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List of abbreviations (if any)

KPI	Key Performance Indicator
KAVA	KIC Added Value Activities
TRL	Technological Readiness Level
PT	Public Transport

List of Figures

Figure 1	a) Gender distribution in Tallinn b) age distribution in Tallinn
Figure 2	a) personal status distribution in Tallinn b) Education level distribution in Tallinn
Figure 3	a) Distribution of workplace district of Tallinn users b) Distribution of school district of Tallinn users

Figure 4	a) number of cars per household in Tallinn b) possession of driving license for Tallinn users
<u>Figure 5</u>	Frequency of transport modes use in Tallinn
Figure 6	Distribution of home district of the users in Tallinn
Figure 7	Frequency of visits per Tallinn district
Figure 8	Visit purpose per Tallinn district
Figure 9	KPIs in Tallinn dashboard
Figure 10	Heatmap of cycling sessions in Tallinn
Figure 11	<u>Monthly trend of registered sessions in Tallinn</u>
Figure 12	Age distribution in Braga
Figure 13	a) Age distribution in Braga b) personal status distribution in Braga
Figure 14	<u>a) Distribution of education level in Braga b) distribution of household composition in Braga</u>
Figure 15	a) Number of cars per household in Braga b) possession of driving license in Braga
Figure 16	Use of Public Transport in Braga

Figure 17	Frequency of cycling in Braga b) Bicycle type of Braga users
Figure 18	KPIs in Braga dashboard
Figure 19	Heatmap of cycling sessions in Braga
Figure 20	<u>Monthly trend of registered sessions</u> in Braga
Figure 21	a) Age distribution in Istanbul b) Distribution of personal status in Istanbul
Figure 22	Distribution of work distance in Istanbul
Figure 23	<u>a) Private car ownership in Istanbul b) possession of driving license</u> in Istanbul
Figure 24	a) PT usage in Istanbul b) Frequency of PT usage in Istanbul
Figure 25	a) Frequency of bike usage in Istanbul b) Bike type of Istanbul users
Figure 26	KPIs in Istanbul dashboard
Figure 27	Heatmap of cycling sessions in Istanbul
Figure 28	<u>Monthly trend of registered sessions</u> in Istanbul
Figure 29	<u>Frequency of bicycle use after participating in BICIFICATION in Tallinn (1st and 2nd questionnaire)</u>

Figure 30	Main purpose of BICIFICATION trips in Tallinn (1 st and 2 nd questionnaire)
Figure 31	Preferences of Tallinn users about reward types (1 st and 2 nd questionnaire)
Figure 32	Evaluation of BICIFICATION system's features in Tallinn (1 st and 2 nd questionnaire)
Figure 33	Evaluation of features included in BICIFICATION mobile application in Tallinn (1 st and 2 nd questionnaire)
Figure 34	Evaluation of the overall experience of BICIFICATION in Tallinn (1 st and 2 nd questionnaire)
Figure 35	Frequency of bicycle use after participating in BICIFICATION in Braga (1 st and 2 nd questionnaire)
Figure 36	Main purpose of BICIFICATION trips in Braga (1 st and 2 nd questionnaire)
Figure 37	Preferences of Braga users about reward types (1 st and 2 nd questionnaire)
Figure 38	Evaluation of BICIFICATION system's features in Braga (1 st and 2 nd questionnaire)
Figure 39	Evaluation of features included in BICIFICATION mobile application In Braga (1 st and 2 nd questionnaire)
Figure 40	Evaluation of the overall experience of BICIFICATION in Braga (1 st and 2 nd questionnaire)
Figure 41	a) Frequency of bicycle use after participating in BICIFICATION in Istanbul b) Main purpose of BICIFICATION trips in Istanbul

Figure 42	Preferences of Istanbul users about reward types
Figure 43	Ranking of BICIFICATION system's features in Istanbul
Figure 44	Ranking of features included in BICIFICATION mobile application In Istanbul
Figure 45	Evaluation of the overall experience of BICIFICATION in Istanbul
Figure 46	Comparison of monthly trend of registered sessions among pilot cities
Figure 47	Comparison of the preferences about reward types among pilot cities
Figure 48	Comparison of the evaluation results of BICIFICATION system's features between Braga and Tallinn
Figure 49	Ranking in higher positions of BICIFICATION system's features in Istanbul
Figure 50	Comparison of the evaluation results of the BICIFICATION overall experience among pilot cities

Contents

Document information.....	2
List of abbreviations (if any).....	2
List of Figures.....	2
1 Executive Summary.....	8
2 Quantitative evaluation	9
2.1 General information for the pilots.....	9
2.2 Tallinn city	11
2.2.1 Users Profile	11
2.2.2 Pilot KPIs	15
2.3 Braga municipality	17
2.3.1 Users Profile	17
2.3.2 Pilot KPIs	20
2.4 City of Istanbul	22
2.4.1 Users Profile	23
2.4.2 Pilot KPIs	25
3 User assessment results.....	28
3.1 Tallinn city	28
3.2 Braga municipality	32
3.3 City of Istanbul	37
4 Cross-area comparisons.....	39
5 Conclusions and Lessons learnt	43
6 Acknowledgement	44

1 Executive Summary

The aim of the project is to motivate citizens to shift from motorized vehicles to cycling, through the implementation of gamification/rewarding schemes in 3 cities (Braga, Istanbul, Tallinn) that are already making great attempts to promote active mobility. These schemes are supported by an already high-TRL technological solution provided by FB INNOVATION (Pin Bike), consisting of a patented hardware and software, which is capable of accurately monitoring bicycle trips, and they engage:

- a) Local authorities are the regulators of the scheme, set rules and provide rewards. Additionally, they collect bike trajectories data and extract useful information to create knowledge for the usage of active means of transportation.
- b) A critical mass of users is the main actor of the scheme. They receive a Pin Bike kit, install the Pin Bike APP and earn points and rewards as they ride.
- c) Local shops are supporters of the scheme, and they provide discounts based on the collected points. Thus, an additional benefit for the local communities is the promotion of purchases from local shops instead of large shopping malls often located out of the city perimeter, and reachable only by private cars.

This document, corresponding to DEL04 “Assessment results”, is produced in the context of Task A2204, “Pilot demonstration and evaluation”. Its main goal is to present the results of the assessment of the 4 months pilots’ implementation. Both qualitative and quantitative data are analyzed resulting in conclusions for further improvements regarding the technological solution and the implementation of similar schemes in other cities. The document has been developed by CERTH with the collaboration of PinBike based on the valuable inputs collected by the city of Istanbul, Tallinn and Braga during the task.

In the first part of the deliverable, a quantitative evaluation of the pilots is performed. This part includes descriptive analytics both for the users’ profile in each city and the KPIs of the pilots’ implementation. The users profile data derived from the registration form that each city launches during the preparation phase (April-May) to collect the interested users and they were compared with the social criteria set by the cities under Subtask 2.1 as presented in the DEL03 “Elaboration of use cases”. The analysis is performed just for the active users; being an active user requires two conditions:

- Being registered to registration form and being selected by the municipality among the final users
- Receiving a PinBike Kit, downloading the dedicated mobile application and activating the related code

The second part of the deliverable includes the qualitative evaluation of the pilot based on questionnaire surveys delivered to the users in the three pilot sites. A single questionnaire was drafted for the three pilot sites for allowing cross-area comparisons.

The present document provides to pilot cities useful and valuable insights both on the implementation of rewarding schemes of active mobility and the users perspectives, allowing them to better design future actions and more efficient strategies towards the successful promotion of a greener and more active mobility.

2 Quantitative evaluation

2.1 General information for the pilots

The first step for the implementation of the technological solution included the definition of the requirements of the local authorities in order to form gamification/rewarding schemes that totally address their needs. The needs concerned the “nature” of the rewards (e.g. monetary, vouchers, gifts, virtual) and the way that these rewards are transferred to the users.

Moreover, the social layers to be used for participants' confirmation or refusal of their application are defined since not all applicants were confirmed after the registration phase. In each pilot, 500 participants were selected among the applicants according to social layers pre-identified by each Municipality involved in the BICIFICATION.

Each city has identified different social layers according to their needs and objectives. These social layers are assessed through user registration forms, where applicants had to answer to different demographic questions such as:

- **Language**
- **Age**
- **Gender**
- **Neighborhood** where they live
- **Personal Status** (Employed, Unemployed, Student, Pensioner)
- **Education Level** (Primary School, High School, College/University, Master/PHD)
- **N. of cars** in the household (0, 1, 2+)
- Possession of **driving license** (yes, no)
- **Usage of Public transport** (yes, no)
- Frequency of **usage of Public Transport** (Every day, included weekends, Every working day, Around twice a week, Once a week)
- Frequency of **usage of Bicycle** (Every day, included weekends, Every working day, around twice a week, Once a week)
- **Household composition** (Single with kids, Single without kids, Couple with kids, Couple without kids)

The communication campaign of the cities to the citizens and the local shops was performed during April-May. During this period cities planned and organized dedicated events and actions to inform the citizens and their local ecosystems about the BICIFICATION project. These events/actions will be described in detail in DEL06 – “Report on dissemination activities” to be submitted at the end of the project in December.

All three cities developed registration forms that were available to the citizens through the municipalities' websites during the pilots' preparation phase in order to reach the targeted 500 users. The registration forms along with the project rules including terms and conditions of participation in each city, details about

the type and the use of the rewards and the setting up of the kit among others, were also available in BICIFICATION website (<https://bicification-project.eu/join/>). The type of the rewards and the specific amounts that users can earn are described in detail in DEL03.

Although all the three pilots started during June, the start dates were slightly different depending on the preparation activities of each city. Consequently, each pilot ended after the completion of 4 months between end of September and mid-October (as month is considered a 30-day duration and not a calendar month). During the whole duration each participant in all three cities checks the number of his/her rewards in the Pin Bike mobile application. For Braga and Tallinn, every 10 € accrued, the app automatically creates a 10 € voucher that can be spent to purchase products/services offered by the local shop. The participants are able to see in the app the local shops that participate in the BICIFICATION project. As soon as the vouchers are used by the participants, Pin Bike is responsible on behalf of the cities for the monthly reimbursements to the local shops.

In Istanbul, although vouchers are created automatically by the application for each 10 € earned, the amounts are transferred as a credit on the Istanbul Card of each participant. BELBIM, one of the subsidiary companies of the IMM, is the provider of IstanbulCard which is a city card that people can use it for shopping, art activities, transportation and other social activities.

Except of the users' profile and the quantitative data collected during the pilots' implementation, two questionnaires were delivered to participants in Braga and Tallinn in order to collect their feedback about different elements of the BICIFICATION system and the mobile application.

Due to some administrative problems the allocation of the rewards to Istanbul users was delayed; the rewards started to be allocated during September. As this might have a negative impact to the pilot evaluation, it was decided to deliver the users questionnaire after the rewards allocation. Thus, in Istanbul only one questionnaire was delivered to users at mid-October to evaluate their experience during the whole 4-month period. The questionnaire was open from 14 to 21 of October.

The first questionnaire in Braga and Tallinn was sent via notification in the mobile application on 30th of August and it was open until 7 September. Second questionnaire was sent also via notifications on 11/10 and was open until 18/10. As an incentive to collect more answers, the users that filled in the 2nd questionnaire was rewarded with a voucher of 10 euro in Tallinn and Braga and similarly with 10 euros in their Istanbulkart in Istanbul. The answers collected were the following:

- Braga 1st questionnaire: 172 answers and 2nd questionnaire: 166 answers
- Tallinn 1st questionnaire: 209 answers and 2nd questionnaire: 194 answers
- Istanbul 253 users answered the questionnaire.

2.2 Tallinn city

The total number of the interested citizens that were registered in the Tallinn registration form was 686. As the number of the registered users was above the target value, the municipality had to select the 500 final users based on the following social criteria that has been set during the preparation phase:

- Language (Estonian - 65%, Russian - 33%, Other - 2%)
- Gender (Female - 44%, Male - 56%)
- Age (15-29 - 26%, 30-44 - 38%, 45-59 - 23%, 60+ - 13%)
- City district (Haabersti - 7%, Kesklinn - 17%, Kristiine - 7%, Lasnamäe - 19%, Mustamäe - 14%, Nõmme - 12%, Pirita - 3%, Põhja-Tallinn - 21%)

Although the selected applicants were invited to collect the BICIFICATION kit by the municipality before the start of the pilot on the 1st of June, some non-shows were observed. So, during the pilot period (1st June - 30th September), 450 kits have been totally distributed by Tallinn municipality to users and 421 out of them have activated their participation in BICIFICATION through the mobile application.

The following descriptive analysis was performed on the data collected from 274 out of 421 active users. This is due to the fact that some of the active users had filled the registration form with a different email address than the one used to be registered in the application and thus, their data couldn't be matched properly. However, the sample is considered representative of the composition of the users group.

2.2.1 Users Profile

Regarding the language of the participants 236 (86%) are Estonian and 38 (14%) are Russian instead of the target value of 65% and 33% respectively. The gender is quite balanced as 46% of the participants are women and 53% are men (Figure 1a). These percentages are almost equal to the ones set as targets by the municipality before the start of the pilot.

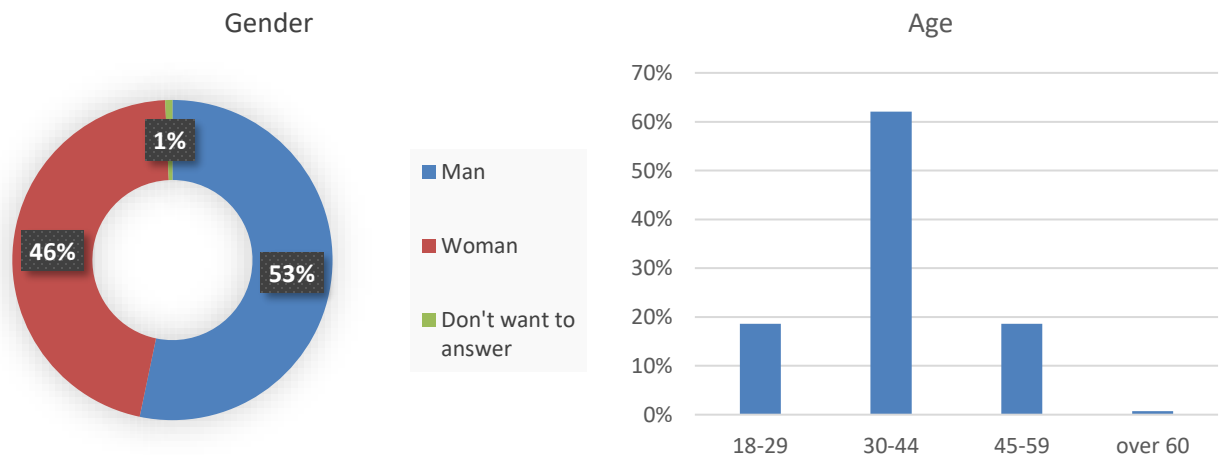


Figure 1: a) Gender distribution in Tallinn b) age distribution in Tallinn

The age target values for the age groups of 15-29 (26%) and 45-59 (23%) are almost achieved as the percentage of both these categories reach 19% (Figure 1b). On the other hand, for the age group of 30-44 the percentage of the participants is 62% instead of 38%. The highest deviation from the target goal is noted in the age group of 60+ since just 1% of the participants belong in this group instead of 13% initially planned.

