WECOUNT

WeCount: Citizens Observing UrbaN Transport

Deliverable 5.3: Summative Monitoring & Evaluation Case Study Report – Cardiff, Dublin & Ljubljana

Report for:
European Commission
Research Executive Agency (**REA)**

Date: September 2021

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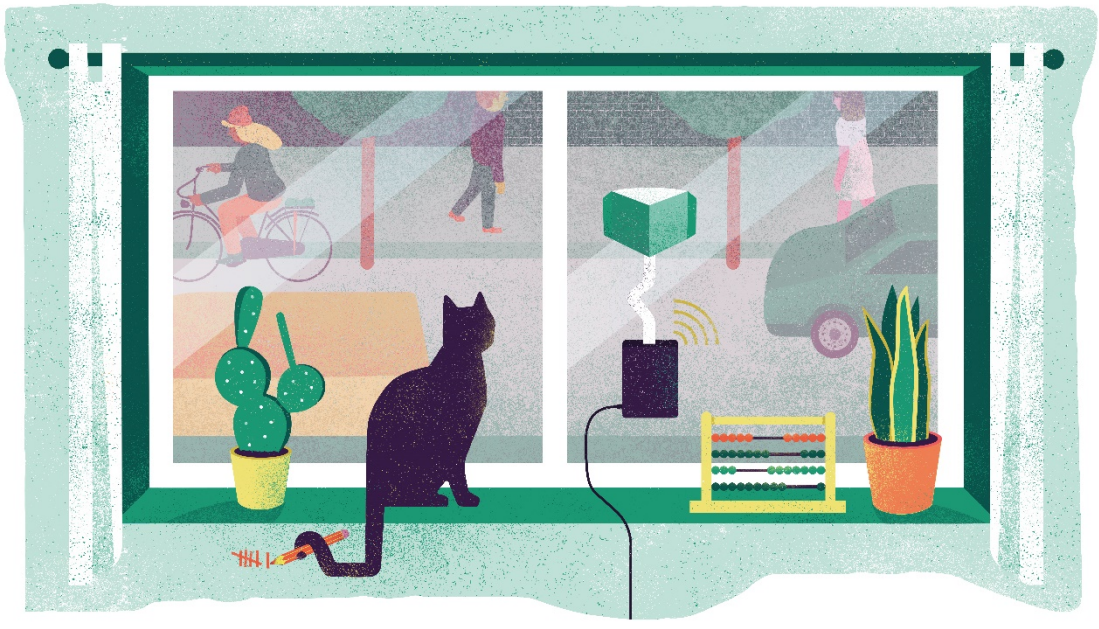

The WeCount Project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 872743

Document Details

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Creation Date	May 2021
Date of Last Revision	September 2021
Description	This deliverable describes the process and results of monitoring and evaluating the engagement process in **Cardiff, Dublin & Ljubljana**. As well as outlining the evaluation rationale and the results so far, it describes the methodology used in detail and includes a full evaluation kit. The monitoring and evaluation have been led by Margarida Sardo (UWE), with contributions from Sophie Laggan (UWE), Laura Fogg Rogers (UWE), Elke Franchois (Mobiel21) and Anke Bracke (Mobiel21). The monitoring and evaluation was done in collaboration with the Case Studies, who were responsible for applying the evaluation framework and collecting data.

Version History

Version	Updated By	Date	Changes / Comments
V1.0	M Sardo	12/05/2021	Deliverable draft
V2.0	M Sardo	24/06/2021	Content updated
V3.0	M Sardo	15/07/2021	Integration of comments and content from the WP5 team.
V4.0	M Sardo	03/09/2021	Integration of comments from Case Study Leaders
V5.0	M Sardo	15/09/2021	Integration of comments from Consortium
V6.0	M Sardo	21/09/2021	Final review

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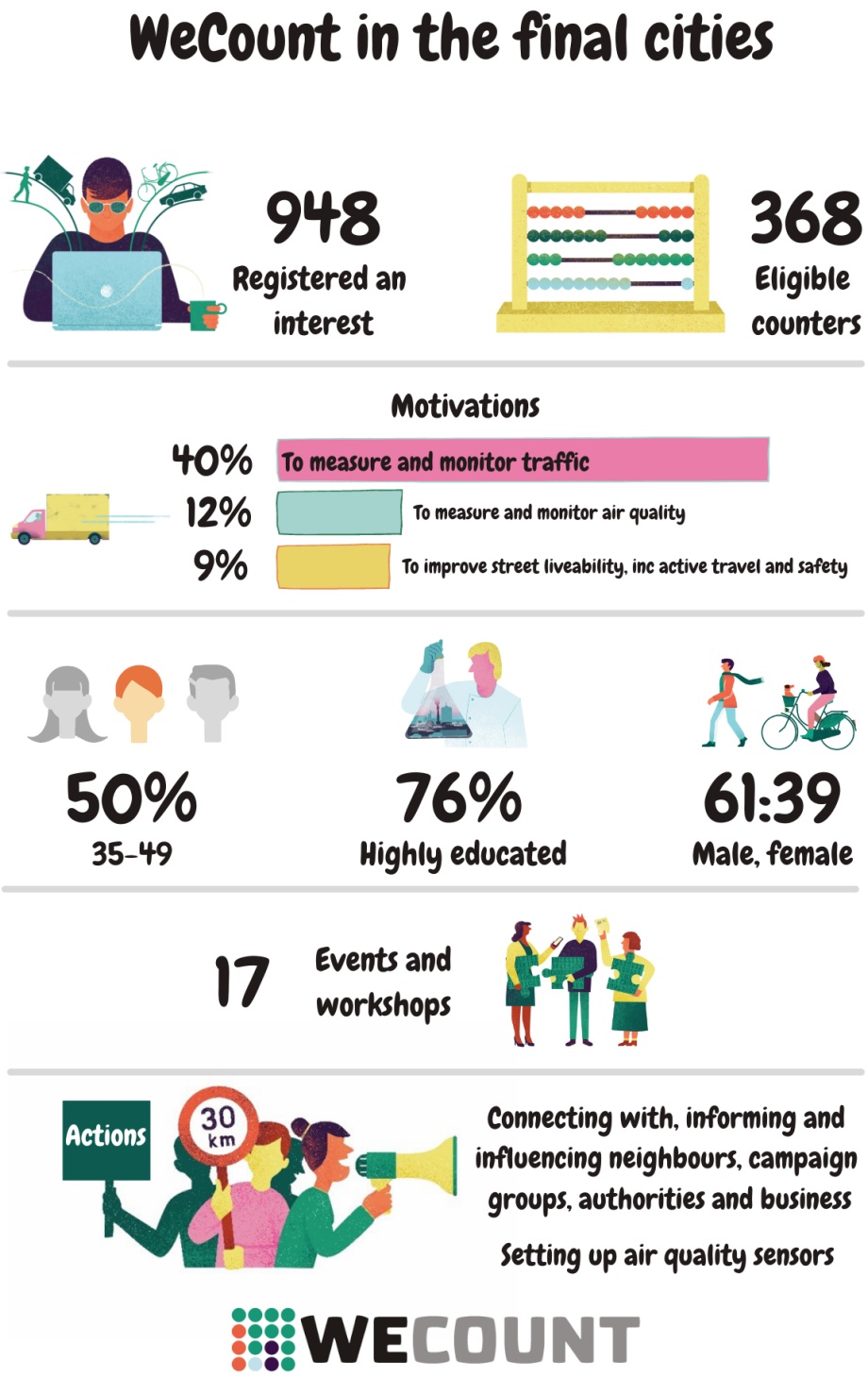

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WeCount is a H2020 project which aims to quantify local road transport, produce scientific knowledge in the field of mobility and environmental pollution, and co-design informed solutions to tackle a variety of road transport challenges. Citizen scientists are involved in collecting and analysing the data, and engaging with key stakeholders throughout the process. Uniquely, the project puts mobility data in the hands of residents to empower them to act.

The project follows participatory citizen science methods across five case studies; these are Madrid/Barcelona (Spain), Leuven (Belgium), Ljubljana (Slovenia), Dublin (Ireland) and Cardiff (UK). The five cases follow a similar execution pathway, with Leuven & Madrid deploying first and serving as pilots for the remaining three case studies.

This report focuses on the monitoring and evaluation of activities in the remaining case studies, Cardiff, Dublin and Ljubljana.

A total of **948 people registered interest** in the Cardiff, Dublin and Ljubljana. Of those, **368 were deemed eligible counters (39%)**. They were mainly **35-49 years old** (50% of participants across the three case studies) and **highly educated** (76%). The majority of participants in Cardiff, Dublin and Ljubljana were **male** (61%).

Across Cardiff, Dublin and Ljubljana a total of **17 events and workshops took place**, most of these were online. These events and workshops engaged a total of **249 citizens across the three case studies**. Overall, the workshops were well rated by the citizens scientists, who found their input was valued and that their knowledge had been strengthened. **Being able to measure and monitor local traffic was the main motivation** for citizens to get involved in WeCount (40%).

In Cardiff, Dublin and Ljubljana, actions taken included connecting with, informing and influencing neighbours, as well as campaign groups, authorities and businesses. A few citizens in these case studies have also set up adjacent air quality sensors. WeCount is an innovative project and overall, despite set-up challenges, citizen scientists had a **positive, enjoyable and enriching experience**.

Running a large-scale Citizen Science project during a global pandemic has been a challenge but one that the WeCount team have excelled at, by very quickly changing and adapting all plans from recruiting and engaging face-to-face, to recruiting and engaging citizens largely online. There is no question that the COVID-19 pandemic severed plans to build potential relationships with some citizens, especially those with a low-socioeconomic status, or intermediary organisations. Other impacts include slower deployment of sensors and impact on the team dynamics.

We hope this monitoring and evaluation report captures the efforts made by the research team in delivering an engagement project during COVID-19 times, and together with D5.2 and D5.4 proves useful to other Citizen Science and research projects working specifically on citizen-led change for sustainable development.

Note: In order to provide appropriate framing and context on the WeCount project, sections 3 and 4 of this report are largely identical to sections 3 and 4 in *D 5.2 Summative Monitoring & Evaluation Pilot Report - Leuven & Madrid*. By including all sections and background here, the report can stand alone without the reader needing to refer back to D 5.2.

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2 Project Summary

2.1 The WeCount Project

WeCount, Citizens Observing Urban Transport, is a Horizon 2020 funded project, part of a Science with and for Society (SwafS) call (H2020-SwafS-2018-2020).

WeCount is a Citizen Science project working across five case studies in Europe to empower citizens to take a leading role in the production of data, evidence and knowledge around mobility in their own neighbourhoods, and at the street level. The project follows participatory citizen science methods to co-create and use innovative low cost, automated, road traffic counting sensors (i.e. Telraam) and multi-stakeholder engagement mechanisms across five case studies.

Citizen scientists in the five case studies were involved in collecting the data, analysing it and engaged with key stakeholders throughout the process. WeCount aimed to quantify local road transport (cars, large vehicles, active travel modes and speed), produce scientific knowledge in the field of mobility and environmental pollution, and co-design informed solutions to tackle a variety of road transport challenges. Moreover, the project provided cost-effective data for local authorities, at a far greater temporal and spatial scale than what would be possible in classic traffic counting campaigns, thereby opening up new opportunities for transportation policymaking and research.

2.1.1 *WeCount objectives*

- WeCount will advance citizens (and broader scientific) knowledge on traffic counting, transport management and related impacts.
- WeCount will establish a durable ecosystem for citizen science traffic counting and related impacts.
- WeCount will lower the technology threshold to reach a more diverse audience and ensure broader citizen inclusiveness.
- WeCount will demonstrate the diverse potential applications, in five use cases, to tackle five different societal issues related to local road traffic.
- WeCount will achieve meaningful research and local policy change, as a direct result of the evidence collected from the citizen science activities.

2.2 Case Studies

The project follows participatory citizen science methods across five case studies (**Error! Reference source not found.**) in Madrid/Barcelona (Spain), Leuven (Belgium), Ljubljana (Slovenia), Dublin (Ireland) and Cardiff (UK). The five cases followed a similar execution pathway, Leuven & Madrid deploying first and serving as pilots for the remaining three case studies.

This report focusses on the monitoring and evaluation of activities in three case studies, Cardiff, Dublin and Ljubljana.

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Figure 1 - The initial five WeCount case studies.

2.2.1 *Cardiff*

The Cardiff case study started in August/September 2020 and in keeping with the aims and ambitions of WeCount and the citizen science approach, participating citizens assumed a proactive role across all phases of the case study, from its problem formulation and co-design, through to data collection and analysis, with the intention that the data generated is used for communication campaigns and policy engagement.

The COVID-19 pandemic had a large impact on the Cardiff case study. As a project team, UWE Bristol, the Cardiff Case Study lead, made an early decision, primarily influenced by Welsh and UK Government advice, to move all face-to-face interactions planned with participants online. Secondly, the COVID-19 pandemic changed traffic patterns in Cardiff due to businesses and schools being closed and most people being encouraged to work from home. Across the lifetime of the WeCount Cardiff network, the city has been in full or partial lockdown. Much of the Cardiff case study is still ongoing, and we are expecting to continue to collect and utilise valuable data during Autumn 2021. To account for extensive lockdown restrictions, the WeCount Cardiff process was adapted from the original workplan to incorporate the following phases:

1. **Phase 1: Community building**: This phase of the case study involved stakeholder and policy mapping, raising awareness of the project and co-designing local transport challenges encountered by citizens. The key citizen engagement activity of this phase was a series of WeCount Introduction & Scoping Workshops. This phase started in August 2020 and ended in November 2020 with occasional updates as new members joined.
2. **Phase 2: Data Collection**: This phase of the case study involved the recruitment of citizen scientists to establish a WeCount Cardiff Network using Telraam sensors. The key citizen engagement activity of this phase was the Telraam sensor deployment, with follow-up email support if citizens experienced problems in collecting data. This phase started in October 2020 and is ongoing as new members join.
3. **Phase 3: Data Analysis and Interpretation**: The aim of this phase was to work with citizens to understand how the data can be analysed and interpreted. The key citizen engagement activity, beyond the continuous support provided through the recruitment, installation and data collection phase, was a series of Data Analysis & Interpretation Workshops. This phase started in March 2021 and is ongoing.

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4. **Phase 4: Communication & Policy Engagement**: In this phase, the case study will help citizens to utilise their data for communication campaigns and connecting into, and influencing, local transport policy. This phase will be delivered in Autumn 2021.

The following infographic (Figure 2) illustrates the phase of the WeCount Cardiff case study highlighting the key phases that have been completed (green shading), phases ongoing at the time of writing this deliverable (orange shading) and phases that are planned for the coming months (blue shading).

Figure 2 - Phases of the WeCount Cardiff Case Study

Details on activities undertaken in Cardiff can be found in *Deliverable 4.2: Case Study Report – PART C: Cardiff, United Kingdom.*

2.2.2 *Dublin*

The Dublin case study started in May 2020 and continued for more than 16 months. Consistent with the citizen science approach adopted, participating citizens have assumed a proactive role across all phases of the case study, from its problem formulation and co-design, through data collection and analysis, to planning and implementing the resulting actions informed by the case study's outcomes and experiences. Much of the Dublin case study is still ongoing, and the local team are expecting to collect valuable data during the summer and autumn when lockdown restrictions will (likely) be lifted and schools will re-start.

Traffic and transport infrastructure are well-known problems in Dublin. Prior to the pandemic, Dublin was reported to be the 6th most congested city in Europe[1], with Dublin road users spending on average 213 hours sitting in rush hour traffic during 2019. This is related to the growth of the city since the 1990s and its insufficient public transport system. On the national level the number of registered vehicles in Ireland has almost doubled over a 20-year period, with 1.4 million vehicles registered in 1997 to 2.6 million vehicles registered in 2016[2]. Although only around 1/5th of vehicles are registered in Dublin itself, a considerable proportion of vehicles commute into Dublin on a daily basis, despite many roads lacking the capacity for this degree of traffic volume.

[1] https://www.thejournal.ie/dublin-traffic-congestion-4985027-Jan2020/

[2] https://data.cso.ie/

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In Dublin a wide range of transport-related stakeholders exist, ranging from high level policy makers, such as the local council, via private businesses and industry, to local schools and community groups. Some of these stakeholders, e.g. Dublin City Council have been involved in WeCount since the proposal stage; local community groups, meanwhile, have been heavily involved since the start of the project and have provided valuable support in terms of participant recruitment and traffic counter distribution and installation.

In addition to the stakeholder engagement activities, Dublin have held a series of introductory workshops, which helped the local team to co-design the next steps within the citizen science process. These workshops provided important insights on (1) local problems encountered by citizens and (2) how citizens would like to address these in terms of data analysis and outputs from WeCount.

COVID-19 had a large impact on the Dublin case study. First and foremost, it stopped most face-to-face interactions planned with participants. Secondly, it changed traffic patterns in Dublin due to businesses being closed and most people being encouraged to work from home. The case leaders tried to adapt to these new circumstances as best they could, by changing most interactions with participants (and stakeholders) to online formats. Going beyond the projects aims, they will also carefully evaluate the data from the traffic sensors to account for different patterns during the lockdowns, and if possible identify formal change points in the time series of the traffic count data. Change points are a statistical method for time series analysis.

Details on activities undertaken in Dublin can be found in *Deliverable 4.2: Case Study Report - PART C: Dublin.*

2.2.3 *Ljubljana*

The first Slovenian sensor started counting in December 2019 and has been active for more than 18 months. In line with the citizen science approach adopted from the pilot studies, participating citizens have taken a proactive role in all stages of the case study, from problem formulation and co-creation, data collection and analysis, to planning and implementing the resulting actions based on the case study findings and experiences.

After starting WeCount pilot study in Ljubljana, the decision was made to expand the case study outside Ljubljana area, to Novo mesto and the coastal part of Slovenia. This was done for two reasons. First, there was strong local-champion type activity in Novo mesto and in the Primorska region. Second, early on it was recognised that there was difficulty in finding suitable locations for Telraam sensors due to the "Green City" policy in Ljubljana, which points to a large number of trees in the streets. Therefore, it was challenging finding a suitable window whose view of the street is not obstructed by trees and which was suitable for the installation of a Telraam sensor.

