WP4 – DEMONSTRATIONS (PROOF OF CONCEPTS, TEST AND VALIDATION)

D4.5 DEMO MONITORING REPORT

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1. EXECUTIVE SUMMARY

The purpose of this deliverable is to report how the monitoring activities were performed during the execution of the Ride2Rail project and to provide recommendations for the replicability of the trials. The monitoring activities were an integral part of the demonstrations held in the four selected sites of Athens, Helsinki, Brno and Padua and concerned both general aspects, represented by KPIs valid for all demonstration sites, and local aspects, represented by specific KPIs for single site. The document takes up the D4.3 Monitoring Tools to testify the adoption of the indications reported and offers some considerations regarding the improvement of the monitoring possibilities. Inherent in the monitoring, there was also an evaluation activity of the collected values (T5.3) which is shown here. However, considerations and analysis on KPIs are not part of this document because they are included in D5.3 Evaluation and Impact assessment.

Finally, some considerations are provided regarding the replicability of the experiments carried out, offering ideas for a next project that could be even more fruitful, with larger results achieved.

The document is structured as follows:

- chapter one will report the Background information regarding the Ride2Rail project, the Shift2Rail context, and the purposes of WP4;
- chapter two will describe the Monitoring Tools indicated in D4.3 and how they were adopted in the project;
- chapter three will describe how monitoring was executed, depicting the two different but strongly linked phases in which monitoring took place: the WP4 and the T5.3;
- chapter four will report the conclusions regarding the monitoring process and some recommendations for replicability.

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Abbreviations and acronyms

CFM	Calls for Members
DC	Driver Companion
DL	Dissemination and exploitation leader
DoA	Description of the Action
CB TSP	Crowd Based Transport Service Provider
EL	Ethical leader
EU	European Union
ER JU	Europe's Rail Joint Undertaking
GA	Grant Agreement
H2020	Horizon 2020
IP4	Innovation Programme 4
OC	Open Call
PC	Project coordinator
PMO	Project Management Office
PMT	Project Management Team
PO	Project Officer
QAIC	Quality Assurance and Innovation Committee
S2R JU	Shift2Rail Joint Undertaking
TC	Travel Companion
TL	Technical leader
WP	Work Package
WPL	Work package leader

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2. BACKGROUND

2.1. Shift2Rail Context

Shift2Rail is the first European rail initiative to seek focused research and innovation and market-driven solutions by accelerating the integration of new and advanced technologies into innovative rail product solutions. Shift2Rail promotes the competitiveness of the European rail industry and meets changing EU transport needs. Research carried out under this Horizon 2020 initiative develops the necessary technology to complete the Single European Railway Area (SERA).

The delivery of Shift2Rail is based around five Innovation Programmes (IPs); the focus of this report is IP4 – IT solutions for attractive rail services. To become a more attractive option, rail must respond to customer needs to support anytime, anywhere, door-to-door, intermodal journeys encompassing distinct modes of transportation. Rail must achieve interoperability with other transport modes and mobility services, with regions, cities and people engaged in social and economic activities, and with the key elements of the supply chains which can make rail products and services available to those people. In order to achieve this, rail needs to take due advantage of the increasing connectivity of people and objects, the availability of European Global Navigation Satellite System-based locations, the advances in cloud computing, big, linked and open data and the propagation of internet and social media. The step towards sharing data needs to be considered and progressively developed, in order to enable service developers to provide connected travellers with the services they need and expect. Shift2Rail ended in 2022, with Europe's Rail, its successor, kicking off its activities and launching its first projects, continuing the work of S2R and taking advantage of its outstanding results.

2.2. Ride2Rail

A key aspect of delivering more attractive services is by delivering end-to-end (or first- and last-mile) travel services that enable rail as their core mode of mobility. This can be challenging in a rural environment, where connectivity to rail is problematic. It is also relevant in urban or peri-urban environments where there may be poorer provision of public transit.

Contributing to Shift2Rail's IP4, Ride2Rail's overall objective is to develop an innovative framework for intelligent mobility, facilitating the efficient combination of flexible (ride-sharing) and scheduled transport services (rail, bus, and other public transport services), thus enhancing the performance of the overall mobility system, especially in rural and on demand areas, but also in urban contexts. Ride2Rail should, in particular, address the first and last mile problem by offering a wider range of transit options, while harnessing the capacity of single occupancy vehicles, along with existing, or future, demand responsive transit.