The majority of the participants are employed (245 users-89%) while just 6% (16 users), 4% (11 users) and 1% (2 users) are students, unemployed and pensioner respectively (Figure 2 a). Regarding the education level, 85% holds a university/master/PhD degree and 15% of the participants are high or primary school graduates (Figure 2 b)

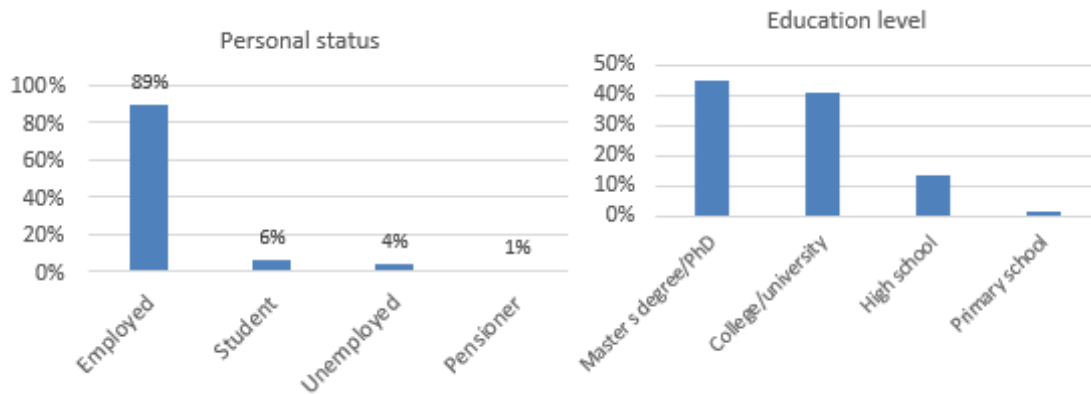


Figure 2: a) personal status distribution in Tallinn b) Education level distribution in Tallinn

For the 245 employed participants and the 16 students there was an additional question about their workplace and their school district respectively. 54% of the employed work in city center and the school of 31% of the students is in Mustamäe district. The distributions are shown in Figure 3 a and Figure 3 b:

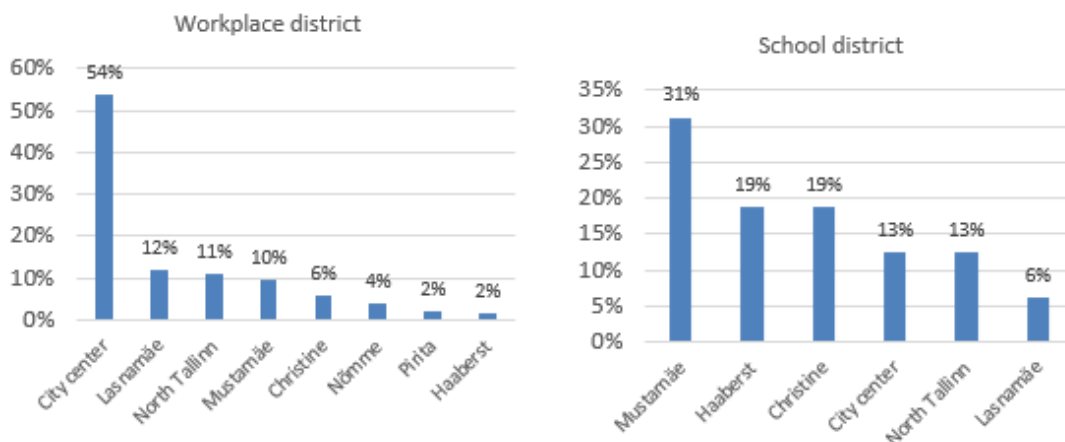


Figure 3: a) Distribution of workplace district of Tallinn users b) Distribution of school district of Tallinn users

54% of the participants has one car in their household while 10% of them has more than two cars. It is worth mentioned that a high percentage of them (36%) don't own a car (Figure 4a) even though they have a driver license (just 21% of the participants don't have a driving license) (Figure 4b).

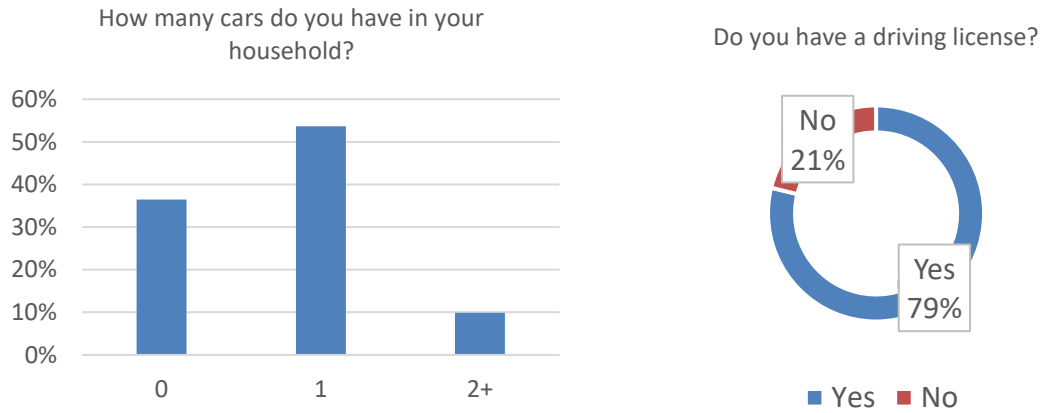


Figure 4: a) number of cars per household in Tallinn b) possession of driving license for Tallinn users

34% of the users in Tallinn use their personal bicycle every day, including weekends, 27% of them every working day and 34% of them about two days a week (Figure 5).

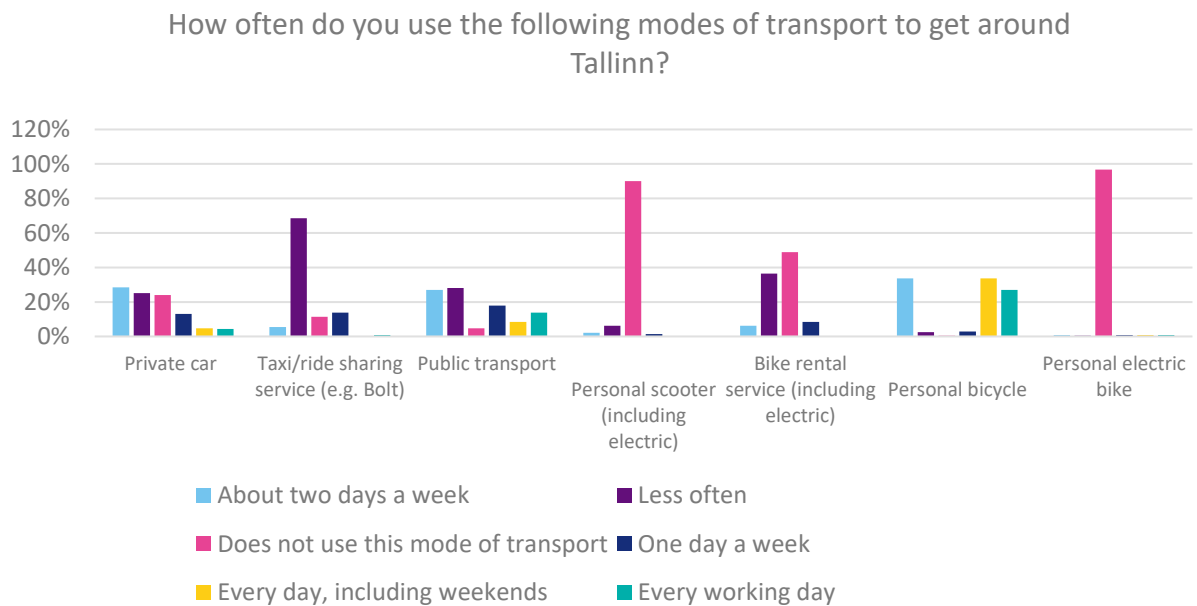


Figure 5: Frequency of transport modes use in Tallinn

Among the KPIs set by the Tallinn city was also the participation of citizens from specific city districts as following: city center 17%, North-Tallinn – 21%, Nõmme - 12%, Mustamäe - 14%, Lasnamäe - 19%, Kristiine - 7%, Haabersti - 7% and Pirita - 3%. As presented in

Figure 5 the participation percentages have a deviation of about 1-3% from the target values. Exceptions are the percentages of city center that reaches 26% instead of 17% and the one of Lasnamäe that is 11% instead of 19%. Figure 7 presents the frequency of visits peer Tallinn district. The majority of the Tallinn users live in city center or/and visit it every working day because they work and have business connections there (Figure 8).

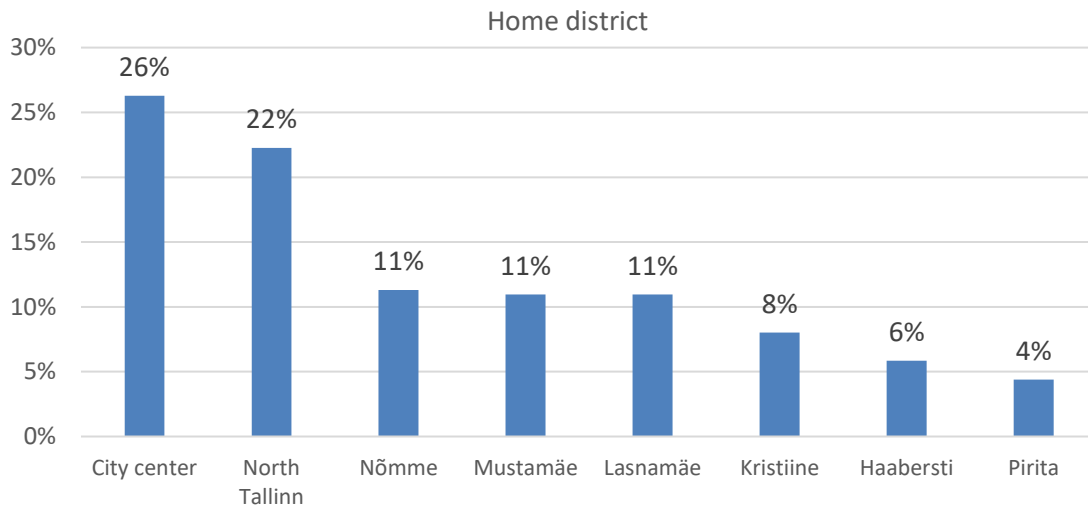


Figure 6: Distribution of home district of the users in Tallinn

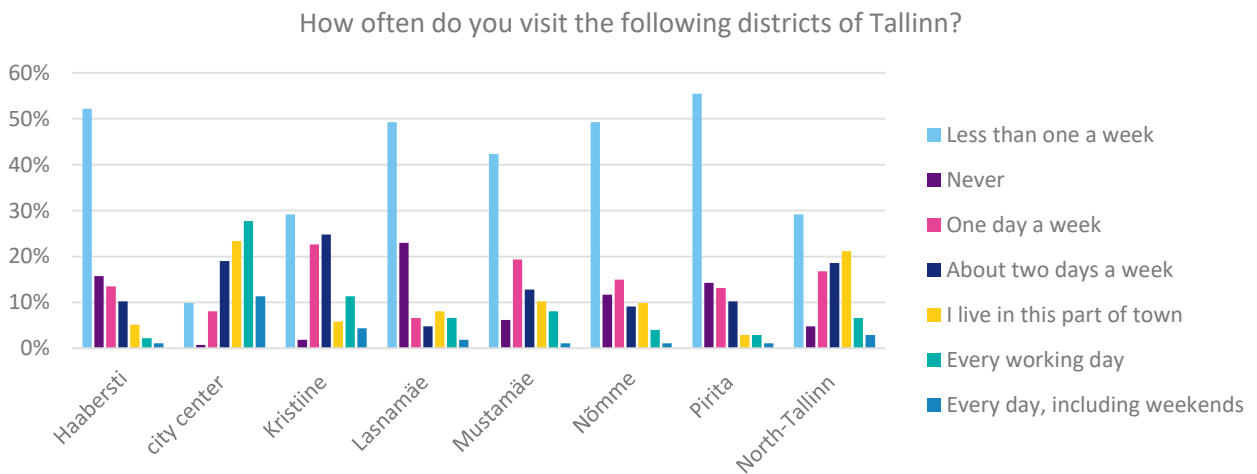


Figure 7: Frequency of visits per Tallinn district

For what purposes do you mainly visit the following districts of Tallinn?

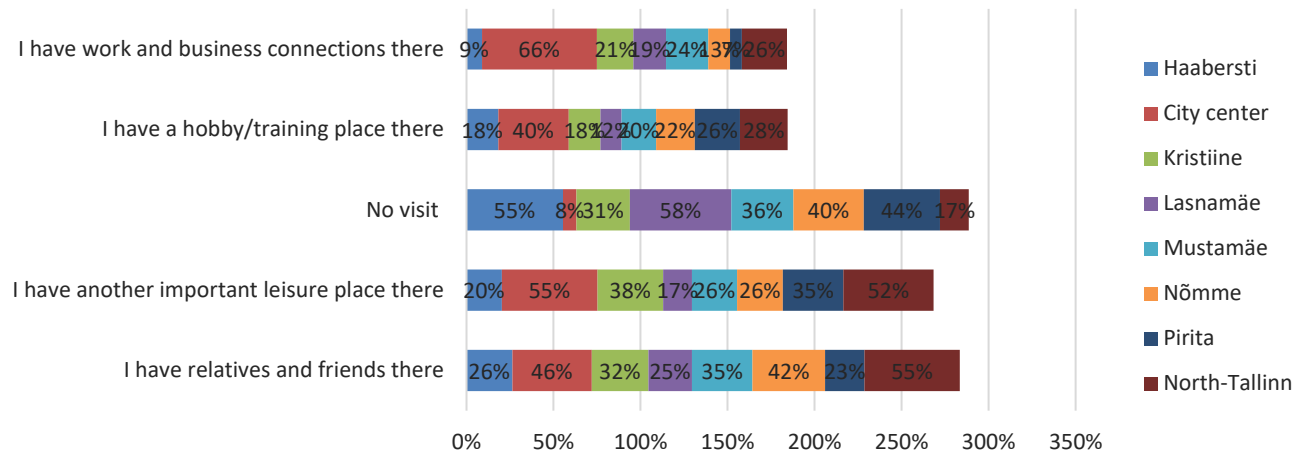


Figure 8: Visit purpose per Tallinn district

2.2.2 Pilot KPIs

During the period of 1/6- 30/9 in Tallinn, 29, 060 cycling sessions were performed by the 421 active users. The total distance travelled was 185, 612 km with an average session distance at 6.39 km and the CO2 saved was more than 29 tones (Figure 9). The following KPIs along with heatmaps (Figure 10) of cycling trajectories are available to cities through the municipality dashboard in order to continuously monitor the cycling conditions in their cities.

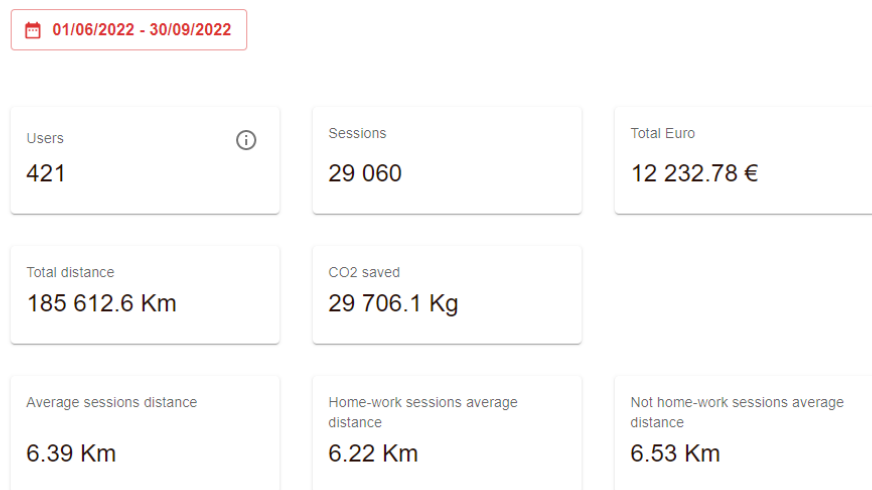


Figure 9: KPIs in Tallinn dashboard

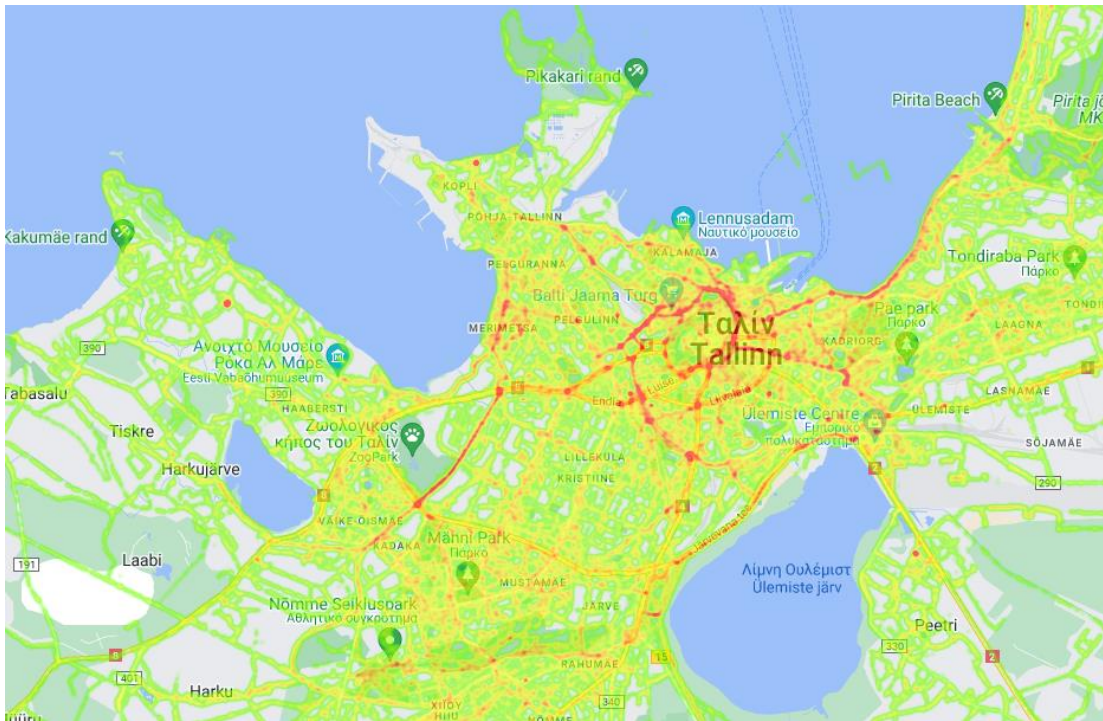


Figure 10: Heatmap of cycling sessions in Tallinn

Regarding the local shops engagement 19 shops were registered to participate in BICIFICATION in Tallinn and a total amount of 12, 232 € were used by users in a 10 euros voucher format and consequently were reimbursed to local merchants by Pin Bike. Figure 11 shows the number of sessions performed by the users in Tallinn per month of pilot's duration.

