pre-trial to 67% in post-trial); payment process is not actually perceived as a difficulty being low on both pre-trial (15%) and post-trial (14%).

One significant outcome is that ‘Difficulties in travel planning’ increased from 19% (pre-trial) to 33% (post-trial). This might be due to people starting using the apps and services made available by MobiWallet and facing thus problem in understanding interfaces for best planning their journey. Indeed, from the pre-trial to the post- trial we detect a 15% decrease in the use of paper tickets, which is a very good value. In addition, more respondents cited that they use online and smartphone app compared to the pre-trial data.

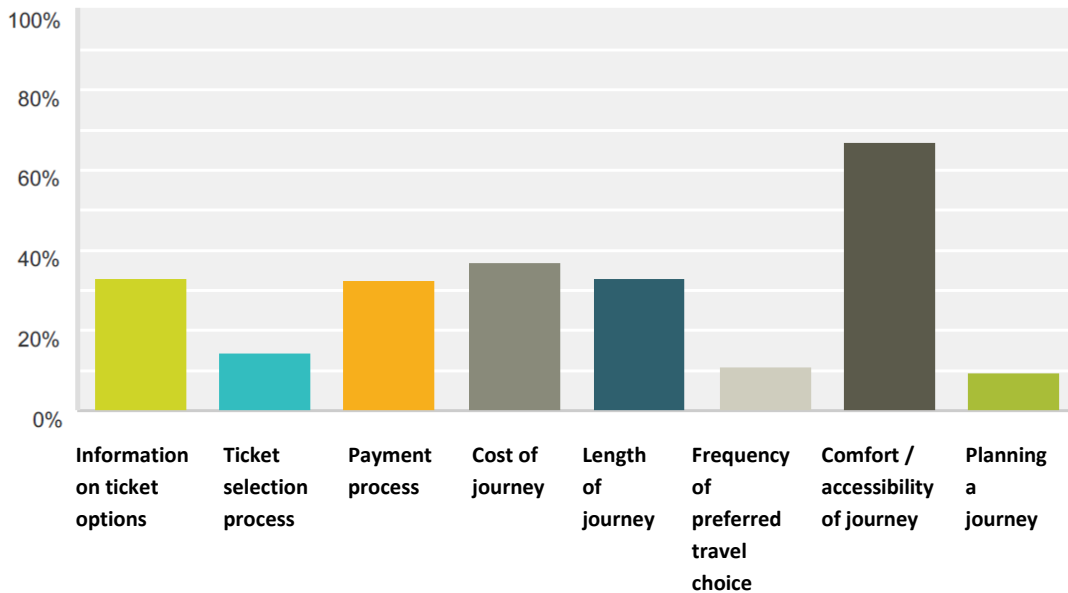


Figure 10. Chart of principal difficulties encountered by respondents in the post-trial. Delays are the main concern, followed by insufficient comfort

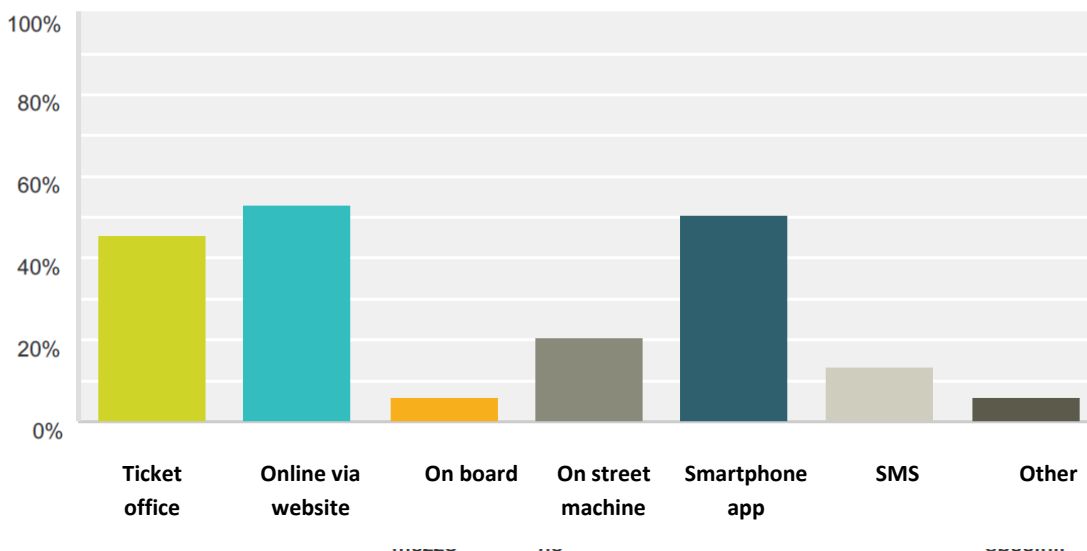


Figure 11. Chart of most used payments in the post-trial. An increase of the use of apps was recorded from pre-trial to post-trial.

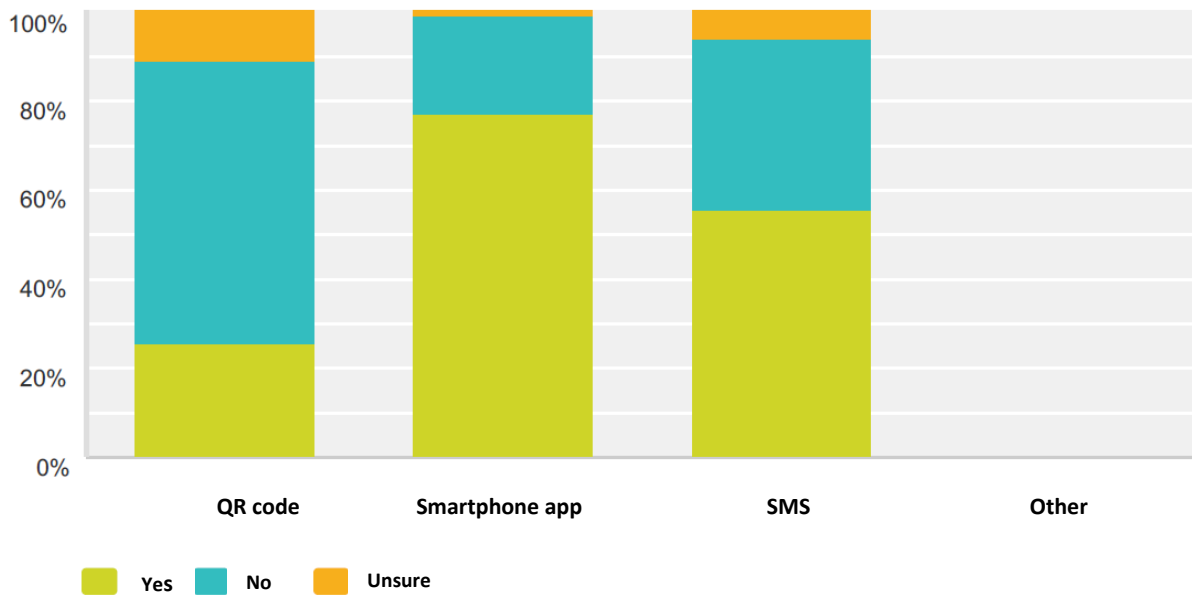


Figure 12. Use of payment technologies asked after the trial. QR codes, app on the smartphone and SMS were used respectively by 26%, 77% and 56% of respondents.

Regarding satisfaction with MobiWallet as current transport payment, data shows a positive shift to being more satisfied for convenience, ease and speed. Similarly concerning the experience of using MobiWallet to make a payment, post-trial responses indicate a noticeable increase in the use of MobiWallet payment technologies. The value that experienced the biggest increase was speed of payment (4.83 average score in pre-trial, 5.54 score in post-trial, a +15% increase).

Ticket selection and purchase process also had an improvement in terms of satisfaction: mean for overall satisfaction in post-trial is 6.84 (out of 10), compared to 6 out of 10 in pre-trial, a +14% increase.

In comparison to previous method of transport and payment, MobiWallet was positively evaluated by most of respondents, indeed:

- 76% of respondents said there had been a slight improvement, an improvement or significant improvement.
- 29% said there had been no change.
- 2% said that the system had got slightly worse.

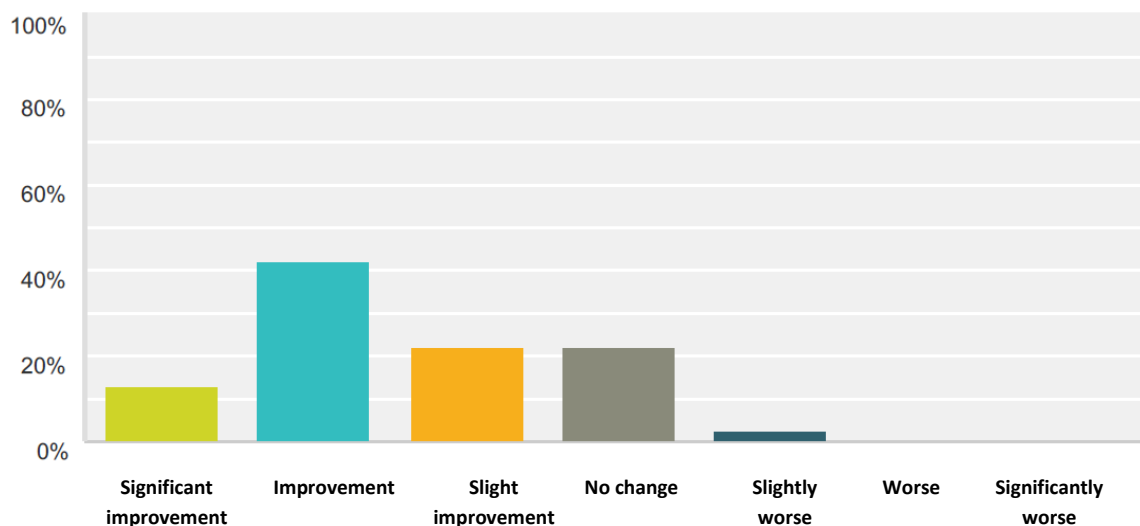


Figure 13. Overall improvement to travel experience thanks to MobiWallet

Over 75% of respondents were also willing to recommend MobiWallet services to others. About using the system in the future, the average rating was 5.07 (out of 7) which is positive and shows that people would be willing to use the system in the future, whilst highlighting that there is room for improvement in the system owing to the score not being higher than 5. In particular, some of the improvements that have been envisaged by the respondents include:

1. App for IOS / windows mobile.
2. Extend the app to multi-modal forms of transport and the geographic boundary the app works in (so that suburban / regional rail can be included).
3. App and website needs to be made more user-friendly.

Such improvements can be all tackled for technological perspective, without any barrier.

Other comments that were frequently mentioned included the need to include real-time information on schedule and the need to have a consistent pricing structure (currently paper and electronic tickets have differing prices) and some incentive to use the app more (i.e. carnet system or the more frequent you travel, the cheaper your ticket is). These last comments have instead more deep barriers in their implementation due to the need to find agreement with transport companies external to the project; it was therefore not possible to address these issues in the limited timeframe of the project.

Other comments included the limited number of car parks managed by the system, which is already being tackled by some partners of the project in view of the continuation of service provision, also beyond the end of project.

3.4.3.3 Survey in Serbia

In Serbia, during the second evaluation phase, it was possible to collect 54 pre-trial responses and 35 post-trial ones. Such figures are slightly below the sample size target (that was set to 80) but, nevertheless, this is considered to be a good sample, also in consideration of the late running of the evaluation and the limited time available.

The demographic of the sample set exhibits a fairly even gender split (52% male; 48% female), as in the Italian case, that is broadly the same both in the pre and post-trial surveys. As in the Italian case the age group between 16-18 and 19-25 years old is low represented. Again, the age group with highest representation is 35-49 in both pre-trial (50%) and post-trial (43%).

The age of respondents in the surveys suggests that the Serbian team have not managed to meet the user profiling as outlined in the evaluation framework (Attachment E), especially considering Novi Sad is estimated to be a student city with a high population of younger people. It is possible that, as in the case of Italian pilot, having held the trial in summer might have reduced the possibility to involve people from this age group.

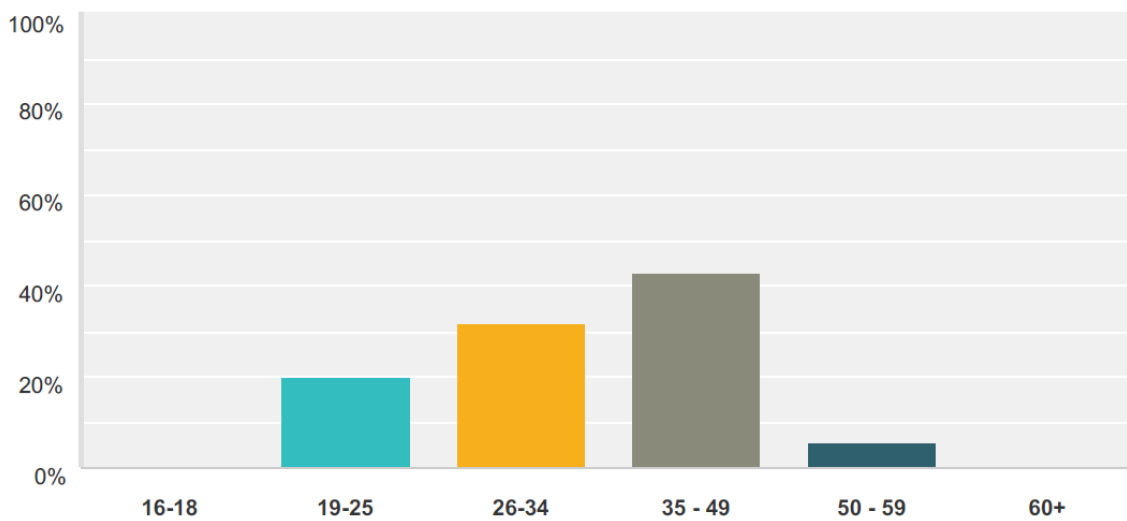


Figure 14. . Age distribution of Serbian sample set

Respondents mainly had access to a car. Indeed, 92% of pre-trial respondents reported having regular or occasional access to a car, whilst only 7% said they did not have a car. This is mirrored in the post-trial survey where 6% of respondents said that they did not have access to a car.

Among people having access to a car, however, a large percentage of people (83% pre-trial; 93% post-trial) agree that they are thinking about switching their regular car journeys to cycling. After cycling, bus and car sharing were the next most considered alternative forms of transport, although there was a 10% decrease in respondents who agreed that they would consider switching to using the bus in the post-trial. The highest percentage of respondents who disagreed was with car sharing, although this decreased from pre-trial (39%) to post-trial (33%).

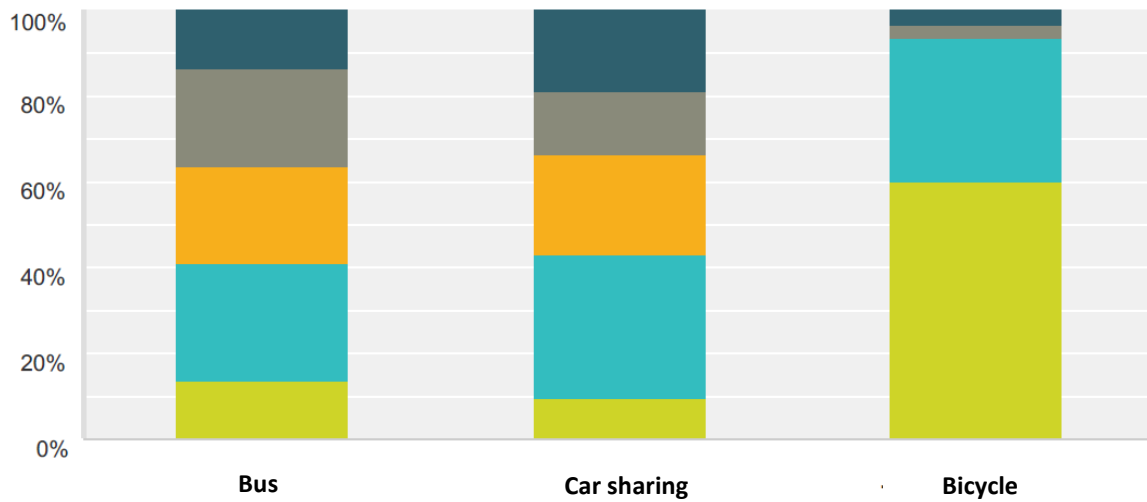


Figure 15. Willingness of Serbian users to switch from car to alternative transport means, i.e. bus, car sharing and bicycle. Green denotes people strongly agreeing in changing.