Ride2Rail aims to integrate multiple (public/private/social) TSPs (Transport Service Providers) operating in the projects' demo sites, integrating them in the IP4 ecosystem thus promoting an effective ride sharing practice of citizens, making it a complementary transport mode that extends and "feeds" public transport networks.

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The objectives of the Ride2Rail project are:

- To develop an innovative framework for intelligent mobility, facilitating efficient combination of flexible and scheduled transport services, integrating real-time information about public transport and ride sharing;
- To facilitate the comparison and the choice between multiple options/services classified by a set of criteria, for example environmental, travel time, comfort, cost;
- To encourage carpooling (and ride sharing acceptance) as complementary for public transport;
- To enhance the performance of the overall mobility system, reducing road congestion and environmental impact, reinforcing the mobility offer in rural and low-demand areas;
- To combine travel offer classifications and software components, integrating them into existing collective and on-demand transport services;
- To induct the access to high-capacity services thanks to easy-to-use multimodal and integrated travel planning, booking, ticketing and payment features;
- To design, develop and test in four real demonstrators a set of software components for the IP4 ecosystem, including an enhanced Travel Companion and the crowd-based Transport Service Provider;
- To produce recommendations for replicability.

2.3. Work Package 4 Context

Work Package 4 provided the demo context where Ride2Rail has been evaluated. This covers both the contextual factors (such as the types of trips likely to be encountered in a demo area) as well as the capacity for demo site leaders to support evaluation activities, which influences the feasibility of evaluation. The WP4 implemented demonstrations of the project solutions in four locations: Padua (Italy), Athens (Greece); Brno (Czech Republic), Helsinki (Finland).

To understand the performance of the demos against the aims of the project it has been necessary to specify targets for the expected performance of the Ride2Rail deployment in each location. These targets were specified through Key Performance Indicators (KPIs). The specification was made in a methodical manner to allow a full understanding of the impact of RIDE2RAIL. After the specification of KPIs, values gathering methods were discussed among partners to find best available options. To the end, three kinds of data collection tool/method came out:

- Survey, the main tool. It covers a real huge spectrum of data: from quantitative measures to perceptions;
- Eco-system, the IT set made by CB-TSP, TC and DC. Due to a set of tech and privacy limitations it is usefull mainly to better understand data collected by the survey;

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- Direct obeservations, for local KPIs the demo leaders are responsible to gain measures.

This document constitutes the D4.5 “Demo Monitoring Report” in the framework of the WP4, task 4.1 and depicts the outcome of the monitoring process as envisaged in D4.3 “Demo Monitoring Tools”. At the end, conclusions and recommendations for replicability are held.

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3. MONITORING TOOLS

In WP5 (Task 5.1) a harmonised set of indicators to support a consistent monitoring and measuring approach (D4.2) was defined. Then, in WP4 (Task 4.1), monitoring tools were set (D4.3) with the aim to measure the performance associated with the success and the achievements of the R2R solutions, the measurement approach was applied to both “whole project” and “local” KPIs.

"Whole project KPIs", reported in Table 1 were a number of indicators applicable across the entire R2R evaluation with whole project targets. It is worth to mention that while in the list it was used the term "Ride2Rail App", in reality there is not a single project app but this expression refers to the following tools used in the project:

Travel Companion TC app (provided by CFMs project partners)

Driver Companion DC app (developed within the Ride2Rail project in WP3)

Ride2Rail Components (R2RComp, pieces of software developed by the project and integrated in the TC enhancing the TC functionalities)

KPI	DEFINITION
KPI#1 Number of Ride2Rail app users	Demo site users who download the app and request at least one trip
KPI#2 Number of completed Ride2Rail app trips	A completed trip made by a demo site app user
KPI#3 Number of completed multi-occupancy vehicle trips with R2R app	A completed trip made by a demo site app user that involves either rideshare or Robobus (Helsinki)
KPI#4 Number of completed trips involving public transit/rail with R2R app	A completed multi-modal trip
KPI#5 Number of completed commuter trips with R2R app	A completed trip that is a regular journey (work or education) conducted 4 (including outward or return) or more times a week
KPI#6 Number of completed rural trips with R2R app	A complete trip where one or both origin and destination is from a rural (or suburban) location
KPI#7 Number of Ride2Rail app downloads	Number of times app has been downloaded by unique users

Table 1 “Whole project” KPI list (from D4.2)

Local KPIs, reported in Table 2 were indicators relevant only for specific demo sites. These were given only for Athens, Brno, and Helsinki (not for Padua).