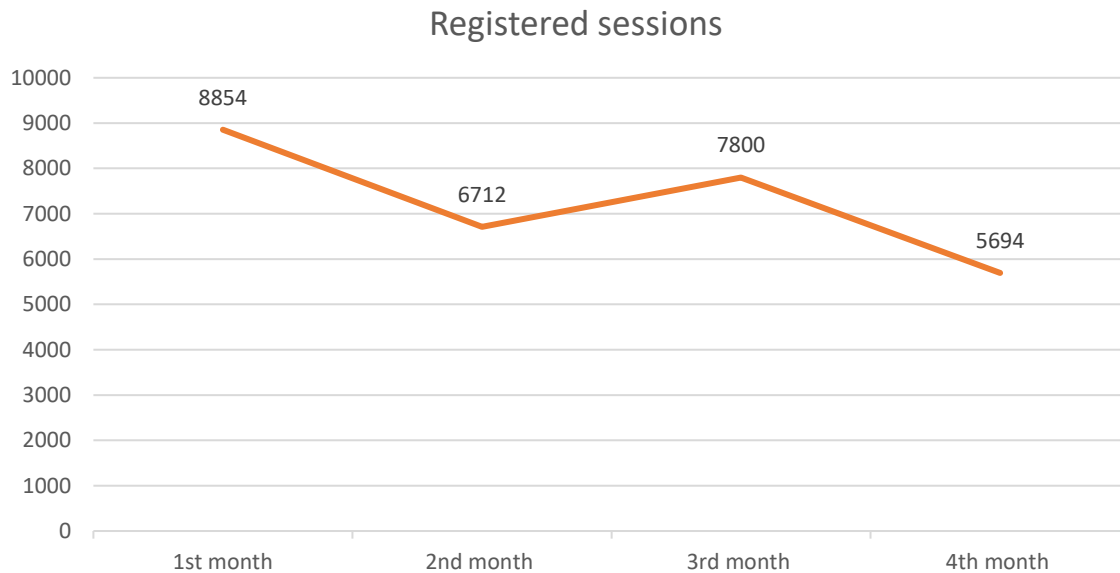


Figure 11: Monthly trend of registered sessions in Tallinn

2.3 Braga municipality

The 4-month pilot in Braga started on 6th of June and ended on 7th of October. 1034 citizens in Braga registered in the related form, stating their interest in participating in the pilot. The final 500 had to be selected by the municipality based on the following criteria that has been set in during the preparation phase in order to ensure a balanced participation:

- Gender: 49% women, 49% men, 2% non-binary
- Age groups: 25% under 25, 25% 26-44, 25% 45-54, 25% over 55
- Work Status: 40% active/employed, 40% student, 20% inactive/unemployed/pensioners
- Car owner: 50% yes, 50% no
- Regular Public Transport user: 50% yes, 50% no

Although 462 kits have been distributed by the municipality to interested citizens, 397 people activated their code in the app and start cycling. The following descriptive analysis was performed on the data collected from 296 out of 397 active users. This is due to the fact that some of the active users had filled the registration form with a different email address than the one that has been used to be registered in the application and thus, their data couldn't be matched properly. However, the sample is considered representative of the composition of the users group.

2.3.1 Users Profile

The participants in Braga are 31% women and 69% men. The percentages are quite far from the balanced target values that was set by the municipality before the start of the pilot (49% women, 49% men, 2% non-binary) (Figure 12).

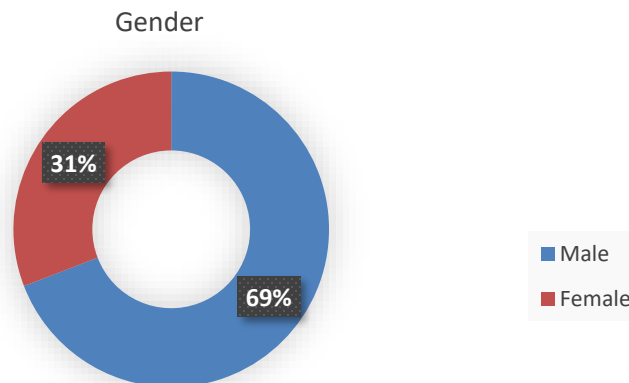


Figure 12: Age distribution in Braga

The municipality would also like to have equal distribution of 25% for the different age groups. Although it was achieved for the age group of 45-54 with a percentage of 26% and almost achieved for the over 55 group with 20%, the percentages for the other two age groups were 16% (less than 25) and 39% (26-44) (Figure 13 a). Regarding the profession the majority of the participants (77%) were employed while 13% were students and 10% were unemployed/pensioners (Figure 13 b).

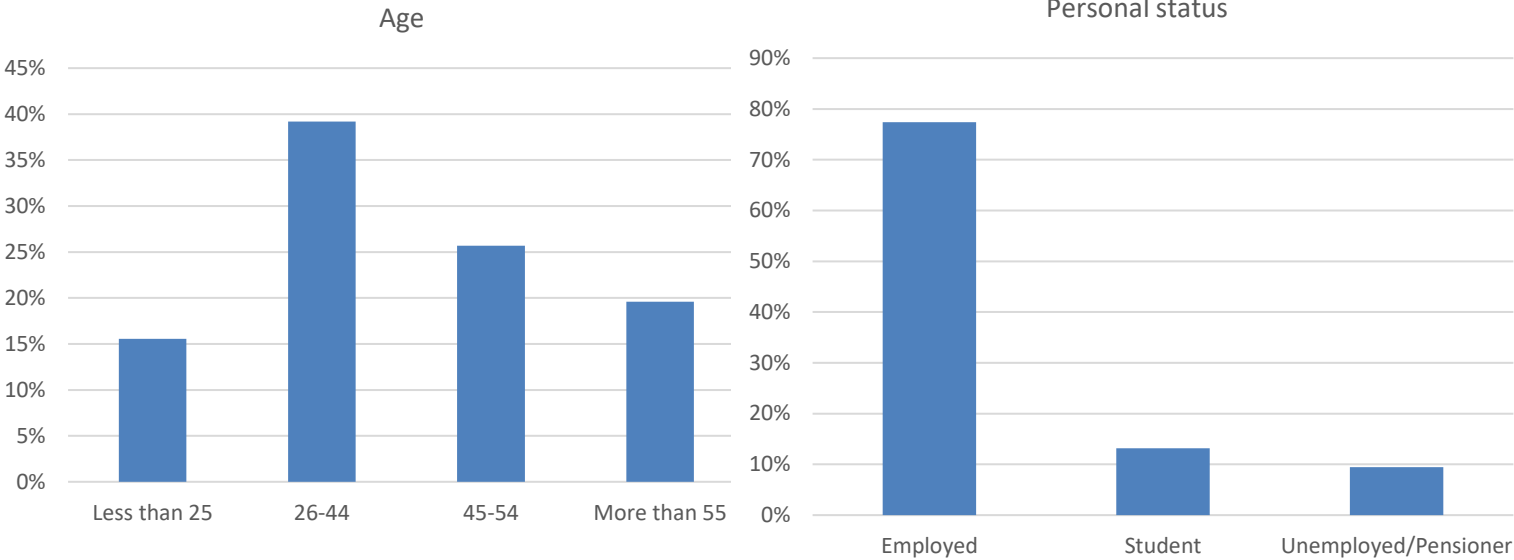


Figure 13: a) Age distribution in Braga b) personal status distribution in Braga

59% of the users in Braga holds a university/Master/PhD degree (Figure 14a) and 45% of them are couples with kids (Figure 14b).

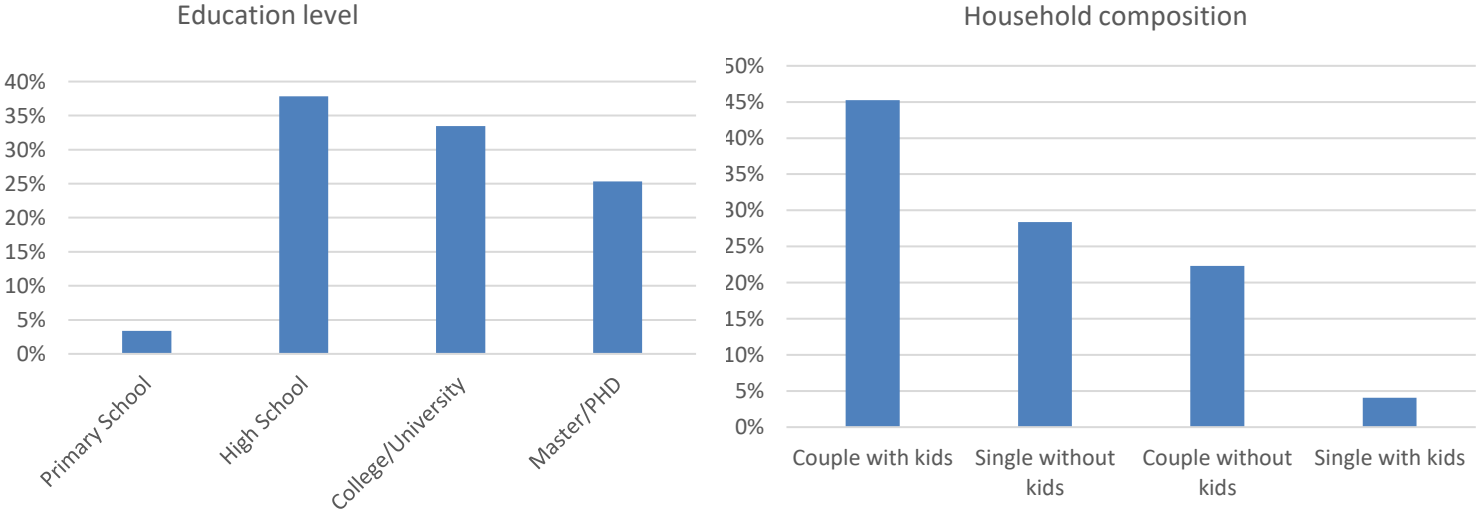


Figure 14: a) Distribution of education level in Braga b) distribution of household composition in Braga

90% of the participants has at least one car (35% has one car and 55% has more than 2 cars) while just 10% don't own a car (Figure 15 a). The percentages are similar for owning a driver license (89% of the participants own a driving license and 11% stated that they don't have a license) (Figure 15 b).

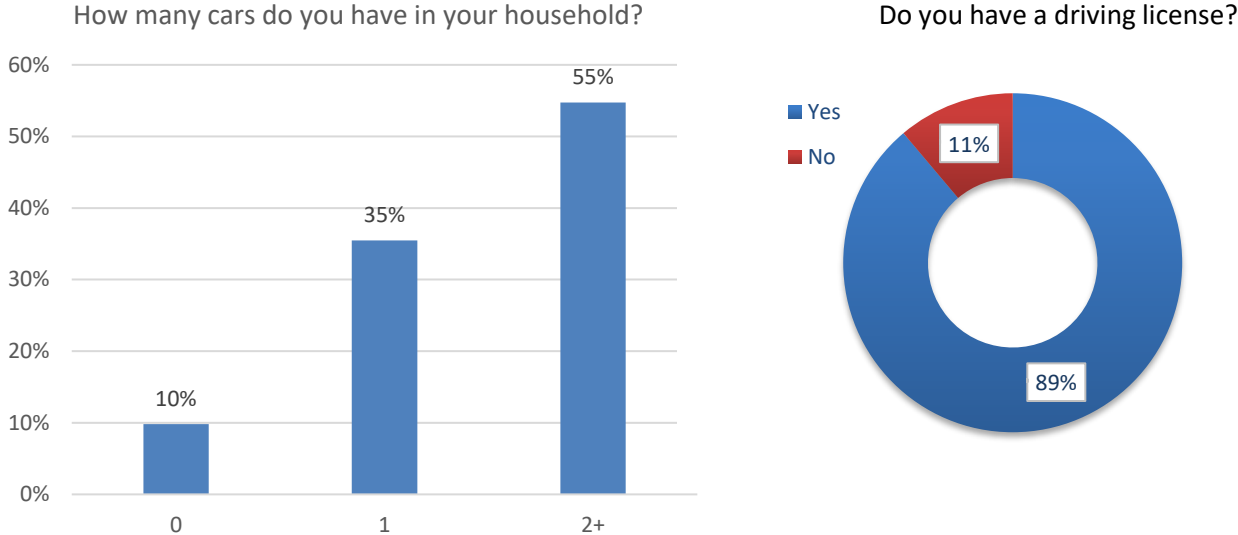


Figure 15: a) Number of cars per household in Braga b) possession of driving license in Braga

Although Braga aimed to attract 50% of non-regular public transport users, this percentage was higher reaching 73% of the participants (Figure 16).

Do you use Public Transport in Braga?

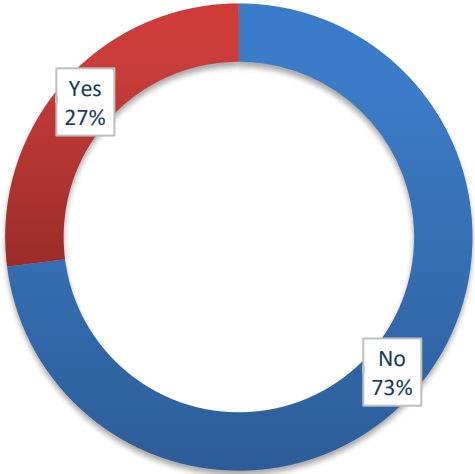


Figure 16: Use of Public Transport in Braga

The majority of the participants (36%) stated that they cycle 2-3 times a week. 29% stated that they cycle every day, including weekends, 19% only in the working days and 16% once a week (Figure 17a). The final question in Braga’s registration form concerned the bicycle type of the users with 75% answering that they have a muscular bicycle while 25% have an electric one (Figure 17b).

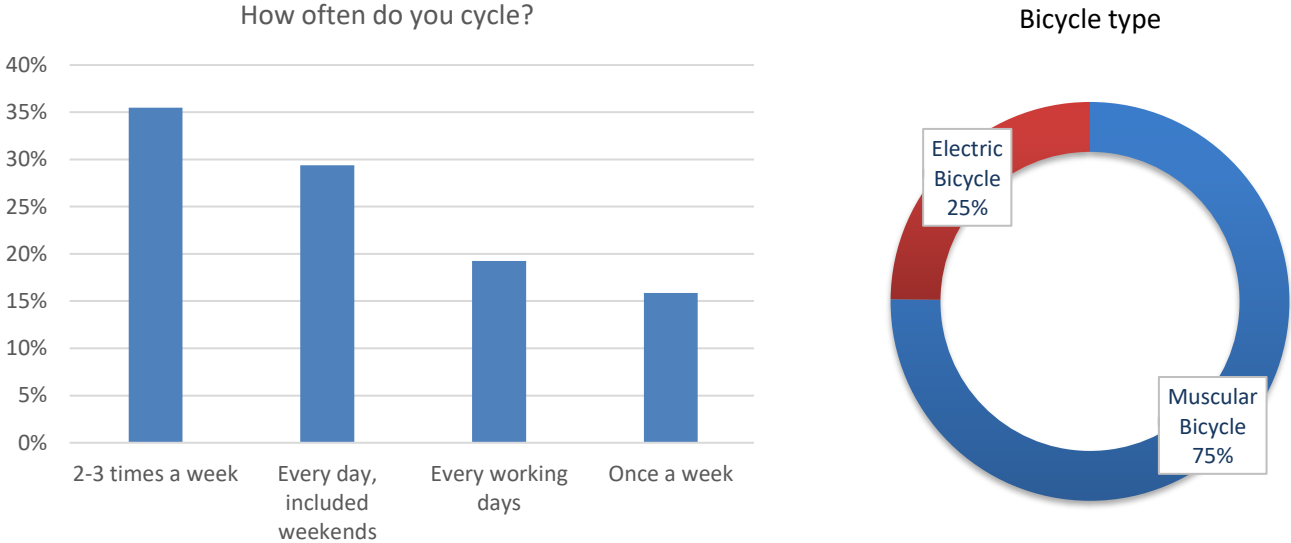


Figure 17: Frequency of cycling in Braga b) Bicycle type of Braga users

2.3.2 Pilot KPIs

During the period of 6/6- 7/10 in Braga, 22, 236 cycling sessions were performed by the 397 active users. The total distance travelled was 149, 975 km with an average session distance at 6.74 km and the CO2 saved was about 23.5 tones (Figure 18). The following KPIs along with heatmaps (Figure 19) of cycling trajectories are available to cities through the municipality dashboard in order to continuously monitor the cycling conditions in their cities including the routes used by citizens, the most used roads, starting and ending points, average and maximum speeds, preferred routes vs suggested routes, etc.