Normal habits to travel to work include personal car (68%) and cycle (50%), while park & ride and train seem not to be used regularly in the city of Novi Sad. Such percentage changed slightly in the post-trial, in which bus appeared at the first place with 78%. About travelling for education purposes the sample size is too small to claim some facts; however, it is worthwhile noticing that bus (which is included in the Serbian pilot) is used by 20% of the people either going to school or following educational programs. When shopping, people seem to use a variety of modes, including car (76%), cycling (56%) or taxi (44%), as it can be inferred from the post-trial. Travelling for leisure exhibits the same behaviour, with an increase in the use of taxi (included in the Serbian pilot) in the post-trial with respect to the pre-trial.

In summary:

- Most trips are made by car for whichever purpose.
- The use of taxi seemed to grow from pre-trial to post-trial.
- Most unpopular forms of transport are train, park & ride and car sharing.

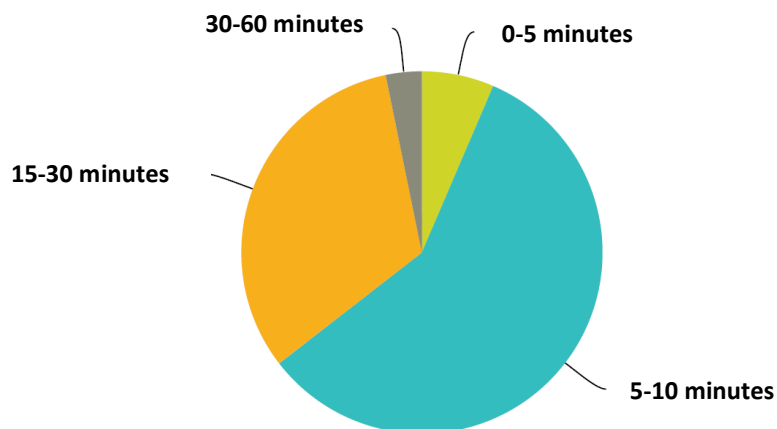


Figure 16. Chart with distribution of travel times for Serbian respondents. Over 80% of the people take less than 30 minutes for their most common trip

For what regards the journey experience, the highest satisfaction rates are for cycling (average 8.25), with car coming a close second (this stays the same in pre and post-trial, as in the case of other pilots). From the pre-trial to the post-trial a satisfaction increase can be appreciated for bus (+10%) and bicycle sharing (+33%). Lowest satisfaction rates were with park & ride and train.

About the difficulties when using public transport as reported by the participants to the trial, the payment process is the main concern (42% in both pre and post-trial), followed by length of journey and information on ticket options.

About payment, from the pre- to the post- trial it was possible to highlight a 10% increase in on board ticket payment, as well as a small increase in number of smartphone app payments – from 4% to 6.4%.

The satisfaction in performing transport payments experienced a +8% increase in satisfaction levels after introducing MobiWallet, changing from 3.78 to 4.1 average rating. Indeed, the post-trial responses indicate a noticeable increase in the use of all MobiWallet payment technologies exposed by the Serbian pilot, and notably:

- +45% in QR code use
- +18% in phone app use

Overall, the satisfaction with ticket selection and purchase process showed a +17% increase in satisfaction levels.

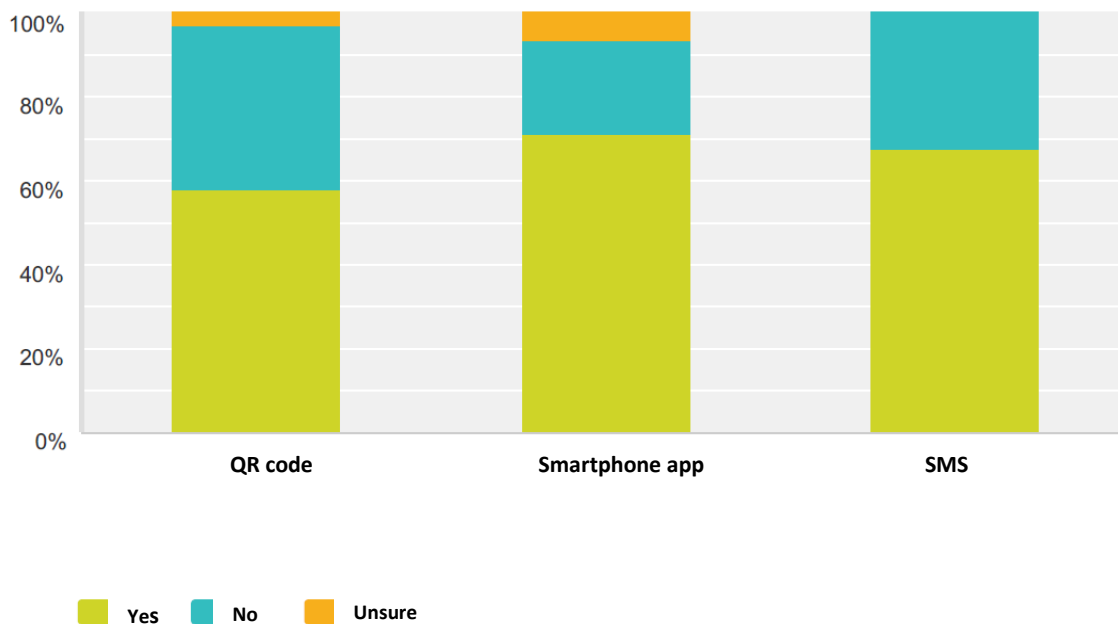


Figure 17. Chart showing the use of payment technologies of Serbian pilot: QR code (first column), app on the smartphone (second column) and SMS (third column). Green represents yes, blue no and orange unsure

A very positive overall rating was given to MobiWallet in comparison to previous method of transport. Indeed 83% of respondents said there had been an improvement or significant improvement. Similarly, 81% of users are committed to recommend the system to others.

Confidence in using the system in the future was also good with an average rating of 5.74 which is positive and shows that people would be willing to use the system in the future, whilst highlighting that there is room for improvement of the system owing to the score not being higher than 6. Participants proposed indeed the following 3 improvements to the system:

1. Easier payment.
2. Better information.
3. Multi-modal payments.

Users also identified some barriers that can prevent them from using MobiWallet services more often. Indeed, the payment method is considered difficult by someone and the lack of availability on different travel modes is seen as a limitation. It would be preferable to have the system operational on the full bus network and not just on selected lines. Nevertheless, this is due to the project being a pilot though. Support for other mobile operating systems (iOS) would have been welcome.

3.4.3.4 Survey in UK

In the UK case, the pre- and post-trial surveys were run by Centro and not directly by TTR, using the survey system by CENTRO, that is CENTRO own Survey Monkey account. In any case, there was a significant integration work to put the surveys in a similar form to other pilots so as to have the possibility to perform comparisons. This was done to some extent but there has not been full overlap of the information provided by the survey and, therefore, there are certain conclusions which cannot be drawn for UK, making it difficult to assess the change during a user's experience of the best fare calculator. Nevertheless, it is important to note that the UK pilot cannot be compared directly to Italy, Serbia or Spain as its MobiWallet functionality (Best fare calculator) is different to any other pilot. It should also be noted that MobiWallet functionalities in UK were released inside existing products or frameworks that are operational at large scale (such as SWIFT card). It was therefore natural that all the steps related to evaluation (such as questionnaire administration and user selection) should be carried out by CENTRO with the external support of TTR and the full evaluation team.

The pre-trial and post-trial had success in reaching the target size with 138 and 139 answers respectively.

The gender split was good as in other pilot with 58% of pre-trial respondents' female, whereas in post-trial the split was more even (50% female). Age group with lowest representation is 19-25 in both pre-trial and post-trial. Age group with highest representation is 35-49 in both pre-trial (32%) and post-trial (28%). Also in this case, the age of respondents in the surveys suggest that the pilot have not managed to meet the user profiling as outlined in Attachment E.

About 60% in both and post-trial has access to a private car, which is the main transport mode for going to work (85%) followed by bus (51%) as inferred from the pre-trial. Bicycle hire, car sharing and taxi seem not to have a role for this purpose of travel. Trips for education are more distributed over the various transport modes, with 63% using car, 47% cycling and 45% bus as assessed in the post-trial. Shopping is similar with 95% using car, 86% cycling and 65% bus as assessed in the post-trial. Travelling for leisure exhibits similar figures (car 97%, cycling 92%, bus 75%) to shopping.

In summary:

- Most trips are made by car for whichever purpose.
- Cycling is done a lot for leisure/recreation and shopping.

- Most unpopular forms of transport are taxi, car sharing and bicycle hire.

As in other pilots, regarding journey experience, the highest satisfaction rates are found for cycling, with car coming a close second (this stays the same in pre and post-trial). Lowest satisfaction rates were with carpooling, car sharing and bicycle hire. This could be possibly due to the schemes being in their early infancy and/or low awareness of the schemes.

Among the difficulties encountered, users complain with the cost of journey; such concern actually increased from 36% in the pre-trial to 38% in the post-trial survey. Information on ticket options (32%) was also reported as being one of the main difficulties experienced, suggesting that the Journey Planner / Best Value Ticket Calculator services provided by UK pilot needs to be promoted better. Satisfaction with ticket selection and purchase process show no significant change from pre- to post-trial, being at 3.5 with respect to the reverse scale used in UK (1 is very satisfied, 10 is very dissatisfied), and thus a good value.

The respondents which rated MobiWallet services with respect previous available services said in the 92% of cases that the system had significantly or slightly improved. They were also confident in using the system in the future (average score of 2.5 in a reverse scale from 1 best to 10 worse). Some specific questions about the journey planner were included, exhibiting good rating for what regards speed of downloading (93%), ease of finding the information (decreased from 92% in pre-trial in 82% in post-trial) and overall design and layout (91% in pre-trial, 89% in post-trial). Although the slight decrease of some values from pre- to post-trial, they were all rated 'very good/good'.

Again on the specific use of the journey planner, 58% actually went on to the make the journey they were enquiring about in the pre-trial, whereas 75% did in the post-trial, suggesting a marked improvement in the overall aim of the journey planner.

Furthermore, 95% of respondents in the post-trial felt the information provided by the Journey Planner was 'very/fairly accurate', which is a key feature for the system. Thus, most of the people (91%) would recommend the Journey Planner and 85% would recommend the Best Value ticket calculator to others.

Some comments from post-trial survey respondents suggest that the journey planner and best fare calculator still have room for improvement, particularly with regards to the integration of the Swift card. Some discontent with the pricing structure has been also reported, but (as in the Italian pilot case) it must be noted that this is outside the scope of the MobiWallet project.

3.4.3.5 *Global findings and discussion*

We summarize and discuss in the following tables the findings obtained by survey analysis and comparison, with reference to the objectives 1-3 of MobiWallet recalled at the beginning of Section 3, that is:

- Obj 1. Mode-shift increase for users from private cars to public transport supported by the analysis of the evaluation transport and user data.
- Obj 2. Travel time reduction supported by the analysis of the evaluation transport and user data.
- Obj 3. Improved user satisfaction due to technological improvements supported by the analysis of the user evaluations.

Table 10. Impact of MobiWallet on Objective 1

Mode-shift increase for users from private cars to public transport supported by the analysis of the evaluation transport and user data

Where sample sizes allowed (Italy, UK), the difference (in the number of trips made by car and by the most popular sustainable transport modes) was considered to be not statistically significant ($p=0.8054$). The survey sample sizes of Spain and Serbia are not large enough either to be considered for statistical analysis.

However, a "willingness to change travel behaviour from car journeys to more sustainable modes" question in the pre and post-trial surveys suggests that there is an increase in the willingness amongst MobiWallet users to change their travel behaviour away from the conventional single occupancy car driver. On average, 14% of respondents in Spain, Serbia and Italy indicated an increased willingness to use more sustainable modes (namely cycling, bus and car sharing) following the MobiWallet trial. Car sharing, in particular, increased by an average of 22% across the three pilots with available data, suggesting that the efforts to push citizens to use more sustainable methods of transport is moving in the right direction.

Whilst the above results are indicative of a shift, TTR would urge caution due to a large number of potential confounding factors that could influence individuals' choices of transport modes during the study period. It is recommended that future projects implement control groups, as these will help to show statistically relevant modal shift change and the ability to show that the project was the causal link for this modal shift.

Table 11. Impact of MobiWallet on Objective 2

Travel time reduction supported by the analysis of the evaluation transport and user data

- Both Italy and Spain saw decreases (1% and 7% respectively) in the time that survey respondents spent travelling.
- Serbia reported a 2.6% increase in the time spent travelling.
- The UK does not have the relevant data to do accurate comparative analysis.
- Unfortunately, there is therefore no clear result as to whether this objective was achieved or not. Travel time measurement is sensitive to a wide variety of confounding factors such as, amongst others, traffic lights, road works, congestion, tourism and weather. Moreover, payment methods account for a tiny proportion of a travellers' journey and a reduction in travel time is going to be a matter of seconds (not a 7% decrease). For payment method improvements to have an impact, the system needs to be used the majority of users for

each mode. For instance, London’s Oyster smart card and the ability to use contactless payment now means that travellers no longer have to buy tickets as they board a bus or prior to travel, resulting in bus trips in theory becoming shorter. Mastercard research in 2012 revealed that every commuter wastes an entire day every year queuing to buy their tickets either as they board a bus or prior to travel¹.

- This is a key lesson for projects going forward in terms of project evaluation. Questions need to be phrased around the time to make payment and not the actual journey itself, which the MobiWallet pre and post-trial surveys did.

Table 12. Impact of MobiWallet on Objective 3

Improved user satisfaction due to technological improvements supported by the analysis of the user evaluations

- Overall, the MobiWallet project was viewed favourably by users.
- 80% of users across the four pilots said they would recommend the MobiWallet system to others.
- 83.73% of users across the four pilots said there had been a slight improvement, an improvement or significant improvement in comparison to the previous system.
- 5 out of 7 is the average score across the four pilot sites for user confidence in using the system in the future.
- 7 out of 10 is the average satisfaction rating across the four pilot sites in terms of overall satisfaction with the ticket selection and purchase process.

3.5 Evaluation of dissemination

Project dissemination was ensured through a dedicated Website, the presence on the major social media and a dedicated newsletter. In addition, during this last period, local dissemination actions have been carried out by each pilot.

In this section, the analytics data about the website, newsletter, social media and local initiatives are reported.

¹ Source: <http://newsroom.mastercard.com/press-releases/mastercard-helps-bus-passengers-speed-up-their-journey-times-with-contactless-card-payments/>

3.5.1 Website

The official project website is reachable at address <http://www.MobiWallet-project.eu/>. It is realized using Joomla Content Management System (CMS), which allows to easily generate new content and keep it up to date.

This section is an update of the one in deliverable 5.1.1; it preserves the same structure and the access and Website usage statistics are realized exploiting Google Analytics. The reports cover the period between 1 September 2015 and 31 August 2016.

Reports below regard:

- Amount of Website access; detailing also user’s browser.
- Geographic user distribution.
- System used to access to the Website.