Case study leaders in Ljubljana gained valuable insight into public engagement and citizen science during the course of the project, such as on how to approach and interact with the public, and what engagement strategies work best in the Slovenian environment. As a result of these experiences, they have gained know-how on how to extend the case study to other neighbourhoods and cities in the state, an important legacy for the project in Slovenia.

Details on activities undertaken in Ljubljana can be found in *Deliverable 4.2: Case Study Report - PART C: Ljubljana.*

2.3 COVID-19 pandemic: impact on the WeCount project

Just as the WeCount project started recruiting citizens and running workshops, the world was hit by the COVID-19 pandemic, which meant restrictions on who we could meet and where we could meet them. Eventually, all WeCount countries went into lockdown, which placed additional challenges on delivering the project as it was originally planned.

The COVID-19 pandemic is, at the time of writing, ongoing and continues to place additional challenges on projects. WeCount was able to adapt quickly to the new restrictions and limitations, but nonetheless the project has been impacted by this global crisis. The impacts of the pandemic on WeCount were the subject of a small-scale research project led by the WP5 Lead and are described in detail in the report "**Impact of the COVID-19 pandemic in delivering Citizen Science projects: Insights from the WeCount project"** (available on the WeCount website). In summary, the main impacts on WeCount can be seen in **Error! Reference source not found.**.

Table 1 - Overall impacts of the COVID-19 pandemic on the WeCount project.

Impact on	Context/explanation
Deployment	Deployment of case studies was spread out over a longer period of time as everything took longer during the pandemic. More specifically, getting sensors to participants under lockdown was very challenging. This has resulted in at least a 2-3 months delay in the execution of the project and a lower amount of sensor deployment than planned.
Reaching low socio-economic groups	This proved even more challenging in the online environment as these participants struggle to access technology, etc.
Recruitment and engagement	Moved recruitment and engagement to an online environment, with very few exceptions. The citizen engagement strategy had to be re-designed completely.
Geographic areas	As a result of a slower deployment, challenges in recruitment and an online-only environment, some case studies expanded the geographical area of recruitment to be able to target more participants.
Engagement tools	The WeCount Consortium also had to make a collective effort to re-orient the focus to the development of engagement tools to an online format (webinars, instruction videos, etc.).
Team dynamics	It was more challenging to manage a large project due to the restrictions imposed by the pandemic. For example, the usual annual face-to-face consortium meetings had to shift online, limiting the opportunity for 'coffee break' problem solving and strategic coordination.

3 Evaluation Rationale

The Monitoring and Evaluation strategy is based on the Monitoring and Evaluation Framework D5.1. It aims to examine whether the Objectives and Goals set out in D6.1 WeCount Dissemination and Communication Strategy and D6.4 Overview of WeCount communication activities have been achieved, in particular referring to the Research Objectives listed above.

3.1 Researchers and public engagement with research

WeCount sits within a global context for public engagement with science and technology within the science communication field (Davies, 2013). Worldwide, there is both funded- and policy-driven support for more researchers to engage with the public around their research (Poliakoff and Webb, 2007). The UK National Coordinating Centre for Public Engagement (NCCPE) defines public engagement thus:

Public engagement describes the myriad of ways in which the activity and benefits of higher education and research can be shared with the public. Engagement is by definition a two-way process, involving interaction and listening, with the goal of generating mutual benefit.

WeCount has also been designed to fulfil the principles of upstream engagement, outlined in the EU 'Responsible, Research and Innovation' toolkit (RRI, online) as:

Doing science and innovation with society and for society, including the involvement of society 'very upstream' in the processes of research and innovation to align their outcomes with the values of society.

As mentioned, five partner case studies are directly involved in shaping the project. Citizens can get involved through multiple workshops (educational and informative, co-creation workshops, etc.), data analysis and policy workshops and activities in local schools. In addition to these activities, citizens can also get involved through other communication channels such as WeCount's website, LinkedIn group, newsletters, etc.

This Evaluation deliverable explores how successfully WeCount has been in reaching out to a diverse audience, what changes or impacts can be detected in their knowledge on traffic counting, transport management and related impacts, as well as their sense of empowerment following involvement in the project. This deliverable focuses on monitoring and evaluation in Cardiff, Dublin and Ljubljana, the three final case studies.

Due to ongoing impacts of the COVID-19 pandemic, the following data/results will be included in D5.4 Final Monitoring and Evaluation Report (due November 2021):

- **Final interviews** with case study leaders and staff (research question five)
- **Statistical analysis** to observe any significant changes experienced by participants across the five case studies
- Assessment as to whether or not the project met its ambitions of engaging **25% of participants from low socio-economic backgrounds**
- **Helpdesk** feedback
- Outcomes from **data analysis workshops** (planned for in-person delivery when conditions allowed)

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- **Updates** from the community networks, including any **follow-on actions** taken by citizens or case study teams since this report.

3.2 Learning about traffic counting and transport management

Raising awareness of transport management is a broad aim, and as such the Dissemination and Communication strategy (D6.1) outlines how 'learning' about traffic counting and transport management will be central to WeCount communications. Learning is a concept described in the Informal Science Learning literature and outlined in the 'Generic Learning Outcomes' (Arts Council, 2019), whereby learning may involve the development or deepening of skills, knowledge, understanding, values, ideas and feelings. These impacts are measured across five core domains:

- Attitudes and Values
- Knowledge and Understanding
- Enjoyment, Inspiration and Creativity
- Skills
- Behaviour and Progression

Evaluation of the WP activities attempts to measure the impacts of the WeCount project across these domains, for all identified audiences.

3.3 WeCount participants

The WeCount project aimed to engage with a wide range of people. Below we outline the project's main audiences:

Counting Citizens

Citizens that are counting traffic or speeds in WeCount. They might have a sensor at their window (Telraam or another sensor), a strawberry plant or do manual counts.

Involved Citizens

Citizens that are involved in WeCount but do not count. They may take part at WeCount events, subscribe to the newsletter or have applied for a sensor but were not selected.

Local champions

Citizens that support their local network, host meetings, organise events, etc., to build momentum in their communities. They may or may not be counting.

Local stakeholders

Professional stakeholders, policy-makers, neighbourhood workers, 'Techies', teachers, etc. Everyone that was identified in the local stakeholder mapping and is involved in WeCount in a more strategic capacity.

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3.4 WeCount Events

The WeCount project organised different events, led by WP2. Below we outline the format of these events:

Co-design event

Co-design events aimed to work with citizens co-create a suitable data collection protocol and to co-design of the project governance structure relevant to that community. After this event, the data collection campaign is ready to start.

Kick-off recruitment event

Kick-off events happened after the co-design event. The aim was to inform the target groups about the project and to recruit participants more broadly.

Kick-off Telraam workshop

The kick-off workshop was the event where all selected participants for a Telraam were invited to participate. During this workshop the participants received information about Telraam as a tool, the data, as well as how to install the Telraam at home.

Data analysis workshop

This was the final workshop in the WeCount process. All stakeholders (participating citizens, involved citizens, local champions, local policy-makers & stakeholders, professionals, techies etc.) were invited to participate. The aim of this workshop was to analyse the data with the citizens, showcasing practical examples on how to use this data, and thus empowering them to interpret and use the data on their own in the future.

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4 Evaluation Strategy

4.1 Methodology

Evaluation is a process that takes place before, during and after an activity. Formative evaluation allowed our researchers to adapt to meet the needs of audiences, while summative evaluation assessed the quality of the activity being delivered, the delivery process itself and what impacts, if any, it had on the participants. Evaluation during engagements allowed citizens to contribute to the collective story of their network, stating their motivations for joining and shared issues of concern. In this sense, engagement during activities helped with interactivity and community cohesion.

Monitoring and Evaluation have been crucial to understand if the WeCount aims and objectives are achieved and to critically reflect on the activities and delivery processes. **This report has the potential to be used to improve activities, better plan future events and to demonstrate achievements.**

4.1.1 *Ethics Approval and Participant Consent*

Ethics Approval was achieved through an application to the UWE Bristol Faculty Research Ethics Committee (FET 20.02.034). Informed Consent was achieved before taking part in all evaluation activities. All activities in this project have been determined as low risk to the researchers and participants. The main risks identified for participants are found in the time commitment involved, and in providing personal data. As such, all participants were warned about these commitments, with appropriate informed consent measures taken to ensure the participants were aware about their involvement before volunteering.

The Participant Information Sheets and Consent Forms used are included in Appendix 1. All documents were translated into the local languages. For children under the age of 18, class teacher consent was obtained, as required and in keeping with national law. A letter was also included for the parents/guardians of those pupils, again detailing the project and activity, asking them to inform the named teacher should they not wish their child to be involved. Consent by 'opt-out' is standard practice, especially when activities are relevant to the school curriculum, and when the individual children cannot be identified.

The WP leads were responsible for enacting the consent procedures outlined in this document. All personal data was managed in accordance with D1.2 WeCount Data Management Plan. Compliance with Article 39 of the GA and the General Data Protection Regulation (GDPR) with regard to the processing of personal data and on the free movement of such data will be guaranteed. We have ensured compliance with data protection frameworks in all countries in which we process data. If the data processing has taken place in non-EU countries, it has been compliant both with the National Law and GDPR. Data has been protected to ensure no sensitive data is released that can be linked to specific individuals or entities. Any data which can be identified to individuals or entities has been stored separately to their research responses to ensure confidentiality.

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4.1.2 *Research Questions*

A variety of methods were used to evaluate the individual events and activities and the project overall. The evaluation methodology was designed to collect high quality data in an easy and straightforward way that works for all partners and across case studies, focusing primarily on the partners and surveys for citizens. All evaluation methodologies attempted to answer the following research questions, which cut across all the WPs.

Objectives/Research questions:

1. Are we engaging citizens who provide meaningful representation of local populations (gender, social deprivation, education, income etc.)?
2. Are the tools/technology sufficiently robust, yet engaging and simple to use?
3. Are the data generated and the engagement activities being used by citizens themselves?
4. Are new WeCount communities emerging that are self-sustaining with minimal central support?
5. How has developing and running a citizen science project impacted on the research team?
6. How can we optimize recruitment, engagement, monitoring and evaluation of future citizen science mobility projects?

4.1.3 *Research Methods*

A variety of methods were used to monitor and evaluate WeCount. Methods were selected based on how appropriate they were and how practical they were to be used by case study leads, across five different countries and several languages.

WeCount project participation

The project registration process included informed consent approval, plus some demographic, attitude and expectation questions, which were collected whenever a citizen decided to register interest in having a Telraam on their window. This informed consent also enabled anonymous data to be gathered from the Helpdesk, social media, and email queries.

4.1.3.1 Online surveys

Online surveys are a convenient method to gather participants' views and thoughts about events and activities. By using online surveys, we would not take away the participants' attention from the activities they are engaging with. In addition, online surveys take away the pressure of being interviewed, making participants more comfortable (Couper et al., 2002) and eliminating interviewer-bias.

For WeCount participants, a final online survey was design to be relatively short (10 minutes), quick and easy to complete with both open and closed questions, to ensure a variety of data was collected. However, the majority of questions were of a closed format, as this is more inclusive for a variety of different participants (De Vaus, 2002). Including more closed questions than open ones also assisted in making translation and data analysis straightforward. Open-ended questions, meanwhile, allow participants to provide answers in their own terms (Grand and

Sardo, 2017) but were kept to a minimum, since they tend to have a lower response rate (Groves et al., 2004).

Online surveys were originally prepared in English and then translated by local case study teams. They were distributed to participants in their native languages. A final, more in-depth survey was sent to all WeCount participants shortly after their last workshop or interaction with the project/project team.

A copy of the online survey is included in Appendix 8.5.

All data from the surveys were translated to English by an external translation and transcription company. For the analysis of the final survey, six steps were taken for each case study city. First, the raw data was cleaned and closed questions coded in excel. Second, the open questions were given an initial review to identify and code themes (Braun and Clarke, 2006). Next, the quantitative data were transformed into graphs (in Excel) and the researcher began to write the emerging data story. Following this, the cleaned excel was imported into NVivo for a deeper analysis of content and themes. Themes were then condensed and the dominant themes interpreted for meaning and added to the data story. The sixth step, relational statistics, will be performed to see how certain themes relate, if at all, to demographic characteristics and other themes (e.g. knowledge gained and action taken, for instance) and the results presented in D5.4.

In addition to online surveys, the Telraam registration process included some demographic questions, as well as a question on motivation to participate, which were collected whenever a citizen decided to register interest in having a Telraam.

4.1.3.2 Interviews

Individual interviews are described in the literature as a useful evaluation method as they directly access the observations, insights and the experiences of the participants (Tong et al., 2007). In this evaluation, interviews were used to further explore relevant topics, citizens' experiences and any issues.

The individual interview was designed as semi-structured and the schedule included open-ended questions allowing participants to provide answers in their own terms (Groves et al., 2004). The interviews were used to evaluate citizen's thoughts, views and experiences on WeCount. The in-depth interviews occurred over phone or Skype/similar; in the local languages and were audio recorded, then transcribed and 'intelligently transcribed' (e.g. removing 'ums' and 'ahs') by professional transcribers.

The interview data was analysed in NVivo using the process of thematic analysis (Braun and Clarke, 2006), searching for themes that captured patterned meaning across the data. The codes were then refined and accumulated into themes that represented the semantic meaning across the dataset. Secondary analysis was performed with review by WP5 researchers to ensure the themes adequately represented the original data.

A copy of the interview schedule is included in Appendix 8.3.

4.1.3.3 Reflective Logs

Staff running WeCount workshops were asked to keep a self-reflective log. Self-reflective logs are forms that staff running workshops are asked to complete soon after the event takes place. Having access to the thoughts, views, opinions and post-event reflections of WeCount staff enables triangulation with other evaluation data. A self-reflective log form and guidance to fill it out was provided in advance, with the aim of making it easy and straightforward to use. The self-reflective logs were interpreted in a qualitative way per type of event. Insights were gained into the do's and don'ts of organising each type of event.

A copy of the reflective log template is included in Appendix 8.6.

4.1.3.4 Feedback during workshops

A template was created for all case study teams to capture data from workshops. This data included demographics, efforts to target low-socioeconomic groups and participants' motivations for being involved. Within the template there was also space for teams to make notes about the group interactions or results from any ice breaker activities conducted. Processing all this data into pivot tables in Excel resulted in a series of valuable outcomes.

4.1.3.5 Demographic data

Demographic data was collected either during the workshops or, while participants were registering for a Telraam or for events (e.g. an online pre-registration form like Eventbrite). By collecting demographic data in advance of the workshops, we aimed to make the evaluation process manageable for the case study cities, as well for participants, who would not have to dedicate as much time during the events completing long surveys.

In addition to demographic data, information on number of citizens reached was also ascertained. General monitoring covered aspects such as recording:

- number of participants in all WeCount interventions
- number of registrations on the Telraam website

We used Google Analytics as a passive monitoring tool for WeCount and Telraam website-traffic monitoring, with common indicators such as unique users per day/week/month, session duration, user acquire channels, user retention etc. Demographic data from the registration stage (for Telraam and/or events) was either directly exported from the Telraam dashboard or downloaded by the case study leader. This data was analysed directly in excel.

4.1.3.6 Learnings from evaluating the pilot case studies

The evaluation followed the same approach as the overall project: launching in two pilot case studies, learning and adapting when needed before deploying the final three case studies.

Here we outline changes to the original Monitoring and Evaluation Framework, following reflecting and feedback from pilot case studies:

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- **Registration form:** one question was adapted from an open question to multiple choice. The question "What do you want to learn" collected a multitude of unfocused answers from participants in the pilot studies and was therefore adapted to multiple-choice. The choices were based on the main themes emerging from data collected in the pilot case studies.
- **Focus groups** during workshops did not take place. Focus groups were originally planned for face-to-face meeting and proved challenging in the online environment (a mixture of available technology, being time-consuming and digital fatigue from both the WeCount team and the participants). Following feedback from Leuven and Madrid/Barcelona, it was decided not to run focus groups in the three final case studies.
- **Local Champions:** the original evaluation plans included a follow up with Local Champions. During the pilot stage of WeCount it became apparent that it was sometimes tricky to identify Local Champions. For example, participants did not want the additional responsibility, or they already acted as such in their communities in a professional capacity and did not need further entitlement. In addition, email and online fatigue made case leaders weary of not adding more pressure to Local Champions. There are examples of where the model worked well (e.g. Cardiff), thanks in part to the team in actively encouraging enthusiastic participants early on in the project, and some of the local champions experiences have been captured in the final citizen interviews.
- Plans for **Hackathons** were abandoned by the WeCount team, due to disruption caused by the pandemic and therefore not evaluated as initially planned.
- Based on feedback from staff, the **final survey questions** were tweaked slightly to allow participants firstly to select multiple answers to the question on reasons for joining and secondly, to ascertain whether or not participants had already attended data analysis workshops. This question was added as the final survey was deployed while the project was still running. The initial evaluation plan was to launch the survey after the engagement cycle, however the COVID-19 pandemic prevented this.

4.2 Evaluation implementation

A large-scale, international research project such as WeCount needs a monitoring and evaluation strategy and implementation that works across different cultures, levels of expertise and different experiences in using evaluation methods. Here we describe how the WP5 team implemented the Monitoring and Evaluation framework.

4.2.1 *Coordination across work packages*

Several steps were taken in order to involve other consortium members, case study leads and other works packages in the development and implementation of the Monitoring and Evaluation framework:

- All case study leads were consulted and involved in developing demographic questions that were appropriate to their cities/regions.

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- WP2 (WeCount Citizen Science Ecosystem) and WP3 (WeCount Platform and Sensors) were involved in developing the final survey and interview questions, both targeting citizens.
- During the review and development phases, WP5 has had continuous interactions with WP2 (WeCount Citizen Science Ecosystem) and ethics. This resulted in having Monitoring and Evaluation as an integral part of the WeCount Engagement Framework and Toolkit, which embeds in one single resource, the requirements in terms of data gathering (and related templates) for evaluation purposes and those with respect to ethics approval. This coordination across work packages has been crucial in ensuring a coherent approach for informing and supporting the case studies' implementations.