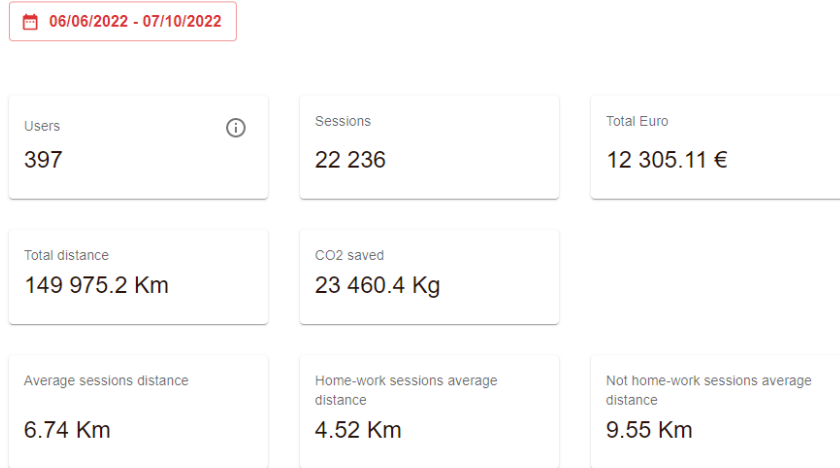


Figure 18: KPIs in Braga dashboard



Figure 19: Heatmap of cycling sessions in Braga

Regarding the local shops engagement 35 shops were registered to participate in BICIFICATION in Braga and a total amount of 12,305 € were used by users in a 10 euros voucher format and consequently were reimbursed to local merchants by Pin Bike. Figure 20 shows the number of sessions performed by the users in Tallinn per month of pilot's duration.

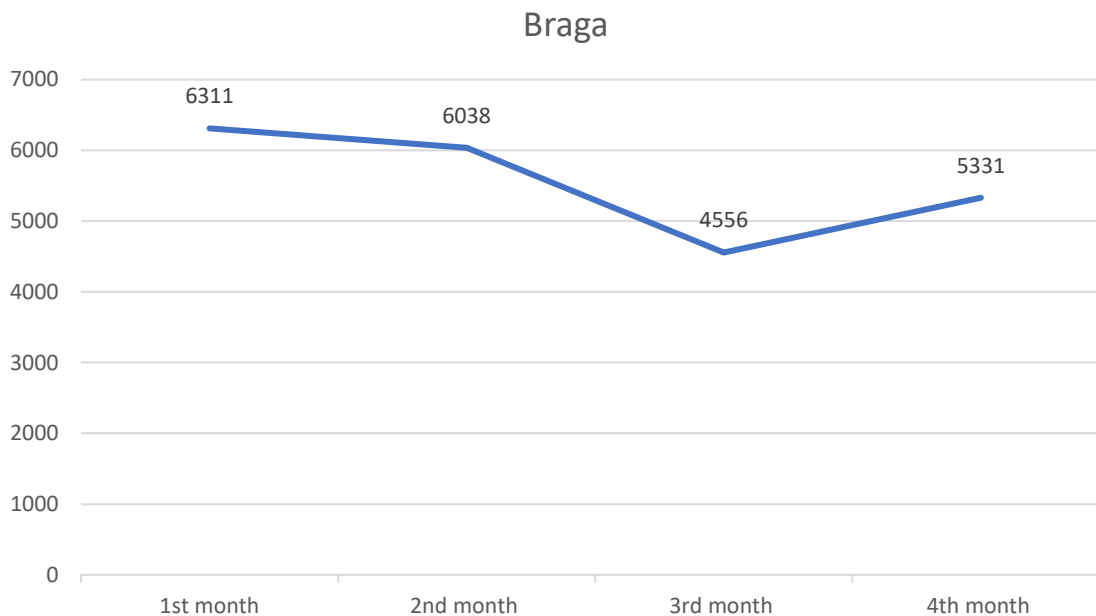


Figure 20: Monthly trend of registered sessions in Braga

2.4 City of Istanbul

The 4-month pilot in Braga started on 16th of June and ended on 16th of October. 719 citizens in Istanbul registered in the related form, stating their interest in participating in the pilot. The Municipality, after collecting all the applications decided how to balance the participation of the final 500 users according to the following criteria:

- Personal Status (Employed, Unemployed, Student, Pensioner)
- N. of cars in the household (0, 1, 2+)
- Possession of driving license (yes, no)

Although 463 kits have been distributed by the municipality to interested citizens, 385 people activated their code. The following descriptive analysis was performed on the data collected from 283 out of 385 active users. Similarly to Tallinn and Braga, this is due to the fact that some of the active users had filled the registration form with a different email address than the one that has been used to be registered in the application and thus, their data couldn't be matched properly. However, the sample is considered representative.

2.4.1 Users Profile

Regarding the gender, 85% of the participants in Istanbul were men and 15% were women (Figure 21 a). In terms of personal status, the participation wasn't balanced as initially planned by the city of Istanbul as 81% of the users were employees while the student, retired and other professions was 6% each (Figure 21 b).

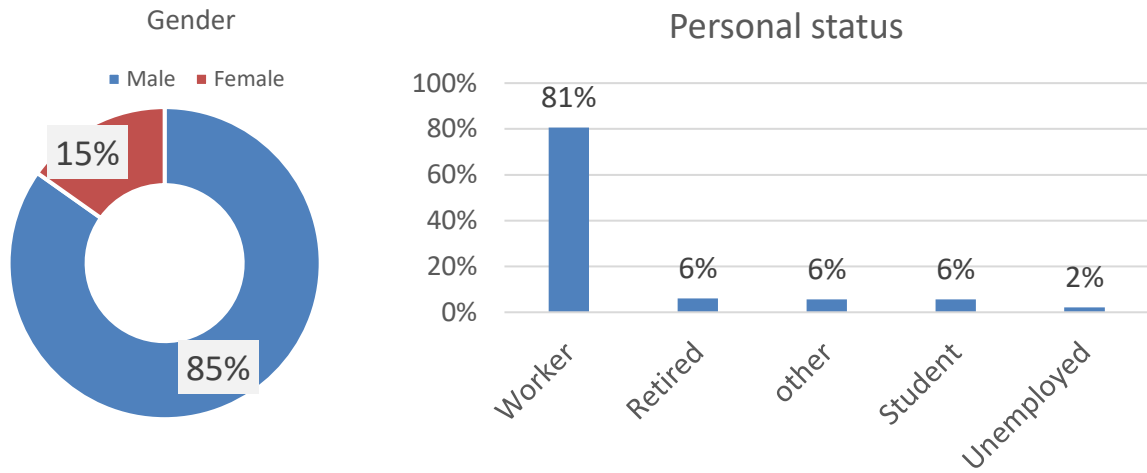


Figure 21: a) Age distribution in Istanbul b) Distribution of personal status in Istanbul

48% of the participants holds a bachelor's degree while the participants that hold a master/PhD degree and those that has completed the high school are equally represented (21% and 18% respectively). Figure 22 presents the most populated work district as stated from the participants. More answers were given but as their percentage was lower than 4%, they aren't included in the figure.

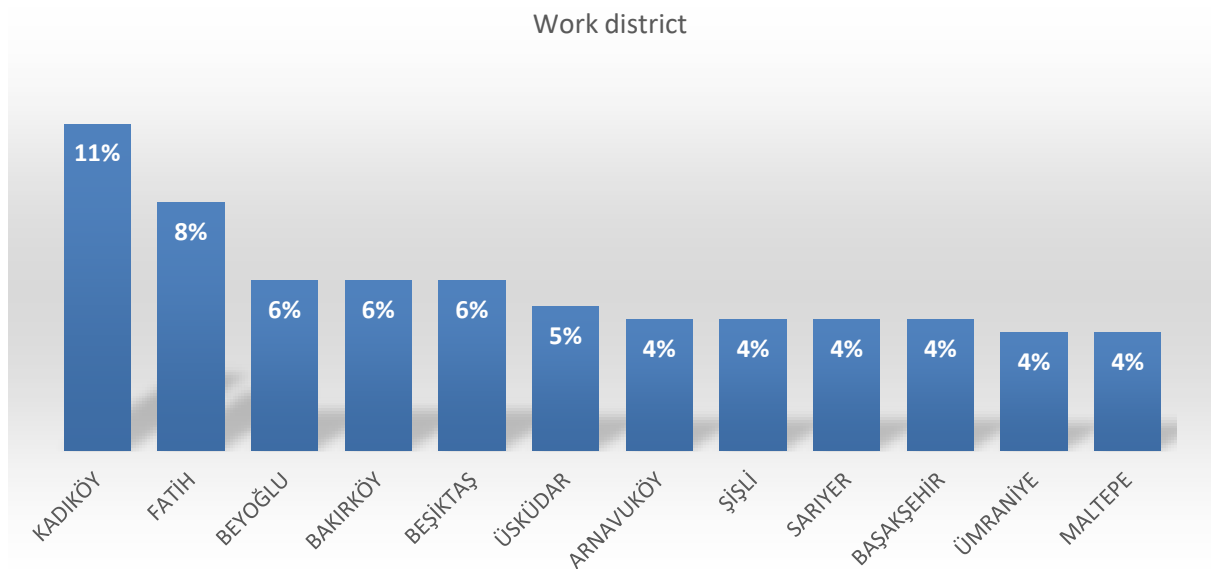
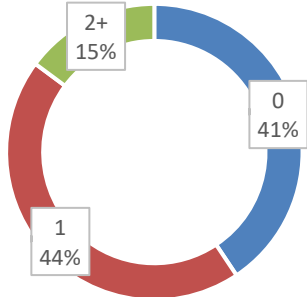


Figure 22: Distribution of work distance in Istanbul

59% of the participants has at least one car (44% of them has one car and 15% has more than 2 cars) while 41% has no cars (Figure 23a). So, the goal of city to attract also people who has car promoting cycling has been successfully reached. It is worth mentioned that not all the participants that has a driving license (88%) own a car (Figure 23b).

Private Car Ownership



Driving License

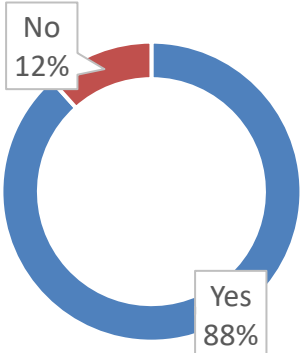
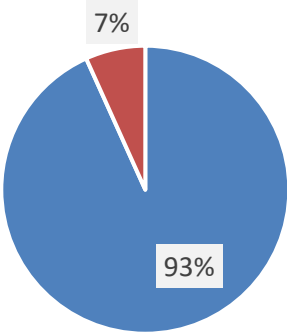


Figure 23: a) Private car ownership in Istanbul b) possession of driving license in Istanbul

The registration form included additional questions related to public transport usage. According to the answers 93% of the BICIFICATION participants in Istanbul use public transport for their routes (Figure 24a). 67% of them use it more than 2-3 times a week. The most common answers among those that don't use public transport (7%) are the ownership of a private vehicle (car and/or bicycle) (Figure 24).

PT usage



Frequency of PT Usage

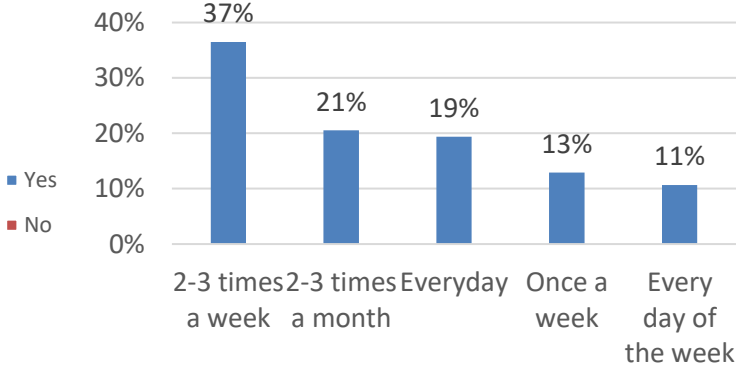


Figure 24: a) PT usage in Istanbul b) Frequency of PT usage in Istanbul

In the question about the frequency of bike usage, the majority (46%) answered that they use their bicycle 2-3 times a week and 31% use it every day(Figure 25a). The most common reasons for cycling are for sport (46%) and work (32%). In the last question, the users were asked to provide information about the type of their bicycle. The answers are presented in Figure 25b.

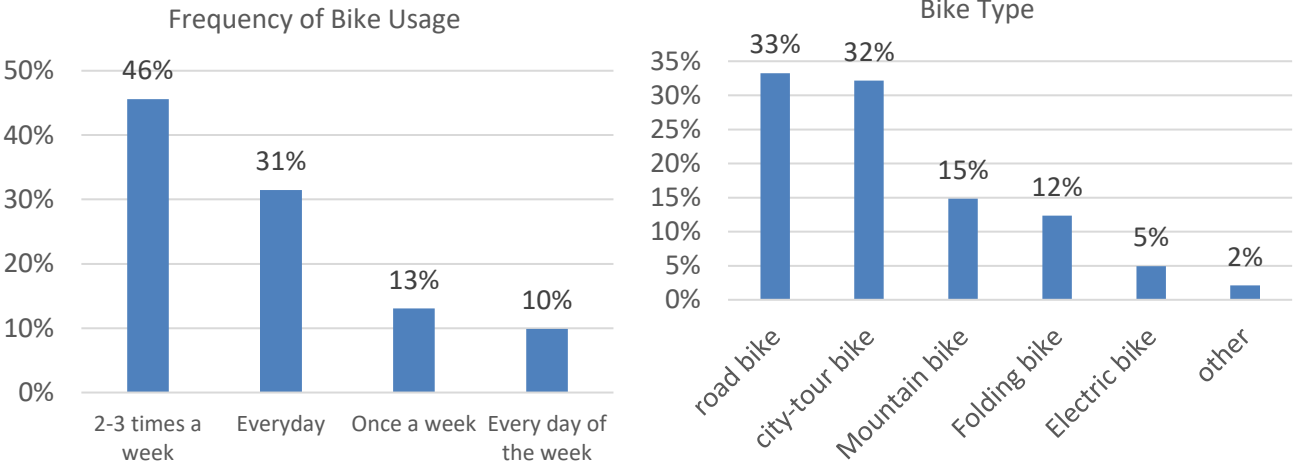


Figure 25: a) Frequency of bike usage in Istanbul b) Bike type of Istanbul users

2.4.2 Pilot KPIs

During the period of 16/6- 16/10 in Istanbul, 17, 081 cycling sessions were performed by the 385 active users. The total distance travelled was 224, 083 km with an average session distance at 13.12 km and the CO2 saved was about 36.5 tones (Figure 27). The following KPIs along with heatmaps of cycling trajectories (Figure 27) are available to Istanbul for monitoring reasons. In total 11, 541 euros were transferred to users Istanbulcards.

Figure 28 shows the number of sessions performed by the users in Tallinn per month of pilot’s duration.