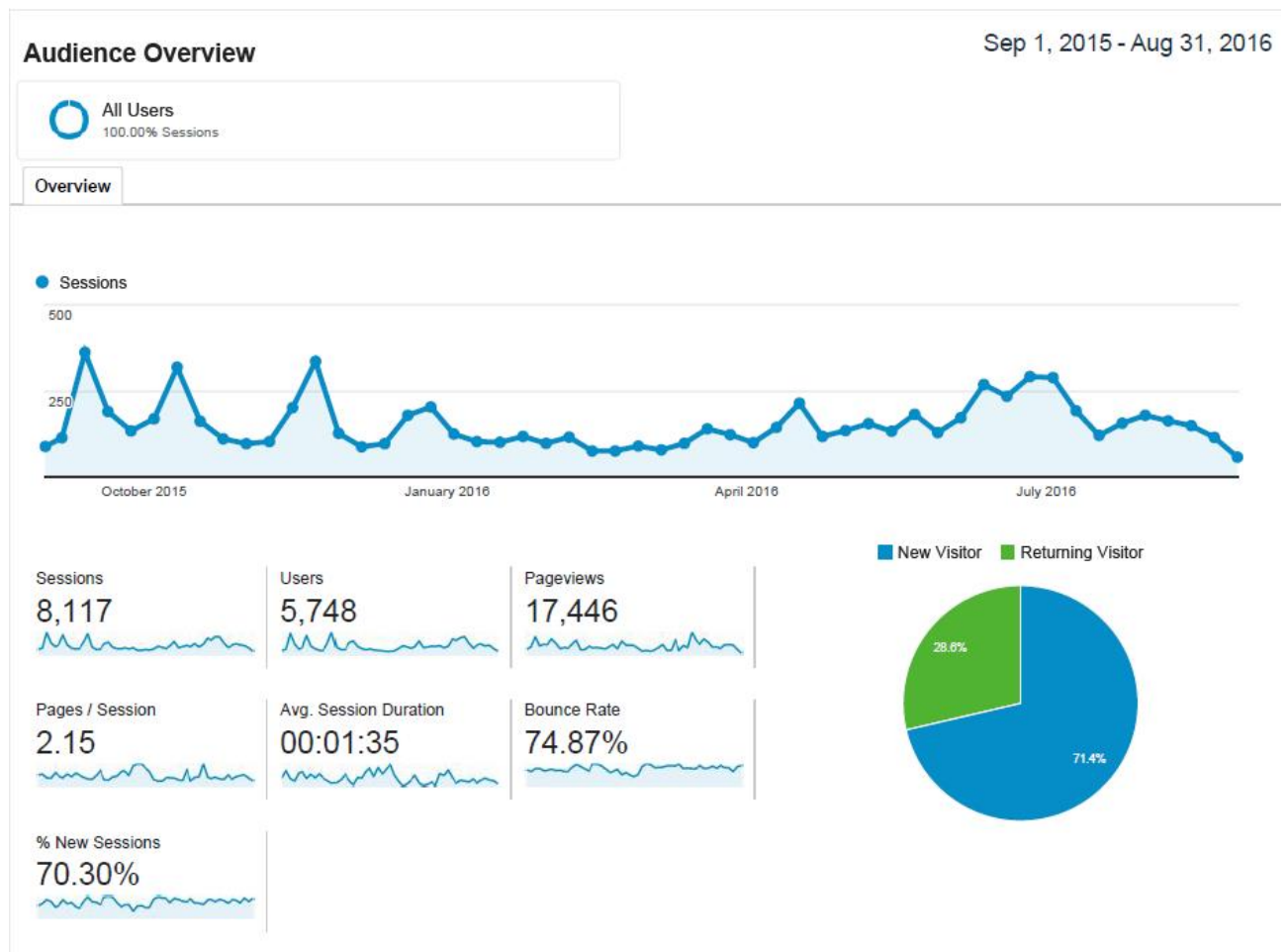



Figure 18. Access to MobiWallet Website statistics

Table 13: Browser access statistics

Browser	Number of accesses	Percentage of accesses
Chrome	5090	62.71%
Firefox	1194	14.71%
Internet Explorer	613	7.55%
Safari	391	4.82%
YaBrowser	185	2.28%
Edge	184	2.27%
Opera	173	2.13%
Android Browser	104	1.28%
Safari (in-app)	67	0.83%
(not set)	35	0.43%

Location

Sep 1, 2015 - Aug 31, 2016

 All Users
100.00% Sessions

Map Overlay

Summary

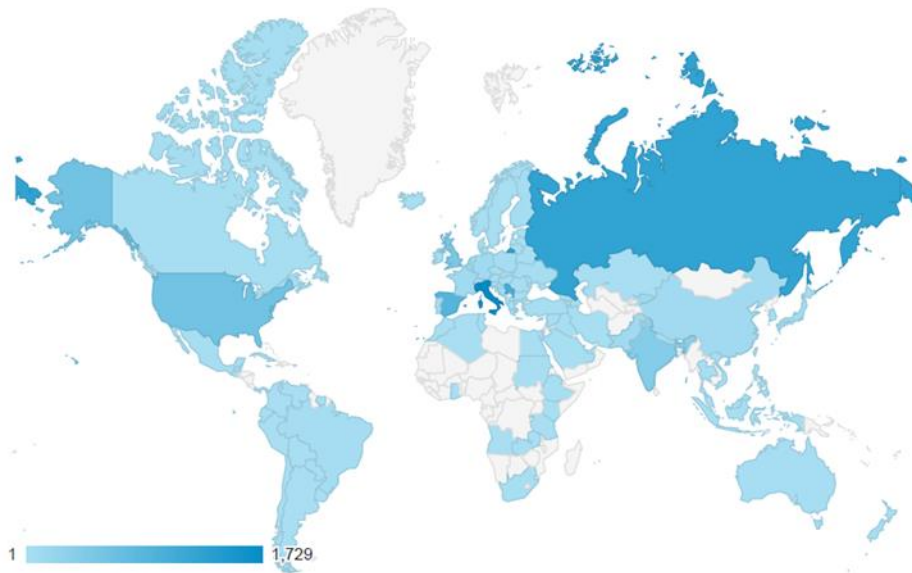


Figure 19. Geographic access distribution

Table 14: Geographic statistics

Country	Sessions	% New Sessions	New Users
Italy	1729	71.37%	5793
Russia	1253	83.56%	1047
Serbia	1017	66.86%	680
Spain	878	50.91%	447
United States	576	94.97%	547
United Kingdom	477	76.52%	365
India	374	89.57%	335
(not set)	329	100,00%	329
Kyrgyzstan	119	84.87%	101
Belgium	115	40.87%	47

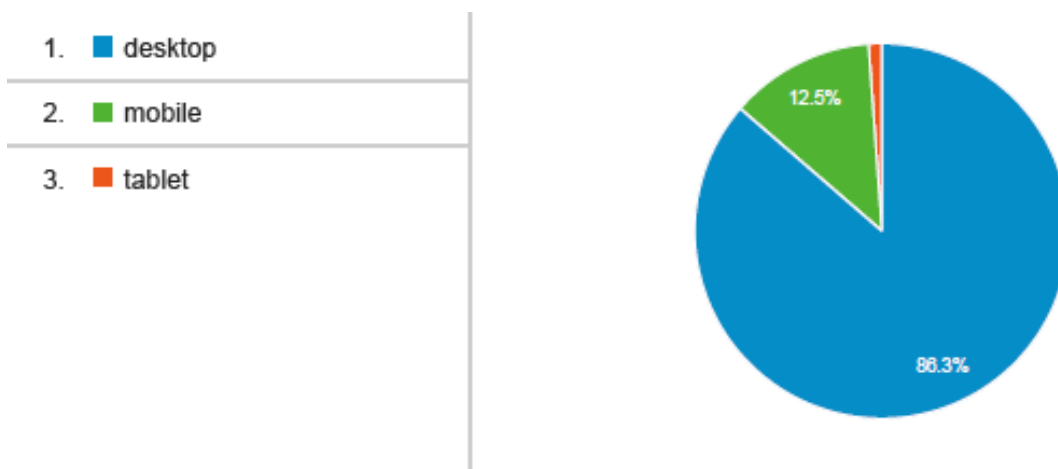


Figure 20. System statistic

Table 15: Operating system statistics

System Type	Access	% Access
Desktop	7007	86.32%
Mobile	1017	12.53%
Tablet	93	1.15%

Notice that the website was visited more than 8,000 times, with a balance mixture of new users and existing users, which visited on average 2.15 pages per sessions, staying connect for about 1m and 30s. The graph in Figure 18 shows that there were peaks in the access to MobiWallet website. For instance, there were good access in i) October, ii) November, iii) January, iv) April and v) summer 2016. These peaks can be correlated with other dissemination activities carried out at consortium level and respectively out attendance to i) POLIS workshop and ii) HoPE workshop, iii) the second pilot demonstration, iv) MobiWallet workshop at TRA 2016 and v) local promotional initiatives in summer 2016 (see Section 3.5.4).

The four countries involved in the project pilots are among the top six nations accessing to the website (see Table 14). Traffic from Russia and United States is also relevant. It is possible that some traffic from India (at position 7) was due by mistake by users looking for another payment platform available in Asia, which is named “Mobi Wallet” as well. This is in line with the high percentage of new sessions (89.57) from India.

The website is also usable by mobile and on average about one out of eight connections was made by smartphones and tablets (see Table 15).

3.5.2 Social media

MobiWallet project is registered on major social media like: Slideshare, LinkedIn, Google Plus, YouTube and Twitter.

All the dedicated project pages are kept up to date and contain information about the project itself, performed activities, news and events.

All such platforms provide internal monitoring tools, with different levels of information available. For example, LinkedIn allows to know the number of followers, while Slideshare gives information about the number of views of the available MobiWallet presentations. Twitter offers a dedicated analytics section with more details on the demographic of the followers and on the impact of each tweet.

In this period, we have focused on Twitter as conventional social media, which proved to be the most advantageous for building a community of professionals, operators and stakeholders for sharing the advances and achievements of the project. YouTube and Slideshare were instead essentially used to share multimedia content, i.e. videos and presentations.

In Figure 21, Figure 22, Figure 23, Figure 24 charts about impressions received displayed in three-month periods over the last year are reported. Impressions correspond to the number of times users saw tweets by MobiWallet on Twitter. In the first quarter (September 2015 – November 2015) over 12,000 impressions were earned with a peak of 1303 impressions on November 19, corresponding to our attendance to **POLIS 2015** (see D6.1.3 for more details and tweets from the day) that started that day. Over the second quarter in Figure 22, the number of impression grew up to 43,300, that is about three times and a half the values earned in the previous quarter. Here the peak is at end of January, linked to the **second pilot demonstration** held in Novi Sad. The next quarterly from March to May 2016 earned over 72,000 impressions thanks to the organization of MobiWallet workshop as a satellite event of Transport Research Arena, that was celebrated on April 18. Indeed, that day shows the highest

score of impressions, of about 8,000. The last quarter showed a more uniform but nevertheless relevant number of impressions, linked to the echoes of the local promotional initiatives carried out by the pilots.

Your Tweets earned **12.0K impressions** over this **90 day** period

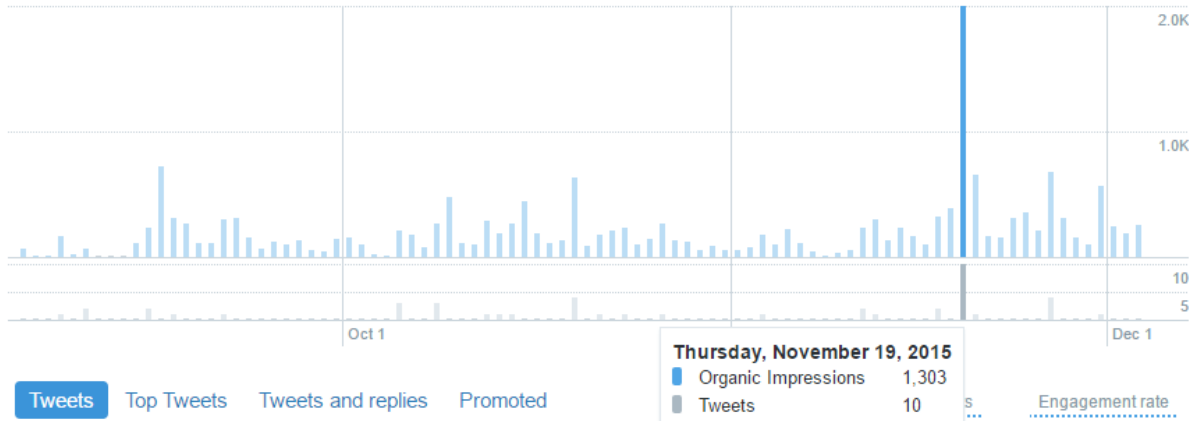


Figure 21. Twitter analytics for impressions during September-October-November 2015

Your Tweets earned **43.3K impressions** over this **90 day** period

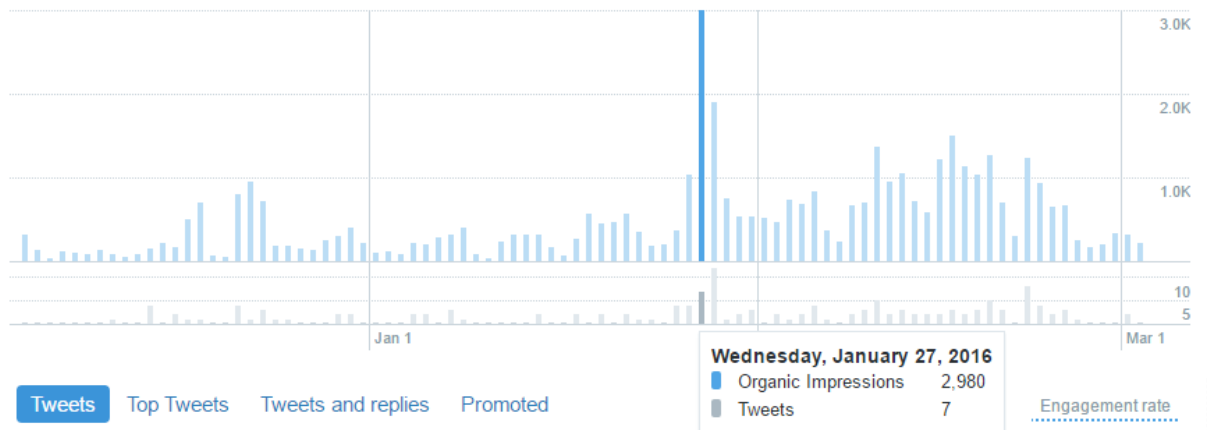


Figure 22. Twitter analytics for impressions during December 2015, January 2016 and February 2016

Your Tweets earned **72.1K impressions** over this **91 day** period

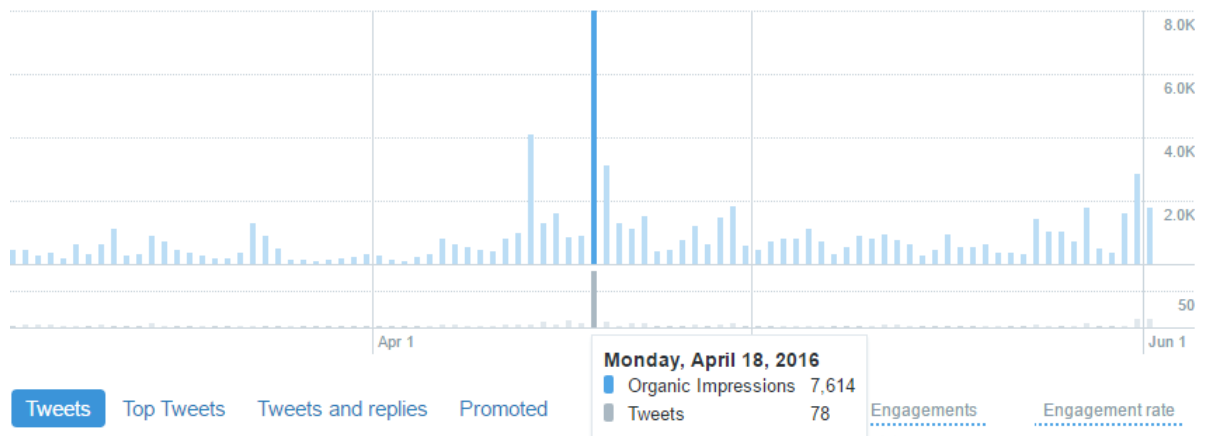


Figure 23. Twitter analytics for impressions during March, April and May 2016

Your Tweets earned **41.1K impressions** over this **91 day** period

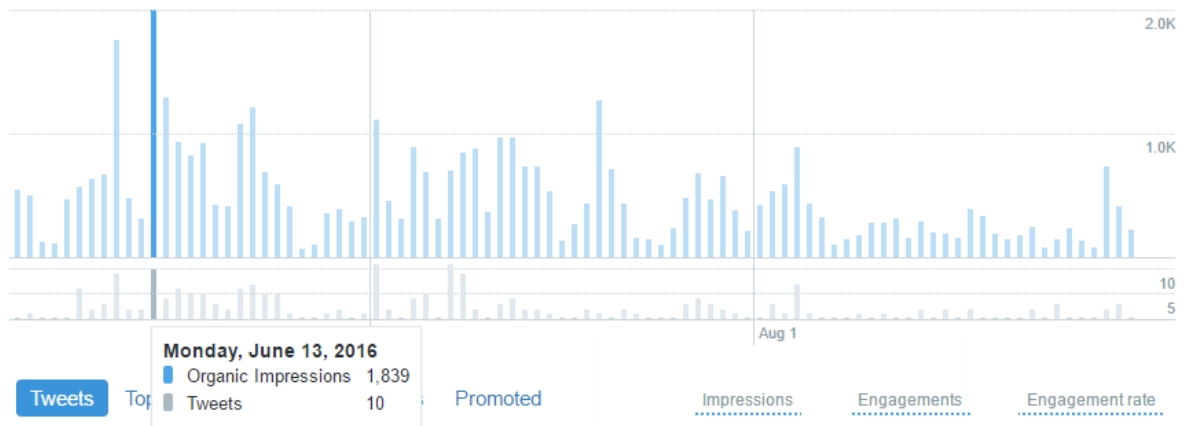


Figure 24. Twitter analytics for impression during June, July and August 2016

The number of followers of the Twitter account increased during the project lifetime. At the first project review, MobiWallet had 59 followers, which increased to 167 at March 2016 (second review) and reached 218 at the time of writing (September 12, 2016). Most of the followers are professionals, institutions or projects with similar aims (such as PSP CIP HoPE project). As a demographic 66% are male and 34% are female. Their interests are reported in Figure 25. Such data suggests that indeed MobiWallet is addressing a community of professionals, since the keywords are coherent with such. Figure 26 reports the geographic distribution of MobiWallet followers. It appears clearly that the project was able to gain interest at regional level, but also with some followers from all over Europe and North America.