4.2.2 *Training*

At several stages in the project, WP5 delivered training:

- **General training session on Monitoring and Evaluation**, delivered in M6, delivered by teleconferencing. The session was planned and delivered jointly by UWE Bristol and M21 and all consortium members were invited to attend. It provided an overview of the purpose of the evaluation, methods used and what each case-study was expected to contribute with.
- **Individual Case Study Monitoring and Evaluation training sessions,** tailored to their experience (if any) and focused on their monitoring and evaluation needs. These sessions provided an in-depth look at the monitoring and evaluation plans, including a detailed methodology and how and when to collect data. All sessions were delivered by teleconferencing.
- **Online survey guidance.** In order to support the local team in disseminating the online survey and getting the best possible return rate, WP5 produced a detailed guide with instructions and set-by-step approach on how to distribute the surveys to all WeCount participants.
- **Interviews with citizens.** Interviews with selected local citizens were conducted by the case study teams, in the local languages to allow participants to fully express their opinions and experiences. When needed, case study teams were offered an online training session on how to conduct research interviews. The case study teams were also given guidance and support on how to approach and recruit participants to take part in interviews, as well as how to get a diverse sample of participants.

4.2.3 *Monitoring and Evaluation mentor*

To ensure an effective implementation of the Monitoring and Evaluation framework, WP5 have created the role of "Evaluation Mentor" role, who provides continuous support across case studies. This role became necessary as close cooperation with every case study is needed to guarantee the successful application of the framework. The mentor guided all local teams through the evaluation plan, following their own local monitoring and evaluation framework. Case studies were provided with the right information at the right time, and supplied with the templates needed to collect evaluation data.

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The Evaluation Mentor has worked closely with all case study leads, organising regular meetings, answering questions, highlighting any monitoring and evaluation needs and sending reminders of data that needs to be collected and/or stored. This approach was quite successful, as all case-studies had access to a high level of support. In D5.4 case study leads will reflect on their experiences with the Evaluation Mentor.

4.2.4 *Ongoing support*

Finally, like in other WPs, the WP5 team have strengthened their relationship with case studies and other WP leads with one-to-one support, should the partners need any clarification, help during framework implementation, brainstorming solutions, or providing additional information.

4.2.4.1 Impacts of the COVID-19 pandemic on monitoring and evaluation

When deliverable 5.1: Monitoring and Evaluation Framework was developed and submitted (February 2020) we could not imagine the world would be about to face a global pandemic. The original framework, which outlines the evaluation rationale and sets out the evaluation plan and methodologies, was designed based on the planned face-to-face interaction and engagement with citizens in the five WeCount case studies.

Just as the project started recruiting citizens and running workshops, the world was hit by the COVID-19 pandemic, which meant several restrictions on who we could meet and where we could meet them. Eventually, all WeCount countries went into lockdown, which placed additional challenges on delivering the project as it was originally planned. Inevitably, the monitoring and evaluation plans had to be adapted to the new reality: the online recruitment of and engagement with citizens.

Listed below are the deviations from the original 5.1 framework:

- The overall evaluation targeted a **smaller number of research questions** than initially planned, due to fewer opportunities to collect feedback from participants, as well as online fatigue. During the pandemic and especially during lockdown, people have seen a huge increase in online events and online demands (as well as general life demands), leading to tiredness and eventually lower uptake and participation in the online world.
- **Snapshot interviews were not used** to evaluate workshops, in an effort not to overwhelm participants with more online demands.
- **Autonomous evaluation methods**: these were not used in their original form (feedback cards and feedback boards), but were adapted to the online world as much as possible. Online tools such as Miro and Mentimeter were used instead to collect additional feedback during workshops.
- **Scoping work**: planned scoping work with local residents (e.g. organising events at neighbourhood centres to inform and involve people from low socio-economic backgrounds) did not take place due to the COVID-19 pandemic. The local teams had to shift priorities and invest their time in looking for other methods and options to recruit participants, as well as setting up online workshops, which was

not initially planned for. Additional time and effort had to be diverted into motivating participants to join the project, as the pandemic proved overwhelming for many people.

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5 Evaluation Results and Discussion

5.1 Technical Outputs

In this section we present some technical outputs from the pilot case studies. The tables and figures below offer an overview for the three case studies of the Telraam activities. These outputs were collected through the Telraam's dashboard, which allows the case leader to track all registrations and activities, as well as communicate directly with participants.

In order to understand and interpret the technical data correctly, the terms used are clarified below:

- **Registrations**: people who registered on www.telraam.net/en/register to participate in the WeCount project and receive a Telraam (or be a volunteer).
- **Official WeCount members**: people that registered to one of WeCounts networks (e.g. Cardiff, Leuven, etc), stating an interest in either volunteering their time or applying for a Telraam. Being a member does not automatically mean they can count traffic. All official members were asked the demographic questions which we analyse below.
- **Known demographic data**: number of people that registered for one of the WeCount networks and completed the demographic questions.
- **Telraam owners**: citizens that proceeded further than the registration. They actively provided location information, including a photo of where to install a Telraam as they specifically wanted to count. They qualified to receive a Telraam, however, they either did not complete the installation process (e.g. their Telraam was never connected to the Wi-Fi and the Telraam Platform) or their installation/registration was initiated, but not finalised.
- **Active Telraams (that counted at least once after registration)**: installed Telraams that have sent data at least once to the Platform via their WiFi network.
- **Telraams still counting**: Telraams that were still counting at the time of the export (June 18th, 2021) form the dashboard of these data.
- **First Telraam installed and counting:** date when the first Telraam in this network was installed and began counting.

Participants whose windows met the selection criteria were sent/given a Telraam. To qualify they needed to be in an area without an existing Telraam and considered by the team as 'strategically interesting'. They also needed to have, among the following, a window with a clear view of the road, free from obstructions (e.g. trees, balconies, shutters) or certain road characteristics (e.g. crossroad, traffic light), a non-encrypted Wi-Fi network, and an electricity plug close to the window/access to an extension cable.

5.1.1 *Cardiff*

In Cardiff (**Error! Reference source not found.**), the network started with its first registration in October 2020. Since then, **267 people** started the registration on the Telraam website. Out of those, 89 completed the necessary forms to receive a Telraam. 74 were eligible and received a Telraam. **65 Telraams counted at least once and 52 are still counting** as of June 2021.

Table 2 - Cardiff: number of participants and Telraam users.

Cardiff participants and Telraam users	Number or date	Percentage
Cardiff registrations	267	100%
WeCount members	89	33%
Known demographic data	89	33%
Telraam owners	74	28%
Active Telraams (that counted at least once after registration)	65	24%
Telraams still counting (June 2021)	52	19%
First Telraam installed and counting	18/10/2020	

5.1.2 *Dublin*

In Dublin (**Error! Reference source not found.**), the network started with its first registration in June, 2020. Since then, **479 people** started the registration on the Telraam website to have a Telraam. Out of those, 141 completed the necessary forms. **141 Telraams were installed and counted at least once and 121 of them are still counting** as of June 2021.

Table 3 - Dublin: number of participants and Telraam users.

Dublin participants and Telraam users	Number or date	Percentage
Dublin registrations	457	100%
WeCount members	141	31%
Known demographic data	139	31%
Telraam owners	143	31%
Active Telraams (that counted at least once after registration)	132	29%
Telraams still counting (June 2021)	121	25%
First Telraam installed and counting	10/08/2020	

5.1.3 *Ljubljana*

In Ljubljana (**Error! Reference source not found.**), the network started with its first Telraam in June, 2020. Since then, **202 people** started the registration on the Telraam website to have a

Telraam. Out of those, 126 completed the forms and 106 of these people qualified for and received a Telraam. **84 Telraams counted at least once and 55 of them are still counting** as of June 2021.

Table 4 - Ljubljana: number of participants and Telraam users.

Ljubljana participants and Telraam users	Number or date	Percentage
Ljubljana registrations	202	100%
WeCount members	126	62%
Known demographic data	91	45%
Telraam owners	106	52%
Active Telraams (that counted at least once after registration)	84	42%
Telraams still counting (June 2021)	55	27%
First Telraam installed and counting	2020/06/24	

5.2 WeCount Citizen Scientists

Note: For simplicity we have used the following abbreviations:

- Survey data: **CITYnumber** (e.g. DUBLIN01)
- Interviews with citizens: **CITYCitizenInterviewNumber** (e.g. DublinCituzenInterview01)

5.2.1 *Cardiff*

5.2.1.1 Demographic data

In the Cardiff case study, **267** citizens applied to participate in the WeCount project by applying online via the registration form on www.telraam.net. Of those, 89 provided the necessary demographic information to be considered for a Telraam. While most of those who applied were from Cardiff (93%; N=83), citizens from other areas within Wales and the West of England also expressed interest, such as from Barry, Bristol, Newport, Penarth and Winterbourne. Note that places outside of Cardiff likely heard of WeCount via *DETI Inspire*[3], another UWE Bristol project that is also making use of traffic sensors to engage young people on engineering for sustainability.

After thorough analysis of these applications for suitability by the WeCount case leaders in Cardiff, **74 citizens (83%)** were selected to receive and install a Telraam (Figure 3). All

[3] https://www.uwe.ac.uk/about/values-vision-strategy/partnerships/department-partnerships/engineering-design-and-mathematics/deti

provided their current place of residence and demographic information. Of those candidates, 95% (N=70) live in Cardiff, while the others live in Barry, Bristol, Penarth and Winterbourne (4%, N=4).

Those unable to receive a Telraam were invited to remain a part of the WeCount case study, through participation in data workshops as attendees where they were provided with opportunities to discuss their local traffic and transport challenges with other WeCount members. They were also encouraged to look at the online data platform to see if other users were collecting data on their road, thus informing them of their likely local data by proxy.

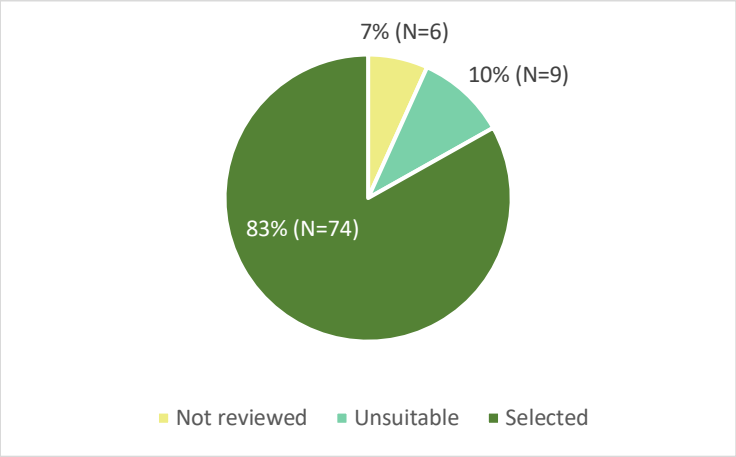

Figure 3 – Telraam selection in Cardiff (N=89)

Interest in participating in the WeCount project in the Cardiff case study came mainly from **male** citizens (Figure 4). Of those who indicated their gender, 65% (N=58) are male and 33% (N=29) are female. 2% of them (N=2) identify as other. This distribution greatly influences by the participants from Cardiff, but similar for the other areas within the country.

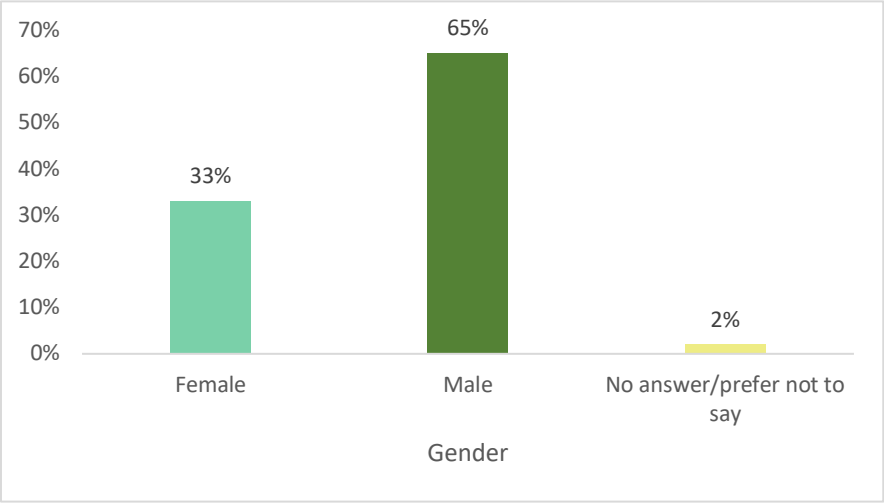

Figure 4 – Gender of participants in Cardiff (N=89).

More than half of the interested applicants in the Cardiff case study (54%; N=48) are part of **generation X** (age 35-49); while 21% are aged between 50 and 64 years old (N=19) (Figure 5). Only 6% of the interested applicants indicating their age are 65 years old or older (N=5). As

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Cardiff are currently launching educational resources at primary schools, it is suffice to say that this graph would be skewed towards a younger populace if these pupils were included.

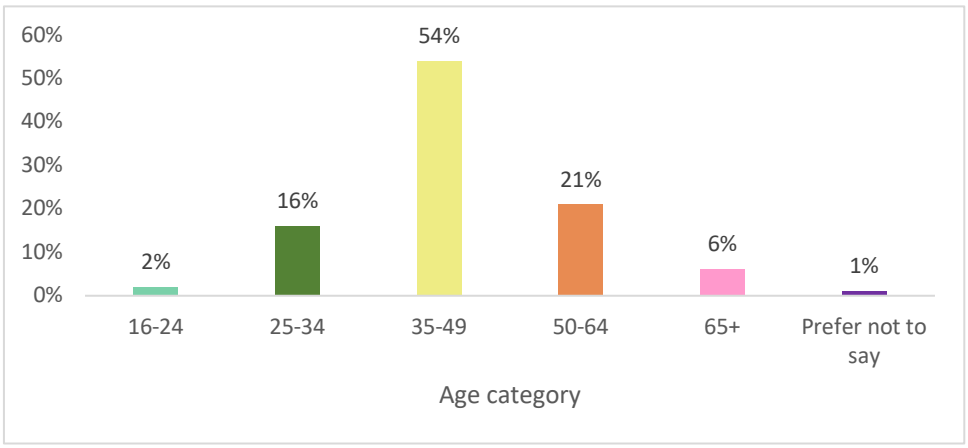

Figure 5 – Age range of participants in Cardiff (N=89).

The majority of applicants in Cardiff have a postgraduate degree (40%; N=36), an undergraduate degree (26%; N=23) or a doctorate (15%; N=13) (

Figure 6). Together, three quarters of the citizens are **highly educated** (81%; N=72). Highly educated people are more likely to get involved in science and citizenship projects. Similar to what we found in the pilot cities, these results not only confirm this, but also raise the question of effective ways of reaching out to less educated residents and getting them enthused about being involved in these types of projects.

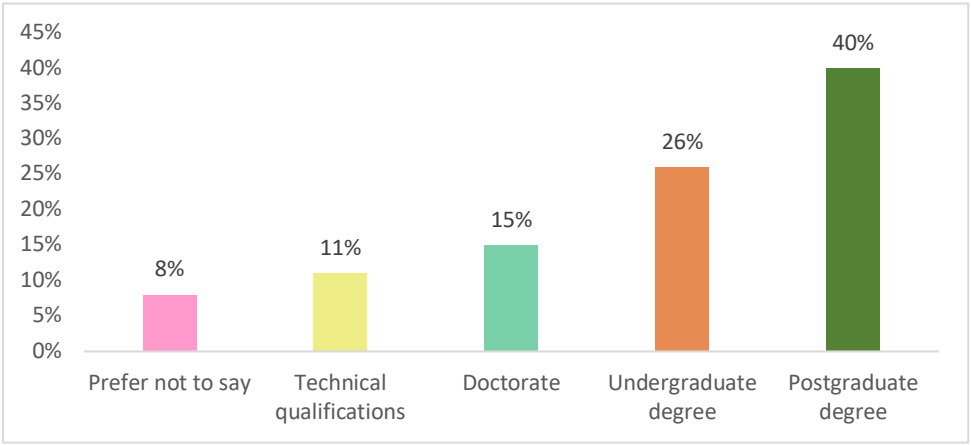

Figure 6 – Educational attainment of participants in Cardiff (N=89).

Data about employment of the interested citizens in and around Cardiff confirm these results, as 61% of them has a higher & intermediate managerial, administrative or professional occupation (N=54), followed by 27% having a supervisory, clerical & junior managerial, administrative and professional occupation (N=24) (Figure 7).

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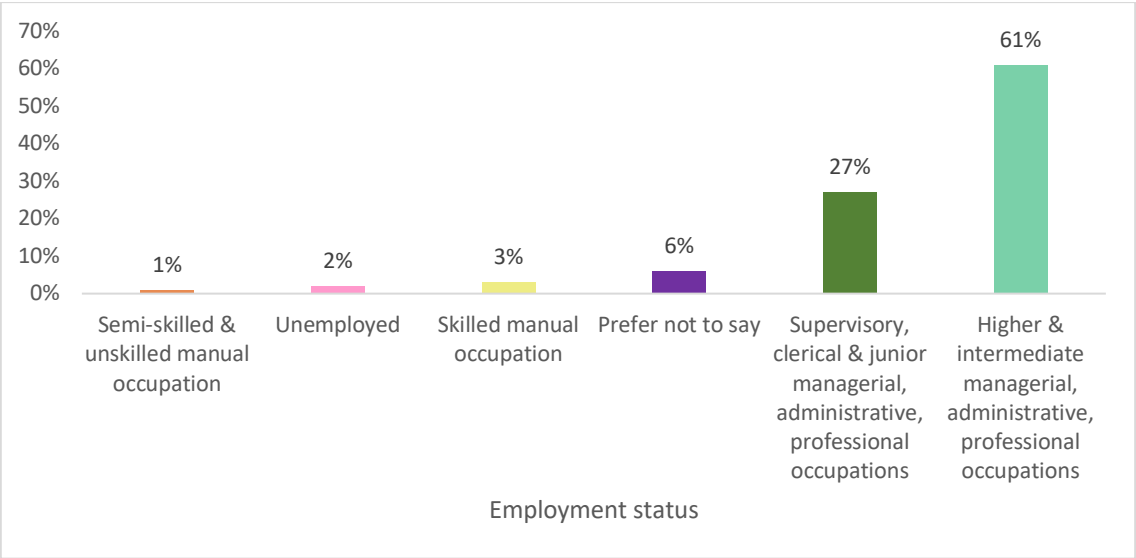

Figure 7 – Employment status of participants in Cardiff (N=89).