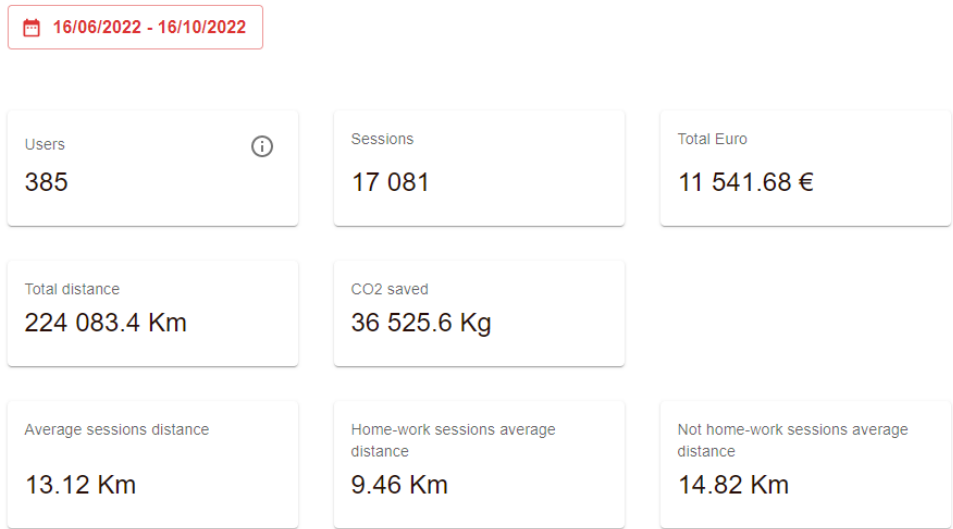


Figure 26: KPIs in Istanbul dashboard

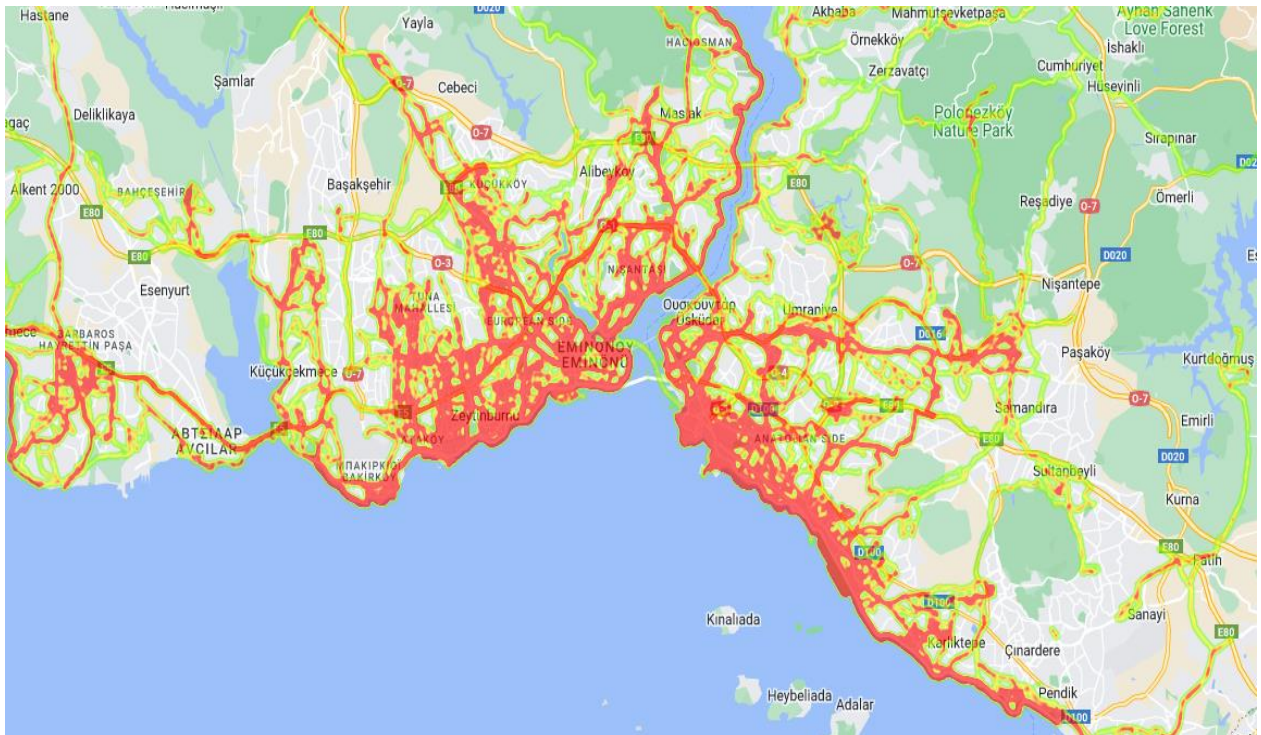


Figure 27: Heatmap of cycling sessions in Istanbul

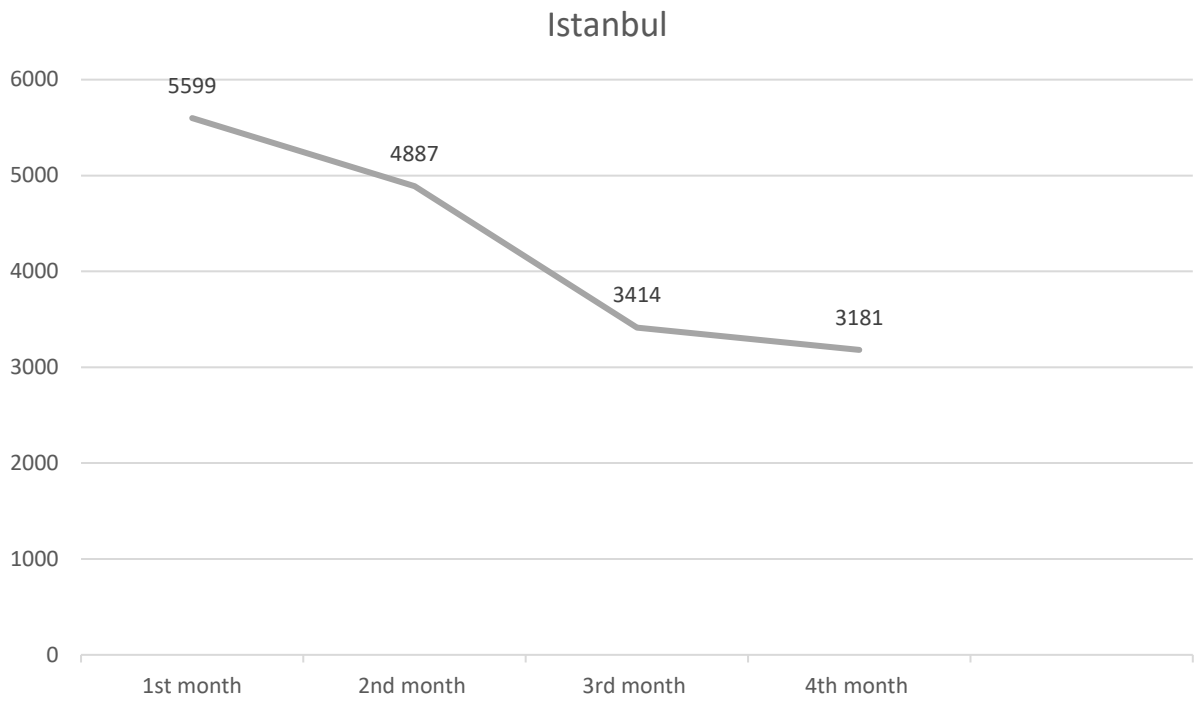


Figure 28: Monthly trend of registered sessions in Istanbul

3 User assessment results

3.1 Tallinn city

The questionnaire delivered to Tallinn users consisted of some general questions related to frequency of bicycle use after joining BICIFICATION scheme and the purpose of the trips. Both In the first and second questionnaires the majority of users answered that they use their bicycle mostly 2-3 times a week. The percentage of those that cycle every day included the weekend decreased from 31% to 27% while the percentage of those that cycle every working day increased from 26% to 30% (Figure 29).

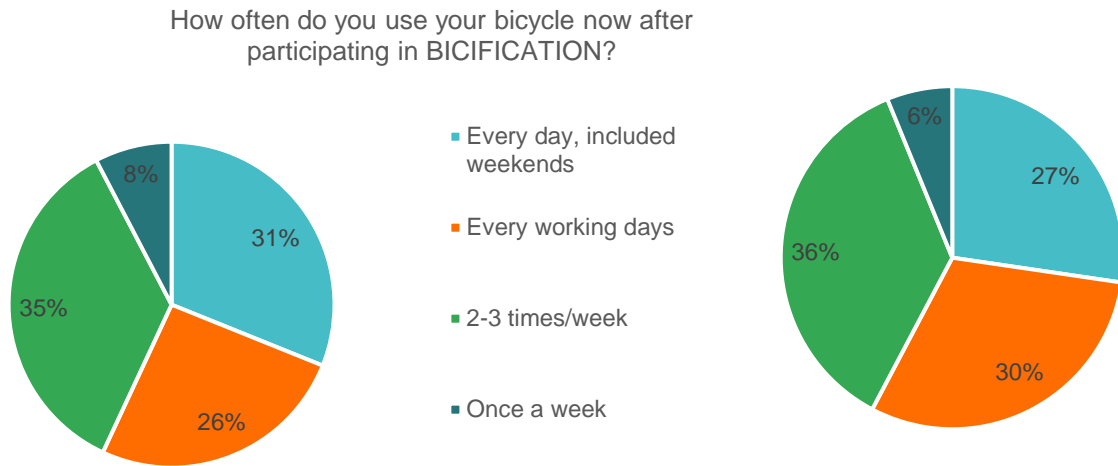


Figure 29: Frequency of bicycle use after participating in BICIFICATION in Tallinn (1st and 2nd questionnaire)

The distribution of the main trip purposes remains almost the same with the majority of the users answering that they cycle mainly to reach their work destinations (

Figure 30).

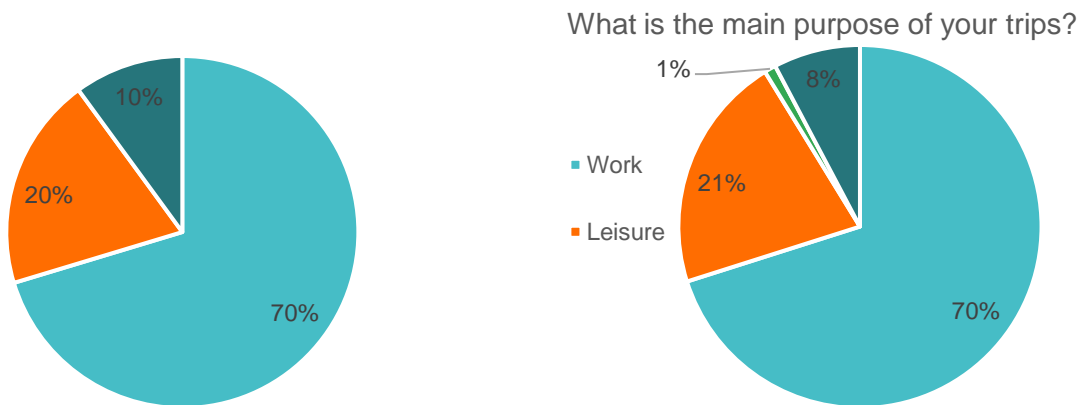


Figure 30: Main purpose of BICIFICATION trips in Tallinn (1st and 2nd questionnaire)

As in Tallinn the only available type of reward is the Km reward that users earn specific amount in euro for each km ridden, the participants were asked to indicate what other types of rewards they would like to be included in BICIFICATION system in Tallinn. In September most of them answered that they would like points multipliers¹ (57%) and monthly rewards² (34%). These two rewards collected the most votes also in the second questionnaire with similar percentages (44% for points multipliers and 47 for monthly rewards). In both questionnaires the cup rewards³ were the least preferred option (Figure 31).

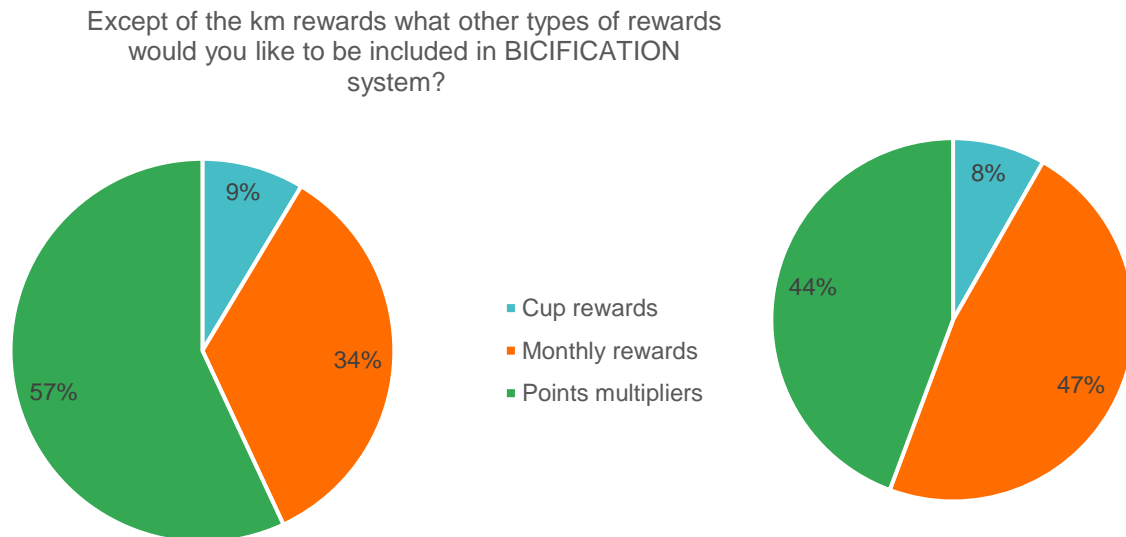


Figure 31: Preferences of Tallinn users about reward types (1st and 2nd questionnaire)

40% of the participants stated that they would like to use BICIFICATION in areas of Tallinn that are not yet included in the system. This percentage increased to 47% in the second questionnaire.

After the general questions the participants were asked to evaluate in a 5 scale different core features of the BICIFICATION scheme such as the kit, the dedicated mobile application, the rewarding system and the idea of the vouchers to be spent in local shops (1: lower value and 5: higher value).

The rewarding system and the vouchers have been evaluated with 4-5 values by high percentages of participants in the second questionnaire (79% and 71% respectively). Although comparing the two questionnaires, the low values 1-2 decreased and the high values 4-5 increased in the mobile application, it is worth mentioned that it still has a high percentage in values 1-3 (80% in the first questionnaire and

¹ Points multipliers (project points multipliers are foreseen during peak hour slots or for specific locations)

² Monthly rewards (For each km rode, the participant receives 10 project points. Every month, monetary rewards are awarded to the participants that collect the highest number of points.)

³ Cup rewards (Cup rewards are of three types: bronze, silver and gold, depending on the milestone reached in a specific time. Cup rewards are not directly linked to monetary rewards but to project points: when a participant wins a cup, he/she receives extra project points that allow her/him to climb the monthly ranking)

72% in the second questionnaire) while only 5% of the participants evaluate it with 5 after the 4 months duration of the pilot in Tallinn (Figure 32).

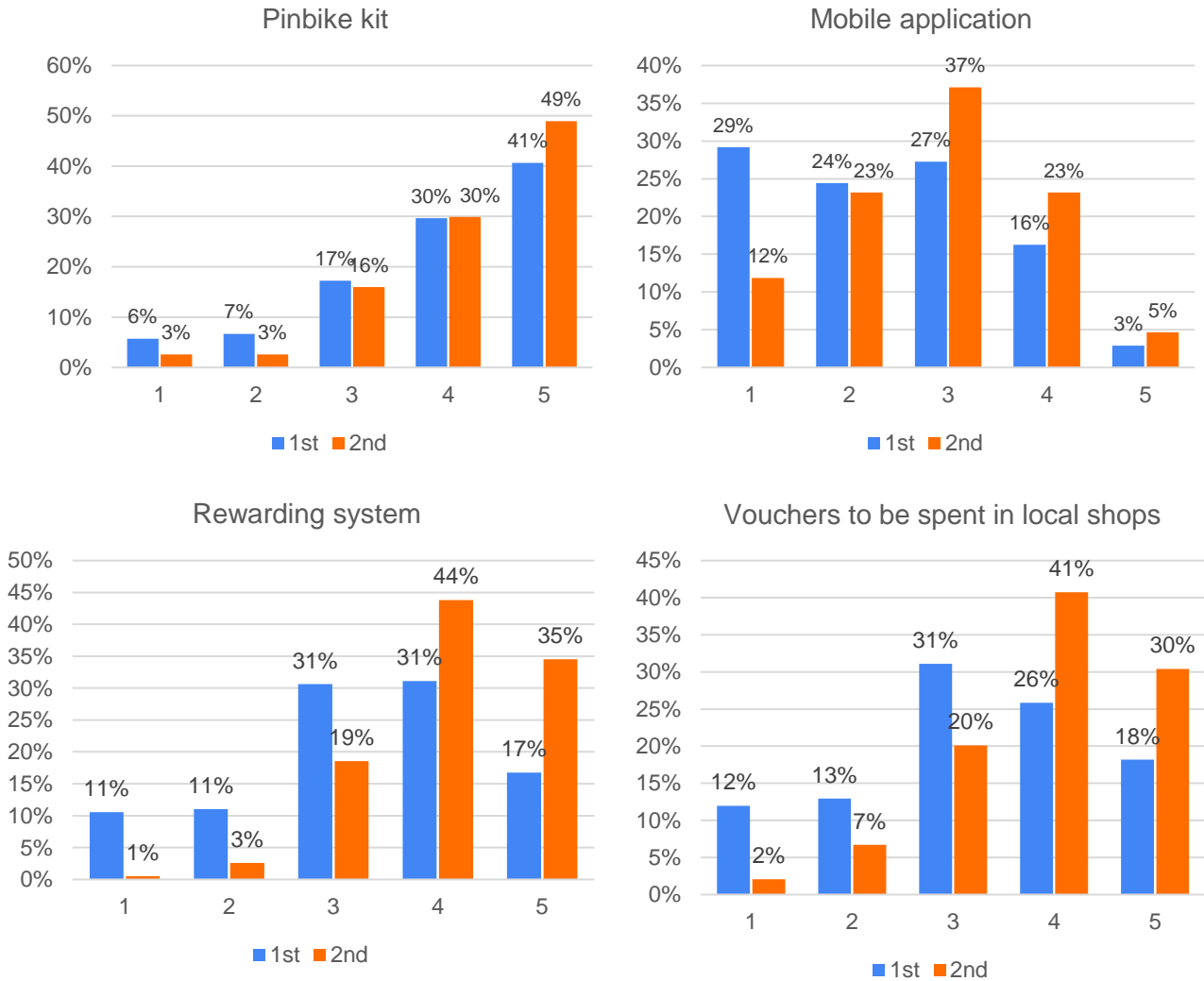


Figure 32: Evaluation of BICIFICATION system's features in Tallinn (1st and 2nd questionnaire)

In the next question the participants were asked to evaluate different features included in the mobile app such as the sessions registration, the CO2 savings, the help center, the rewards, the notifications received, the Identification of elements on the map (drinking fountains, bike parking stations and bike repairing stations) and the report feature. The feature that seems to be at the higher preference for the participants is the notifications sent by the municipality to the users via the app as it has the higher percentage in values 4-5 (65%). 41%, 36% and 35% of the participants in the second questionnaire evaluate with 3 the help center, the identification of the elements on the map and the report feature respectively (Figure 33).