KPI	DEFINITION
KPI#A1 – Athens	Number of parking spaces at urban gate D. Plakentias

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KPI#A2 – Athens	Number of parking spaces at extra-urban Koropi station
KPI#B1 – Brno	Reduction of need for parking spaces
KPI#B2 – Brno	Number of surveyed users attracted to R2R app
KPI#H1 - Helsinki	Number of walk-in trips with the Robobus

Table 2: "Local" KPI list (from D4.2)

The monitoring tools were selected after analysis and discussion with project partners as reported in D5.1 Performance Targets and KPIs. Summarizing the topics covered to choose the option suitable for the project, three different approaches were considered for measurement. These were:

- Sensed and tracked data: using trip and user data within the Ride2Rail and wider Shift2Rail ecosystem.
- Micro survey: using micro surveys, either at the end of each trip or at the end of the day (as a diary) to capture near real-time data from users about their trip.
- Summative survey: surveys sets at the end of the demo period requesting information around number of trips or trip experiences.

Interacting with IT technical partners (mainly involved in WP3), it was identified that there was no current facility to integrate a micro survey in the Apps. Therefore, this option was ruled out at an early stage. The other two options were accepted and implemented, but, for the Sensed and Tracked data some limitations needed to be considered. Sensed and tracked data appeared as the best solution because they require little involvement of participants, no involvement of demo sites, and provide accurate data when available with no concerns about participants' tendency to forget about instructions after the completion of the demo activities. But this solution required technical development and soon came evident that not all KPIs were directly collectable by the system. For example, the KPI#2 "Number of completed multi-occupancy vehicle trips with R2R app" required to count how many completed trips were performed, but R2RComp did not recognize the completion of a trip. So, it was proposed to use the Summative Survey to ask users information that the R2RComp did not managed entirely, too. The following table provides some information and details for each KPI specifying how each of them is addressed in the survey distributed to users.

KPI	Source	Observations	Survey
KPI#1 Number of RIDE2RAIL app users	R2RApp	R2R Components store info regarding all the requests received/produced and is able to distinguish the	Have you ever used at least once the TC app?

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		related user IDs (GDPR compliance)	
KPI#2 Number of completed RIDE2RAIL app trips	TC	Input available in TC. However, we do not have the confirmation that the trip has really been carried/taken	*Ask how many R2R trips a user has completed over the demo period *Ask which type of trip (as passenger, driver, robobus user)
KPI#3 Number of completed multi-occupancy vehicle trips with R2R app	R2RApp	From the Driver Companion (DC) completed trip as rideshare number of passengers in trip	*How many trips did you take in a ride-share mode? *How many passengers were there in each trip?
KPI#4 Number of completed trips involving public transit/rail with R2R app	Survey		*How many trips did you take where your R2R journey then connected with public transit (bus, metro, train)?. This connection could be at the before or after the shared journey.
KPI#5 Number of completed commuter trips with R2R app	Survey		*How many of your trips were commuting from home to work or eduation? *How many of your trips were commuting from work or education to home?
KPI#6 Number of completed rural trips with R2R app	TC	Extracted from the trip responses stored in the Cloud Wallet.	* Did your trips start or end at a rural location (eg XXX [may need to be tailored for each demo site])
KPI#7 Number of Ride2Rail app downloads	Website	Data have been collected through the counter available within the links to download the apps	

Table 3: Resume Monitoring Tools for Whole Project KPI

Combining sources for different KPIs brought the costraint (D4.3) of making KPIs easy to analyse. So, a simplified approach was adopted:

- KPIs 1-6 were recorded through the survey – this gave a single approach, and minimised the need for technical development.
- Where data would be available in the Ride2Rail ecosystem (eg count of users that have requested at least one trip [KPI#1]) this were used to give additional validation of the recorded KPIs.

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- KPI 7 was (theoretically) non-dependent on any particular demo site and it was collected using a feature of the download web-site utilized for spreading the Travel Companion and Driver Companion Apps.

For local KPIs it was decided that demonstration partners had to record those directly.

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4. MONITORING

The monitoring of the values constituting the KPIs was operationally carried out in WP 4 "Demo Execution" with the collection of data from the various sources, while in T5.3 "Demo and overall evaluation" a work was carried out to refine and evaluate what emerged. Results are collected in D5.3 "Evaluation and Impact Assessment".