Most interested participants in and around Cardiff are **British** (94%, N=84), which is no surprise. The remaining are of Dutch (3%, N=3), Portuguese (1%, N=1) or Irish (1%, N=1) nationality. In addition, ethnicity was asked for, resulting in 85% of the candidates identifying as **White** (N=76) and a small amount as Asian (2%, N=2). The others belong to Mixed (7%, N=6) or "other" ethnic groups (6%, N=5).

Finally, of those indicating their reasons for engaging with the WeCount project (N=86; Figure 8), the main reason is to **measure and monitor modal distribution and traffic density** (36%; N=58). This is followed by wanting to improve liveability (including active travel) and safety (19%, N=30) and an interest to measure and monitor car speed (16%; N=25). A small portion of engaged citizens were motivated to participate by the opportunity to measure and monitor local air quality (8%; N=13) and rat running (8%, N=12). Note that respondents could select multiple answers from the list of options.

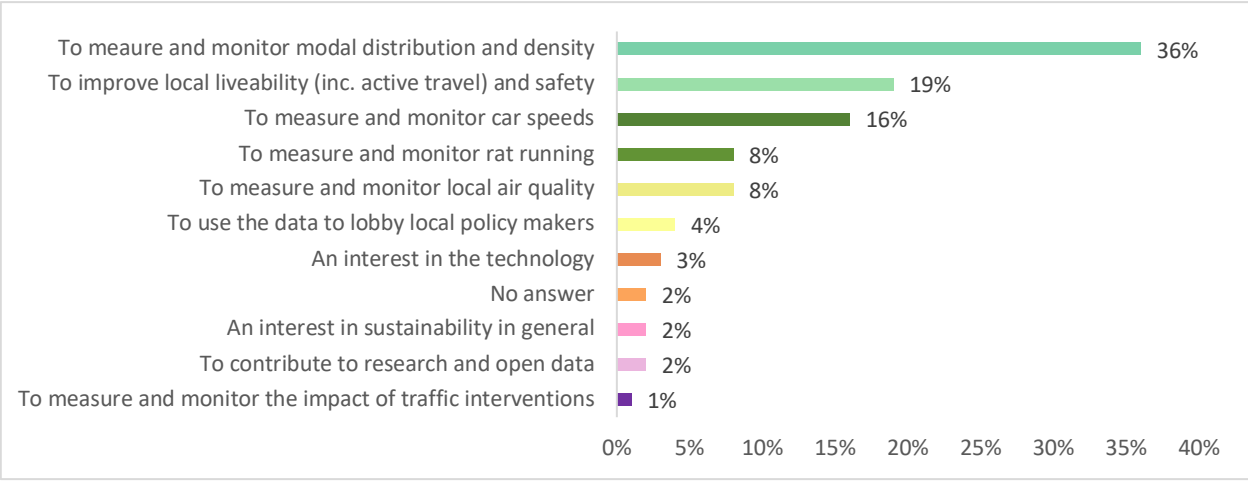

Figure 8 – Motivations for joining WeCount Cardiff (N=160 from 86 respondents).

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5.2.2 *Dublin*

5.2.2.1 Demographic data

In Dublin, **457 citizens** applied to participate in the WeCount project. Of those, **139** people provided their demographic information, which is described below. While most come from Dublin (98%, N=136), a few reside in Cork (N=1), Delgany (N=1), and Wicklow (N=1). 319 people did not complete the second form (address information and the view from the window). This was most likely due to the fact that the second form was sent in a follow up email, rather than being part of the initial registration form. It is also possible that some of these follow up emails were blocked by Spam filters, or that applicants had already lost interest at that stage.

After thorough analysis for suitability of all the applicants by the case leaders in Ireland, **121 citizens** were selected to receive and install a Telraam (Figure 9). Of those, 121 provided their current place of residence and 119 provided (at least some) demographic information. The selection was based on the view from their window. Of all the selected Telraam candidates, 98% (N=119) are from the Greater Dublin area, with the remaining 2 from Delgany and Wicklow.

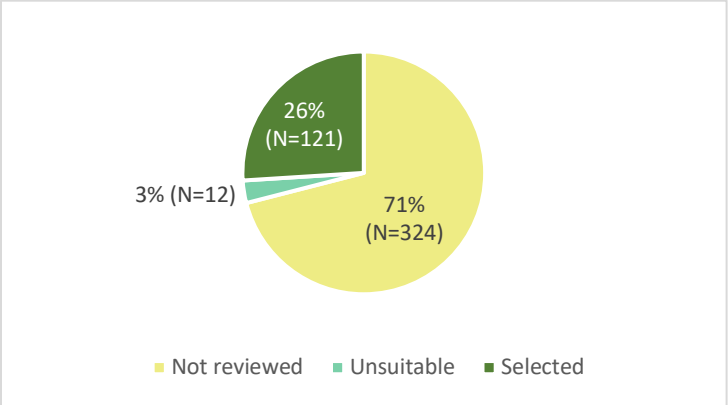

Figure 9 – Telraam selection in Dublin.

The majority of applicants in Dublin were **male citizens** (Figure 10). Of those indicating their gender (N=139), 53% (N=73) identified as male, compared to 44% (N=61) identifying as female.

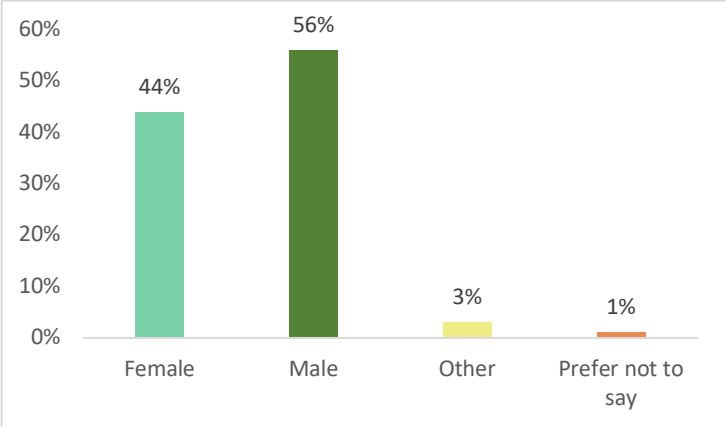

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Figure 10 – Gender of participants in Dublin (N=457).

More than half of interested citizens who indicated their age (N=137) are aged 35-49 years old and thus belong to **generation X** (55%; N=76) (Figure 11). A smaller proportion is aged between 50 and 64 years old (17%; N=23) or between 25 and 34 years old (14%, N=19). Only 6% (N=8) are 65 years old or older.

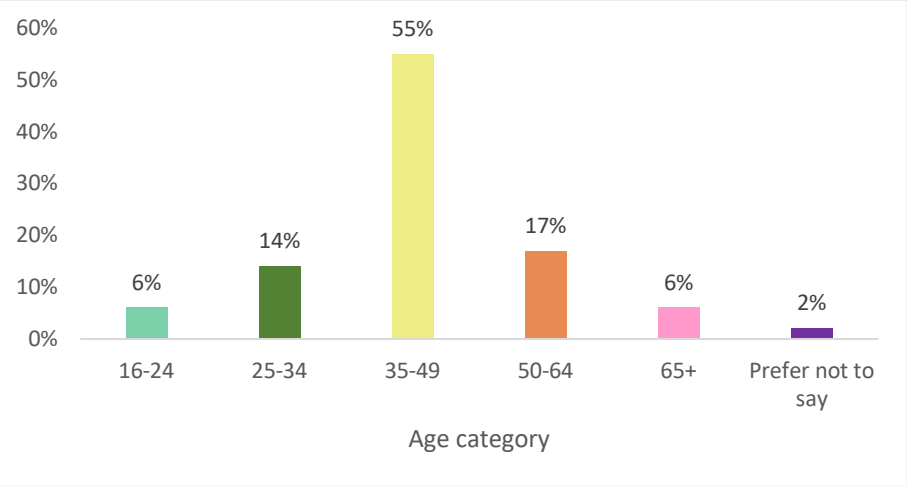

Figure 11 – Age of participants in WeCount Dublin (N=139).

Of those applicants who indicated their level of education, most have a postgraduate degree (53%; N=73) and are therefore **highly educated** (Figure 12). One third have a third level degree (27%; N=38), known as 'higher education' in the UK. These results are in line with the current employment of the applicants: of those indicating their employment (N=139), the majority are professional workers (54%; N=75) and in managerial/technical positions (29%; N=40) (Figure 13). Again, 70% (N=318, each) did not answer this question.

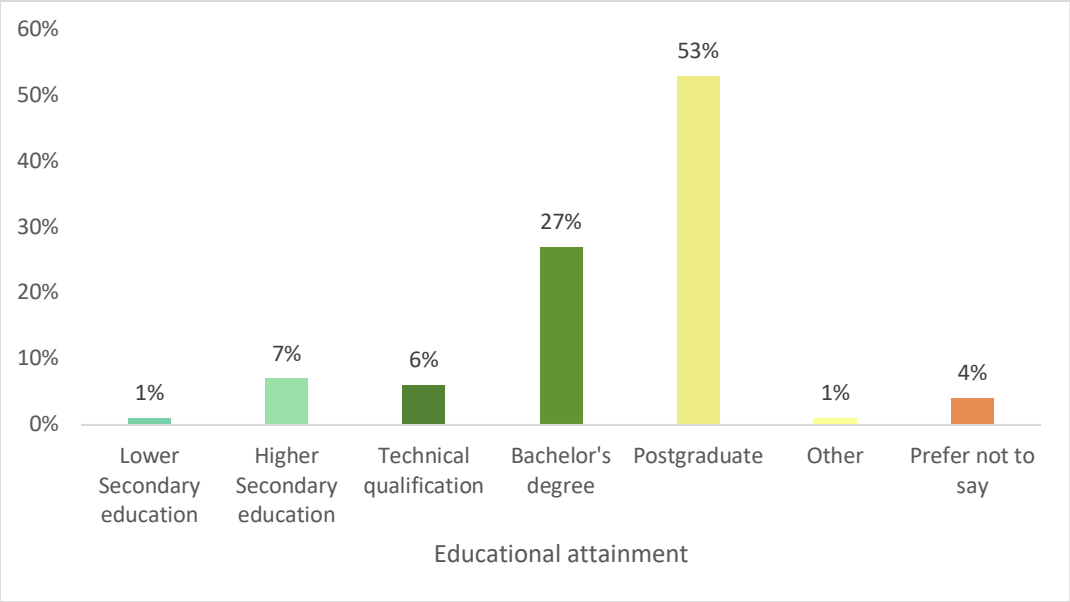

Figure 12 – Educational attainment of WeCount Dublin participants (N=139).

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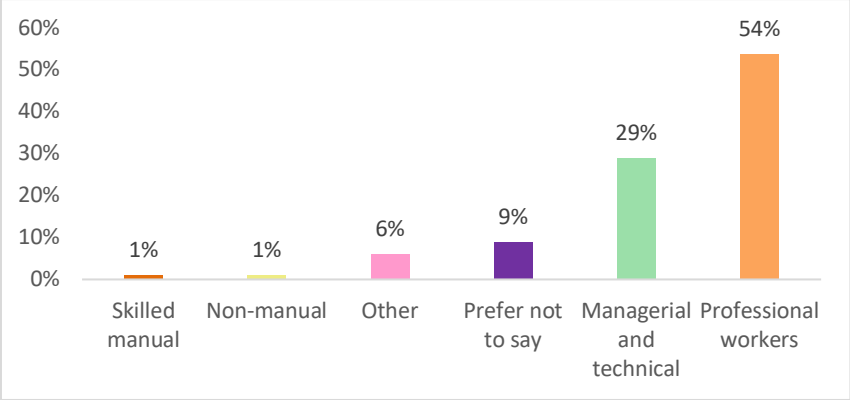

Figure 13 - Employment status of WeCount Dublin participants (N=139).

Finally, in Ireland, **ethnicity** was not asked at registration. This choice was made by the case leaders, as this information was not deemed to be relevant to the case study. Of those indicating their nationality, 90% are **Irish** (N=125), followed by 2% Spanish (N=3), and 1% (N=2) each of German (N=2) British and Dutch. The remaining candidates were from France, China, Italy, Antarctica or the United States of America (all 1%, N=1).

Finally, interested citizens in Dublin were mainly motivated to participate in the WeCount project to measure traffic density (Figure 14). Of those who indicated a reason to participate (N=137), 39% (N=84 of 213) were motivated by the opportunity to measure **modal distribution and traffic density** in their area, followed by measuring and monitoring **local air quality** (22%; N=47 measuring and monitoring the impact of traffic interventions (16%; (8%; N=17), measure and monitoring the amount of cut-through traffic in their street (8%; N=16) and measuring and monitoring car speed (6%; N=13). N=320 gave no answer.

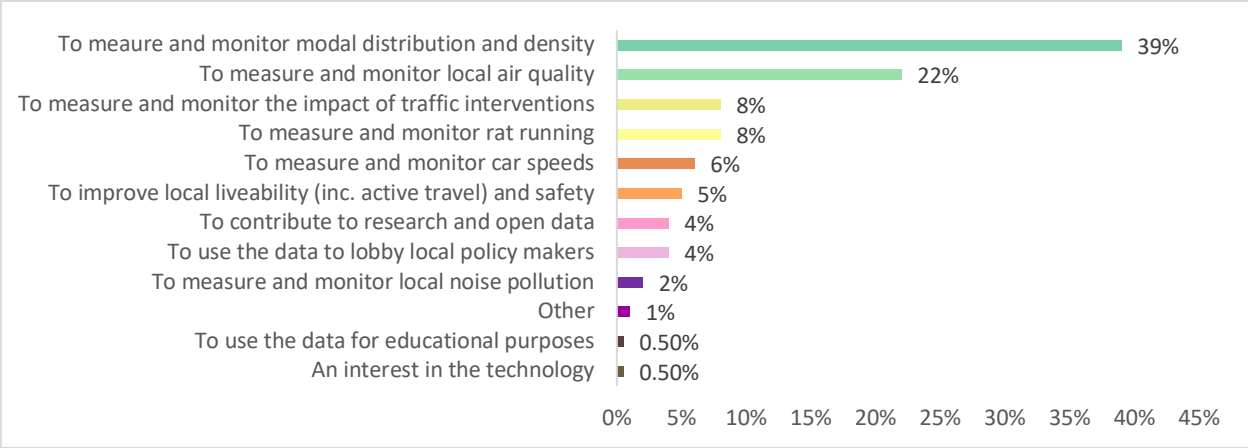

Figure 14 – Participants motivations for joining WeCount Dublin (N=213).

5.2.3 *Ljubljana*

5.2.3.1 Demographic data

In the Ljubljana case study, **202 citizens** expressed interest in participating in the WeCount project, by applying online via the registration form on www.telraam.net. Out of those, 91

applicants provided their demographic information, which are described below. These candidates came from as many as 35 different cities and towns within Slovenia, with a majority from Ljubljana (67%; N=125), Novo Mesto (7%; N=13), Domžale (3%; N=6) and Koper (2%; N=4).

Each of these applications were analysed for suitability by the WeCount case leaders in Ljubljana. As a result, **87 citizens** were selected to receive and install a Telraam (Figure 15). Of these, 87 provided their current place of residence, and 82 provided (at least some) demographic information. The selection was based on suitable requirements for installation of Telraam device (unobstructed view to the street), locations where the counting networks are established. Of all the selected Telraam candidates, 76% (N=66) are from Ljubljana, 6% (N=5) are from Novo Mesto, 3% (N=3) are from Domžale, and an equal percentage are from Koper (N=3). The other candidates (11%, N=10) are from various municipalities within Slovenia (Kamnik, Krško, Lucija, Mengeš, Obala (Riviera), Podnanos, Renče and Velenje).

Non-counters were invited to be involved in other ways. They were encouraged to view Telraam data and follow WeCount Slovenia and Ljubljana social media channels where they could follow developments within the case study, including invites to workshops.

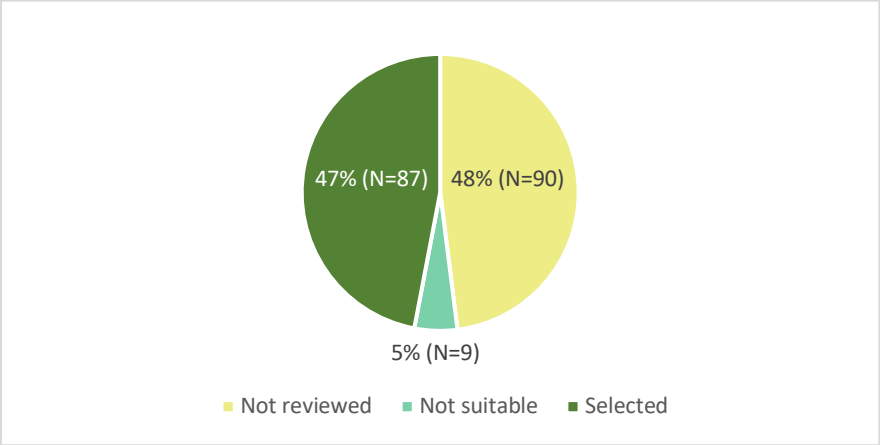

Figure 15 – Telraam selection in Ljubljana (N=186).

An interest for participating in the WeCount project came mainly from **male citizens** in the Ljubljana case study. Of those indicating their gender, 71% (N=65) identified as male, compared to 36% (N=24) identifying as female and 2% (N=2) as other. 51% (N=95) gave no answer.