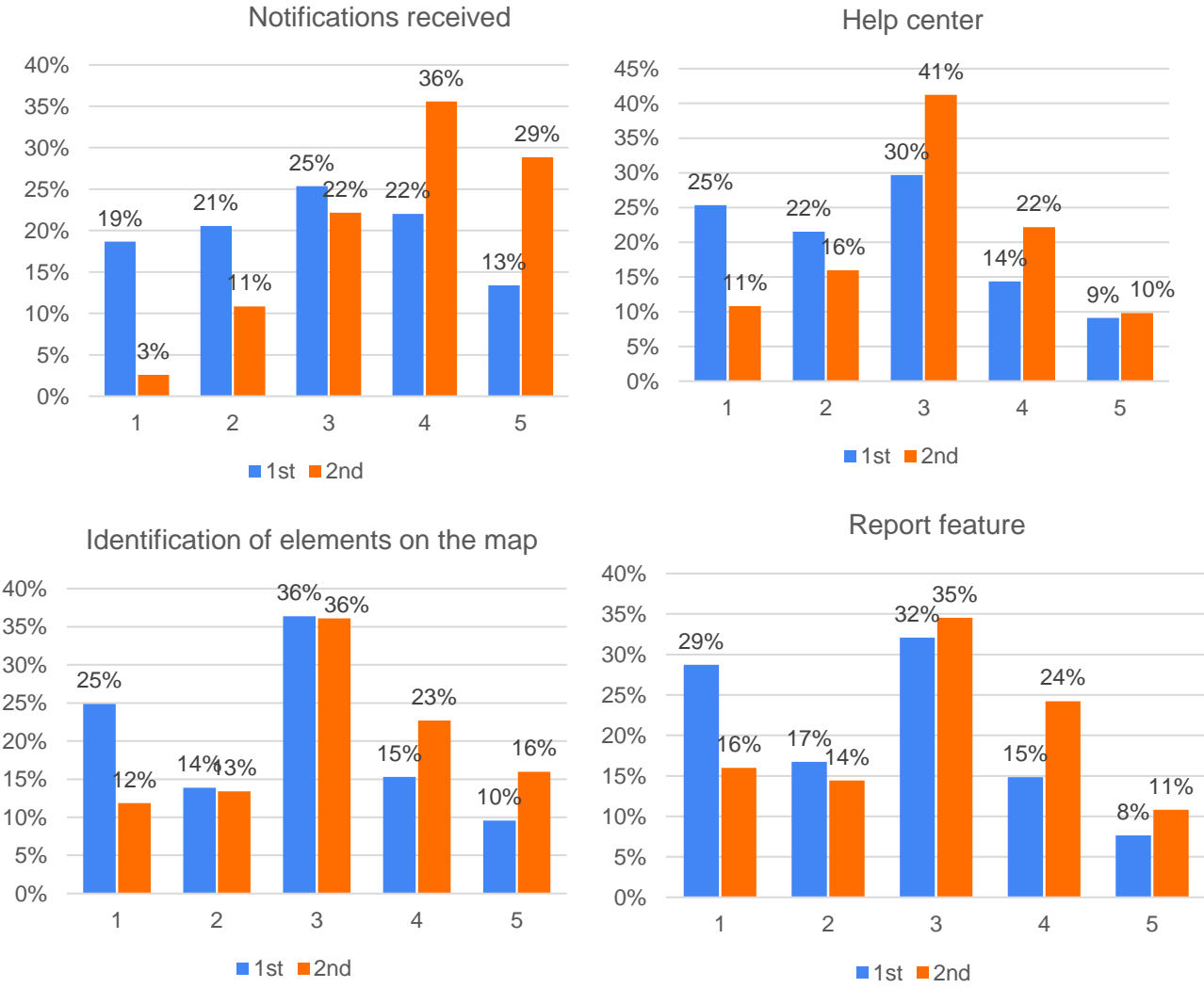


Figure 33: Evaluation of features included in BICIFICATION mobile application in Tallinn (1st and 2nd questionnaire)

The last question of the questionnaires was related to the evaluation of the overall participation experience of the users. The percentages of those that voted the values from 1-3 decreased during the months. The increase of the percentages of those that voted with 4 and 5 within the months was similar (13% increase in value 4 and 12% increase in value 5 (Figure 34).

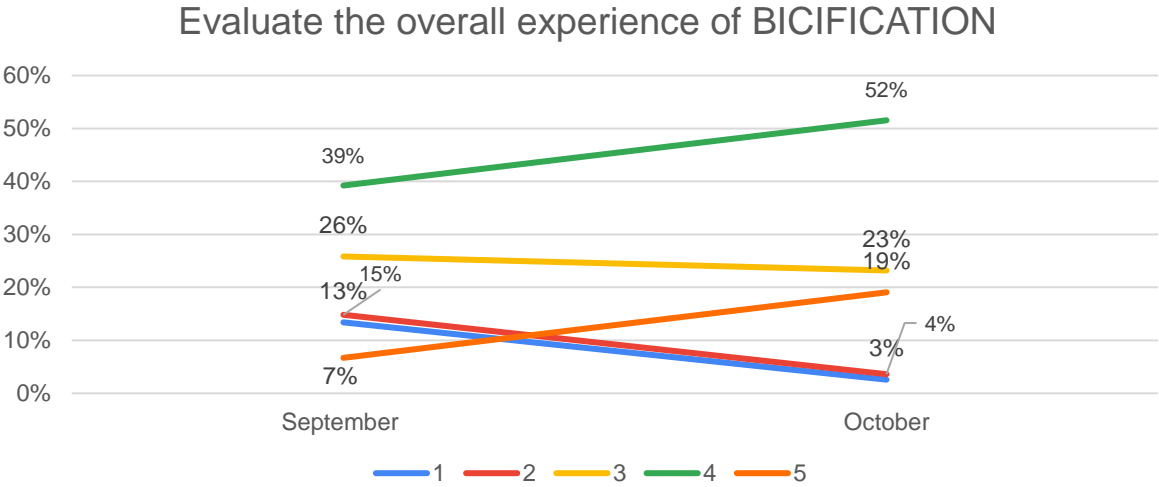


Figure 34: Evaluation of the overall experience of BICIFICATION in Tallinn (1st and 2nd questionnaire)

3.2 Braga municipality

Both In the first and second questionnaires the majority of users answered that they use their bicycle every day included weekends mostly 2-3 times a week (36% in both questionnaires). The percentage of those that cycle every working day decreased from 29% to 27% while the percentage of those that cycle 2-3 days a week increased from 27% to 34% (Figure 35).

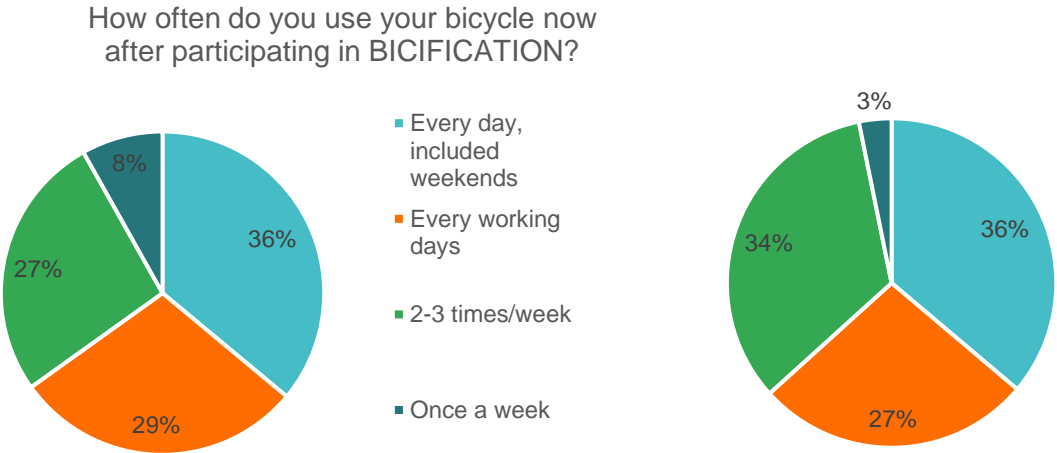


Figure 35: Frequency of bicycle use after participating in BICIFICATION in Braga (1st and 2nd questionnaire)

The distribution of the main trip purposes remains almost the same with the majority of the users answering that they cycle mainly to reach their work destinations (Figure 36).

What is the main purpose of your trips?

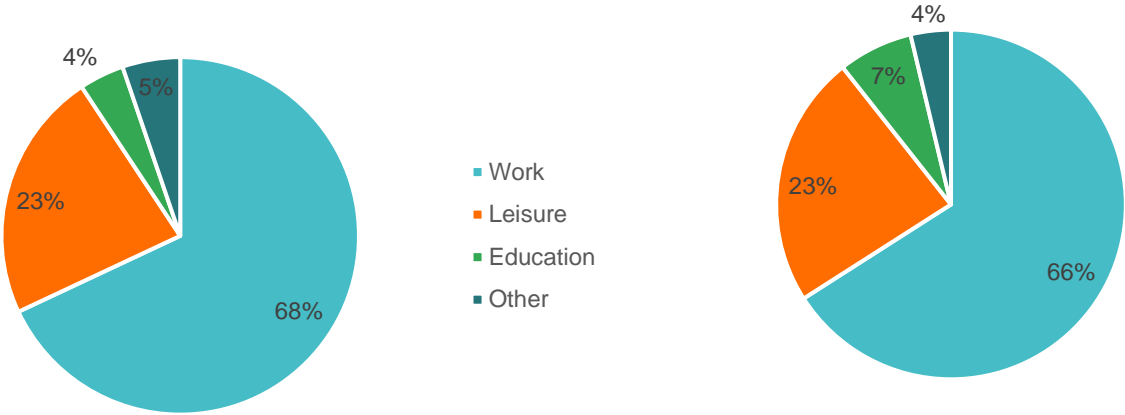


Figure 36: Main purpose of BICIFICATION trips in Braga (1st and 2nd questionnaire)

In Braga all the different types of awards were available to users. Thus, in the question which of the rewards they like most, the users vote for km rewards both in the first and second questionnaire. The preferences percentages for the rest type of the rewards were almost the same in the two questionnaires (Figure 37).

Which of the following rewards do you like most?

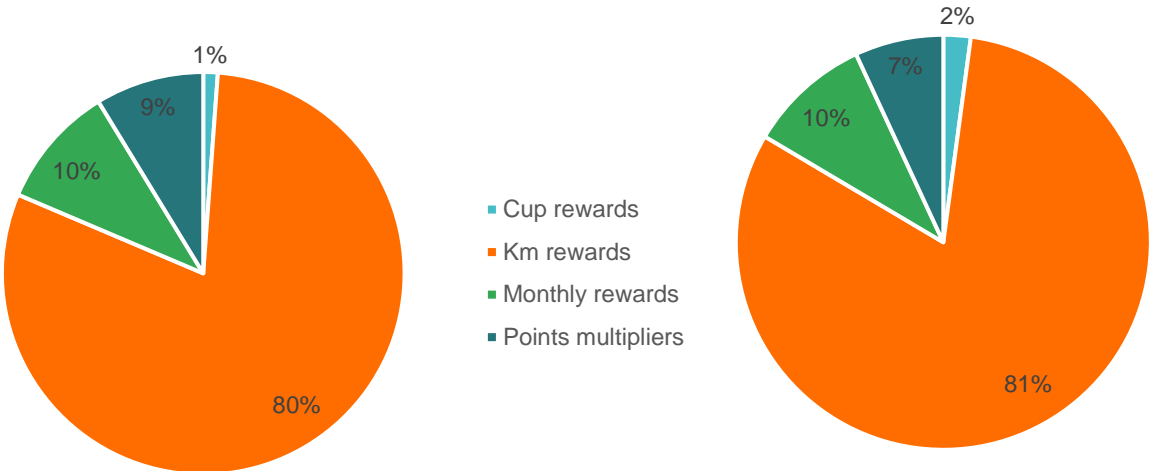


Figure 37: Preferences of Braga users about reward types (1st and 2nd questionnaire)

In all the features of the BICIFICATION scheme, the percentages of those that evaluate them positively (with 4 and 5) increased between the first and the second questionnaire. This could be justified not only by the fact that the participants were getting more familiar with the use of the kit, the mobile app and the participation terms of the rewarding scheme, but also by the continuous improvements of the different features. The vouchers had the higher increase as the percentage of those that evaluate with 5 raised from 15% to 35% (Figure 38).

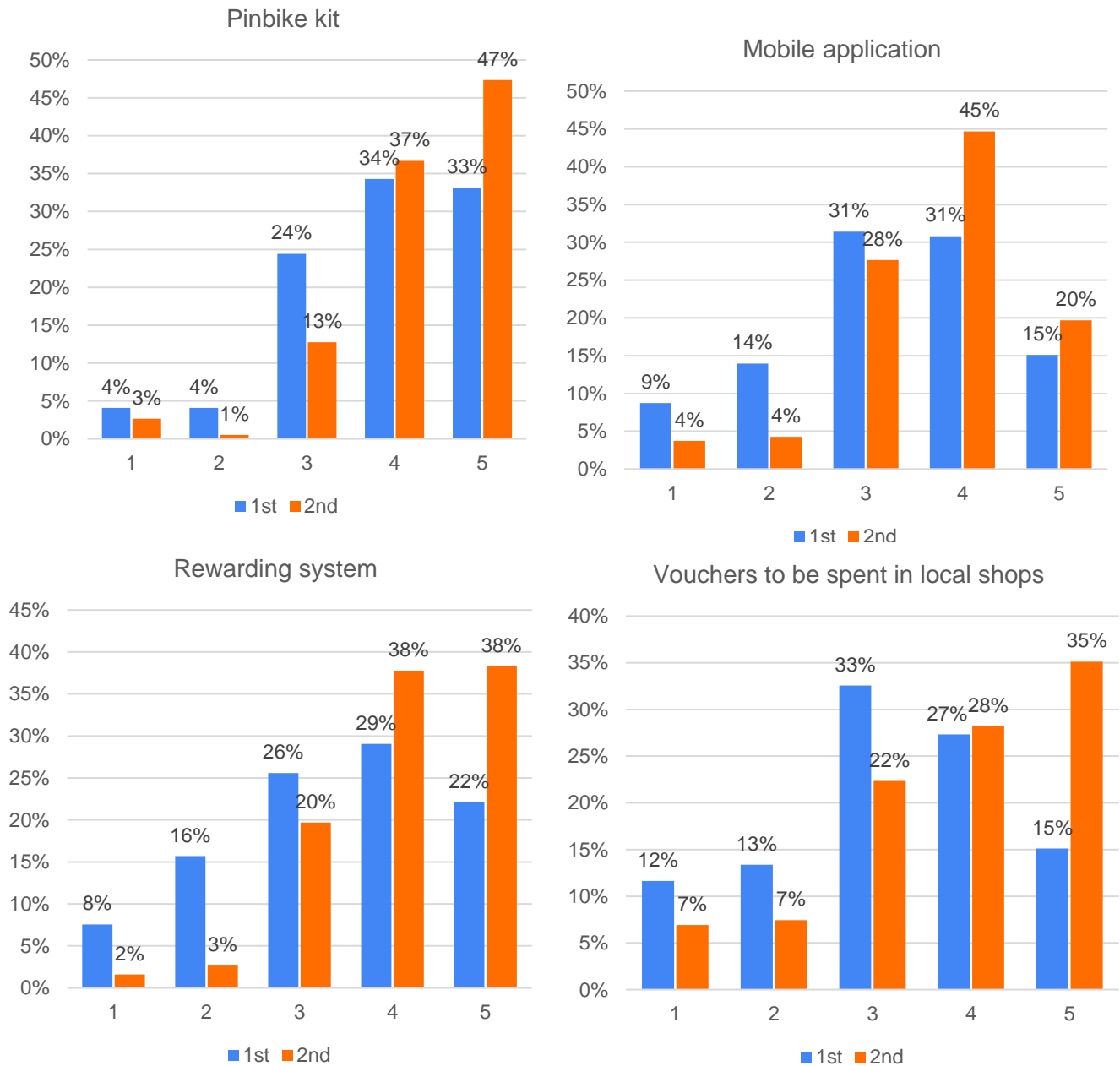


Figure 38: Evaluation of BICIFICATION system's features in Braga (1st and 2nd questionnaire)

The feature of the app with the higher percentage in value 5 (50%) was the CO2 savings. Also, it seems that the notifications sent via the app by the municipality to the participants aren't annoying as 82% of the participants vote this feature with 4 and 5 value in the 5-scale (Figure 39).