Interests

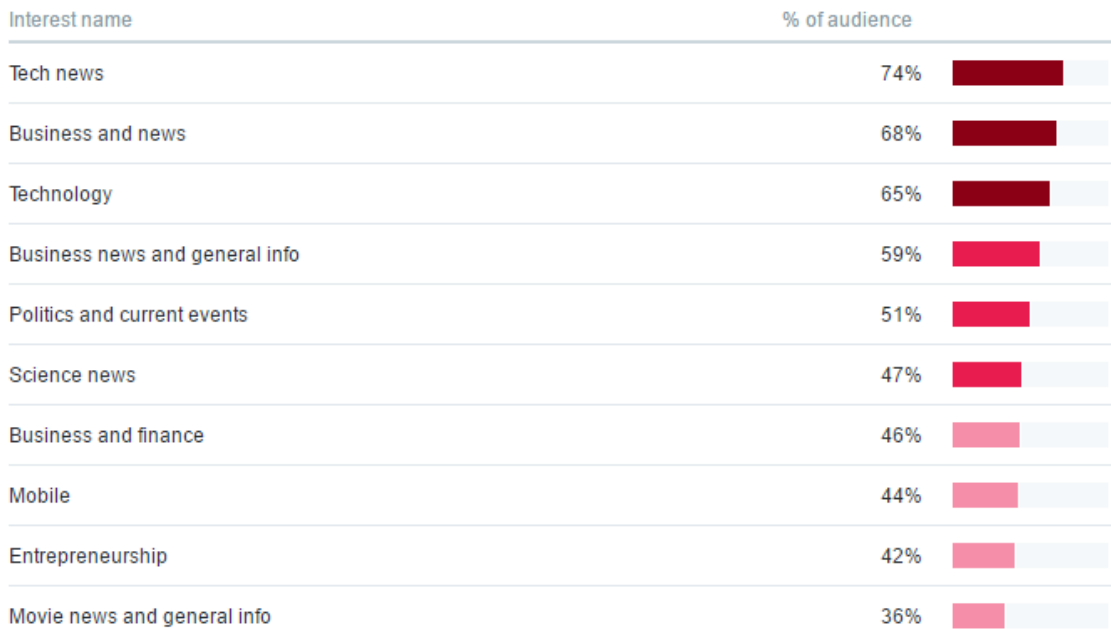
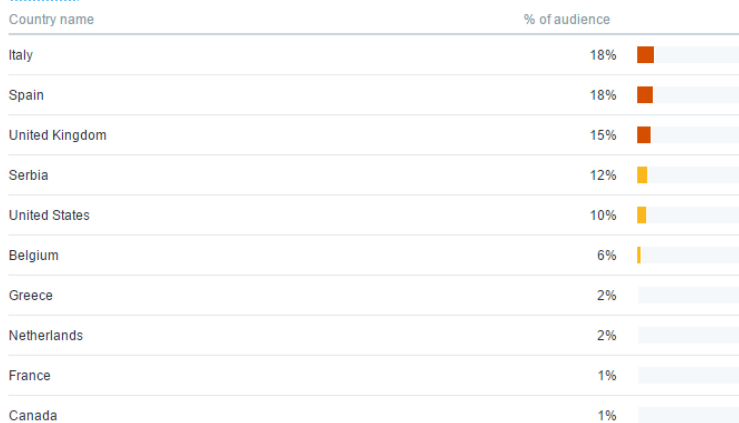


Figure 25. Analysis of MobiWallet followers' interests

Country



Region

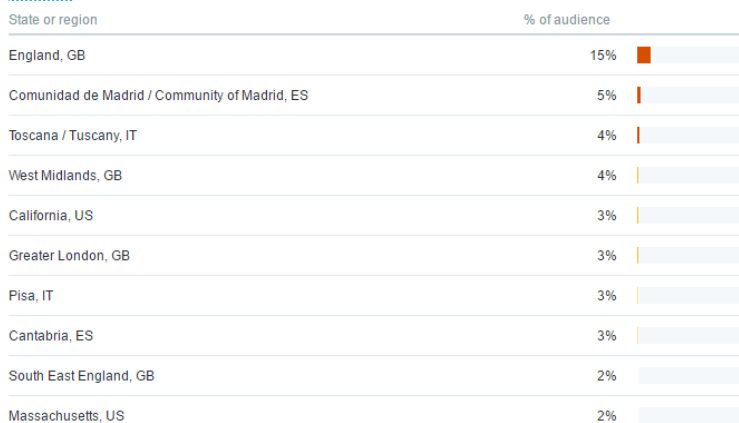


Figure 26. Analysis of MobiWallet followers' origin

Concerning SlideShare, the analytics provided by the platform allowed to assess the number of views earned by the presentations uploaded by the project, i.e. the project presentations and the pilot presentations (see D6.1.3 for information about the uploaded content). Up to the time of writing, 11,765 views were reached over the last 12 months. Since the presentations contain very informative material, such a number show the efficiency of SlideShare in contributing to project dissemination. The views per months are reported in Figure 27. In Figure 28 we report the source of traffic that produced visualization of our presentations.

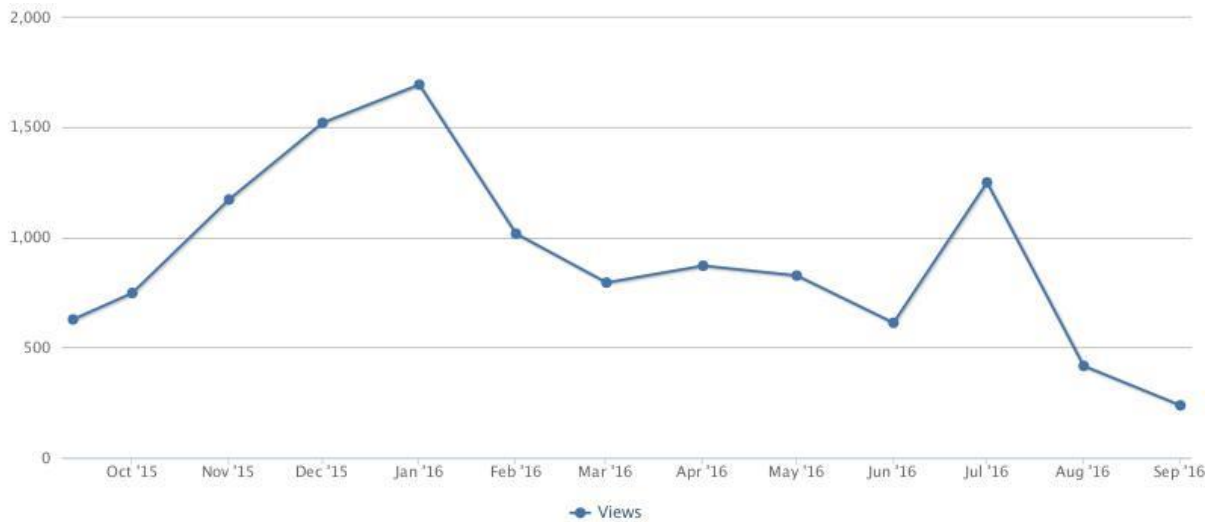


Figure 27. Views per month of MobiWallet presentations in SlideShare

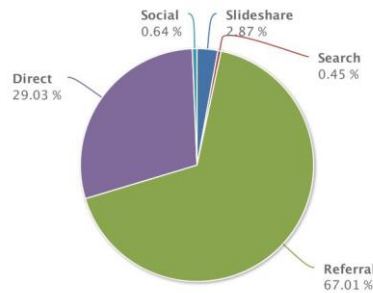


Figure 28. Traffic that gave origin to visualization of MobiWallet presentations

A YouTube channel was used to broadcast footage from the pilots and for collecting important videos in playlists. Over 900 views were reached at the time of writing for the video directly uploaded by the pilot. Such number should be complemented to the number of visualizations reached by videos in the playlists devoted to MobiWallet pilot. For instance, the video by UK pilot on SWIFT card (made available and subtitled by Network West Midlands Channel) reached over 1,300 views (see Figure 29).

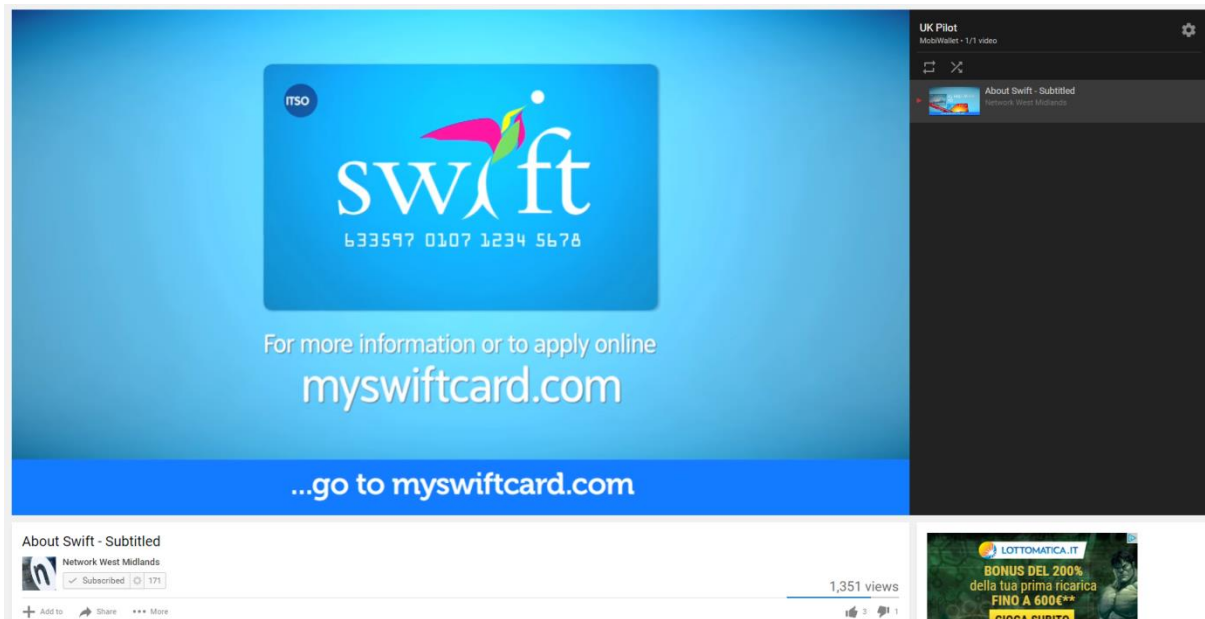


Figure 29. SWIFT card video reached 1351 views at the time of writing

3.5.3 Newsletter

Three issues of the newsletter were published up to now, to a growing community of operators and stakeholders. As shown in Table 16, the newsletters were successful in being received and opened between 250 and 300 times for each issue. It seems that the newsletter was never considered to be unsolicited email by the audience. Indeed, only one person decided to unsubscribe from the newsletter after reception of the first issue.

Table 16. Statics about MobiWallet Newsletters

Issue	Send Date	Sent Emails	Total Opens	Unsubscribe
#01	19 February 2015	295	254	1
#02	08 October 2015	319	325	0
#03	13 April 2016	329	255	0

3.5.4 Other national dissemination activities

During pilot deployment and, especially, in the last months of the project, local initiatives have been carried out to promote the project toward the general public, making them aware of MobiWallet, of its aims and, mainly, of the services the project has made available to citizens, commuters and tourists. Such activities have been surveyed in Section 7 of D6.1.3 “Dissemination Pack (Third Generation)” [6]. The focus of this section is to assess the impact of these actions, by looking at several analytics directly or indirectly linked to them.

3.5.4.1 Local initiatives in Spain

During the last months of the project, and in order to publicize the project and increase the number of users, the Spanish partners carried out the following activities:

- Press notes in newspapers and online.
- Distribute posters and stickers for the modes involved in the pilot (Figure 30).



Figure 30. Sticker to identify MobiWallet vehicles

- Create social media channels in Spanish (Figure 31), where information about the pilot and workshops was published.
 - Facebook: <https://www.facebook.com/MobiWalletSantander/>
 - Twitter: @MW_Santander



Figure 31. Facebook and Twitter account of MobiWallet Santander

- Create a dedicated page within the MobiWallet-project web page, containing an online manual on how to join and use the system:



Figure 32. Online Manual (<http://www.mobiwallet-project.eu/index.php?view=article&id=81>)

- Santander City Council made available its Youth Association Space (“Espacio Joven”), in which volunteers can pick their MobiWallet tag, together with a brochure explaining how to register and use MobiWallet App. Moreover, the association offered a room in which MobiWallet partners had the opportunity to organize several Workshops with users to present the system (as the one depicted in Figure 33).



Figure 33. Volunteers in a workshop learning how to join and use the pilot

Workshops were announced in the City Council Web page, and through press releases and using social media channels.