WeCount has attracted mainly residents from **generation X (age 35-49) and generation Y (age 25-34)**: one third of the candidates (37%; N=33) who indicated their age is between 35 and 49 years old and 32% (N=29) is between 25 and 34 years old (Figure 16). Older people expressed less interest in the project: 19% (N=17) of the candidates are 50 years old or older, of which only 2% (N=2) are older than 65 years old. Bearing in mind that the elderly may have more difficulty installing Telraam and using the online dashboard, due to typically lower levels of digital skills, this number of engagements is expected. The older participants (aged over 50 years old) are largely concentrated in Ljubljana, where 19% (N=13) indicated their age as 50 years or older. 52% (N=96) gave no answer.

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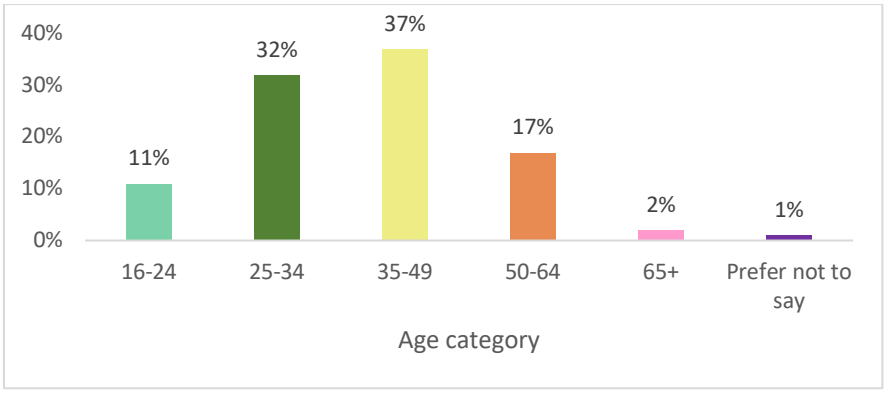

Figure 16 – Age range of WeCount Ljubljana participants (N=90).

Of those candidates indicating their education level, as many as 67% (N=61) are **highly educated**: 21% (N=19) have a bachelor's degree, 37% (N=34) have a master's degree and 9% (N=8) have a doctorate (Figure 17). This trend can be found throughout most municipalities and cities in Slovenia, with the exception of some more rurally located locations like Kamnik and Podnanos, where the highest level of education of applicants is higher secondary education.

The age and education demographics are in line with the current employment of the applicants expressing interest in the WeCount project. Of those indicating their employment, most of them are professionals (32%; N=29) and technicians/associate professionals (18%; N=16). This distribution is also reflected across cities and municipalities within Slovenia, with a particular peak of professionals (37%; N=26) and civil servants (20%; N=14) in Ljubljana. 95 participants (51%) did not answer either of this question.

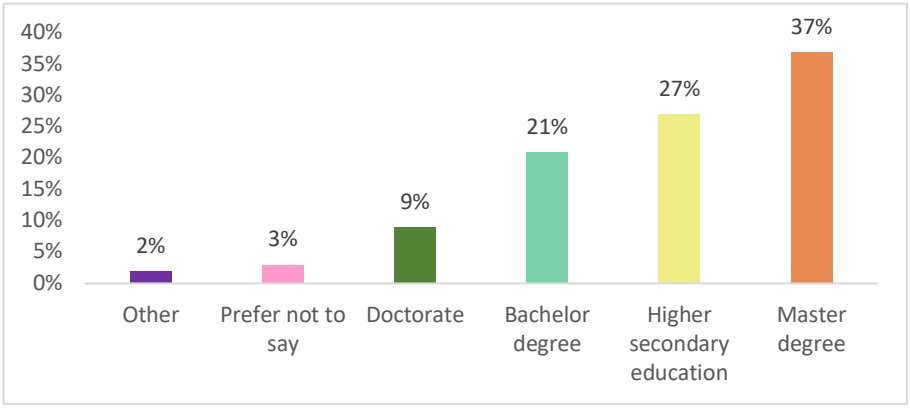

Figure 17 – Educational attainment of WeCount Ljubljana participants (N=91).

It's no surprise that 96% of those indicating their nationality are **Slovenian** (N=86). The others have the Croatian, Albanian, Swedish and Finnish nationality (all 1%, N=1). Finally, **ethnicity** was not asked at registration. This choice was made by the case leaders as this information was not deemed to be relevant to the case study.

Figure 18 shows the main **motivations for participating** in the WeCount project in the Ljubljana case study. It has to be noted that a large proportion of the interested citizens didn't provide an answer here. Of all the citizens providing a reason (N=136), the main one is to measure modal distribution and traffic density (26%; N=36). An interest to improve local liveability (including active travel) and safety came a distant second (N=8, 6%). The others

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reasons indicated are neglectable. On the other hand, it's interesting to note that nobody indicated that they participated to measure and monitor local air quality or to use the data for educational purposes.

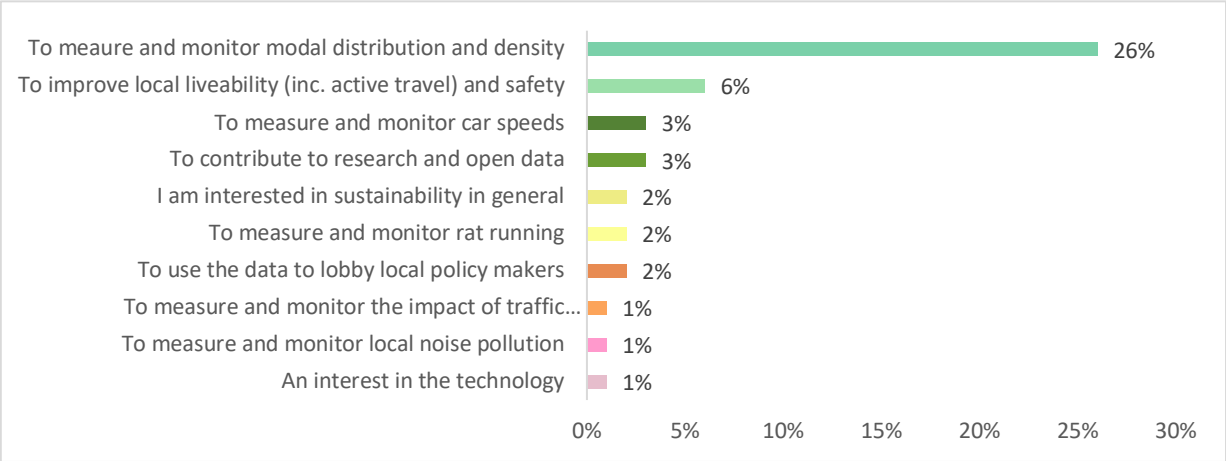
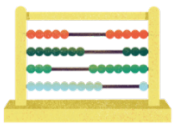


Figure 18 – Motivation for involvement in WeCount Ljubljana (N=136).

5.2.4 *Summary*

	Cardiff	Dublin	Ljubljana
Counting Citizens 	65	141	84
Predominant gender 	65% male	53% male	71% male
Predominant age 	54% 35-49	55% 35-49	37% 35-49
Educational attainment 	81% degree educated	80% degree educated	67% degree educated

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5.3 Events and workshops

5.3.1 *Cardiff*

In Cardiff, a total of **five workshops** were organised between October 2020 and May 2021 to launch and promote the WeCount project, follow up on citizen activities and empower them to use and interpret the data they collected. Four were kick-off recruitment events and one was a data analysis workshop. A total of **75 participants** attended these activities. Before the project ends the local team will deliver two additional data workshops. There is also a 'policy workshop' in the pipeline, which will be an opportunity for citizens to learn more about how they can use their data to influence the policy landscape.

Due to COVID-19 related restrictions, which were enforced in Cardiff throughout the whole period of project activities within the case study, all interactions were conducted virtually with little to no face-to-face contact with participants and stakeholders. The exception was a door-step delivery of sensors, which the case study lead did by cycling around Cardiff.

Kick-off event

Cardiff hosted **four kick-off events** (October to December 2020). As these events do not fit the exact description of a kick-off event as described in this document, the Cardiff team refers to these events as **introduction and scoping workshops**. Three workshops were open to all of Cardiff, with only the first targeted to a specific neighbourhood (Grangetown). Due to COVID-19 restrictions, all were held online, either in the evening or at the weekend, to allow for broader participation. Participants were recruited through social media and targeted advertising through local universities, the council and community organisations. For one of the events, a local champion was used to bring participants together. Specific efforts were also made to reach participants from **low socio-economic groups** by reaching out to community organisations that could broker connections.

A total of **48 citizens** participated in these kick-off events in Cardiff. Of these participating, 50% (N=24) were male and 40% (N=19) female. Most of the participants (35%; N=17) were aged 35-49 years. In addition, half of the participants (N=24) were actively involved in the project as participating citizens, while 13 were local champions, 9 local researchers and civil servants, and 2 were professionals or those with a special interest in the technology. More detailed information about the demographics of the participants can be found in Table 5. Participants were motivated to join the workshops for a variety of reasons, with **road safety and air pollution** ranking top among all participants (respectively, N=26 and N=16). A few people showed a particular interest in addressing traffic around schools and the daily "obstacle course" children are faced with in navigating from home to the school gate (i.e. with no drop curbs and pavement parking, etc.).

The events tackled the following **topics**:

1. Introduction of the WeCount project to local citizens;
2. Opportunity for participants to have their say;
3. Collective discussion about what a local network would look like.

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The kick-off events in Cardiff were very well received by participants, with an overall score of **4.3/5**. Participants thought their input was valued, with an overall score of 4.3/5. By asking for explanations for these scores, the Cardiff team learnt that the kick-off events were seen as "**informing and engaging**" by many. Participants were "made to feel welcome" and "listened to", liking the fact they were "referred to by name" and that their contributions could "be helpful". "**Everybody was included and understood**" and it felt "personal". Participants thought the project was explained clearly and in a concise way and the sessions well organised and well facilitated. It was commented that the small group size was key, giving everyone the time they needed to contribute. By the end of the sessions, there was a real enthusiasm among attendees: "I can't wait to get started!" one replied.

Table 5 - Details and demographic data of kick-off meeting participants.

Kick-off events		**Cardiff**			
Venue		Online (Zoom)			
Number of participants (date)		16 (22/10)	14 (5/11)	9 (7/11)	9 (10/12)
Gender	Female	6	6	3	4
	Male	10	6	3	5
	X/No answer/Prefer not to say	0	2	3	0
	16-24	2	2	2	0
	25-34	2	4	0	3
	35-49	6	4	3	4
	50-64	6	0	0	1
	65+	0	2	1	1
	No answer/Prefer not to say	0	2	3	0
Project involvement	Participating citizens	5	10	5	4
	Local champions	5	3	3	2
	Local policy makers & stakeholders	6	0	0	3
	Professionals and those with a special interest in the technology	0	1	1	0
Average evaluation score (from 1-5)	In general, how did you like the workshop/this event?	4.4	4.5	4.2	4.2
	Do you feel your input was appreciated?	4.1	4.5	4.4	4.4

The successful interactivity and enthusiasm among the participants during the events have been pinpointed as the main **strengths**. During the events, lots of exchanges took place between participants, either through the chat or during facilitated discussion. Many shared contact details, put forward ideas of who else could be involved and came to consensus on the main priority areas of concern for their community. Reaching consensus was much more straightforward in

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the targeted session with Grangetown, as the other sessions had representation from dispersed communities.

Yet there is always room for **improvement**. One remark was made that the session was "overly long for a weekend", while another would have liked more time for discussion. Finding the right amount of time to keep everyone engaged and alert is often a challenge online. Some participants also struggled using the Teams platform, which was used to host the workshops online. When organizing an online workshop, the Cardiff team suggests it would be useful to spend a few minutes at the start of the event with participants to familiarise themselves with the platform. If timing does not allow this, a one-page 'how-to guide' could be made available. It was also suggested starting the events in the future with an icebreaker. This could be a fun online game to get to know everyone and build trust.

Data analysis workshop

At the time of writing this deliverable, **one data analysis workshop** has taken place in Cardiff. This event tackled the data collected in the Roath neighbourhood of Cardiff and its surrounding area. As this was a targeted event, a private Eventbrite link was shared via email, with additional promotion through social media. Therefore, no efforts were made to reach low socio-economic participants for this event. More data analysis workshops will take place before the end of the project.

A total of **27 citizens** attended the data analysis workshop. There was a mix of participants in attendance, from those already active in their communities (e.g. part of Playing Out or a local campaign group) to more passive members, interested in the data collection or the tech. There were 19 males (70%) and 8 females (30%) in attendance, and the majority (48%; N=13) were aged 35-49 year. More information about the demographics of the participants is to be found in Table 6.

The **scope** of this event was to share success stories, re-enthuse participants and help them in both interpreting and acting upon their data. The following topics were discussed:

- Introduction;
- Data stories from local residents;
- Instructions on how to explore data on the dashboard;
- Local issues in the Roath neighbourhood (i.e. speeding, traffic volumes);
- Roundtable: *what other information would you like to see on the data dashboard* and *how can this data help with your local priorities*?
- Next steps – promoting upcoming policy workshop

Seven participants responded to the evaluation poll at the end of the workshop. Overall, the event received high scores, with a **4.6/5** for enjoyment. In addition, all stated that they understand the data coming from the Telraam to some extent, scoring this question 4.7/5. Finally, participants scored their ability to take action based on the data coming from Telraam with 4.6/5.

Table 6 - Details and demographic data of data analysis workshop participants.

Data analysis workshop	Cardiff

Venue		Online (Teams)
Number of participants		27
Gender	Female	8
	Male	19
Age	16-24	1
	25-34	2
	35-49	13
	50-64	8
Average evaluation score (from 1-5)	In general, how did you like the workshop/this event?	4.6
	Do you feel like you understand the data coming from Telraam?	4.7
	Do you feel able to take action based on the data coming from Telraam?	4.6

The Cardiff team was overall very pleased with how the workshop went. In particular, the chairing of the roundtable was well managed, and is therefore seen as one of the main **strengths**. In addition, live Tweeting during the event by one team member to "make some noise" added to the overall experience. Finally, the local champions were seen as the "stars of the show," as they added a richness to the content and lived-experience that participants could relate to.

The team felt the event was a little slide-heavy and a little light on the conversation and there is room for **improvement** in the future. Next iterations could spend more time on the roundtable and in preparing for the data analysis. For example, it would be useful to have additional data stories to showcase during the event; in particular comparisons, such as city averages, before digging down into specific areas. It was also suggested to start the event with an icebreaker, to add some humour to an otherwise content-heavy session. Finally, the online setting of the event has put some limitations on the ability to interact and keep people engaged, although they did bring flexibility and convenience to some participants. These types of events are ideally run face-to-face.

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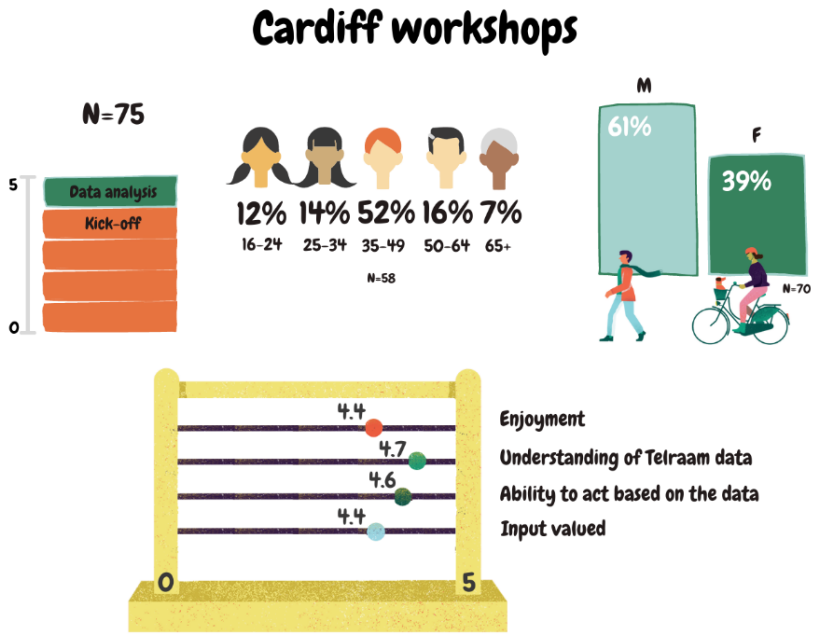
Summary of Events and workshops in Cardiff



5.3.2 *Dublin*

In Dublin, to date **seven workshops** have been organised as part of the WeCount project. These events took place between November 2020 and April 2021. Two were engagement workshops with children to introduce the sensor and the other five were problem formulation workshops with adults. Further data analysis and final findings workshops are planned for August and October. A total **of 74 participants** attended these activities.

Due to COVID-19 related restrictions, which were enforced in Ireland throughout the whole period of project activities within the case study, almost all interactions were conducted virtually with little to no face-to-face contact with participants and stakeholders.

Kick off recruitment workshop: "Engagement" event in Dublin

In November 2020, **two engagement workshops** were organized in schools in Dublin to kick-off the project. Both workshops took place face to face. The main goals were to introduce the school children to the Telraam sensor, to let the children assemble some sensors and to get them interested in the project. A small number of sensors were left with a teacher in each

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school. This enabled students to take a sensor home if their parents agreed to participate. In this sense, the engagement workshops had an educational and practical distribution scope.

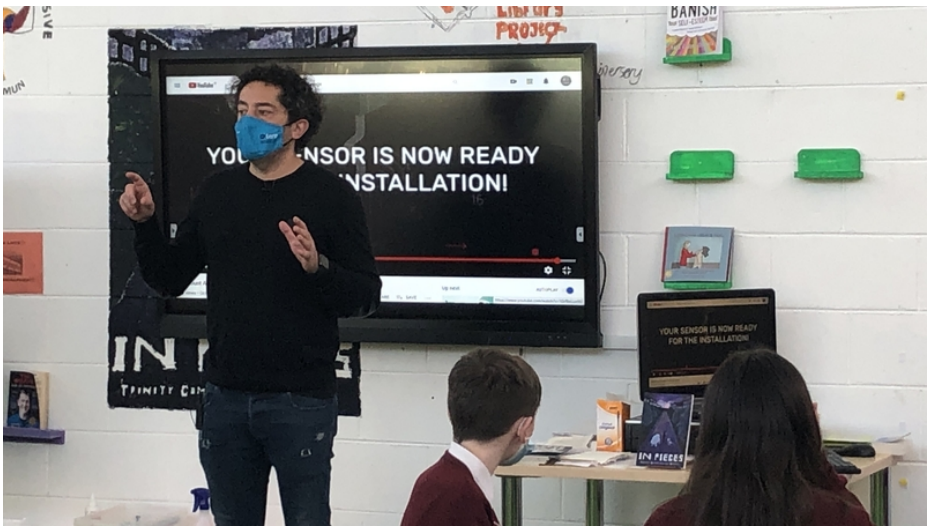

Figure 19 – Dublin case leader delivering a workshop in Trinity Comprehensive School, as featured on RTE News.