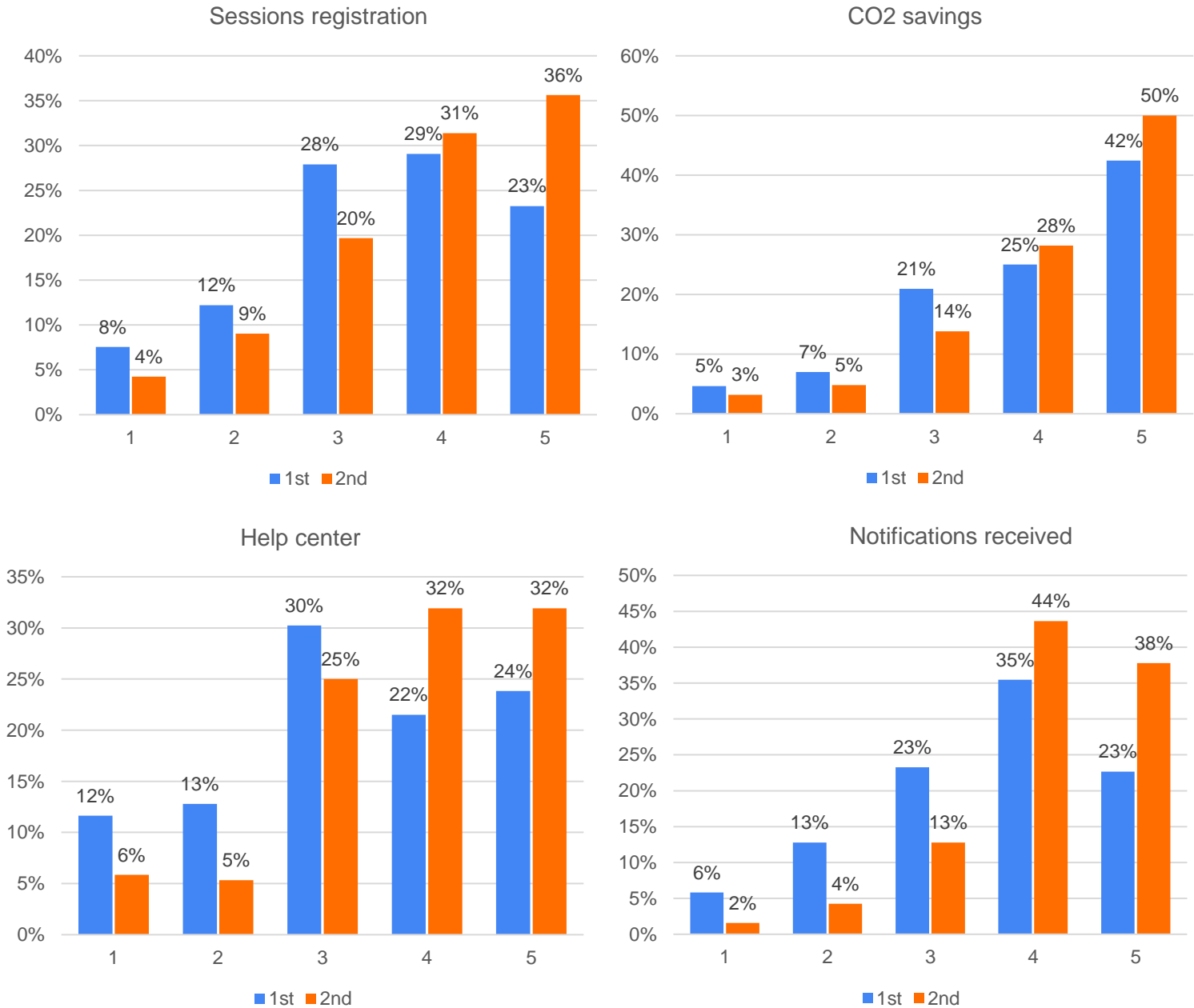


Figure 39: Evaluation of features included in BICIFICATION mobile application In Braga (1st and 2nd questionnaire)

The last question of the questionnaires was related to the evaluation of the overall participation experience of the users. The percentages of those that voted the values from 1-4 decreased during the months. The chart shows that about 25% of those that has initially evaluated their experience from 1-4 has shifted to value 5 in the second questionnaire; 5 value increased from 26% to 48% (Figure 40).

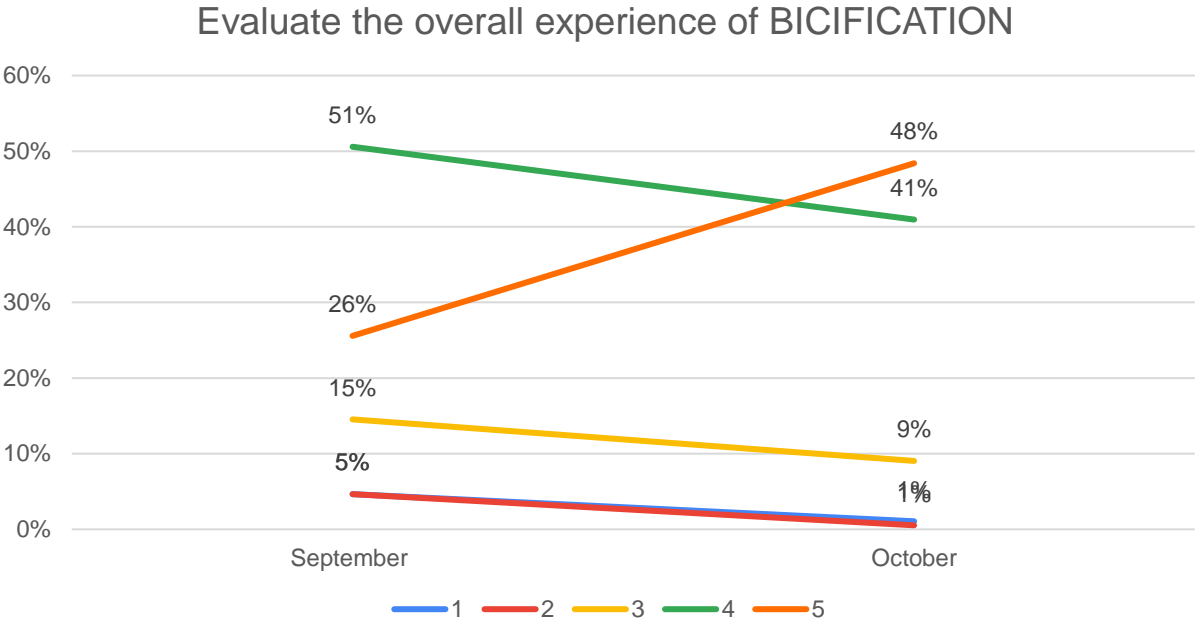


Figure 40: Evaluation of the overall experience of BICIFICATION in Braga (1st and 2nd questionnaire)

3.3 City of Istanbul

The majority of users (41%) use their bicycle 2-3 times a week while 26% of them use it every day included the weekends (Figure 41a). The distribution of the main purpose of the trips is 36% work, 39% leisure activities, 1% education and 23% other (Figure 41b).

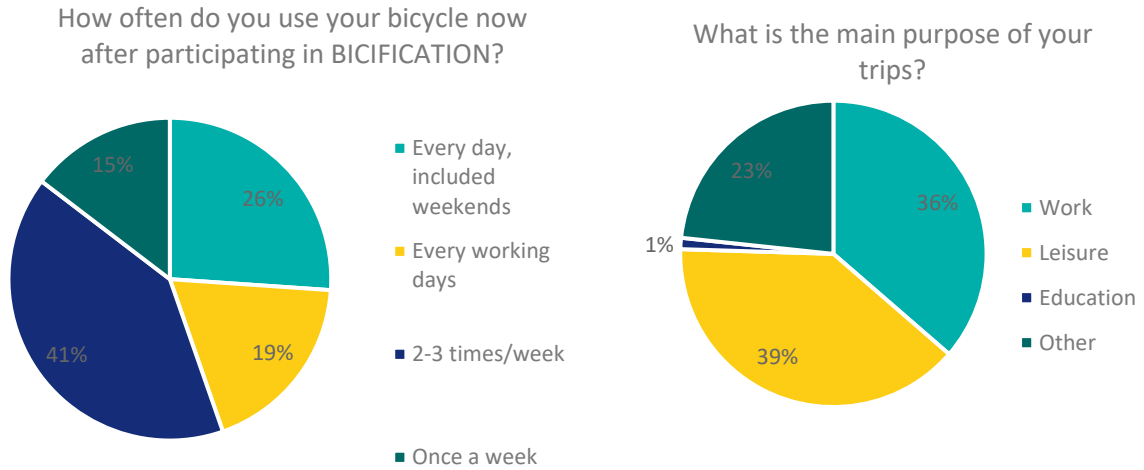


Figure 41: a) Frequency of bicycle use after participating in BICIFICATION in Istanbul b) Main purpose of BICIFICATION trips in Istanbul

In Istanbul all the different types of awards were available to users. Thus, in the question which of the rewards they like most 61% of the users vote for km rewards, 22% for the monthly rewards, and 8% and 9% for the cup rewards and the multipliers respectively (Figure 42).

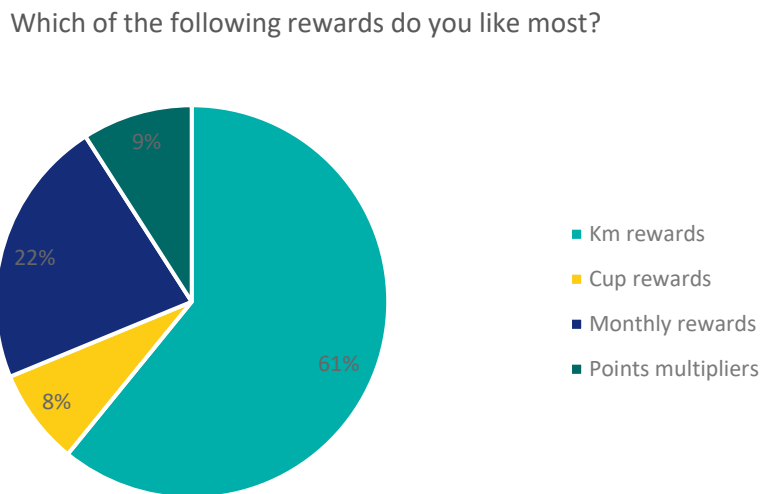


Figure 42: Preferences of Istanbul users about reward types

In Istanbul the users were asked to rank the different features of the BICIFICATION scheme (1-4, where 4 indicates the feature with the best performance among the others). 30% of the participants put the PinBike kit in the 3rd rank while 32% of them put the rewards to be spend in local shops in the higher position. The distribution among the different rankings for the mobile app was quite balanced (Figure 43).

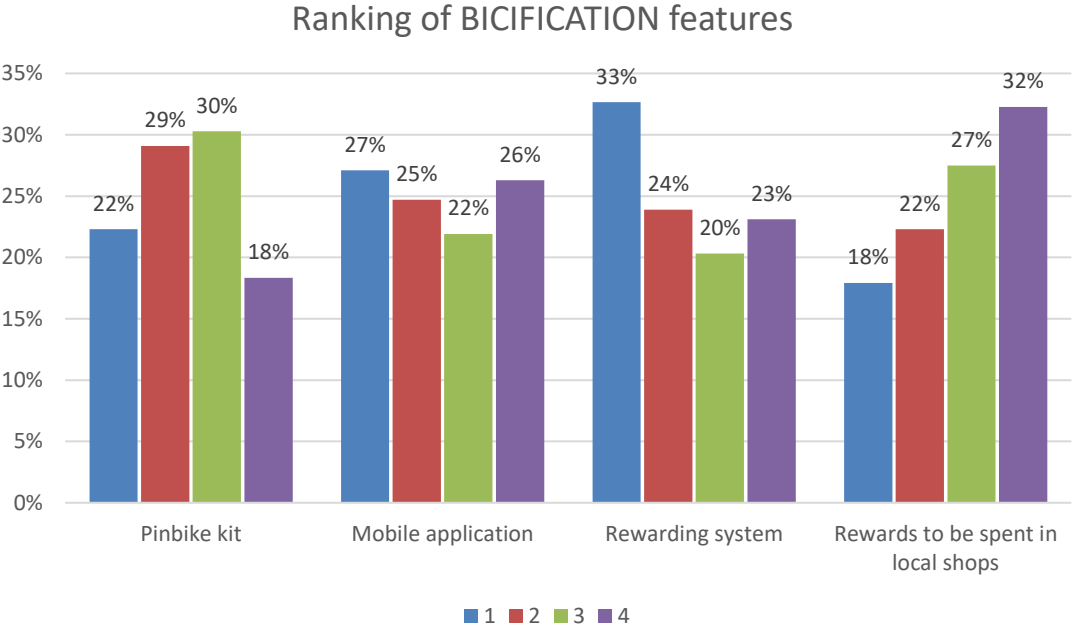


Figure 43: Ranking of BICIFICATION system’s features in Istanbul

In the ranking of the mobile app features, 21% of the users put the rewards in the lower position and another 21% in the higher one. The same was also observed for the CO2 savings feature (Figure 44)

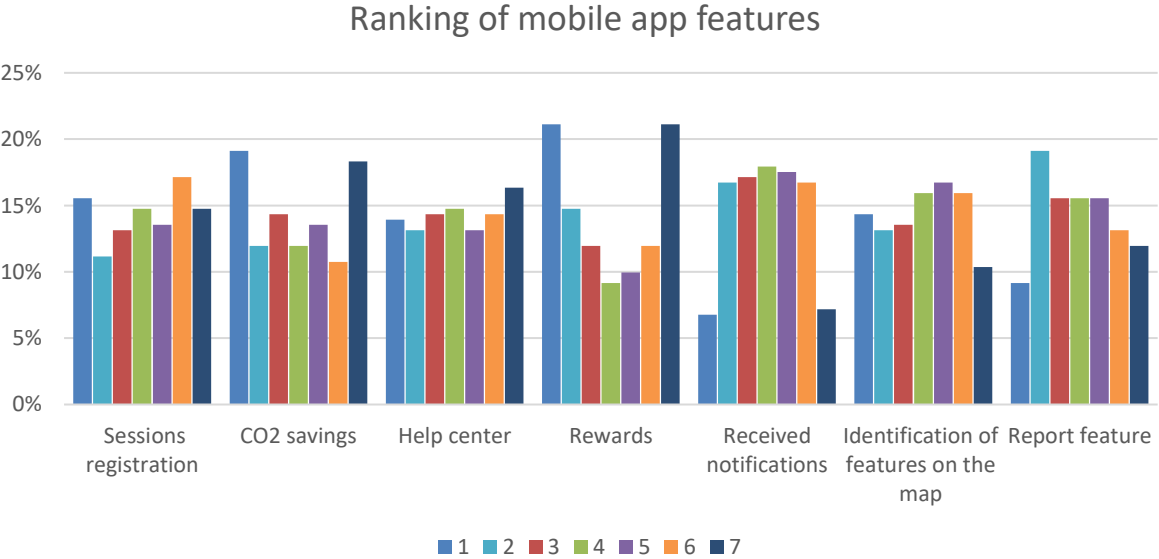


Figure 44: Ranking of features included in BICIFICATION mobile application In Istanbul

Finally, in the last question 82% of the participants evaluate the overall experience of participating in BICIFICATION with 4 and 5 values while just 4% weren't satisfied from their participation (Figure 45).