Figure 34. Santander City Council Web Page with information about the workshops

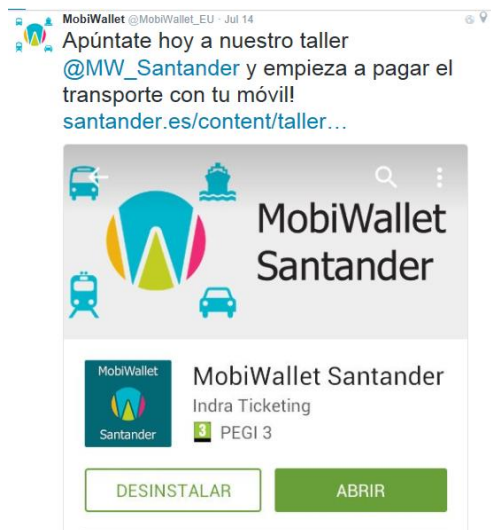


Figure 35. Tweet to advertise the workshops

- A video was showcased in the TV channel of all bus lines, during several weeks in the summer. It is also available in YouTube: https://youtu.be/UR_e0mvlEFOff

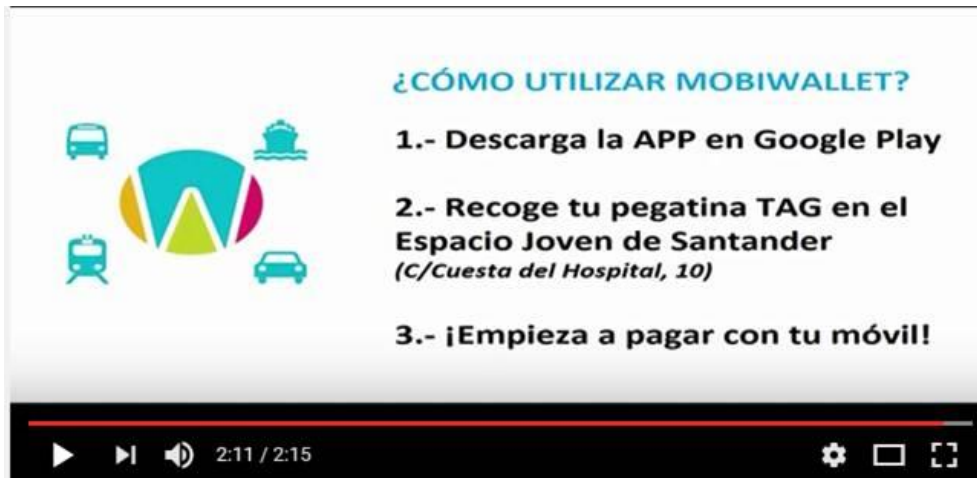


Figure 36. Video broadcasted in the TV channel of all bus lines in Santander

- An email address was made available for users to ask about how to join the project or ask for technical support in case of problems with the system.

Impact

The Facebook and Twitter accounts did not have a big success in terms of followers, but were considered useful to provide potential or current users with information on how to use the system, when workshops were organized and to include manuals, tips and links to videos showing how to use the system. All of this is written in Spanish, because the target audience in the country is not usually fluent in English.

More impact had the Online Manual web page, visited more than 200 times during summer 2016 with an average reading time greater than 3 minutes and a half (see Figure 37).

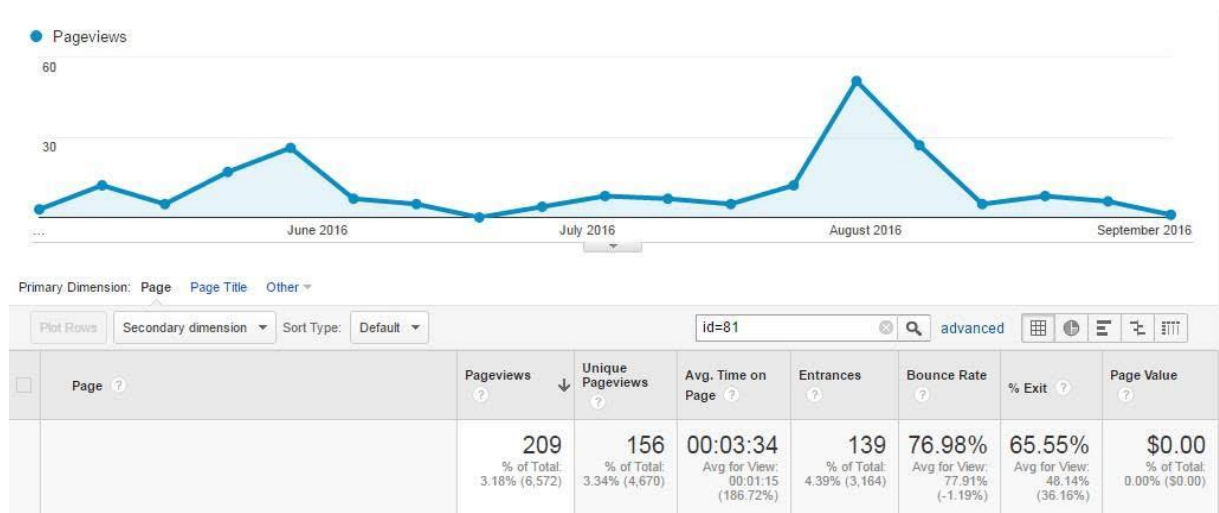


Figure 37. Statistic of access to the Online Manual page of Spanish Pilot

Finally, the channel considered more active and more used by the volunteers was the email address (usuariomobiwallet@mobiwallet-project.eu), to which many volunteers sent an email indicating

that they have seen the dissemination material (posters/stickers/press notes etc) and they are willing to get involved.

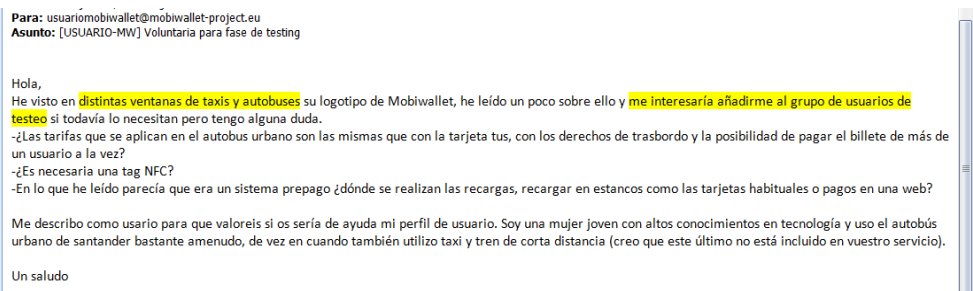


Figure 38. One of the several emails written by volunteers to join the system

3.5.4.2 Local initiatives in Italy

#mobiwith_it is the promotional campaign promoted by the Italian pilot of MobiWallet project that was run from May to early August 2016.

The initiative #mobiwith_it had a two-fold aim:

- encourage the use of the services offered by the Italian Pilot of MobiWallet project;
- understand the current habits of citizens and their possible willingness to use more sustainable forms of transport, by inviting people to join the pre-trial and post-trial surveys organized in the framework of WP5 as reported in previous sections of this document.

The campaign was supported by pages on major social media and, especially, on Facebook which is the most popular platform in Italy for reaching the general public.

The success of the page was constantly evaluated and monitored by using Facebook insights tools. Few days after its release the page reached 100 likes from the public. Then, such number increased steadily during the full duration of the campaign until reaching 167 likes at the time of writing (see Figure 39).

Posts issued by the campaign were able to reach hundreds of users. Two posts reaching respectively 319 and 454 users are reported in Figure 40 and Figure 41.

These figures show that the campaign on social networks was helpful in reaching the aims of the #mobiwith_it initiative that were fully met featuring more than 200 of surveys completed and an increase in the number of transactions.

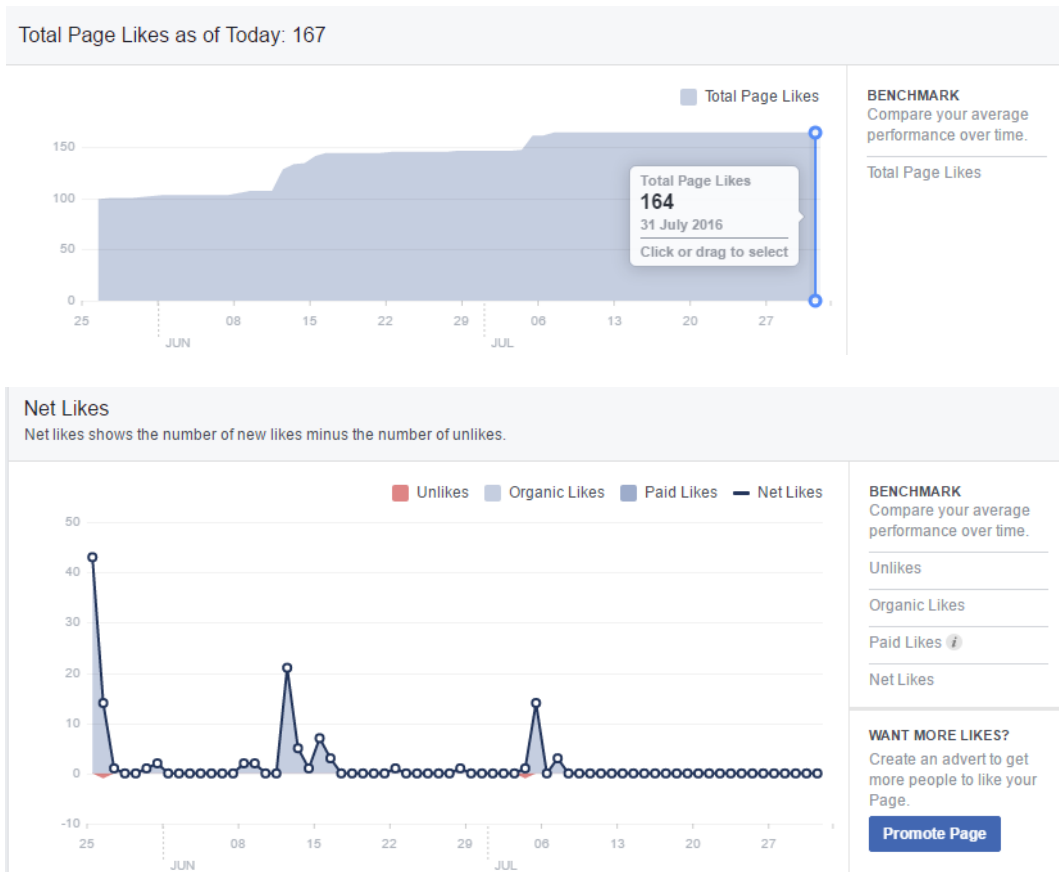


Figure 39. Number of likes featured in #mobiwith_it page. The number of likes has a strong peak at the beginning and then increased steadily without losing its impact (indeed, there are no negative values reported in the bottom chart)

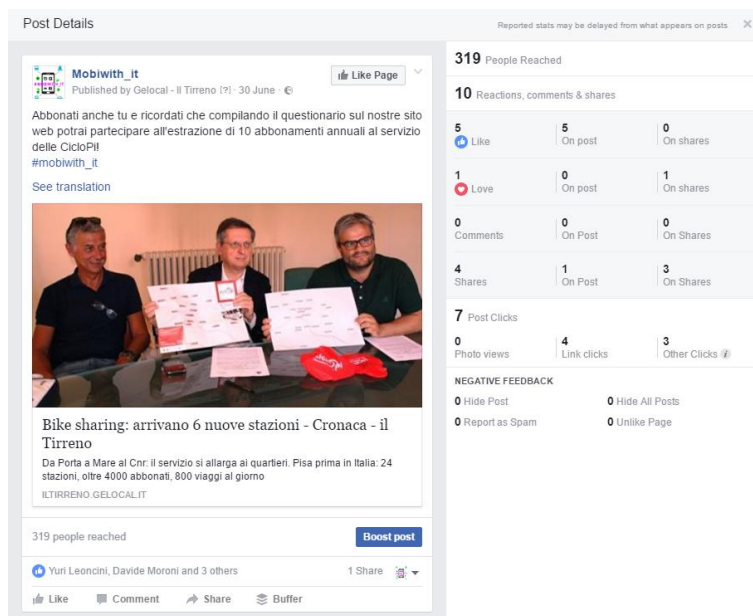


Figure 40. Post showing Pisamo director, Pisa Mayor and the assessor to mobility inaugurating new bike sharing stations in Pisa. Bike sharing vouchers are one of the incentives made available by #mobiwith_it campaign.

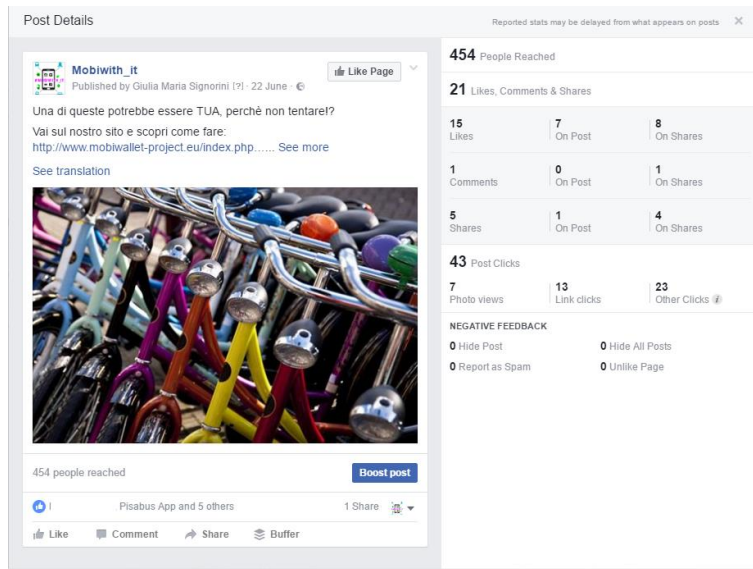


Figure 41. Post promoting the initiative and asking user to participate to the survey. A number of bikes were made available as prizes for users testing the system and letting the consortium know their opinion about the provided services.

The Italian cluster has also promoted the initiative MobiWith_IT also through Twitter posting the most important updates of the pilot and of the initiative. Pictures below depict some of the tweets of previous months:



Figure 42. Tweet by Aleph promoting #mobiwith_it



Figure 43. Tweet by PisaBus promoting #mobiwith_it

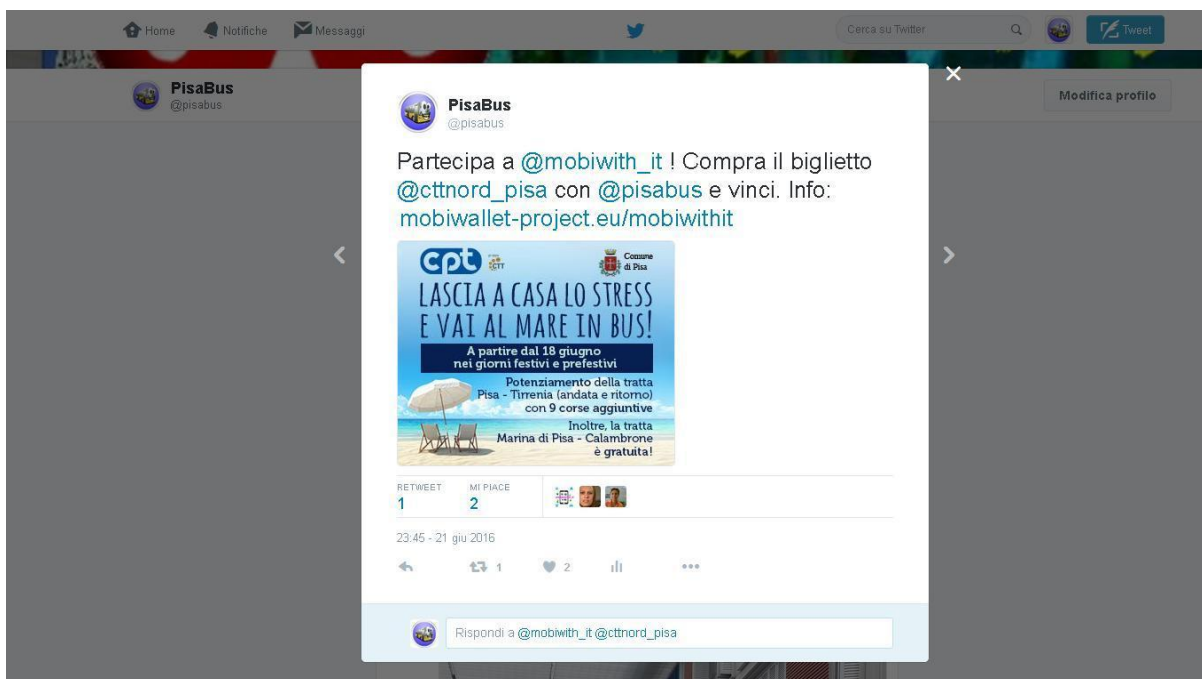


Figure 44. Tweet by PisaBus promoting #mobiwith_it

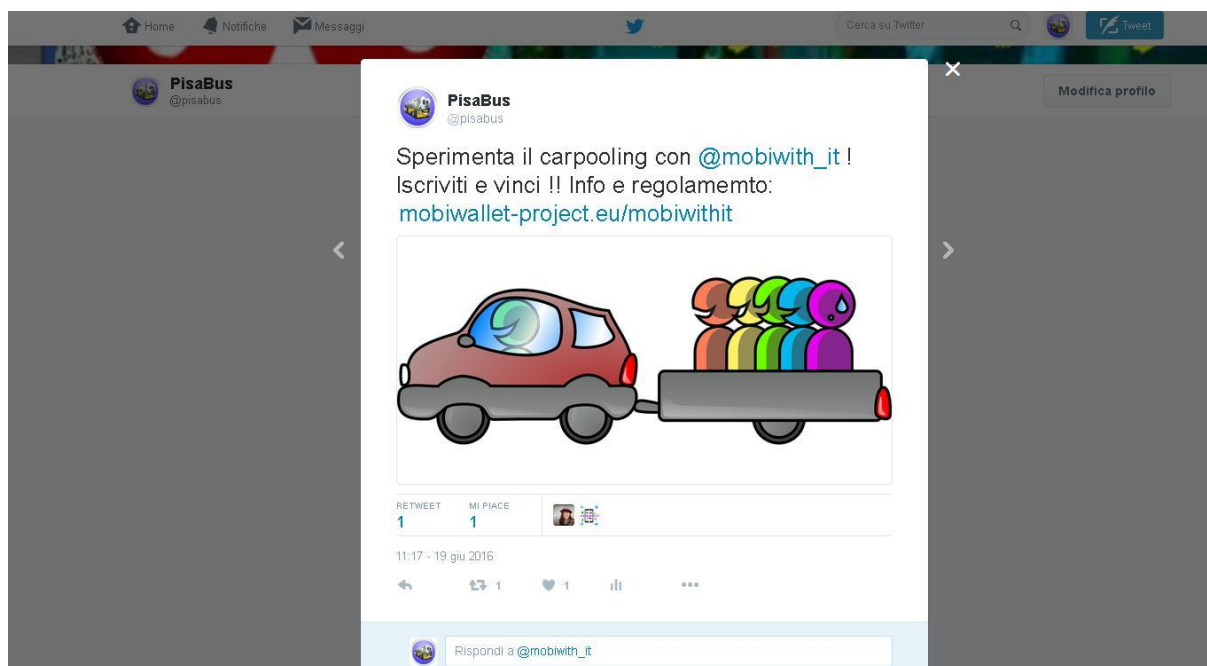


Figure 45. Tweet by PisaBus promoting carpooling services made available by MobiWallet

3.5.4.3 Local initiatives in Serbia

During the last period of the MobiWallet project, Serbian partners focused on the more intense promotion and publicising of the pilot in order to increase the number of users. Major activities carried out are listed below.

Promotion of MobiWallet project and mobile app through Totem “Smile of the city”.

- City of Novi Sad and DunavNET are actively involved in promoting the latest technologies that can considerably improve the quality of life and business atmosphere in the city.
- One of the latest promotional activities refers to setting up the totem “Smile of the city” which promotes the concept of smart cities through detection of smiles of passing citizens. The totem invites citizens to smile and download mobile applications and get involved in numerous activities related to development of Novi Sad into a smart city.
- This includes promotion of the MobiWallet project and pilot. The goal is to collect 10,000 smiles and once this number is reached 10,000 RSD will be donated to one of the childcare institutions.

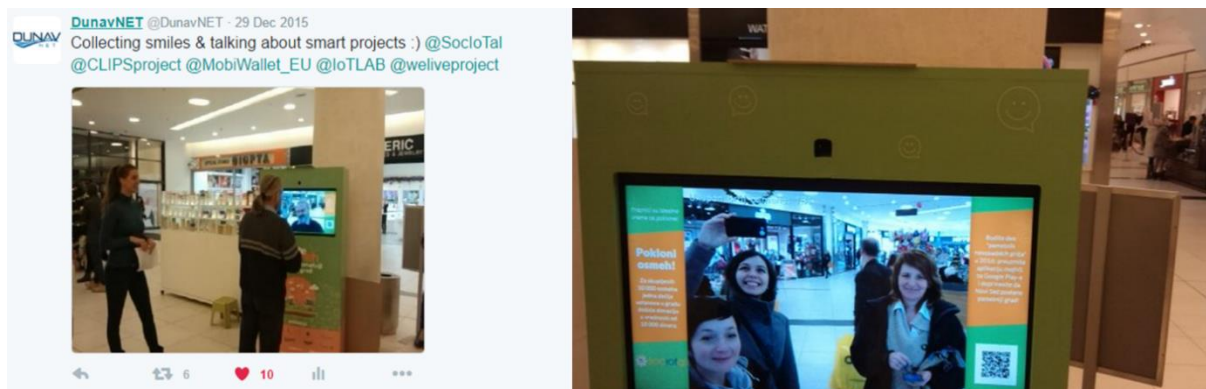


Figure 46 Smart cities' projects including MobiWallet initially promoted through the Totem "Smile of the City" on 29th December 2015 in the shopping Centre "BIG".

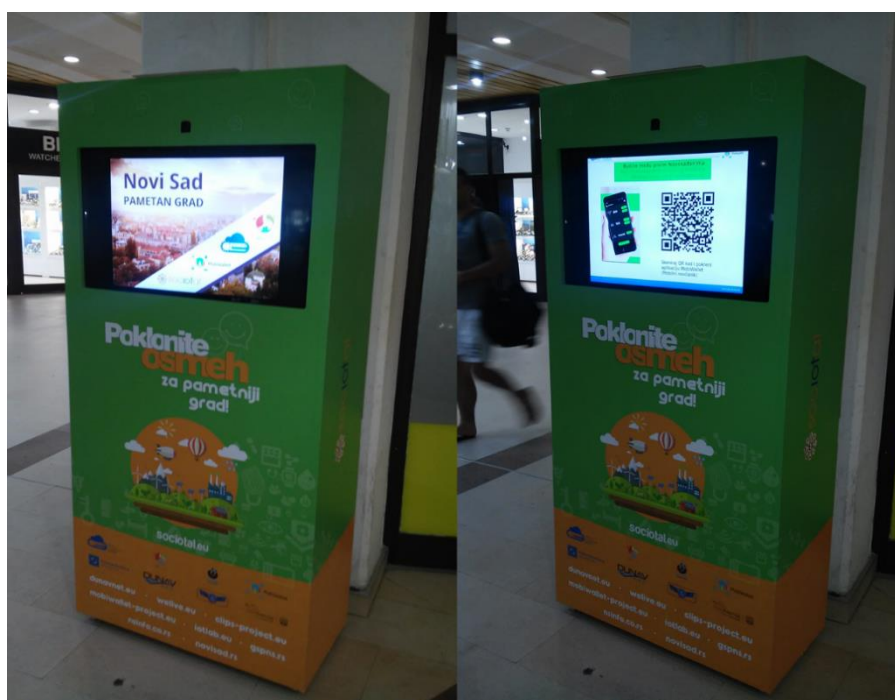


Figure 47 Totem Smile of the City in Novi Sad promoting concept of Smart Cities and presenting active Smart Cities related projects (including MobiWallet) – Summer 2016 at Sport and Commercial Centre Vojvodina in Novi Sad

Other promotional activities:

City of Novi Sad also organized several "smart city" events in the city, where MobiWallet project objectives and developments status were presented.

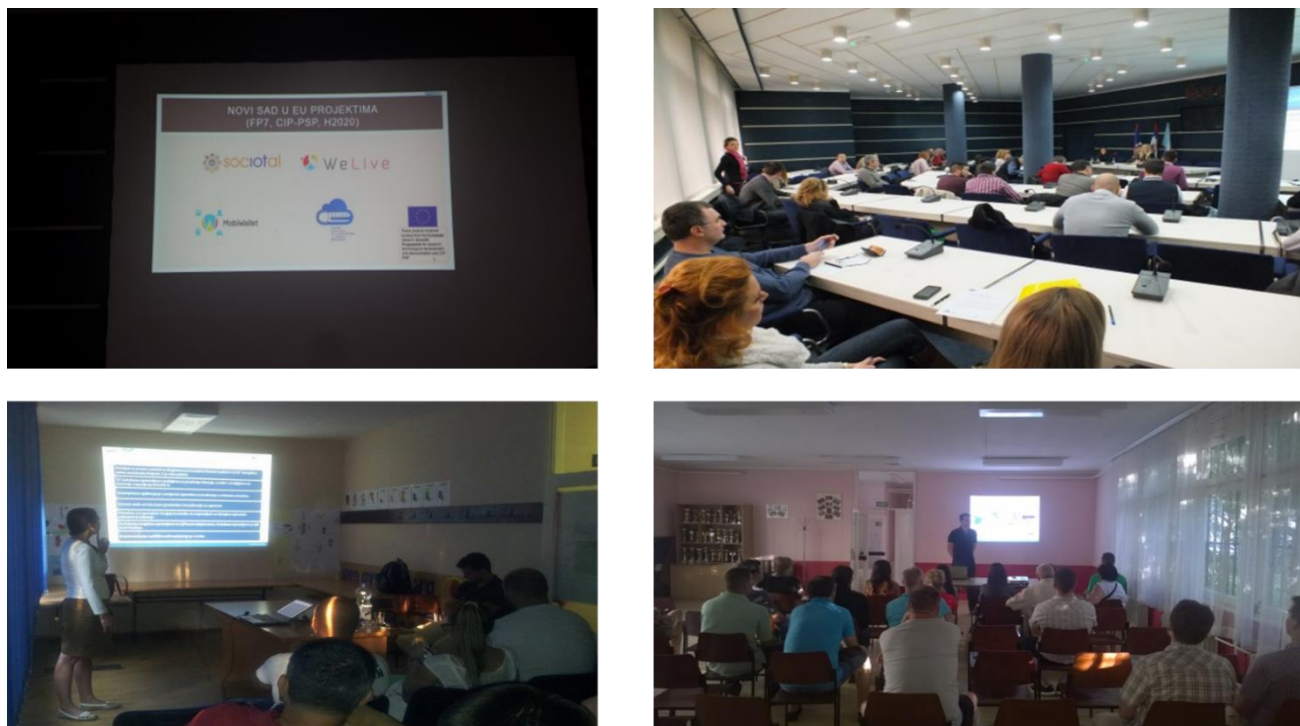


Figure 48 Various local dissemination activities organised by the City of Novi Sad and DunavNET



Figure 49 Smart cities workshop in Novi Sad presenting MobiWallet project in December 2015

Serbian MobiWallet pilot and mobile app have also been promoted through social pages – twitter, Facebook and LinkedIn. The latest promotional activities on the MobiWallet Facebook page are illustrated with the few posts on a local Facebook channel promoting the pilot activities as well as the latest MobiWallet app novelties. Serbian pilot partners also included some promotional packages for using the transport services through the MobiWallet application. For example, each user using the taxi service and paying for it via virtual wallet received additional 30% of the value paid in as gratis into the virtual wallet.



Figure 50 Post about promotion of MobiWallet project at IoT Week in Belgrade in June 2016



Figure 51 Facebook posts promoting the Serbian pilot and parking service payment via mobile app



Figure 52 Facebook posts promoting the latest novelties in MobiWallet app - Taxi service

Focus groups with system users were also organized in July where the latest version of the mobile app and its features were presented and evaluated with participants.



Figure 53 Focus group with system users

Impact

a) Totem “Smile of the city”

The totem Smile of the City collected around 2,000 smiles in August and can be considered as a good tool for promoting the pilot.

b) Social networks

The local Facebook and Twitter accounts were quite active in promoting the pilot and useful in providing the potential and current users with the new features of the app, incentives schemes offered and promotional workshops. Local Facebook is written in Serbian and has some moderate visibility. Total number of followers is 150 since starting the page in October 2015 to date. Graphs on Figure 54, Figure 55 and Figure 56 provide some analytics from this communication channel.

Ukupan broj lajkova stranice od pokretanja 9/10/2015 do 10/9/2016



Figure 54 Total number of Facebook likes

Reach postova od pokretanja 9/10/2015 do 10/9/2016



Figure 55 Post reach since starting the Facebook page

All Posts Published						
Published	Post	Type	Targeting	Reach	Engagement	Presence
28/07/2016 10:30	Danas su se u prostorijama kompanije DuwaNET okupili korisnici MobiWallet aplikacije	Image	Global	125	94 1	Reach post
26/07/2016 10:30	Danas je održan sastanak partnera koji učestvovali su na novosađskom pilot projektu MobiWallet	Image	Global	130	272 1	Reach post
26/07/2016 10:10	Novo verzija aplikacije MobiWallet dostupna je na Google Play-u: https://play.google.com/store/apps/details?id=com.mobivault	Image	Global	129	15 4	Reach post
19/07/2016 10:30	MobiWallet aplikacija zapre je 8u1. 1ka pite autobusku kartu 2.pozivnice i platite ta	Image	Global	180	19 0	Reach post
18/07/2016 10:30	MobiWallet misli na sve detalje: omogućava i plaćanje parkinga putem aplikacije - b	Image	Global	168	9 0	Reach post
15/07/2016 11:17	NOVO! Od sada se taksijem Maxi Novosađani mogu voziti bez novčanika. Posebno je	Image	Global	138	8 4	Reach post
14/07/2016 11:31	[AKTUELNO!] MobiWallet aplikacija dobila je novu opciju: omogućava i plaćanje taxi	Image	Global	197	30 9	Reach post
28/05/2016 10:40	MobiWallet projekt sledne nedelje bio je predstavljeno na međunarodnoj konferenciji IoT	Image	Global	140	18 7	Reach post
18/04/2016 10:30	Kako putovati lakše: Prezentacija MobiWallet aplikacije na novosađskom pilot projektu u Varu na	Image	Global	120	28 3	Reach post
15/04/2016 14:12	Sledne nedelje smo od 18. do 21. aprila u Varu! Posetimo celu Evropsku konfer	Image	Global	127	10 4	Reach post
28/01/2016 10:30	U Novom Sadu 27. januara održana je druga demonstracija pilota MobiWallet projekta	Image	Global	163	598 2	Reach post
18/01/2016 10:30	Pogledajte najnovije informacije o MobiWallet projektu i njegovom razvoju pilota ova	Image	Global	147	19 2	Reach post
20/03/2016 10:30	Novo samo plaćanje taksija	Image	Global	138	18 8	Reach post
20/03/2016 10:30	U petak, 17. decembra održana je nova prezentacija aplikacije MobiWallet na konferenciji	Image	Global	90	78 1	Reach post
20/03/2016 10:30	MobiWallet ima 1298 preuzimanja na Google Play-u i 1000 na App Store-u	Image	Global	0	8 8	Reach post
20/03/2016 12:30	Preuzeti smo se u petak, 17. decembra u 17h na sajtu na koji se linka na	Image	Global	110	12 3	Reach post
20/03/2016 10:30	18. aprila predstavili smo aplikaciju MobiWallet na konferenciji i poslovnom sastanku u Novom Sadu u	Image	Global	220	84 8	Reach post
27/03/2016 10:30	[NOVO] Pogledajte kako je bilo naše prezentiranje aplikacije MobiWallet na konferenciji u	Image	Global	110	18 3	Reach post
18/03/2016 10:30	Prva pilot projekta MobiWallet u Novom Sadu i Beogradu. MT.	Image	Global	104	42 12	Reach post
18/03/2016 10:30	MobiWallet ima 1000 preuzimanja na Google Play-u i 1000 na App Store-u	Image	Global	0	8 8	Reach post
12/03/2016 10:30	Prva prezentacija MobiWallet aplikacije na konferenciji i poslovnom sastanku u Novom Sadu u	Image	Global	040	41 28	Reach post
10/03/2016 10:30	U petak, 17. decembra održana je nova prezentacija aplikacije MobiWallet na konferenciji	Image	Global	211	22 17	Reach post
09/03/2016 10:30	MobiWallet ima 1000 preuzimanja na Google Play-u i 1000 na App Store-u	Image	Global	0	8 8	Reach post
08/03/2016 10:30	U petak, 17. decembra održana je nova prezentacija aplikacije MobiWallet na konferenciji	Image	Global	400	8 8	Reach post
23/03/2016 10:30	Aplikacija MobiWallet dostupna je novosađanima na Google Play-u i App Store-u	Image	Global	200	8 8	Reach post
11/03/2016 10:30	Dobro došli na konferenciju i poslovni sastanak u Novom Sadu u prostorijama kompanije DuwaNET	Image	Global	204	22 8	Reach post
12/03/2016 10:30	MobiWallet ima 1000 preuzimanja na Google Play-u i 1000 na App Store-u	Image	Global	0	28 8	Reach post
08/03/2016 10:30	MobiWallet	Image	Global	0	20 8	Reach post

Figure 56 All published posts and statistics for each of them

Twitter coverage was in English and went via DunavNET twitter account. It also regularly reported about any event/promotional activity but did not have a big impact in terms of followers in Serbia.

c) Focus groups

In addition to obtaining a very positive feedback from the participant of focus groups, they also spread the impressions about the mobile app around. This was probably considered the most effective way of engaging the users through live demonstration of the app features.