In total, **43 students** participated in these workshops (Table 7), which were organized during school hours. The majority of the participants were male (77%; N=33). The 24 participants from the primary school workshop aged between 9 and 11, while the 19 from the secondary school were under 16. Half of the children were considered participating citizens, while the other half were involved citizens.

Both workshops followed the same structure:

1. A preliminary introduction about the project and the broad challenge to be tackled and the impacts of traffic on air pollution;
2. A conversation with the students about the specific traffic related challenges in their areas;
3. An introduction about the sensors and their role in collecting evidence to tackle the specific local challenges;
4. A hands-on workshop during while the students built the sensors;
5. Some final remark about following on activities and what to do with the sensors.

The evaluation of these workshops was done based on a group consensus. In general, students seemed to like the workshops, as they came to an agreement to rate it with the maximum score: **5/5.** Students felt fairly capable of installing a Telraam themselves after these workshops, giving a general score of 3.5/5. Finally, students indicated that they largely know everything they need to know about Telraam (4/5).

Table 7 - Details and demographic data of kick-off workshops participants.

Kick-off events		**Dublin**	
Venue		Face to face	
Number of participants		24	19
Gender	Female	0	10

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	Male	24	9
Age	<16	24	19
Project involvement	Participating citizens	12	9
	Involved citizens	12	10
Average evaluation score (from 1-5)	In general, how did you like the workshop/this event?	5 (group response)	5 (group response)
	Do you feel capable of installing your Telraam at home/yourself now?	4 (group response)	3 (group response)
	Do you feel you know everything you need to know about Telraam?	4 (group response)	4 (group response)

Figure 20 - Students assembling DIY sensors during workshops in schools.

Kick-off Telraam workshops: "Problem formulation" in Dublin

In Dublin, **five problem formulation workshops** took place. These events were organized virtually between March and April 2021. Each of these events was organized for a specific area within Dublin: Kimmage-Dolphin's Barn, Dun Laoghaire – Blackrock, Sandymount – Ringsend, Phibsborough and Castleknock. It should be noted that the exact definition for these workshops varies slightly from the definition stated at the start of this document. The Dublin team refers to these workshops as introductory workshops for participants who already have their Telraam sensor, to understand the key local concerns and pinpoint priorities to focus the actual data analysis workshops on. The data analysis workshops will take place in August. An email invitation was sent to all registered WeCount participants in each of the areas mentioned above. For this reason, there were no additional efforts made to reach people from low socio-economic groups.

Due to the local approach when organizing these workshops, only a small number of people participated in each of the data analysis workshops. In total, **31 citizens** were present, of which the distribution between males (42%; N=13) and females (58%; N=18) was fairly well balanced.

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In terms of age, the large number of people aged 50 or older stands out (52%; N=16). We speculate this could have something to do with older groups typically being longer-term residents and therefore having more of an interest in their neighbourhood than say a transient younger population, many of whom do not own their own home. Because of the targeted approach, it is no surprise that almost all (94%; N=29) participants in these workshops were participating/counting citizens. Details on the demographics of participants can be found in Table 8. Citizens attending these workshops participated for various reasons. While some indicated it was out of concern that people use their area as a rat run, others reported feeling unsafe in their community because of the traffic. Their participation in the WeCount project was motivated by the opportunity to **monitor the speed of cars, to understand more about local air quality, to encourage walkers and cyclists,** and to WeCount data to **lobby local policymakers**.

The workshops started with a general introduction and overview of the WeCount project. This was followed by an interactive section during which participants were invited to describe the key transport and environmental challenges in their area. In addition, they were asked "What information and knowledge resources could contribute to improvements in your area?". Depending on the size of the workshop this was done verbally or using an online tool such as Miro. After this the local case lead presented an overview of the existing data analysis resources provided by the Telraam website, and three ideas for types of data analysis that could be done during the data analysis workshop. This was then opened up for discussion, to determine which type of data analysis participants were most interested in. Participants indicated they enjoyed the preparatory data analysis workshops, giving these workshops an overall score of **4.7/5**. All participants indicated that they felt their input was appreciated (4.9/5).

Table 8 - Details and demographic data of data analysis workshops participants.

Data analysis workshop		**Dublin**				
Venue		Online (Zoom)				
Number of participants		4 (23 M)	5 (8 AP)	3 (15 AP)	4 (22 AP)	15 (29 AP)
Gender	Female	1	4	2	2	9
	Male	3	1	1	2	6
Age	25-34	0	1	1	1	0
	35-49	2	3	0	2	5
	50-64	2	1	2	0	8
	65+	0	0	0	1	2
Project involvement	Participating citizens	4	5	3	4	13
	Involved citizens	0	0	0	0	2
Average evaluation score	In general, how did you like the workshop/this event?	4.8	4.8	5	4.8	4.3
	Do you feel your input was appreciated?	5	4.8	5	NM	4.7

(from 1-5)	Do you feel capable of installing your Telraam at home/yourself now?	NM	NM	NM	4.5	NM

The problem formulation workshops in Dublin showcased a lot of **strengths**, as reported by the local Dublin team. First, the enthusiasm to participate in the project was visible. Everyone attending was already engaged with local transport and environmental issues, which meant they were very keen to participate and share ideas. It was also noted that participants were optimistic about the opportunity to connect with other likeminded local residents, and be empowered together. The small group size in each workshop lowered the threshold for interactivity tremendously. Everyone got a chance to participate and contribute. This resulted in interesting discussions and a series of useful ideas to use during the next data analysis workshops.

Unfortunately, the online format of these workshops proved to be a **weakness**. The digital barriers have limited the ability of some participants to take part. Not everyone was able to join online. Of those who were able to participate, not everyone was on board with the digital tools that were used to facilitate the activities. In addition, hosting a fruitful discussion in a digital platform proved a challenge. There were some technical issues as well; some of the online tools did not work properly, and some participants had poor internet connection. This meant that case leaders had to ask for individual comments from each participant. This was time-consuming, and made the workshop less interactive and dynamic. It also meant that more time was dedicated to understanding the problems, and not enough time was spent discussing possible solutions and outputs from the resulting WeCount data.

To **improve** these events in the future, the local Dublin team suggests making sure there is a clear structure of the event being organised, especially if it is online. It would be particularly useful to use breakout rooms instead of having one large group discussion. Moreover, it would be more efficient to ask participants to raise their virtual hand before speaking. This would foster a smoother discussion, as participants would not talk over each other. Anticipating problems is key and it is a good idea to have a back-up plan ready if the digital tools do not work properly or people do not feel comfortable using them.

Summary of Events and workshops in Dublin

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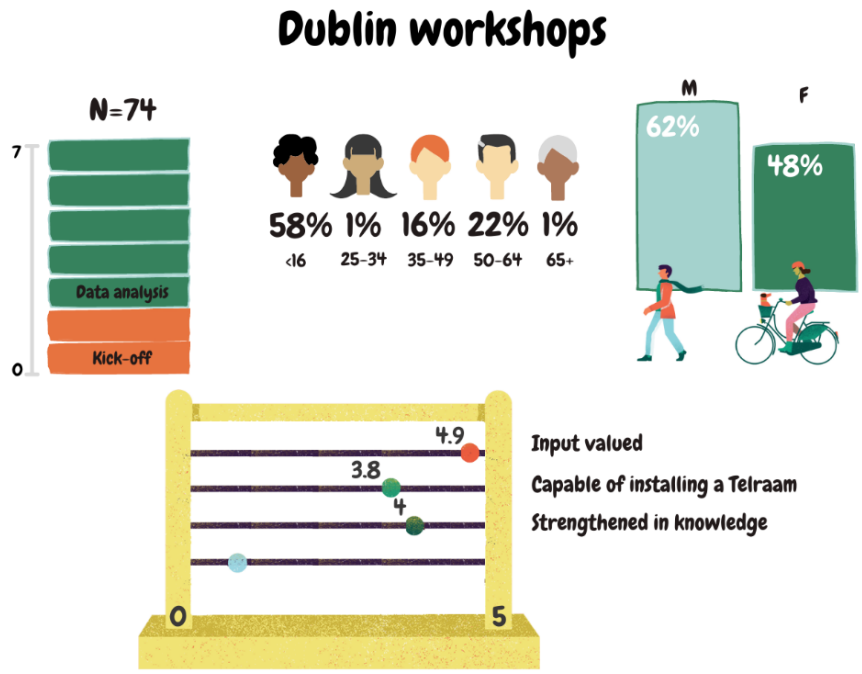

5.3.3 *Ljubljana*

In total, **three workshops** were organised in Ljubljana, in addition to a few preliminary awareness-raising presentations with schools. These events took place between September 2020 and January 2021. Two of the three formal workshops were kick-off Telraam workshops and one was a data analysis workshop. In total, **100 participants** attended these events. A lot of time went into preparing for the main workshops, however this was met by disappointment when only one or two people showed up (out of the 20-30 people contacted). Due to the low turnout, the local project team opted for a different kind of data analysis event – data analysis presented on public buses in the hope that the public will respond through social media (Facebook, Twitter and link to the WeCount website).

Due to COVID-19 related restrictions, which were enforced in Ljubljana throughout the whole period of project activities within the case study, nearly all interactions were conducted virtually with little to no face-to-face contact with participants and stakeholders. However, the preliminary WeCount presentations were able to be face-to-face. Counters that had trouble installing the device also received face-to-face help when possible to do so in the first few months. Installation and data collection issues meanwhile, were dealt with via phone calls, online meetings and emails.

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Figure 21 - WeCount presentations organised in Ljubljana.

Kick-off Telraam workshops

Between October 2021 and January 2021, **two kick-off Telraam workshops** were organized (online) in Ljubljana. The goal of the events was to guide the participants trough the installation of the Telraam sensor. Participants were reached by social media and directly by e-mail. Because only selected participants for a Telraam were invited, no effort was made to reach people with a low socio-economic status.

A total of **12 citizens** participated in the kick-off workshops in Ljubljana. Although all participants eligible for a Telraam were invited, not all attended. The participation rate was generally quite low (14% of those selected; N=12). Those that attended received a Telraam box with written instructions. A YouTube video tutorial was made as well. Those attending the kick-off workshops in Ljubljana were mostly male (83%; N=10) and aged 35-49 (58%; Table 9).

The motivations for these citizens to WeCount concerned a desire to **monitor the speed of cars**, and an interest in using the resulting data to **lobby local policymakers.** Also, but to a lesser extent, participants joined out of concern that their street was being used as a rat run, or because they wanted to encourage a mode shift to cycling.

The events tackled the following questions:

1. What is WeCount all about?
2. What are the benefits of participating in the project?
3. How does the Telraam sensor work, and how can you install it yourself?

Overall, participants rated their participation in the kick off Telraam workshops as 'very good', with an average score of **4.4/5.** Participants also felt that their input was appreciated and will be used in the future, with overall scores of 4.8/5 and 4.4/5 respectively. The workshop leaders confirm these results, as was reported in their self-reflective logs: people were very excited about the project in general and participated actively when asked for their input.

Table 9 - Details and demographic data of kick-off workshops participants.

Kick-off workshops		**Ljubljana**	
Venue		Online (Zoom)	
Number of participants		6 (22 OCT)	6 (20 JAN)
Gender	Female	0	0
	Male	4	6
	X/No answer/Prefer not to say	2	0
Age	25-34	1	3
	35-49	4	3
	50-64	1	0
Project involvement	Participating citizens	4	5
	Involved citizens	1	0
	Local champions	2	0
	Local policy makers & stakeholders	2	0
	Professionals, and those with a special interest in the technology	2	1
Average evaluation score (from 1-5)	In general, how did you like the workshop/this event?	4.3	4.5
	Do you feel your input was appreciated?	4.8	4.8
	Do you feel your input will be used?	4.2	4.5

The overall levels of enthusiasm and excitement, considering the limitations imposed by an online event, were reported as a **strength** by the local case leaders. Most people had a lot to say and felt confident to unmute themselves and ask questions when needed. This is important, as participants need to build connections with one another for the networked approach of WeCount to work, and to understand exactly how they should get started with the installation of their own Telraam sensors. The high level of interaction during these events may be indicative of local citizens' preference to engage online rather than face to face (see section 5.4.3.3).

However, it was not ideal to host these workshops online. The participation rate for these workshops was generally quite low, which has been indicated as a **weakness**. This might be due to digital barriers, online overload during the Pandemic or other unknown factors. Future kick-off workshops could be organized in a face-to-face setting with the option for remote participation, allowing both types of audience (those that prefer face-to-face and those that prefer online) to attend. Recordings could also be made available if people had previous commitments on that date, but with the caveat these remain available for a small window of time to keep momentum going. Adding interactivity into the session could also go some way to keeping participants engaged.

Data analysis workshop with students

At the time of writing this report, **one data analysis workshop** had taken place in Ljubljana, in November 2020. As mentioned, additional workshops were abandoned in favour of advertising on buses, given repeatedly low attendance. No efforts were made to reach people with low socio-economic status. This characteristic is not clearly defined in Ljubljana based on where people live, so no assumptions could be made or efforts targeted. Similarly, schools do not share this data and according to case study leads, schools are attended by all socio-economic groupings.

There were **28 citizens** present at this data analysis workshop. Participants were university students from the Faculty of Architecture, of which the project team belong. The majority were females (64%; N=18) and were aged 34 years old or younger. More details on the demographics of these participants can be found in Table 10.

The data analysis workshop in Ljubljana discussed a various range of topics, ranging from public participation, urbanism, city planning to actual data analysis and the Telraam sensor. It was planned as follows:

1. Overview of WeCount and the role of participants
2. Role playing exercise for students to become 'local champions' and put together a pitch to persuade residents to join the project. Students then completed one of two online surveys, according to whether or not their window was suitable
3. Presentation of Telraam data for their street. After sketching what student thought was the traffic situation on their road segment, they were presented with actual data to compare. With this data, they put forward suggestions to improve traffic regulation.

Citizens who participated in this workshop were pleased with how this workshop went and what came out of it. Overall, they scored the event a **4.2/5** for enjoyment. In addition, citizens indicated that they understood the data coming from the Telraam sensor quite well, scoring this 4.3/5. Finally, citizens felt largely able to take action based on the data coming from Telraam (4.1/5). Whether or not this transpires to action we do not know.

Table 10 - Details and demographic data of data analysis workshops participants.

Data analysis workshop	**Ljubljana**
Venue	Online (Zoom)
Number of participants (date)	28 (25/11)

Gender	Female	18
	Male	10
Age	16-24	21
	25-34	7
Participant type(s)	Involved citizens	28
Average evaluation score (from 1-5)	In general, how did you like the workshop/this event?	4.2
	Do you feel like you understand the data coming from Telraam?	4.3
	Do you feel able to take action based on the data coming from Telraam?	4.1

Working together with students to analyse and interpret the data coming from the Telraams was a success. One of the main **strengths** of this online workshop was the interest that the students showed in counting traffic with a sensor. Since these students were part of the Faculty of Architecture, they were quite confident with the different topics related to urban design. Having this baseline knowledge, as well research skills, helped them to interpret the data with relative ease. In addition, the students seemed engaged, resulting in an interesting debate about realistic urban mobility scenarios. It is worth noting that this was already a captive audience, and one that the local team were already closely connected with. It would have been a real asset to engage the public, including those perhaps not familiar with data analysis, however we understand that restrictions and the short time-frame of the project made this hard.

Even though all students were digitally able to participate in an online way, this format also proved to be a **weakness**. Online formats allow participants to turn off their cameras and microphones and potentially disengage from the conversation. In the case of this workshop, the students that turned off their audio and visual did not participate in the debate and it is unknown if they even actively followed the session. To **improve** engagement in the future, the Ljubljana team hopes to deliver these types of workshops in a live setting. As mentioned previously, workshops need not be black and white (live or online) – a hybrid approach can be taken to best accommodate varying needs and interests. However, this will involve openness to adapting and tweaking the format to suit the local context and prevailing conditions.

Summary of Events and workshops in Ljubljana

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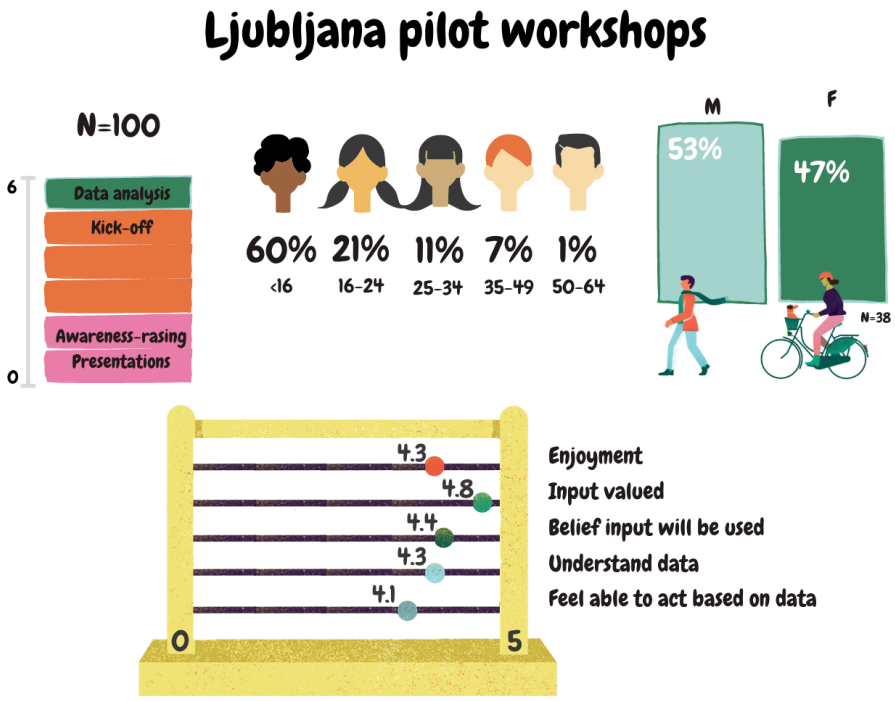

5.4 Citizen's experiences of WeCount

In this section we present formative and summative evidence from the citizens engaged in the project.