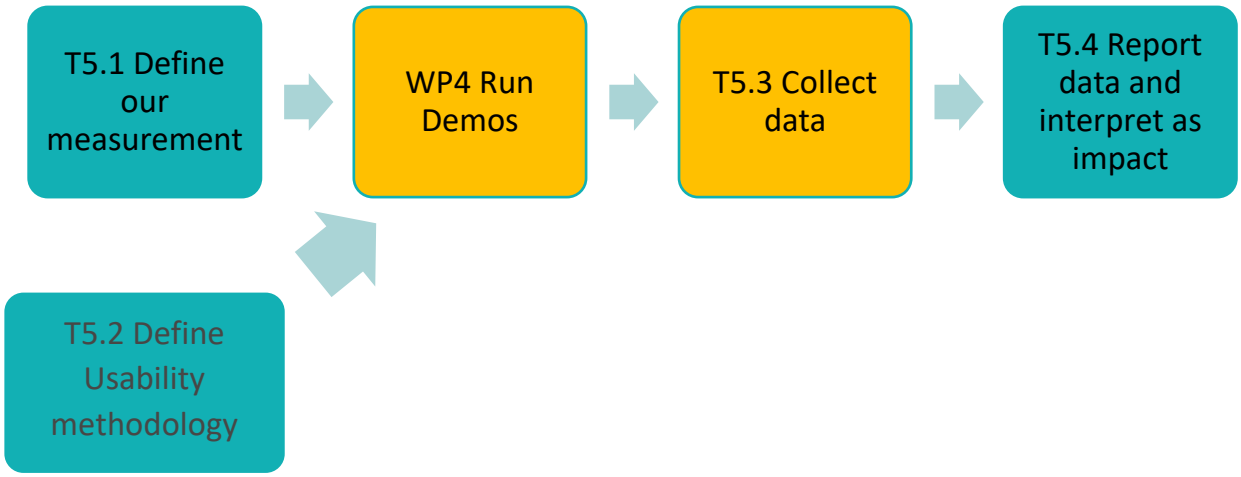

Figure 1: Task Flow

4.1.WP4 Demo Execution Actions

WP4 was the field test of the concepts theorized in the inception phase and of the mobility services implemented through the Travel Companion and Driver Companion Apps. The whole system was tested on four different sites (Athens, Helisinki, Brno and Padua, see D4.4 Demo Execution Report) at different times of the year and for different durations. During the test of the services, the R2RApp system collected the data according to what is reported in Table 3. The KPI#7 "Number of Ride2Rail app downloads" was instead monitored directly both for ease of access, it is in fact made up of a counter that can be read online, and because it acted as a "thermometer" on the number of users who intended to participate in the test (and therefore to attempt "push" operations if needed).

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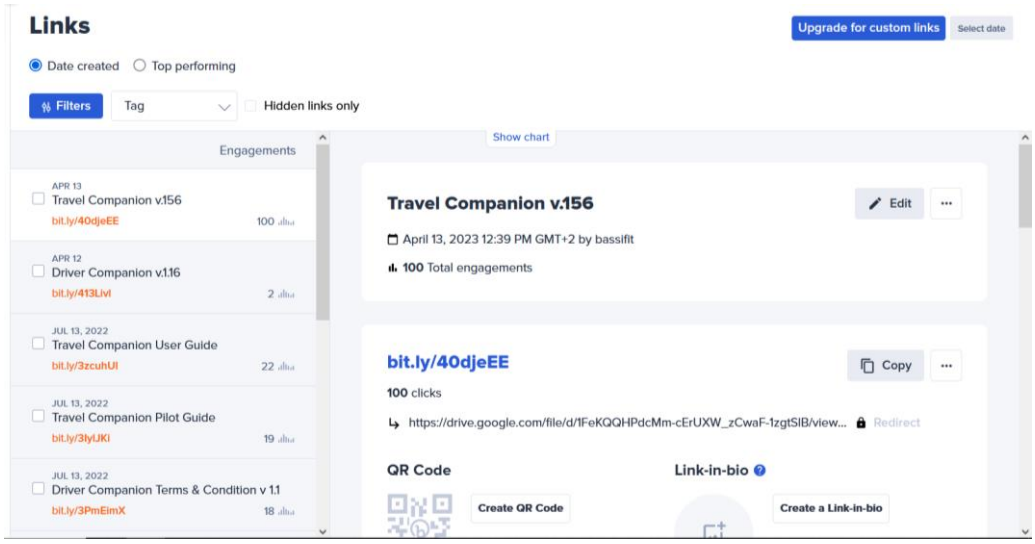