3.5.4.4 Local initiatives in UK

As the MobiWallet solution in the UK is an enhancement of existing systems, it has been inappropriate to promote it as a singular solution. However, the Network West Midlands website, which hosts the journey planner, has promoted extensively as is the Swift smart ticketing solution and its fulfilment functions. Due to the popularity of the Network West Midlands website and the Swift smart ticketing solution, the impact of the promotion of MobiWallet functions has been successful. For instance, the promotional activities linked to MobiWallet surveys were published on the NetworkWestMidlands Twitter page (<https://twitter.com/networkwm>), which is followed by more than ten thousand users; in addition, the Twitter account dedicated to Swift card (<https://twitter.com/myswiftcard>) is followed by more than one thousand users. This has been sufficient to attract a large number of customers to use the MobiWallet functions. Furthermore, these accounts were open to live tweets during selected schedules in order to provide quickly answers to users' questions and doubts.

4 Process & policy evaluation

The process and policy evaluation was used to assess the project performance and stakeholder views on achieving the following five original objectives and an additional sixth identified in the early stages of the project.

- 1) Configuration and deployment of four pilots.
- 2) Definition of an interoperable framework based on the ISO24014.
- 3) Adaptation of technical solutions to the MobiWallet interoperable framework.
- 4) Providing a multimodal fare management service to a minimum of 700 European users across four countries.
- 5) Involving at least 3 separate modes of transport per pilot.
- 6) Evaluation of the payment infrastructure developed to enable the pilots.

The purpose of a process and policy evaluation is to understand lessons from the various project stakeholders on how MobiWallet has approached the task so that future deployments can be made with reduced risk.

The process evaluation approach will be familiar to anyone who has implemented quality management procedures within their organisation; understand how something happened, review whether it can be improved, then making recommendations for the future.

Policy evaluation looks at the wider context of the deployment, beyond what the pilot teams have direct control over. Questions to identify desirable, economic, legal, behavioural or political features of the wider operational environment can also be investigated to identify impact of success and suitability of IFM implementation and adoption.

4.1 Methodology

Process and policy evaluation was comprised of three methods of evaluation. The first involved surveys of each pilot project delivery team, and surveys of each pilot's participating public transport operators and city authorities. The second involved running focus groups with both project delivery partners at each pilot site, and separately system users at each pilot site. All results were translated and returned to TTR for analysis. The third method involved a structured symposium involving all direct project partners, from all pilots in one focus group which focused on the delivery of the programme overall, rather than focusing on individual pilot levels as previous focus groups had been. Whilst it was originally intended that this symposium would be held as a face to face meeting for all project delivery partners, technical delays within the pilots meant that availability was difficult at this late stage of the project, and so the symposium was conducted via teleconference instead.

4.2 Approach

There are five main audiences or contributors whose views are of interest within the process and policy evaluation, each identified to have different views on different aspects of the project. These are:

- **System Users:** These members of the public have been selected to participate in the testing of the pilot systems.
- **Project partners:** Those personnel who are involved in the transnational partnership elements of the MobiWallet project who can be expected to have a certain level of understanding about the original project aims and objectives.
- **Wider technical team:** This includes personnel in partner organisations who have some involvement in the local pilots (operational, strategic...) but are not directly involved in the wider MobiWallet project. This can also include third party technology or subsystem contractors. It should be expected their views to offer a different perspective than those more closely embedded in the transnational elements of the project.
- **Transport operators:** This involves management and potentially drivers/ticket inspectors/sales staff from all modes involved in each pilot. They will provide an important commercial and practical context to the evaluation process.
- **Cities:** Representatives from the cities will provide an important policy and practical context to the evaluation process.

Each identified audience group participated in the process and policy evaluation. Table 17 outlines the number of stakeholders that participated in each element of the evaluation and the three different evaluation methods that were utilised. Note there were no transport operators or city representatives highlighted against the UK as all project development was undertaken by the project partners, who are also the city transport representatives, and development did not involve public transport operators in any significant sense.

Table 17. Number of stakeholders from each audience group involved in each method of evaluation within each pilot

Audience groups						
Evaluation methods	Pilot site	System users	Project partners	Wider technical team	Transport operators	Cities
Online survey	Spain	N/A	11		13	
	Italy	N/A	26		14	
	UK	N/A	7		N/A	
	Serbia	N/A	5		3	
Focus groups	Spain	10			10	
	Italy	10			10	
	UK	10	12		N/A	
	Serbia	10			10	
Per project						
Structured symposium			12			

Online questionnaires provide an easy way of gathering feedback from a high number of users and provide quantitative weight to the project evaluation. Key audience groups identified in Table 17 were asked to participate in an online survey to gather individual opinions and responses. An important element of this survey, which the analysis will show below, was to identify processes undertaken and key lessons learnt.

4.2.1 Project partners and wider technical team

A total of 49 project partners and wider technical team members, across the four pilot sites, completed the process and policy focused survey. Results show that partner satisfaction with the overall MobiWallet project is high, with an average rating of 7.98 out of 10, with the highest satisfaction rate coming from Spanish pilot partners and lowest coming from Italian pilot partners.

The perceived value of the project is further evidenced by partners, who indicate they would be willing to participate in a future project (4.67 out of 5), with Spanish pilot partners again scoring the highest.

4.2.1.1 What worked well

Table 18 below outlines the top three most successful aspects reported by each pilot. There are two themes perceived as successful consistently across all four pilots. The first is the technical outputs of each pilot, being regarded as valuable developments that benefit each city and laying the foundation for future improvement. The second is in working in wide collaborations both within the direct delivery team and across sectors within each city.

Table 18. Top three most successful aspects reported by each pilot

Italy	Spain	UK	Serbia
<ol style="list-style-type: none"> 1. Simplification of the payment process for end user 2. Integration of different systems to enhance inter-modality 3. Strong project partnerships and involvement of public and private entities 	<ol style="list-style-type: none"> 1. Implementation of the pilot/technical solution (I.e. payment for public and private operators) 2. Increased convenience for end users in terms of payment method 3. Involvement of various stakeholders, having a positive impact on transport managers/operators in particular 	<ol style="list-style-type: none"> 1. Technical solution (“The end solution - has put us in good stead to really make things better for customers” and “Without the pilot we probably would not have tried to deliver something like this for some time”) 2. Involvement in a European project 3. The way in which the project team met targets and worked together under limited resources 	<ol style="list-style-type: none"> 1. Technical solution (creation of application, improving options for the end user) 2. Involvement in a European project – networking opportunities

4.2.1.2 What worked less well

Table 19 outlines the top three least successful aspects reported by each pilot. One common challenge was a lack of engagement with the correct stakeholders from the beginning of the project. Looking

across the other answers, one other major theme was a lack of clarity concerning expectations of what the project will require either in technical or project management terms. This reinforces outcomes from other sections of the evaluation that suggest that more careful and thorough consideration of project requirements for the project before bid submission would be worthwhile in avoiding project delays and challenges after project start. Changes at the EC level in terms of time available to bid, and supporting resources for bidding may be worth considering in order to ensure the EC receives the maximum value from commissioned projects, by ensuring the correct partners are involved, with clear and accurate ideas for what is involved and required for successful and full project delivery.

Table 19. Top three least successful aspects reported by each pilot

Italy	Spain	UK	Serbia
<ol style="list-style-type: none"> 1. Lack of engagement and inclusion in the project with key stakeholders (financial, carriers (Coopvoce)) 2. App compatibility issues (no iOS) 3. e-ticket pricing compared to paper; lack of clarity on definition of interoperability; insufficient funds available compared with the necessary technical work 	<ol style="list-style-type: none"> 1. Compatibility of NFC in phones created delays (solution was deemed not user friendly) 2. Not all stakeholders being involved (operators, taxis) 3. Low user recruitment 	<ol style="list-style-type: none"> 1. Project management issues were experienced (i.e. “Not all of the project team had a full understanding of the pilot expectations from the start” and “dates and targets seemed fluid” and “It wasn’t always clear what work belonged to which work package” and “objectives were not always clear”) 2. Staff changes – 3 different project managers worked on the project 3. Resourcing (not being pre-planned) and communication 	<ol style="list-style-type: none"> 1. Inclusion and participation of other relevant institutions required for the implementation of the project 2. Technical compatibility with other services. 3. Legal procedures meant that mobile payments did not happen (it is felt that there are “Inconsistent mobile phone payments. Define the legal procedures for operators to freely use this function.”)

4.2.2 Transport operators and city representatives

Transport operators and city representatives were also surveyed in order to understand key lessons on project delivery and project process from the point of view of these key stakeholders. A total of 30 respondents completed the survey across three pilot sites. The UK did not run this particular survey as the direct project delivery partners are also the city transport representatives, and the UK pilot did not involve significant involvement from the public transport operators. The following table outlines the key findings from the survey:

Table 20. Transport operators and city representative summary report

Top 3 benefits of implementing MobiWallet	Top 3 barriers faced in implementing the system	Top 3 improvements required
<ol style="list-style-type: none"> 1. New payment process makes it simpler, easier and quicker for the end user. 2. Helps to increase public transport patronage and decrease ticket evasion. 3. Improved integration with the public transport system of each pilot city/region. 	<ol style="list-style-type: none"> 1. Limited use of the services by users. 2. Engagement of certain stakeholders was difficult and delayed implementation in several pilot cities. 3. Technological barriers meant that the system was not universally accessible to all users. 	<ol style="list-style-type: none"> 1. Increased promotion / marketing to raise awareness of the system. 2. Extend the system geographically and modally to ensure widespread integration and adoption is feasible. 3. Support from more stakeholders.

4.3 Focus group analysis

Focus groups are a way of bringing a variety of users together in a group environment to discuss and summarise ideas and information in relation to a particular topic. They help to stimulate ideas and identify common themes whilst offering more in depth qualitative analysis than surveys. Focus groups were held with two of the five audience groups (system users and public transport operators / city representatives), along with a symposium for project partners (see 4.4) to explore the programme delivery process from each stakeholder’s perspective, and key lessons from MobiWallet programme delivery.

Each group discussion was pilot site specific; however, they all followed a standard topic guide, translated into local languages as applicable. Below are the key findings from all focus groups across the four MobiWallet pilots.

4.3.1 System Users

Focus groups were held in Serbia, Spain, Italy and the UK with system users who have experienced the MobiWallet system. A total of 60 users were involved across the four pilots. Below are the key summary findings but please refer to Attachment D for a more detailed summary of each focus group held.

4.3.1.1 Pilot involvement / awareness

Most participants had a good awareness and experience of using the MobiWallet system implemented in their respective locations. However, in the UK, 8 out of 8 focus group respondents were unaware of the full capabilities of using the MobiWallet technology to transfer purchased fares onto their Swift

card, which suggests that further communication, education and training is required for users, bus drivers and public transport operator employees. Users were aware of two of the three individual components of the technology (journey planning and fare selection), and felt the fare selection tool was extremely valuable, but were not aware of the ability to transfer tickets to swift card using NFC.

4.3.1.2 User experience

On the whole, where technology had been previously used, the user experience was positive. A number of technical problems/delays were experienced in Spain and despite this, focus group participants appreciated that this was a pilot and that these technical problems had now been solved. Specific technical issues in the UK were also raised, although further exploration is required to define whether these are genuine technical issues, specific phone related technical issues or user based error. Regardless, where there were technical issues, users reported that when the technology is fully running they would be very keen to replace their current methods with the new payment method.

4.3.1.3 Suggested improvements

Each focus group across the four pilots made useful improvement suggestions. Common improvements that were suggested include the need to extend the pilot to include more modes and a wider geographical area, improve the inter-face of the apps involved (making it more user-friendly) and improve communications on how to use the technology so that it is as easy as possible for the end user to use. Perhaps the clearest recommendation is in the promotion of the new technology to users, as awareness in the general population to these new payment options is still relatively low. This is to be expected given the nature of the pilots, and technical delays meaning that for three of the four pilots the technology is only recently getting to a standard of reliability to enable a wider roll out and promotion to the general public.

4.3.1.4 Satisfaction levels

All focus groups, except the UK, suggested that they would be confident in using the MobiWallet system in the future, providing an average score across the four pilot sites of 5.5 out of 7. UK focus group participants scored typically 4 out of 7 for confidence of use. This is mainly due to a lack of awareness and practice in how the technology linked together (journey planner > fare selector > transfer of ticket to Swift card using NFC), combined with a variety of technical issues down to handset and user error. This may not be indicative of the general population in the West Midlands, as the balanced scorecard and impact evaluation data shows a large number of users are using the system.

4.3.2 City Representatives and Transport Operators

Focus groups were held in Serbia, Spain and Italy with public transport operators and city representatives. In the UK, a focus group was held with the wider project team as the aforementioned actors were not involved in the UK pilot, so the results are not directly comparable. Below are the key summary findings but please refer to Attachment E for a more detailed summary of each focus group held.

4.3.2.1 Pilot evaluation

All stakeholders at the focus groups across the four pilots believed that the technical improvements were one of the key advantages of the MobiWallet project. Further positive comments were that the improved system gave end users multiple benefits (Santander) and in the UK, the process that allowed

user testing and experience was advantageous and resulted in thorough analysis that enhanced their development process.

However, there were a number of largely non-technical issues that each pilot experienced that delayed the progress of each pilot; negotiations with operators took a long time in Spain, financial problems relating to ticketing in Italy and Serbia and internal project resourcing issues in the UK.

4.3.2.2 Lessons learnt

Each pilot placed great emphasis and importance on how good an opportunity the MobiWallet project has been in order to uncover and address previously unknown barriers. These barriers were reported in a positive light, with all focus group attendants stating that the lessons learnt will help to improve future projects and represented clear progress towards transnational interoperable fare systems in the future. The two key lessons learnt across the projects were in uncovering the two key barriers to wider deployment of transnational interoperable systems:

1. A standard low commission mechanism for enabling international financial transactions between transport users of one country, and public transport operators of another country.
2. The standardisation of data standards across Europe to significantly reduce the work required in developing API's to allow different fare management systems to communicate with each other.

Improvements most raised across the four pilots at the project delivery level included the need to include the correct partners (i.e. financial, telecommunications, operators, public authorities) right from the outset of the project, careful scoping (resourcing / budgeting) at inception stage and in particular, clarification of key terms such as interoperability, ensuring that all projects are closely aligned.

4.3.2.3 Satisfaction levels

All focus groups agreed that they would participate in a future project and on average, rated their satisfaction with the project 7 out of 10. The technical development and legacy, along with collaborative working with multiple stakeholders both within each pilot and across pilots were the most valuable aspects of the project, with project management and awareness of technical and resource requirements (at the beginning of the project) bringing the satisfaction levels down.

4.3.2.4 Legacy

The UK and Serbia will continue to use the MobiWallet system and extend upon this. For instance, the UK plans to develop an open data API which will be available to developers to incorporate into other apps. Discussions have already taken place with organisations such as City Mapper, Regional Services Limited and another EU funded project (HoPE). Through the deployment of the open data API, the UK will be encouraging potential competitors to offer greater solutions within the area of journey planning, fares information and smart ticketing as this will generate a greater range and diversity of available apps for customers.