5.4.1 *Cardiff*

As mentioned, the Cardiff case study had 89 members on the Telraam platform, and 65 counting citizens at the time of writing this report, with 52 still counting. A total of 249 participants, nearly all of those who registered an interest in the project, were subsequently invited to complete the final survey for Cardiff. Of all those invited, **32 completed the survey**, representing just over a **10% response rate**. While this is low, it is understandable given the fact that just one third (N=89) of interested citizens completed the necessary forms to take part. This chapter of the report presents the findings from the survey, supplementing the evidence with excerpts from interviews with citizens.

A total of **seven citizen interviews** were conducted by case study leaders in Cardiff. The citizens were either approached as they offered to be interviewed or were selected as the team thought they better represented a diversity of demographics and participant types.

5.4.1.1 Participant types

The survey respondents represented only two of the citizen categories defined by WeCount (see section 3.3). **94% (N=30) were counting participants**, and 6% (N=2) were involved (but without a Telraam) (Figure 22).

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Involved participants did not have a Telraam because either their window was not suitable or there was no Telraam network in the place where they live. Instead, they either counted manually or attended a workshop/event.

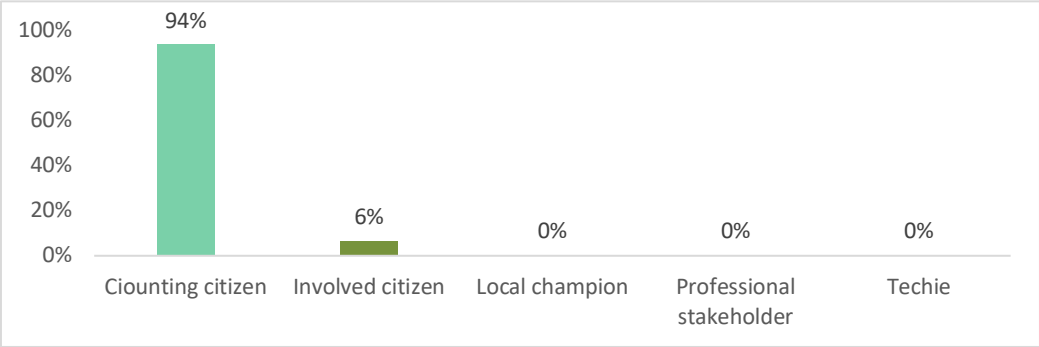

Figure 22 - Participant types from Cardiff survey (N=32).

5.4.1.2 Survey respondents' demographics

29 respondents chose to respond to the set of demographic questions asked during the survey. All age categories were represented in the Cardiff survey, with **the majority (41%; N=12) falling into the 35-49 age range** (Figure 23). This spread across the age categories largely mirrors those pulled from the registration form, analysed in section 5.1.1.

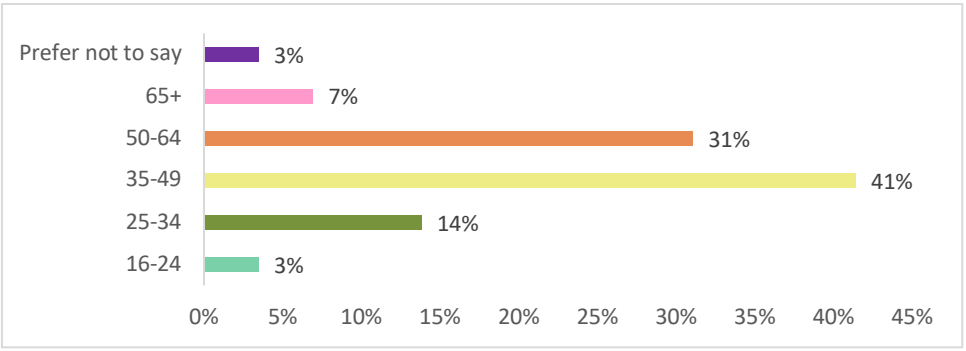

Figure 23 - Age range of Cardiff survey respondents.

Typical of citizen science projects, **the majority of survey respondents identify as being male** (52%; N=15) rather than female (41%; N=12) or non-binary (0%) (Figure 24). The demographic data from the registration shows a greater skew towards male participation, and a slight uptick in participants that identify as "other" (see section 5.1.1).

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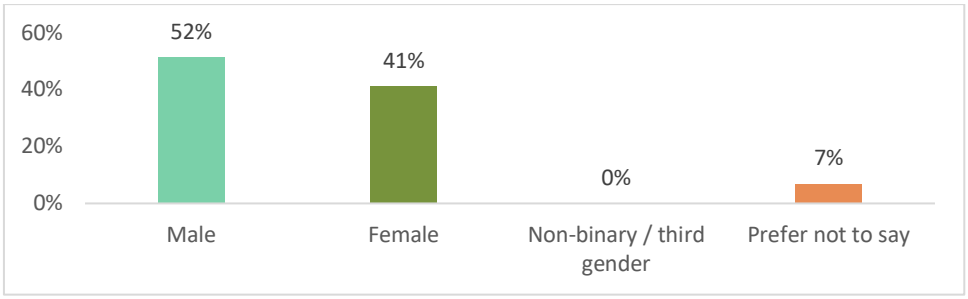

Figure 24 - Gender of Cardiff survey respondents.

Also typical of citizen science projects, the **majority of respondents are highly educated**, with an undergraduate degree or above (90%; N=26) (Figure 25). Only 10% (N= 3) had either a school leaver certificate (3%; N=1) or a technical qualification (7%; N=2). Again, similar conclusions are drawn in section 5.1.1, with 81% highly educated.

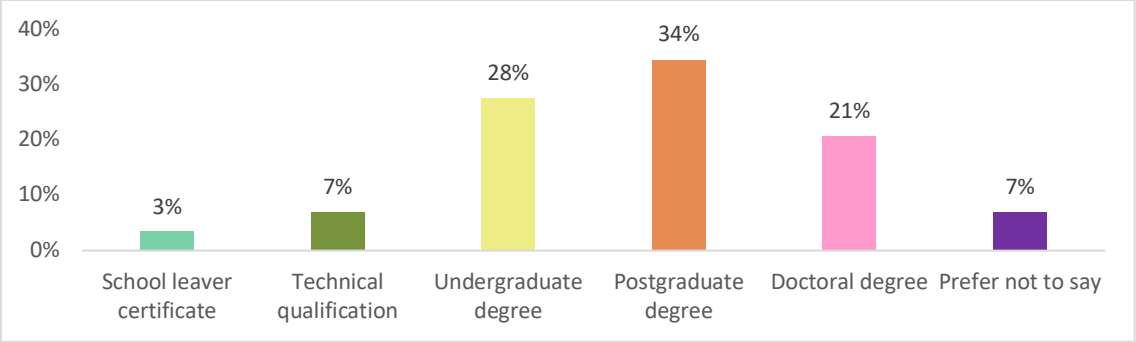

Figure 25 - Highest educational attainment for Cardiff survey respondents (N=29).

5.4.1.3 WeCount experience in Cardiff

Motivations

Motivations for joining WeCount were gathered upon registration, during kick-off workshops and in the final survey. Measuring and monitoring modal distribution and traffic density and a desire to improve neighbourhood liveability ranked top among registered citizens. By the time the workshops came around, the motivation had shifted to an interest in road safety and air pollution.

From survey respondents, their main motivations for joining the project were fairly evenly spread across four categories: **to make a difference** (21%; N=26), **an interest in sustainable mobility** (18%; N=23), **to count traffic** (18%; N=22) and **to contribute to research** (17%; N=21) (Figure 26). An interest in the science/citizen science was next (13%; N=16), followed by an interest in technology (10%; N=13). (Note, participants could select more than one of the listed options)

The diverse reasons for joining may be indicative of the broad appeal of WeCount, or it may simply be a framing issue, in which the researchers presented a set list of motivations for citizens to choose from. Each time the list of options was slightly different, with more altruistic options such as 'to make a difference', only making an appearance in the final survey.

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All of the citizens interviewed in Cardiff (N=7) either heard about WeCount through Twitter (N=5) or work colleagues (N=2). Their motivations for joining, which they stated openly without a pre-defined list, were a mix of professional interest, existing interest in technology, citizen science ("data collection"), sustainability or active travel, concern about local traffic and pollution levels, speeding, or a desire to make a difference.

> *A lot of what we do at Cardiff Cycle City is trying to encourage Cardiff Council to widen their cycling infrastructure, but also trying to encourage more people to leave their car keys at home and get on their bikes. That's why once I found out about it, I was quite keen to get a sensor and get involved.* (Cardiff Citizen Interview 01)

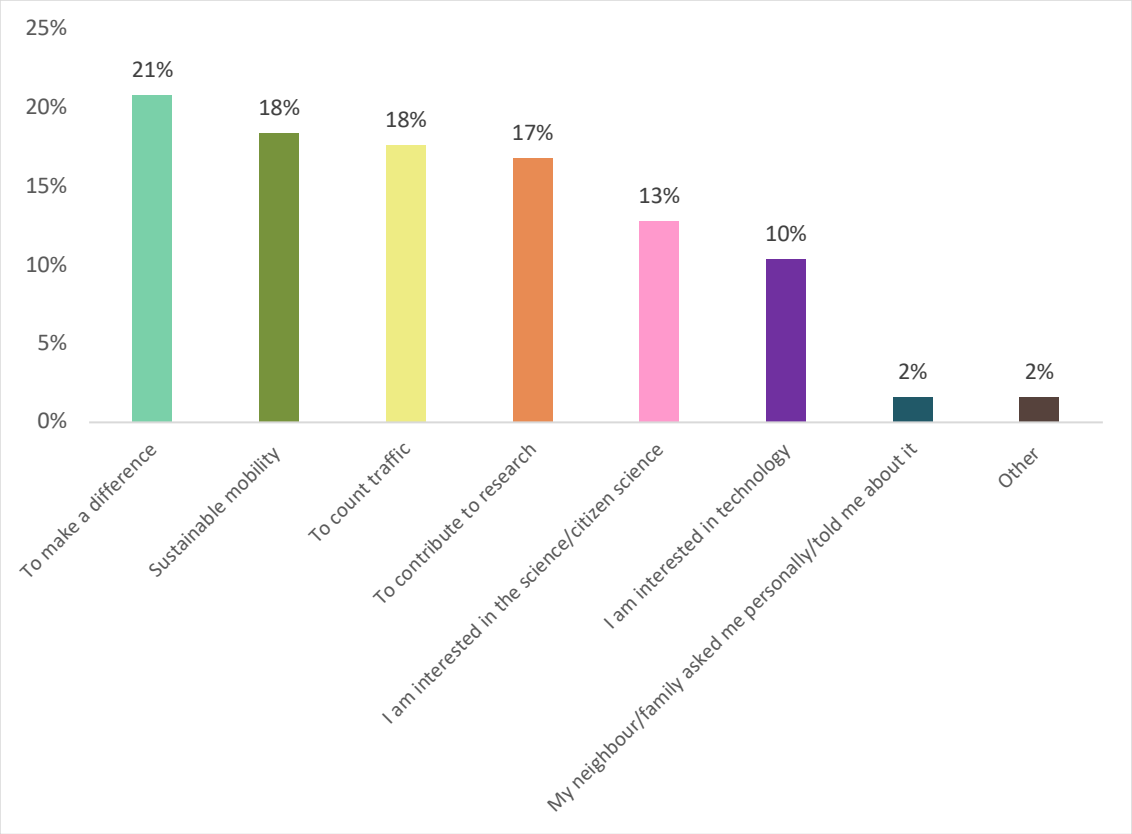

Figure 26 - Motivations for joining according to Cardiff survey respondents (N=125).

Expectations

Respondents were asked to rank the extent to which their expectations were met during their time on WeCount (Figure 27). Reflecting their enjoyment rating (figure), **78% (N= 24) of respondents believed their expectations were met to a satisfactory level** (16% extremely well and 61% very well). 23% (N=7) were moderately satisfied and no one believed WeCount did not live up to their expectations.

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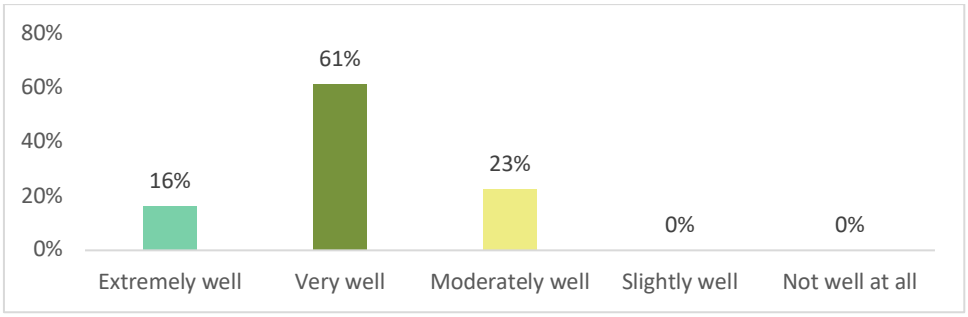

Figure 27 - Extent of expectations met according to WeCount Cardiff survey respondents (N=31).

Rating time on WeCount

All respondents enjoyed their time on WeCount Cardiff (N=31; 97%), with the exception of one person (3%) that rated their time as average (Figure 28).

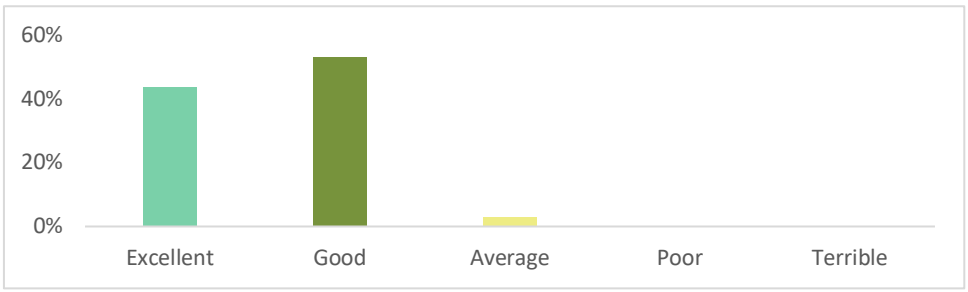

Figure 28 - Survey respondents rating of time on WeCount Cardiff (N=32).

This was echoed by interviewees, explaining that **clear instructions, a human touch and the simplicity of the data platform all made for an enjoyable experience**:

> I*t was really easy to get involved, somebody responded pretty quickly, X showed up on his bicycle pretty immediately, that was really good. There's pretty good documentation available.* (Cardiff Citizen Interview03)

> *I think you guys are doing a great job. I love the interface…I like how you made it simple, accessible to many people. I particularly liked, as soon as I got in touch with you… I got a really prompt response, but also you follow like a sort of procedure. That kind of gave me confidence that you are doing everything right in a way… but, at the same time, it doesn't feel like you're talking to a computer that is following steps. You kind of had the human touch... And the fact that it's being done in different cities, and you can compare the data around, yes, I love it. I wish my projects were like that as well.* (Cardiff Citizen Interview05)

Favourite aspect of being involved

As with the Spanish and Belgian pilot case studies before them (see **D 5.2 Summative Monitoring & Evaluation Pilot Report - Leuven & Madrid** for details), **being part of a research project** ranked highly among the favourite aspects of WeCount involvement (N=20;

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32%) (Figure 29). This is unsurprising given the high level of education among respondents. Of the 63 answers to this question, over one quarter (N=17; 27%) said "**feeling as through I am making a difference**" was their favourite bit – this sets Cardiff apart from Leuven and Spain, who ranked this much lower. 17% (N=11) said that gathering evidence for their campaigning was their favourite part, suggesting that there are a number of already active citizens among the survey respondents. This could be because more active citizens like to fill out surveys, or because those were the types of participants drawn to this project. In Cardiff there are a number of environmental NGOs working to address air pollution and traffic issues (e.g. Friends of the Earth[4] and Playing Out[5]) and case study leaders are well connected to these groups.

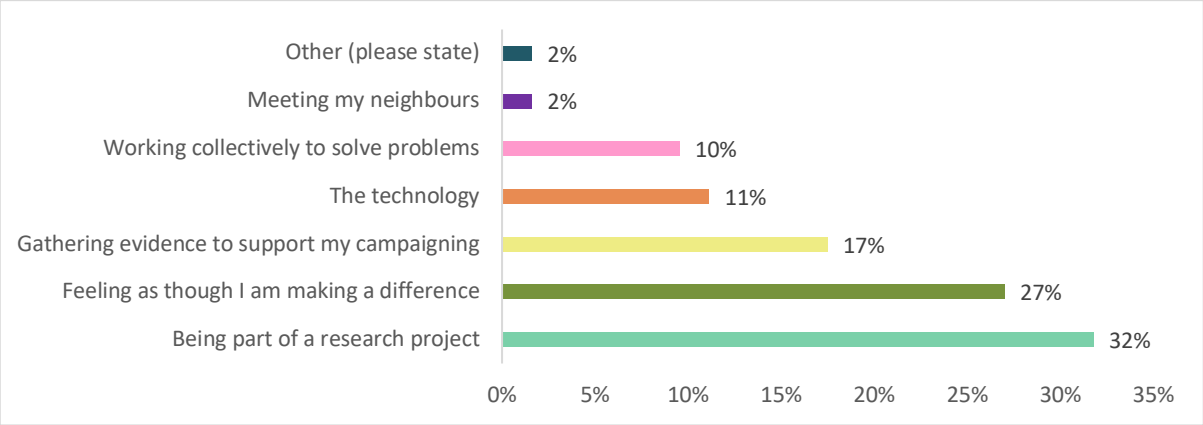

Figure 29 - Cardiff survey respondents' favourite part of being involved (N=63).