Figure 2: Screenshot of the download website

The Survey was a fundamental tool for valorising and validating the KPIs. The Survey consisted of 35 questions with different response methods (see D5.3 for details) and it was translated into Greek, Czech and Italian and was designed to be completed online. Access links were sent by demo leaders at the end of each demo to users who participated in the test. The online survey management system was also the data repository which was then extracted and processed in the form of statistics by the partner University of Newcastle (aggregated and anonymous data have been used, to comply with GDPR). In the form of a sequence of activities, the management of data collection via Survey occurred in the following steps:

1. The Survey was prepared and shared among the partners during the preparatory phases of WP4 and WP5 (see the deliverables dedicated to KPI and Monitoring for details).
2. With the collaboration of the Demo Leaders, the survey was translated into Greek, Czech and Italian to make it easily understandable by local testers. In Helsinki, it was decided to keep the survey in English considering the good level of knowledge of the language.
3. The Survey was made accessible online via completion forms.
4. At the end of each demo, the demo organizers sent the Survey access link to each tester. In the Athens Demo, a code was assigned to each survey to be used as “proof” of participation to receive the promised prizes.
5. Testers could then access the online Survey and fill out responses.
6. The survey management system stored the responses and allowed for a final data extraction to process the results.

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7. The University of Newcastle partner collected the aggregated/anonymous results in the form of statistics and shared them with the other partners.

As regards the local KPIs, the values assumed in the demos were communicated by the Demo Leaders to the WP Leader (FIT) at the end of the individual Demos.

4.2. Task 5.3 Demo and Overall Evaluation Actions

Task 5.3 was aimed at the evaluation and analysis of the data collected from the different sources during the demos. The execution of the task consisted of two phases (see D5.3 Evaluation and Impact Assessment for details):

- Pre-demonstration evaluation
- Post-demonstration evaluation

4.2.1. Pre-demonstration evaluation

To understand the performance and success of RIDE2RAIL, Task 5.1 set the Key Performance Indicators of referral and Task 4.1 appraised baseline values and measured, for each demo site, how near the target was hit.

About the appraisal of baseline values of KPIs belonging to the "whole project" set, it results that since the KPIs are related exclusively to the services offered by the R2R project, a term of comparison with any pre-existing or contingent situations was missing and consequently it was not possible to establish a baseline value. Same kind of evaluation with the second set of indicators, the specific ones for each demo site. They were too specific to the testing and it was impossible to set a baseline for the lacking of foster experiences.

For sake of simplicity, it was assumed that baseline values equal zero.

One more issue to face was the definition of rural trip. As KPI#6 "Number of completed rural trips with R2R app" calls for counting rural trips it was necessary to define for each site a criteria. Deeping the different urban situations of each demo site it came out that for Athens, Helsinki and Brno it was a matter of boundaries. For those cities, in collaboration with Demo Leaders, it was depicted a virtual urban area (with geo-fencing) to classify trips in "Urban", those made inside the urban area, and "Rural", those with origin and destination outside the urban area. For Brno a completely different criteria was adopted: all trips using a bus or a train were considered rural trips, those using just trams were instead urban trips.

Having determined the reference parameters, analysis started with Post-demonstration evaluation.

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5. POST-DEMONSTRATION EVALUATION

This activity consisted mainly in the comparison between performance targets set in the proposal stage and KPI values collected for each site. Then, a general evaluation was possible to best depict how Ride2Rail performed in respect to expectations.

The following table reports the cross-demo targets for each of the KPIs by demo sites as per the D4.2 Monitoring indicators and targets.

KPI	Athens	Brno	Helsinki	Padua
KPI#1 Number of RIDE2RAIL app users	50	100	50	50
KPI#2 Number of completed RIDE2RAIL app trips	500	2000	400	4500
KPI#3 Number of completed multi-occupancy vehicle trips with R2R app	10	400	200	315
KPI#4 Number of completed trips involving public transit/rail with R2R app	2	50	200	4050
KPI#5 Number of completed commuter trips with R2R app	187	20	240	4050
KPI#6 Number of completed rural trips with R2R app	500	2000	0	3150
KPI#7 Number of R2R App downloads	NA	NA	NA	NA

Table 5 - Cross-demo targets

Regarding the KPI#7, Bitly.com was used as a tool to share download links as it allows to count the number of downloads for each demo site. This solution was not evident during the setting of KPI targets, as it was supposed to use the official app stores of Apple and Google, for this reason the baseline is only reported aggregated at project level as reported in the next table.