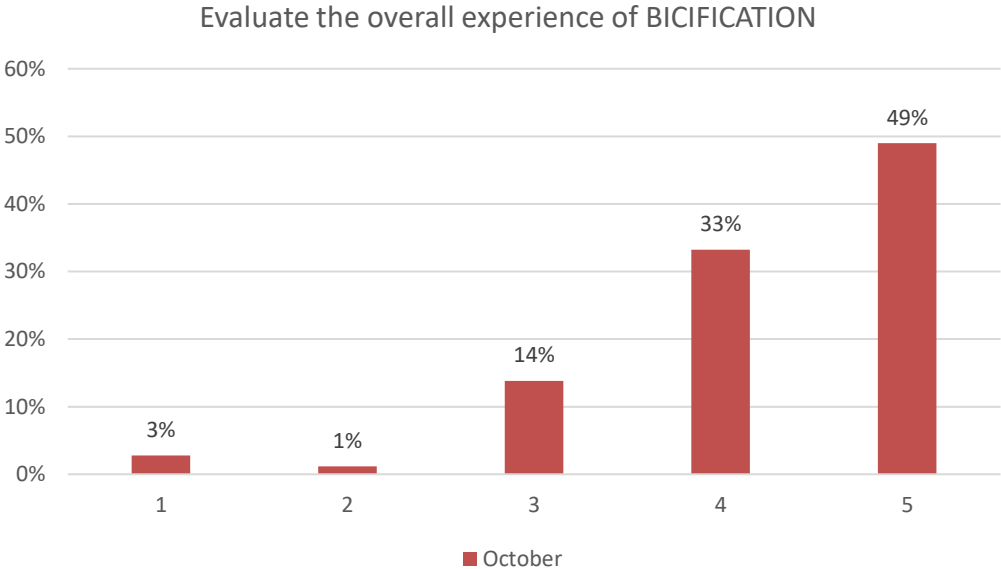


Figure 45: Evaluation of the overall experience of BICIFICATION in Istanbul

4 Cross-area comparisons

Although the pilot duration in all cities was 4 months, the start and the end date of each pilot is slightly different. To have comparable results in the pilot KPIs, a month is considered as a duration of 30 days and not as a calendar month.

The number of sessions in Braga and Istanbul follow a similar slightly decreasing trend by the 3rd month. The high numbers of the 1st month in all cities could be justified by the enthusiasm of the citizens to participate in a new mobility scheme. Some problems related to the allocation of the vouchers to the users during the 2nd and the 3rd month as well as some difficulties in the use of the mobile app and of the vouchers in the local shops could explain the slight decrease of the sessions. The solving of these problems leads to an increase of the sessions in Braga in the 4th month reaching almost the number of the 1st month.

The same decrease between the 1st and the 2nd month was also noted in Tallinn for the same reasons mentioned above. However, the users in Tallinn cycled more during the 3rd month (August). A high decrease is also noted between August and September in Tallinn due to weather conditions. The above observations are presented in Figure 46.

Sessions registered

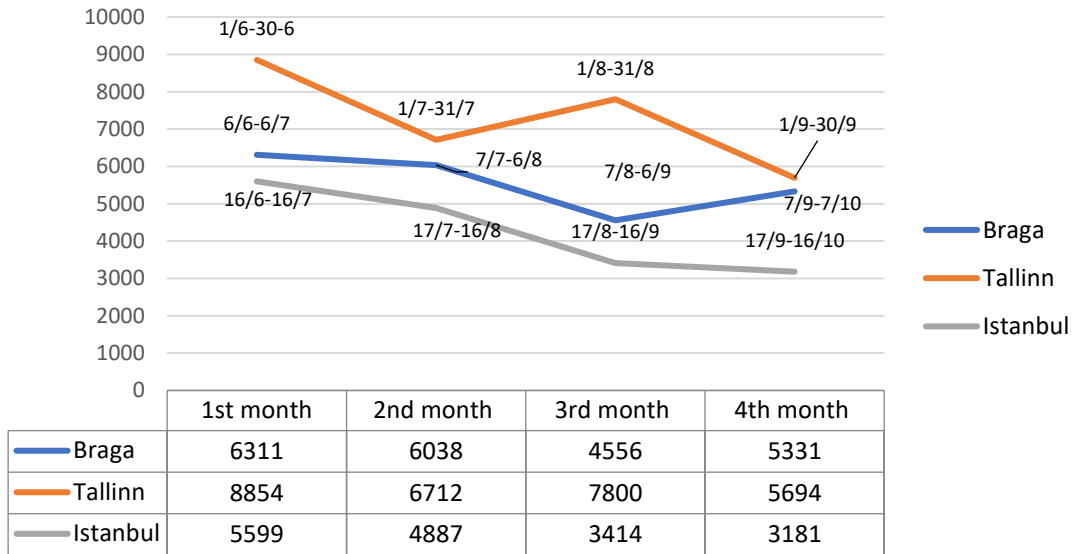


Figure 46: Comparison of monthly trend of registered sessions among pilot cities

The average sessions distance in Tallinn and Braga was similar (6.39 km in Tallinn and 6.74 km in Braga) while in Istanbul this KPI was double 13.12 km. This is due to the fact that Istanbul is a megacity with long distances and the whole city area was available for the BICIFICATION participants to cycle.

It is worth mentioned that the ranking of the rewards' types in Braga and Istanbul follow the same preference order. Thus, both in Braga and Istanbul the most preferred type of rewards is the km rewards. Monthly rewards are in the second rank in both cities while the cup rewards were the least preferred reward for the users.

In Tallinn the only available type of reward was the km reward. However, the preferences of the users on what other types of rewards they would like to be included in BICIFICATION system, follow the same order as Braga and Istanbul (except of km reward): monthly rewards, points multipliers and cup rewards (Figure 47).

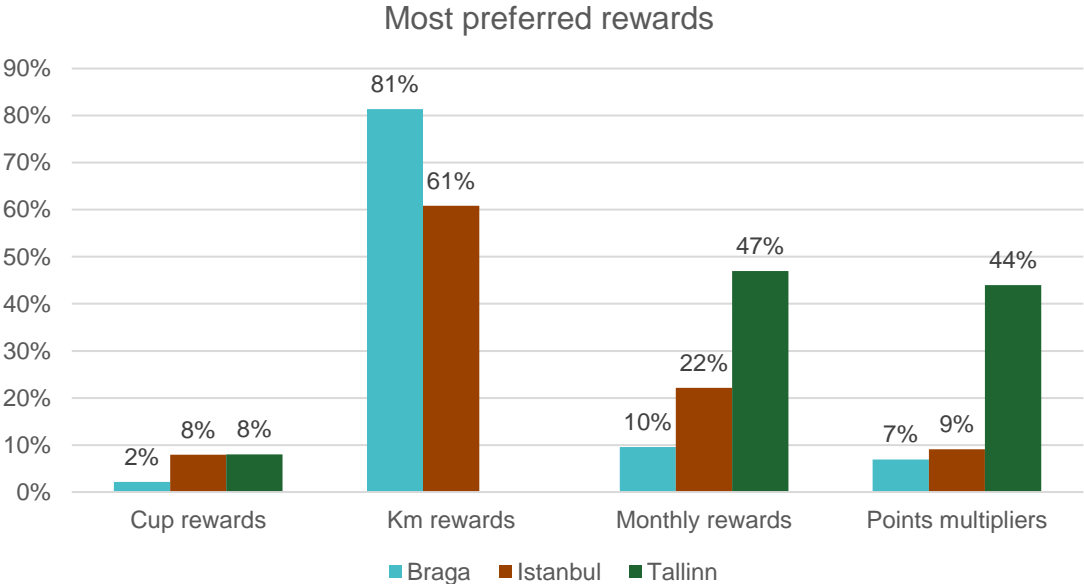


Figure 47: Comparison of the preferences about reward types among pilot cities

Regarding the evaluation of some of the most important features of the BICIFICATION system, both in Braga and Tallinn the higher percentage of 4 or 5 value was for the Pinbike kit (84% in Braga and 79% in Tallinn). The second and the third higher percentage was for the notifications sent to users by the municipalities and the CO2 savings respectively. The identification of elements on the map and the report feature receive similar percentages of positive evaluation both in Tallinn and Braga.

However, the deviation between Braga and Tallinn in the percentages of those that evaluate positively (4-5 values) were high for all features except of the Pinbike kit. The higher deviation was noted in the mobile application. In Braga 64% of the participants evaluated the mobile application with 4 or 5 values while in Tallinn the percentage is 28% (Figure 48)

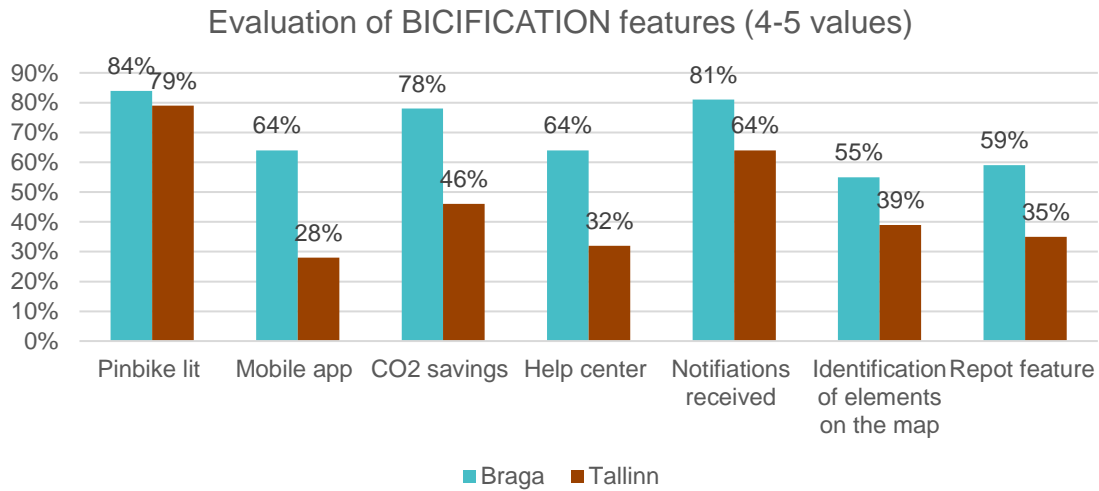


Figure 48: Comparison of the evaluation results of BICIFICATION system's features between Braga and Tallinn

Istanbul follows a different approach asking users to rank the different features, so no direct comparisons can be performed with Tallinn and Braga. However, as we can see in Figure 49, Pinbike kit was ranked in the higher position only by 18% of the users. Similar percentages were also observed for CO2 savings and help center. Although the notifications feature was positively evaluated in Braga and Tallinn, in Istanbul only 7% of the users put this feature in the higher rank of their preferences.

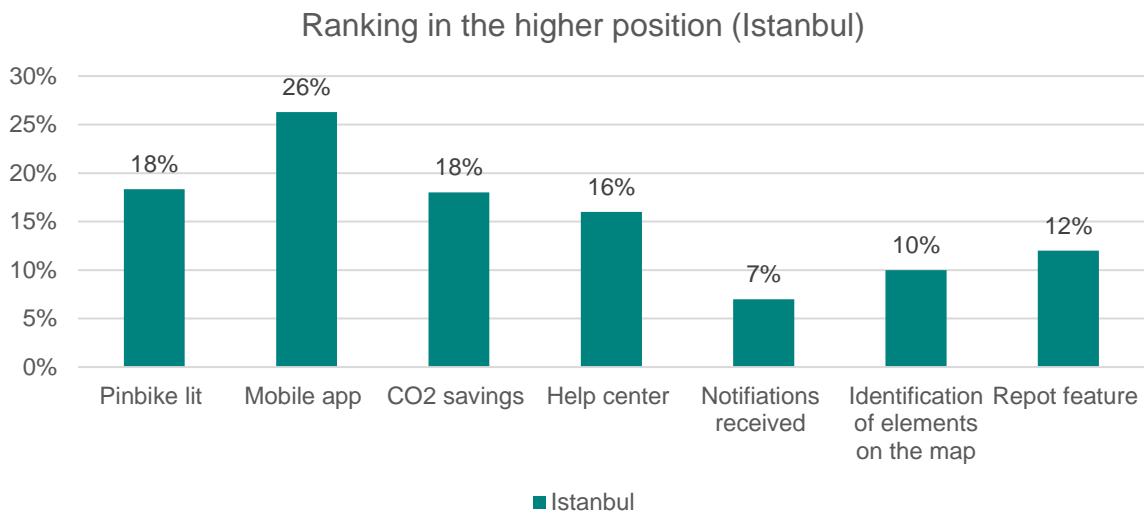


Figure 49: Ranking in higher positions of BICIFICATION system's features in Istanbul

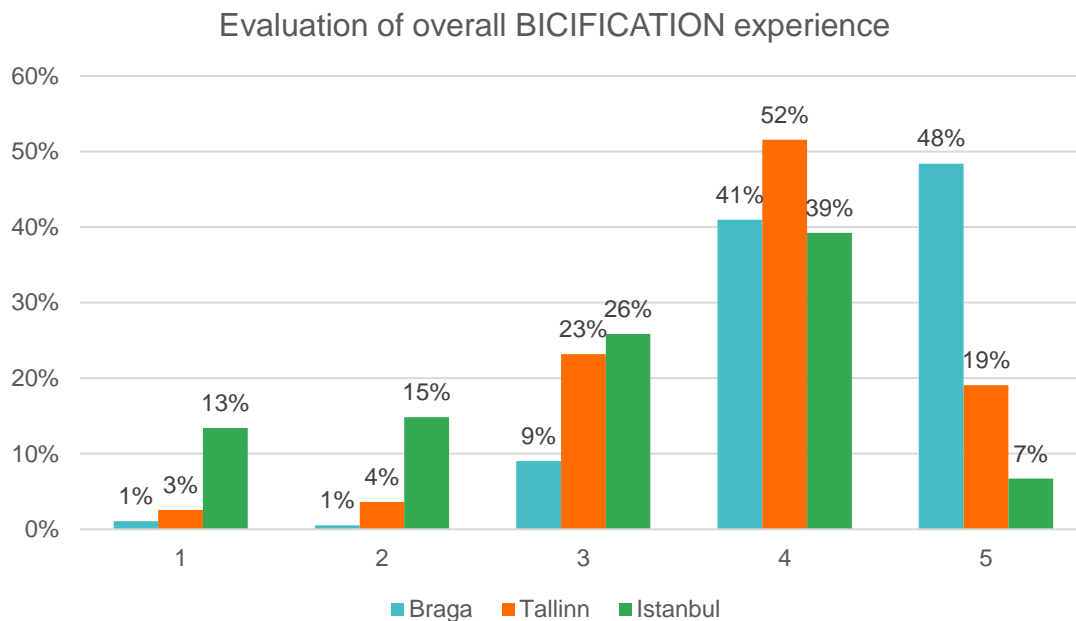


Figure 50: Comparison of the evaluation results of the BICIFICATION overall experience among pilot cities

Finally, in the evaluation of the whole BICIFICATION experience the majority of the users in Braga (89%) balanced their answers between 4 and 5 values. In Tallinn more than half participant evaluate the experience with 4 and only 19% with 5. A significant percentage of 23% evaluated with 3. In Istanbul, the higher percentage was noted for value 4 (39%) while value 5 was voted by only 7%. It is worth mentioned that in Istanbul more than 25% of the participants evaluated the overall experience negatively (values 1 or 2) (Figure 50).

5 Conclusions and Lessons learnt

This deliverable is relevant for the success of the KAVA because it provides an overview of the pilots' implementation during the 4-month period, including important operational indicators and qualitative data that give a clear image of the users' perception.

After the 4-month pilot period in Tallinn, Braga and Istanbul, all three cities expressed their interest in continuing the pilots further until December since it is quite critical for them to incentivize urban cycling during the winter months. The continuation of the pilots will also give cities the opportunity to reward Bike2School rides, which was not possible during the summer months. All three cities updated the terms

and conditions of users' participation considering higher amounts of rewards and more reward types (in case of Tallinn) for providing stronger incentives to the participants.

The extension period started on 1st October in Tallinn, 8th October in Braga and 17th October in Istanbul and will last until 11th December in all cities, in order the users to have time to use their vouchers to local shops and the reimbursements to local shops to be completed before the end of the project on the 31st of December.

In the beginning of December an additional questionnaire will be delivered to the users enabling the comparisons between summer and winter period and providing cities with valuable and useful data for ensuring high levels of cycling within the whole year period. The results of this final assessment will be included in an updated version of the current deliverable to be submitted by the end of the project.

A more detailed analysis of the pilot KPIs and correlations between them will be provided in deliverable DEL05 "Guidebook for cities and practioners" to be submitted by 1st December. More specifically, it will be a guide on using bicycle trajectories data to understand the performance of policy measures to increase bicycling modal share. It will contain practical examples using data from the three pilot cities on the various elements of planning features appreciated and encouraged everyday cycling. The analytical framework in the guidebook will also identify the role of incentives, the success and failure factors and where improvements are needed.

6 Acknowledgement

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