On the other hand, MobiWallet systems in Spain and Italy will not continue, at least in the present form, instead opting to build on the lessons learnt from the MobiWallet project experience and seek further options to address issues of smart ticketing. Spain and Italy now know what is required in order to successfully implement a robust and sustainable IFM system and they can leverage on the technologies and experiences acquired thanks to MobiWallet to realize new systems and services or

improve the existing ones. For instance, in Italy, there are plans for extending the functionalities of MobiTickt app and for widening the number and geographic distribution of parking lots payable through this app.

4.4 Structured Symposium analysis

A discussion (by teleconference) with key project partners was held on 1 September 2016 to gather additional information on the work carried out. 12 partners (with representation from each pilot) participated in the symposium, covering all key stakeholders in the direct project delivery team. The symposium was originally scheduled to be held as a face to face meeting at the end of project consortium meeting but due to reporting deadlines, this was no longer possible and was instead delivered via teleconference due to availability issues.

The symposium focused on programme level delivery lessons that were common to the majority of project delivery partners. These are summarised below in Table 21.

Table 21. Structured Symposium summary

Question	Key summary points
<p>Top 3 challenges to achieving the overall project aims.</p>	<p>Due to the nature of the project i.e. different technologies being deployed across the four pilot sites, there are variations in answers related to country specific issues. However, the below are the 3 that were most frequently mentioned:</p> <ol style="list-style-type: none"> 1. Issues with stakeholder engagement – either the correct partners were not involved at the bid / inception stage or stakeholders were not fully supportive / engaged through the project or when unanticipated barriers were faced, the right expertise was not present in the consortium to adequately overcome these challenges e.g. international financial transaction expertise. 2. The variation in financial transaction costs by banks between countries was a barrier to a local and intra-pilot / international (or European) common business model. 3. The scale of deployed systems is also a challenge – beyond the larger metropolitan urban areas the costs involved in developing and implementing a system are harder to recoup through ‘cash-handling’ cost savings and therefore need public subsidy (or they have to wait for the other systems to expand in geographic scope). <p>Lots of other challenges were faced, summarised as follows: 1) all four projects were technically different, making interoperability difficult; 2) Most partners had trouble engaging with key operators; 3) Time it took to do certain tasks / work packages was widely underestimated; 4) Lack of clarity on the outset of the project in terms of barriers envisaged; 5) There was an absence of appropriate technical experts in key areas, whom if involved at bid stage would have identified key challenges that were not originally identified by bid leaders; 6) policy / legal issues were unforeseen and needed to have been scoped at bid stage.</p>

	<p>The aforementioned plethora of challenges is something that a future project can build upon and learn from. Primarily focused on careful and through consideration of the project at the bid stage, involving all of the appropriate technical experts required for project delivery. Ultimately the consortium feels Interoperable Fare Management System (IFMS) is currently technically feasible, but overarching national legal and financial challenges will need addressed before a system can operate on a fully financially self-sustaining basis.</p>
<p>Top 3 pieces of technical advice for a future project trying to achieve an interoperable fare management system.</p>	<ol style="list-style-type: none"> 1. Financial model for transactions is critical and is the primary challenge to address. 2. Need to ensure that key stakeholders are fully engaged from the start and key challenges are fully scoped out and stress-tested (I.e. financial partners, mobile phone operators, public transport operators). 3. Important to conduct an audit of ticket validation equipment at bid stage and identify partners that are at a similar technological level, so that the technology to be applied can be to a higher standard than certain pilots in MobiWallet used (I.e. NFC tags which proved to be too complex and not user friendly).
<p>Top 3 pieces of project management / involvement advice for a future project trying to achieve similar aims to MobiWallet.</p>	<ol style="list-style-type: none"> 1. Ensure that the volume of work described in the DoW is feasible and properly resourced by partners e.g. do not add workload to existing roles without full consideration to the impacts of additional workload to that role including unforeseen issues and delays. 2. Project planning at bid stage should be given more emphasis and time, although it should be noted that the EU give tight funding application deadlines and proposals often get rushed. Particular emphasis should be given to timing and milestones; need to challenge the technological development stages in order to ensure that interoperability between pilots can be properly tested. The correct partners should be sourced at bid stage too; trying to achieve interoperability with two partners trying to implement two different types of technology is extremely challenging. 3. The % of match funding provided by the EC for the project activities – especially for private sector partners is quite low compared to other EC research programmes (e.g. H2020) and was a barrier to involvement in the project by some organisations. Think carefully about which funding stream will most appropriately meet your projects needs including the involvement of all necessary partners.
<p>Key actions required to make interoperable fare management systems successful in the future.</p>	<ol style="list-style-type: none"> 1. Ensure that the definition of interoperability is defined clearly at the bid stage and that all partners involved have the correct in-house expertise and have clear expectations and targets (DoW). Lack of knowledge on ISO 24014 within the consortium was evident in the early stages - that was supplemented through a subcontractor but that caused some delays.

	<ol style="list-style-type: none"> 2. Ensure that financial institutions can help to navigate and map the payment process and help private/public organisations launch commercial products with low commission fees / rates and allow the easy transfer of money between different countries. 3. Standardisation. Explore the creation of a standard for the exchange of fare information – something like this would have influenced how MobiWallet exchanged information with local partners but also between the pilots on the interoperability side.
<p>Missing elements to the project.</p>	<p>Involvement of a more holistic range of partners at the pilot level. At the bid stage a mapping exercise to identify all key partners required in order to successfully implement an IFMS. Key partners missing from MobiWallet were considered to be telecommunication operators, more transport operators to ensure multi-modality could be integrated into the system, financial and legal institutions (although the Bank of Santander was involved, this was only useful for the Spanish pilot), a partner who can issue tickets, a representative from a body who deals with standards, full engagement from public administrations / municipalities.</p>
<p>Rating of various payment methods used during MobiWallet as the most suitable as “standards” for future national public transport payment in IFMS.</p>	<ul style="list-style-type: none"> - EMV standard (there are standards based on ISO/IEC 7816 for contact cards, and standards based on ISO/IEC 14443 for contactless cards (MasterCard Contactless, PayWave, ExpressPay)). - NFC MIFARE DESFire was widely considered to be a much more secure version of NFC than the version used for MobiWallet. - Smartphone equipped with NFC (linked to a virtual wallet) or EMV were the preferred options. - It was agreed that it was not an either or scenario, instead there is a need to have a physical option as a contingency, one that communicates to the virtual option. One reason for this is what happens if the smartphone runs out of battery, the user could potentially be stranded, especially if on-board payment is phased out (London).

5 Conclusions and discussion

Work package 5 “Monitoring and Evaluation of Results” had the main objective to monitor and evaluate the project activities throughout its full life span, in order to gather quantitative data useful for adequate comparison of pilot results and for timely understanding of key factors contributing to the level of success.

To achieve this goal, *four elements* of interest have been identified in the first stages of the activities:

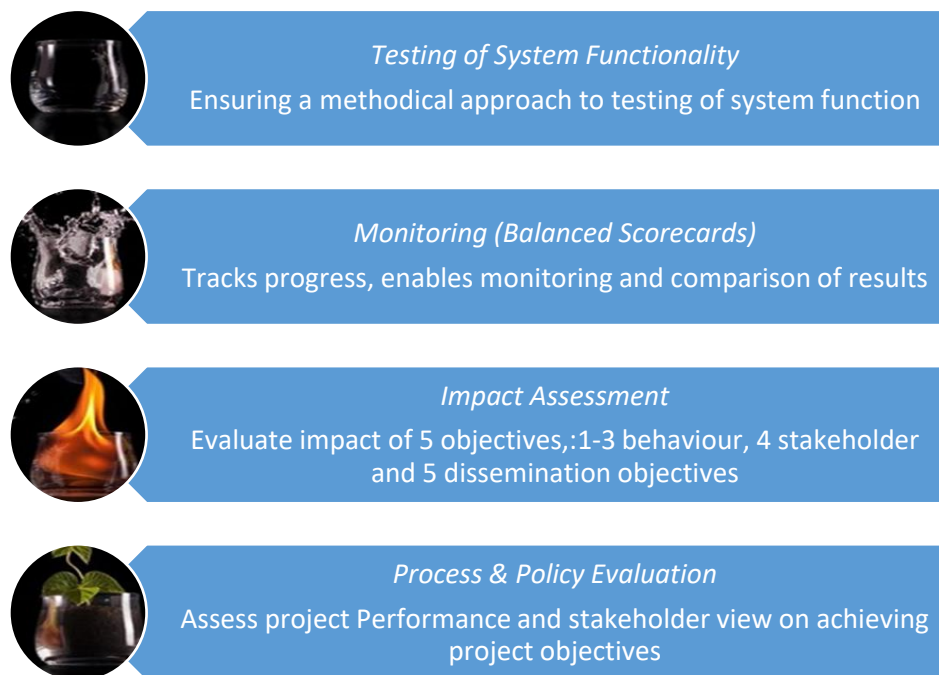


Figure 57. Four elements of MobiWallet evaluation

Such goals could be reached only by following the deployment activities of the project (and, in particular, of the four MobiWallet pilots) *closely* and *from the very beginning*. Thus, WP5 has started its activities at M13 (February 2015), slightly ahead than originally planned in the DoW. The aim has been to work in parallel with WP4, following the pilots during their roadmap to deployment by providing support and a common and correct methodological approach.

An internal document named “Framework Evaluation & Monitoring Plan” was drafted and circulated already in summer 2014. In this document, the methodological basis for monitoring and evaluation was established as well as a draft structure of the team involved in the activities, including partner responsibilities. The draft was approved at the evaluation meeting that was held in London in March 2015 and thereof updated until its present form, as reported in Attachment E.

In September 2015, MobiWallet Deliverable D5.1.1 – Pilot Evaluation and Validation (Interim Version) was issued as first deliverable by WP5. It presented the methodological viewpoint with the definition of a robust and comprehensive framework for common evaluation of the four pilots and of the overall MobiWallet goals. Although being an interim report, first quantitative evaluation of project activities was conducted. In particular, the deliverable collected and discussed the Factory Acceptance Testing (FAT) and Site Acceptance Testing (SAT) reports that were prepared by pilot leaders and local

evaluation leaders in such phases that were preparatory to deployment at a larger scale. The first element of MobiWallet evaluation “Testing of System functionalities” (see Figure 57) was thus assessed in the interim version D5.1.1, of which the present document D5.1.2 represents the final version.

In this final version, named MobiWallet Deliverable D5.1.2 – Pilot Evaluation and Validation (Final Report), the methodological approach defined in D5.1.1 has been recalled and revised and, more importantly, the final data collected are analysed and discussed, in order to evaluate the outcome of MobiWallet and of its pilots.

More in detail, the previous evaluation plan has been revised by making it lighter and more sustainable for all partners, while retaining the principal features and aims. More in detail some intermediate evaluation phases have been dropped, since the ratio between the information they could in principle provide and the effort put on partners and the burden put on users responding to surveys was considered not favourable. In particular, additional surveys to users in the limited timeframe of the trial phase could lead to users’ impatience and possible dropout.

It has been decided to skip the intermediate trial phase of MobiWallet, out of the three originally planned trial phases. Nevertheless, the magnitude of the target sample size for the last phase has been kept, thus reaching eventually an equally wide group of users involved in the project activities. This change was already discussed and motivated during the Second Review meeting held on March 9, 2016 in Brussels.

Other changes and improvements with respect the original evaluation plan have included the re-alignment of the KPIs used in Balance scorecards, which are (as shown in Figure 57) the second evaluation element aimed at tracking project and pilot progress and enabling monitoring and comparison of results. Originally (see [5]) KPIs of interest were extracted from Deliverable 2.2 [4] and, in that form, they were collected up to November 2015. Then, a process of KPI re-alignment was announced and motivated at the Second Review meeting in Brussels. The aim of alignment was to bring the KPIs to a more uniform set, by making use of the same language and of the same methodological approach to their measurements. Notice, however, that the monitored areas of each pilot were not altered in the re-alignment and still they are focused on i) financial, ii) customer, iii) internal business process and iv) learning and growth aspects. If from one side, the revised KPI allowed for a neater evaluation, from the other some delays were experienced in their collection and not all the pilots were able to provide fine-grained information (with the exception of Italian pilot) or to complete all expected data. Nevertheless, the data collected through balance scorecards (Attachment A) allowed to monitor the good to excellent progresses made by the pilots during the period, showing a positive trend in ISO24014 features and customer feedbacks.

Impact evaluation has been tackled through baseline data analysis, structured surveys and dissemination monitoring. In particular, in the interim version of this document, pre-existing baseline data have been collected and discussed where available; where no baseline data was available, surveys were conducted to supply the missing baseline. Surveys were also setup and run during both trial evaluation phases. Also in this case, from the first to the second phase, a re-alignment and focusing process has been carried out. Pre- and post-trial survey have been revised in English and then translated into local languages. Each pilot had the ability to include their own questions as additional questions, without however changing excessively the length of the questionnaire. The blank forms

used in pre- and post-trial surveys in all the pilot languages are attached to this document (Attachment B and C respectively). Surveys were administered to users and the findings are reported in Section 3 of this document. Not always, the pilots were able to reach the target sample size or compositions (some age groups, in particular 19-25, have been underrepresented sometimes). Nevertheless, surveys allowed to have a snapshot of what are the travel habits of people and how strong they would like to change them, also in favour of more sustainable travel solutions such as the one made easier to access thanks to MobiWallet services. Indeed, we also recorded an increased number of usage of the payments solutions such as QR codes, NFC, SMS ticketing and, generally, smartphone apps. Further, most of the people end up claiming that MobiWallet has improved the way they travel.

Impact of dissemination has been also taken into account, especially through account analytics tools made available by Google and other social media. The figures reported in 3.5 show that dissemination was successful in building an interest group focused on mobility, payment and IoT technologies. Furthermore, some general interest has been met, thanks to the project presentations (featuring more than 11.000 visualization in the last year) and the general public, thanks to the local initiatives carried out in Summer 2016, with hundreds of real users following local page in social media.

Finally, process & policy evaluation has been taken into account by organizing online questionnaire to gather opinions & responses from the wide technical team, operators and city representatives as well as focus groups with operators to identify system features and most successful ways for exploitation of project solutions. A structured symposium with project partners has also allowed to gather additional data, identifying top success of MobiWallet and the barriers that still have to be tore down towards frictionless travel around Europe.

In summary, D5.1.2 reports the work that has been done in Task T5.1 of MobiWallet project. Although some adaption and re-alignment has been necessary with respect the original planning, the Task was successful in monitoring and evaluating MobiWallet from multiple perspectives. The results of the analysis permit to claim that the partners of the project have worked in the right direction, obtaining very positive results. The evaluation process – as it is one of its duty – was also able to identify some lacks, highlighting when low performance was met and, thus, to suggest where there is room for further improvement. Indeed, the most advantageous direction along which continue to work have been presented according both to the perspective of users and of operators & city representatives. This is a contribution that WP5 delivers to all the partners of the project, towards optimal exploitation of project results.

6 REFERENCES

- [1] MobiWallet Deliverable D3.1 – Pilot Service Adaptation part 1.
- [2] MobiWallet Deliverable D3.1 – Pilot Service Adaptation part 2.
- [3] MobiWallet Deliverable D3.1 – Pilot Service Adaptation part 3.
- [4] MobiWallet Deliverable D2.2 – Methodology Definition.
- [5] MobiWallet Deliverable D5.1.1 – Pilot Evaluation and Validation (Interim Version).
- [6] MobiWallet Deliverable D6.1.3 – Dissemination Pack.
- [7] SurveyMonkey website, <https://www.surveymonkey.com/>, Last retrieved 19/09/2016
- [8] ISO 24014-1:2015 Public transport - Interoperable fare management system - Part 1: Architecture.
http://www.iso.org/iso/home/store/catalogue_ics/catalogue_detail_ics.htm?csnumber=61545, Last retrieved 22/10/2015.
- [9] RS Kaplan, DP Norton, The balanced scorecard: translating strategy into action, Harvard Business Press, 1996.