To note that Brno values were halved from the orginal ones to better fit actual situation occurring during the demo (see D4.4 Demo execution report for details).

The following table reports the KPIs Targets aggregated at project level:

KPIs	Target
KPI#1 Number of RIDE2RAIL app users	250
KPI#2 Number of completed RIDE2RAIL app trips	7400
KPI#3 Number of completed multi-occupancy vehicle trips with R2R app	925
KPI#4 Number of completed trips involving public transit/rail with R2R app	4302
KPI#5 Number of completed commuter trips with R2R app	4497

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KPI#6 Number of completed rural trips with R2R app	5650
KPI#7 Number of R2R App downloads	500

Table 6 - whole project KPI targets

About local KPIs:

Athens

KPI	Target
KPI#A1 Number of parking spaces at urban gate D. Plakentias	10
KPI#A2 Number of parking spaces at extra-urban Koropi station	5

Table 7 - Athens local KPIs

Brno

KPI	Target
KPI#B1 Reduction of need for parking spaces	10
KPI#B2 Number of surveyed users attracted to R2R app	30

Table 8 - Brno local KPIs

Helsinki

KPI	Target
KPI#3 Number of walk-in trips with the Robobus	200

Table 9 – Helsinki local KPIs

Usability of apps and services was a field of investigation, too. To address this aspect, the approach was to deliver the System Usability Scale (SUS), adapted to Ride2Rail along with two open questions on perceptions of usability ("How would you rate Ride2Rail for organising trips as a DRIVER USING THE DRIVER COMPANION?"; "How would you rate Ride2Rail for organising trips as a PASSENGER USING THE TRAVEL COMPANION?") and a best-worst scaling to confirm user preferences for trip criteria. These questions were delivered as a sub-section of the survey that was submitted.

With the aforementioned methods, following results were collected. About the whole project KPIs:

KPI	Athens		Helsinki		Brno		Padua	
	Targ.	Res.	Targ.	Res.	Targ.	Res.	Targ.	Res.
KPI#1 Number of RIDE2RAIL app users	50	17	50	17	100	60	50	9
KPI#2 Number of completed RIDE2RAIL app trips	500	26	400	99	2000	1852	4500	387
KPI#3 Number of completed multi-occupancy vehicle trips with R2R app	10	15	200	68	400	87	315	9

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KPI#4 Number of completed trips involving public transit/rail with R2R app	2	30	200	58	50	766	4050	10
KPI#5 Number of completed commuter trips with R2R app	187	39	240	58	20	1852	4050	10
KPI#6 Number of completed rural trips with R2R app	500	13	0	7	2000	1665	3150	10
KPI#7 Number of R2R App downloads (driver/traveler)	NA	12/27	NA	7/22	NA	16/44	NA	2/77

Table 10: General KPI values

For the following totals:

KPI	Target	Result	Difference	Diff. %
KPI#1 Number of RIDE2RAIL app users (survey completed)	250	101	-149	-60%
KPI#2 Number of completed RIDE2RAIL app trips	7400	2364	-5036	-68%
KPI#3 Number of completed multi-occupancy vehicle trips with R2R app	925	181	-744	-80%
KPI#4 Number of completed trips involving public transit/rail with R2R app	4302	864	-3438	-80%
KPI#5 Number of completed commuter trips with R2R app	4497	1959	-2538	-56%
KPI#6 Number of completed rural / suburban trips with R2R app	5650	1695	-3955	-70%
KPI#7 Number of Ride2Rail app downloads	500	207	-293	-59%

Table 11: KPI Totals

Regarding local KPIs, following values were collected:

KPI	Target	Result	Difference	Diff. %
KPI#A1 Number of parking spaces at urban gate D. Plakentias	10	10	0	0%
KPI#A2 Number of parking spaces at extra-urban Koropi station	5	5	0	0%
KPI#B1 Reduction of need for parking spaces	20	28	18	180%
KPI#B2 Number of surveyed users attracted to R2R app	60	60	30	100%
KPI#3 Number of walk-in trips with the Robobus	200	1112	912	456%

Table 12: Local KPI values

About usability, scores were computed on the base of surveys:

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Demo Site	Travel Companion	Driver Companion
Athens	64%	58%
Helsinki	44%	37%
Brno	55%	59%
Padua	74%	85%
Overall	57%	58%

Table 13: Usability

Regarding usability, the standard threshold for a demonstration application is 50%.

Lastly, the survey investigated on the choice criteria preferred by users when they have to decide how to move. Following table presents overall ranking scores (lesser is better).

	Quick	*Reliable*	*Cheap*	*Comfortable*	*Environmental friendly*	*Door-to-door*	*Short*	*Healthy*	*Multi-tasking*	*Social*	*Panoramic*
Score	*2.4*	*2.6*	*3*	*3.6*	*4*	*4.1*	*4.1*	*6.5*	*7.1*	*7.4*	*8*

Table 14: Offer criteria data

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6. CONCLUSIONS

The monitoring of KPIs, initially envisaged to be conducted by means of sensed and tracked data and surveys, was then mainly carried out, apart from KPI #7, by means of the survey alone. The reasons for this solution lie, as clarified in D5.1, in the need to standardize the data source and simplify the analysis process. The values obtained from the R2RApps were used as complementary to the survey and to verify what the surveys reported.

Overall, it can be said that the solutions adopted have in any case made possible to obtain the data and information necessary for the analysis (D5.3 Impact and evaluation assessment) with the required punctuality and exhaustiveness. Despite the satisfactory results, it can also be noted that in some cases the general targets have been not completely achieved. After large and extensive interactions with the local demo actors very active on the field and very "interactive" with the users, it was agreed that a possible explanation, is that the proposed services provided with the main purpose of Ride Sharing (which is sharing the car trip with unknown people) are complex to be used in a post-COVID world, with people in many cases still concerned about of social distancing (it has to be considered that most of the demos were organized in 2022). Another complexity level is provided by the technology itself, as the IP4 solutions, to be distributed via a download .apk link and not foundable on a common platform for app-downloading, created some skepticism among some categories of users. Finally, it was clear that users need to be duly trained and informed about what they are required to do, when, which functionalities they can use and how. This is true considering some unavoidable and non modifiable carachteristics of the TC in particular (for example, the impossibility to "delete" some functionalities or to eliminate some addresses belonging to other sites far from the current demo site). A user manual was prepared, translated and shared, but it was by nature a relatively long document, whose reading was believed in some cases not attractive enough. Incentives played a huge role in the engagement process, and overall it can be without objections said that the training of the users is the key to a demo success. This was done in Ride2Rail, as the project partners learned from the experience of the demo leaders, asked on a regular basis to present the outcomes, the process, what worked well and what could be corrected in order to provide to the following demo team all the necessary tips to better organize the activities. CFMs have also been informed about all the issues (positive or negative) encountered by users while using the apps, and this allowed them to address some of the problems "on the go", despite in some cases some issues could not be solved due to the actual nature of the ecosystem. More than 100 users participated in the demos demonstrating their interest in adopting sharing mobility solutions to solve their mobility needs. In most of the cases, users showed enthusiasm and commitment and recognized the huge potential of the solutions presented.

As anticipated, a further consideration must be made regarding the Apps, these were in a pre-market stage of development which means that they were fully working but, at the same time, that they cannot compete at least at the moment with more attractive "market ready" platforms or applications widely used by the general public. Despite this, the ideas behind the TC and DC were widely appreciated and people declared to be willing to know more and exploit the potential given by all functionalities in the future. However, some difficulties in understanding/managing the Apps may have caused an early disappointment in users not

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very skilled with technology. This leads to the previous point, about the importance of training.

Regarding the replicability of the project, it is possible to outline some considerations suitable to improve such services in the future:

Data monitoring features should be integrated in the IT systems and their development should be foreseen since the beginning. They are important sources of knowldege and consequently they must be used at their best.

Still, the survey remains a reference tool for capturing the feeling of users on the use of the services being tested. As pointed out by some Demo Leaders, in theory it would have been more effective if compiled, perhaps in a reduced form, as soon as the users completed the app utilization, instead of sending it only at the end of the demo. In this way, a larger collection of data would have probably been obtained, reducing the risk that at the end of the demo, users would detach themselves emotionally and no longer pay attention to communications (thus not completing the survey). To overcome this barrier, as it was not possible to send the survey automatically after the utilization of the app, it was taken, as lesson learned (used in other projects such as IP4MaaS) to send the survey at the very beginning of the demo, together with all the instructions to the users, sending regular reminders if needed.

As a general consideration for replicability, given that the proposed services have been liked and that the approval ratings have risen as the Apps improved demo by demo, it would be advisable to identify users who already have a certain degree of familiarity in managing Apps at a pre-stage market. This would decrease the risk of premature abandonment of the trial due to technical difficulties.

A final consideration concerns the targets set at the beginning of the project. These were ambitious values that collided, in a period very close to mandatory social distancing with new mobility behaviours emerging (not only social distancing, but also shift of peak hours, increase of teleworking). However, the possibility to contact a large number of testers remained of great importance. This aspect must be strengthened for the next opportunities to repeat the experimentation.

Overall, Ride2Rail experimentations were a cornerstone into IP4 developments, allowing to test a relevant use case (the Ride Sharing) together with its technical complexity and behavioural constraints and the project gathered significant data, analysed in deeper in D5.3, that is a solid baseline for future achievements in the multimodal model looking forward Mobility-as-a-Service.

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7. APPENDIX – SURVEY QUESTIONS

The survey was conducted online by means of a web page. Hereafter there are reported the questions made to the testers of Ride2Rail services.

1. How do you currently travel?
2. Which App (Driver Companion, Travel Companion, both) did you use during the demo period?

Questions for DC App users:

3. How many times have you used the Ride2Rail service as a driver of a shared trip?
4. For all of your Ride2Rail journeys, how many were connected to public transit (bus, tram, train, metro) either at the beginning or the end of the trip?
5. For all of your Ride2Rail journeys, how many were a commute FROM home TO work / education etc?
6. For all of your Ride2Rail journeys, how many were a commute FROM work / education etc TO home?
7. For all of your Ride2Rail journeys, how many either started or ended at a rural or suburban location?

Questions for Travel Companion users:

8. How many times have you used the Ride2Rail service as a passenger of a shared trip?
9. For all of your Ride2Rail journeys, how many were connected to public transit (bus, tram, train, metro) either at the beginning or the end of the trip?
10. For all of your Ride2Rail journeys, how many were a commute FROM home TO work / education etc?
11. For all of your Ride2Rail journeys, how many were a commute FROM work / education etc TO home?
12. For all of your Ride2Rail journeys, how many either started or ended at a rural or suburban location?

Questions for users of both DC and TC apps:

13. How many times have you used the Ride2Rail service as a passenger of a shared trip?
14. How many times have you used the Ride2Rail service as a driver of a shared trip?
15. For all of your Ride2Rail journeys, how many connected to public transit (bus, tram, train, metro) either at the beginning or the end of the trip?
16. For all of your Ride2Rail journeys, how many were a commute FROM home TO work / education etc?

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17. For all of your Ride2Rail journeys, how many were a commute FROM work / education etc TO home?
18. For all of your Ride2Rail journeys, how many either started or ended at a rural or suburban location?

Questions about Apps usability and feeling on tested services:

19. How would you rate Ride2Rail for organising trips as a DRIVER USING THE DRIVER COMPANION?
    a. I think that I would like to use the Ride2Rail frequently.
    b. I found the Ride2Rail unnecessarily complex.
    c. I thought the Ride2Rail was easy to use.
    d. I think that I would need the support of a technical person to be able to use the Ride2Rail.
    e. I found the various functions in the Ride2Rail were well integrated.
    f. I thought there was too much inconsistency in this Ride2Rail.
    g. I would imagine that most people would learn to use the Ride2Rail very quickly.
    h. I found the Ride2Rail very cumbersome to use.
    i. I felt very confident using the Ride2Rail.
    j. I needed to learn a lot of things before I could get going with the Ride2Rail.
20. What is the best thing about the Ride2Rail service? What did you like about it?
21. What problems did you face with the Ride2Rail service? What did you dislike about it?
22. How would you rate Ride2Rail for organising trips as a PASSENGER USING THE TRAVEL COMPANION?
    a. I think that I would like to use the Ride2Rail frequently.
    b. I found theRide2Rail unnecessarily complex.
    c. I thought the Ride2Rail was easy to use.
    d. I think that I would need the support of a technical person to be able to use the Ride2Rail.
    e. I found the various functions in the Ride2Rail were well integrated.
    f. I thought there was too much inconsistency in this Ride2Rail.
    g. I would imagine that most people would learn to use the Ride2Rail very quickly.

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h. I found the Ride2Rail very cumbersome to use.

i. I felt very confident using the Ride2Rail.

j. I needed to learn a lot of things before I could get going with the Ride2Rail.

Questions about user anagraphic:

23. How old are you?

24. What do you do?

25. If you selected Other, please specify:

26. What gender do you identify as?

27. If you selected Other, please specify:

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