From the analysis of the survey's open questions, it is clear that making a difference is reflected in respondents remarks:

> *Technology has worked well and* ***it has been interesting for the family to look at the data.*** (Cardiff02)

> *For me it's been a very positive experience.* ***I feel more able to engage with the wider community in trying to make transport better for everyone.*** (Cardiff16)

Interviewees added that it has been a "**fantastic**" experience, "**fun**", "**inspirational**" and "**satisfying**" to see the data and for it to "**challenge**" **ideas**. The project has been "**well thought through**" and "**very well organised**", they appreciate how "**anonymity is assured**", that "**data is publicly available**" and that the sensor is "**not expensive**". **It's been interesting to see other user's data and nice to see and monitor their own data**, they said. Several spoke highly of the **effort made by the Cardiff case study leader to cycle to all counters house with a welcome pack** – "I just thought God, he's a superhero [practicing what he preaches]" said one person**.** Having staff **on hand to troubleshoot** and pop over if needed also made others feel able to take part: "I'm not sure I would have been able to sort it out without having him" said another. While some were nervous in setting up the Telraam, it proved "**really straightforward**" and "**easy**" once time could be dedicated to it. One interviewee, a researcher, also said they reference WeCount every time they talk to other people doing air pollution work, as they think it is such a great project.

[4] https://friendsoftheearth.uk/
[5] https://playingout.net/

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Satisfaction of technical help and support

We begin to see a trend towards more positive feedback in the final cities, continuing with significant improvement in survey respondents' satisfaction relating to technical help and support (

Figure 30). Based on feedback from the pilot cities, effort was made to improve the instructions on the website during registration, the FAQ articles and helpdesk response. By and large, all of these aspects were rated favourably in Cardiff, with 90% (N=28), 87% (N=20) and 84% (N=11), respectively either **somewhat or extremely satisfied**. Far fewer respondents engaged with social media (N=7) or people they knew (N=9), however those that did were overall satisfied (72% (N=5), and 77% (N=7), respectively). As mentioned above, the clarity of instructions, combined with a human touch, were considered by the interviewees and survey respondents to be the secret formula for the success of WeCount Cardiff case study.

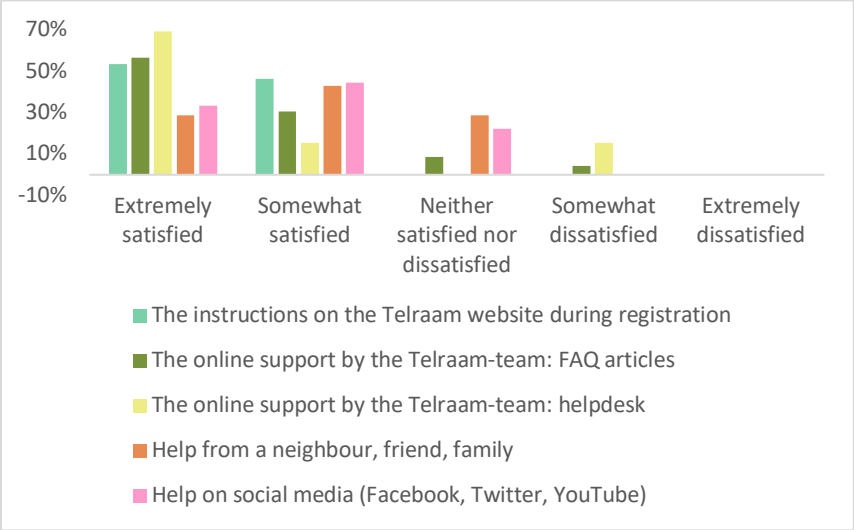

Figure 30 - Satisfaction of technical help and support according to Cardiff survey respondents. N= variable.

Telraam data

Welcome pack

Figure 31 - Items in Cardiff's welcome pack included a Telraam guide and promotional postcard.

All counting citizens received a welcome pack, delivered by bike (Figure 32), at the start of their WeCount journey (Figure 31). The packs aimed to equip counters with all they needed to get up and running with the Telraam sensor, and to make them feel part of something bigger than themselves.

> *The whole thing came in this lovely little box with very clear instructions, and as well* ***he didn't just deliver the box and left, he explained****. He [the case study leader arrived on their bike and] gave me and my partner a few instructions, and obviously, because it was lockdown, he was outside, we were standing inside and it was a bit of a socially distanced interaction, but he was very clear on the instructions. Right there and then, that evening we took all the pack out to see, to follow the instructions.* (Cardiff Citizen Interview05)

Figure 32 – The case study leader in Cardiff (left) cycled around the city, delivering sensor kits.

89% of participants thought the packs were useful (N=24 of 27), 7% were neutral (N=2) and 4% (N=1) thought the pack was slightly useless (Figure 33). No feedback was given by this unhappy participant on how to improve the packs, however three people did suggest ways the packs could be improved next time. These suggestions were: improvements to the camera tape to make it easier to understand which is the right way up; better instructions on how to connect to Wi-Fi; and the possibility of a pre-assembled option for technophobes:

> *We greatly enjoyed assembling but it might be a barrier to some people taking it on.* (Cardiff27)

It is worth noting that most of the interviewees considered themselves tech savvy. Not everyone will have found Telraam set up so straightforward, even if there were instructions in the pack and available online. However, as the quote above indicates, having someone to offer advice and calm nerves can go some way towards reducing anxiety about getting the Telraam up and running.

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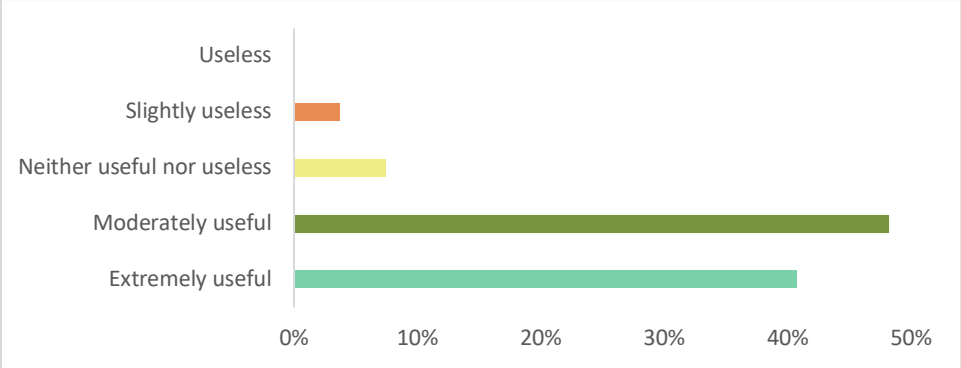

Figure 33 - Usefulness of Cardiff welcome pack, according to survey respondents.

Use and rating of online platform

The majority of counting citizens in Cardiff view the Telraam dashboard regularly (N=20; 71%), with 25% (N=7) viewing the platform "now and then". Only one respondent no longer looks at the platform.

Respondents were asked to rank the various aspects of the Telraam platform and associated resources (Figure 34). **26 of 27 respondents (96%) rated their own map data highly, all that used the FAQ information (N=15) rated it highly (100%) and the majority (N=23; 88%) rated the map data highly also.** These are the most easily accessed and easy to use data sources.

Over 65% (N=17) did not use the API, and 44% (N=12) did not use the background information on the FAQ. We expect that the reason for not engaging with the FAQ was due to having ways to find answers to their questions elsewhere (e.g. helpdesk, email), while the API is simply too inaccessible for most. Saying this, the majority that did use the API (8 out or 9, or 88%) thought it was good/very good.

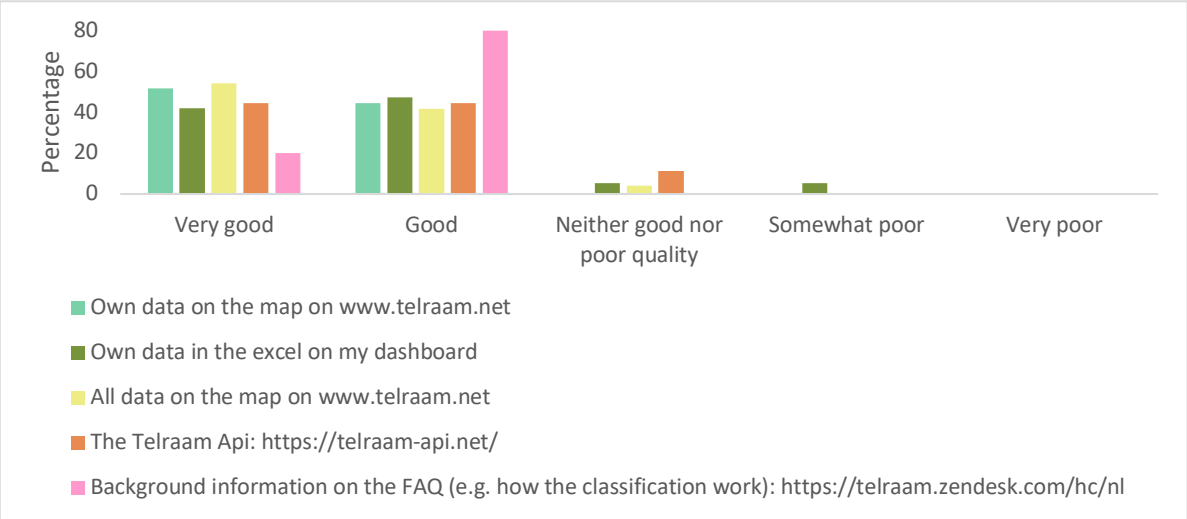

Figure 34 - Rating of Telraam platform and related resources according to Cardiff survey respondents (N= ave 27).

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Reactions to traffic data and traffic accuracy

For the majority of Cardiff survey respondents, **the street/area-level data they saw surprised them to some extent (N=22; 74%)** (Figure 35). The remainder stated the data was as they expected (N=8; 27%).

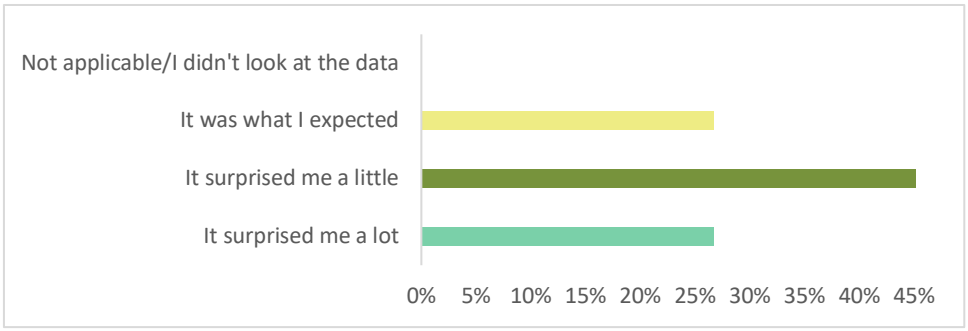

Figure 35 - Survey respondents' reactions to the Telraam data (N=30).

Of those who explained why they were not surprised (N=4), the main reason lied in the fact that the data simply confirmed their initial beliefs:

> *I know traffic is bad in my neighbourhood. Only data I've seen* ***proves what I suspected.*** (Cardiff26)

Of respondents that were surprised to some extent (N=22), 15 expressed that this was because either traffic numbers were higher than expected (N=7; 47%) or lower than expected (N=2; 13%), or because speed was higher (N=4; 27%) or lower than expected (N=2; 13%). Two mentioned that the data allowed them to **gain new knowledge**, either by understanding how vehicle flows peak outside of rush hour or by comparing the busyness of other streets with theirs.

Reviews are also mixed in terms of data accuracy (Figure 36). Of the responses (N=25), **only one fifth (N=5) believe the data to be accurate**. 68% (N=17) stated that mostly, yes, the data was accurate, while 12% (N=3) stated they were not convinced.

Nine respondents commented that they believed the Telraam was either over or undercounting:

> *On six random checks the Telraam undercounted pedestrians by 90% and vehicles by 21%. Cyclists were overcounted by 25% (small sample). It probably had difficulty counting groups of people.* (Cardiff21)

Some counters said that the position or the weight of the Telraam can be problematic in this regard, often obscuring part of the view, while the periodic loss of connection also plays a part. Learning from the pilots, the Cardiff team have reiterated, several times over, the limitations of using a low-cost sensor to count traffic. It is by no means perfect but can at least contribute towards existing datasets, spark conversations and fuel activism, as one respondent points out:

> *I have not yet had the opportunity to test the accuracy of the data recorded, but "gut feeling" suggests that cycle movements are over-counted, possibly under-counting car movements.* ***Even so, the data is interesting, and poses questions and may inform future campaigns.*** (Cardiff10)

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It is worth noting that the three out of the five **respondents that thought the data was accurate did so because they simply trusted the technology and the data coming out of it** (60%).

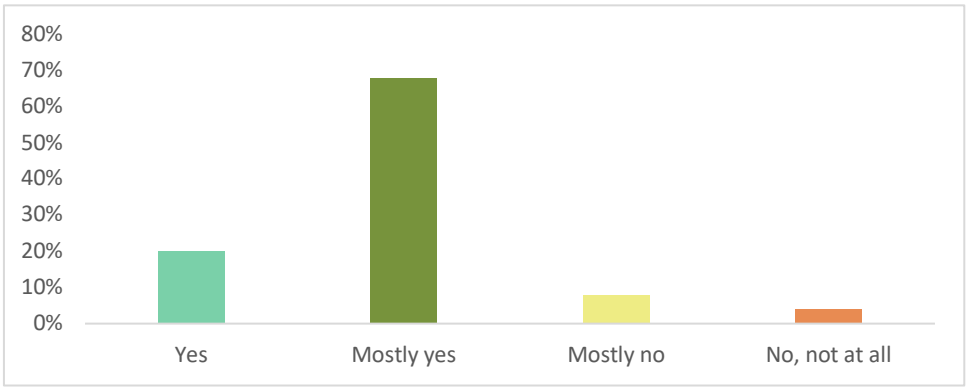

Figure 36 - Perceived accuracy of Telraam data, according to Cardiff survey respondents (N=25).

Interviewed citizens corroborated the mix in taking data at face value on the one hand, and believe the data to be inaccurate on the other:

> *I think the situation is actually worse than we thought it was, so it's been eye-opening really. It is a busy road, there's no denying that, but* ***it's actually busier than we thought it was because the data actually shows us that it's busier****, so yes, it's really revealing and hopefully, it can be building and used for some kind of constructive change, yes, that's what we're hoping. So yes, more interesting; quite shocking.* (Cardiff Citizen Interview07)

> *It's just looking at the numbers themselves, and they're frequently quite* ***unrealistic****. I would like to have the time, basically, to try and sit for an hour and do my own count and see how it compares, but it's not really feasible.* (Cardiff Citizen Interview02)

Knowledge improvement

A key objective of the WeCount project is to "advance citizens (and broader scientific) knowledge on traffic counting, transport management and related impacts". There are signs this is occurring to some extent in Cardiff. While the response rate for the different types of knowledge improvement is variable, we can draw some general conclusions. Overall, **knowledge improved the most (a lot/massively) for "traffic in my street/neighbourhood" (N=13; 45%) and "how I can act" (N=11; 40%), closely followed by general topical knowledge (N=12; 32%)** (Figure 37). Air quality knowledge improvement, perhaps unsurprisingly, improved the least. Cardiff had hoped to have rolled out some air quality sensors, and associated awareness campaign, by the end of spring 2021 (the timing of this report), however this was delayed due to COVID-19 restrictions.

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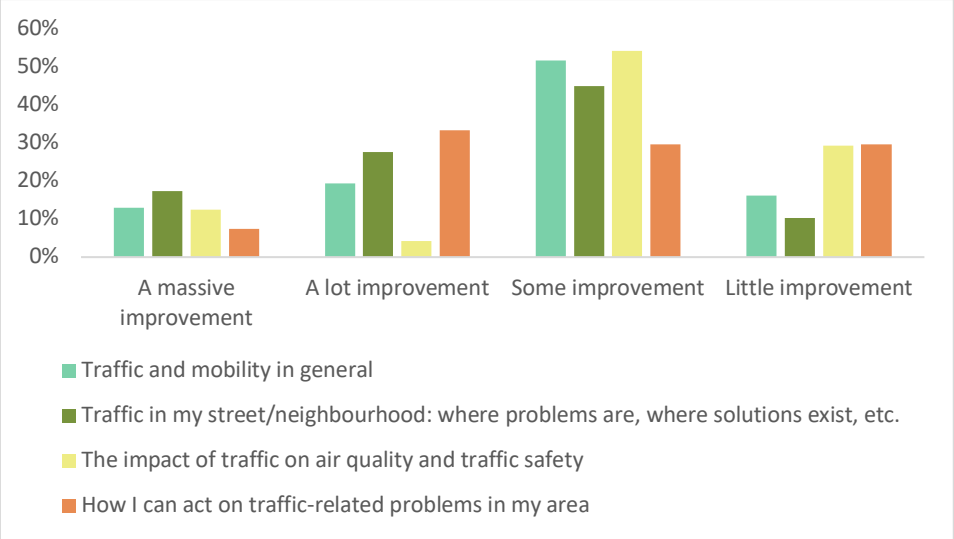

Figure 37 - Cardiff survey respondents' perceived knowledge improvement (N = variable, ave. 28).

Change in opinions and feelings

Roughly half of survey respondents believe that WeCount has changed their overall opinion about traffic-related issues (53%; N=16 of 30 at street level; 50%; N=14 of 28 at neighbourhood level) and half have experienced no change (Figure 38). Again, this 50:50 split is mirrored in the interviewee responses, with three stating their opinion has changed, largely because they already had strong convictions, three stating it has not and one not sure.

> *I suspect actually it has [changed my opinion], this is slightly speculative, but I think having spent a little time looking at the numbers…I think if a car goes down the road at speed today I'm **more conscious** of it, I'm probably **more resentful** than I would have been 12 months ago.* (Cardiff Citizen Interview03)

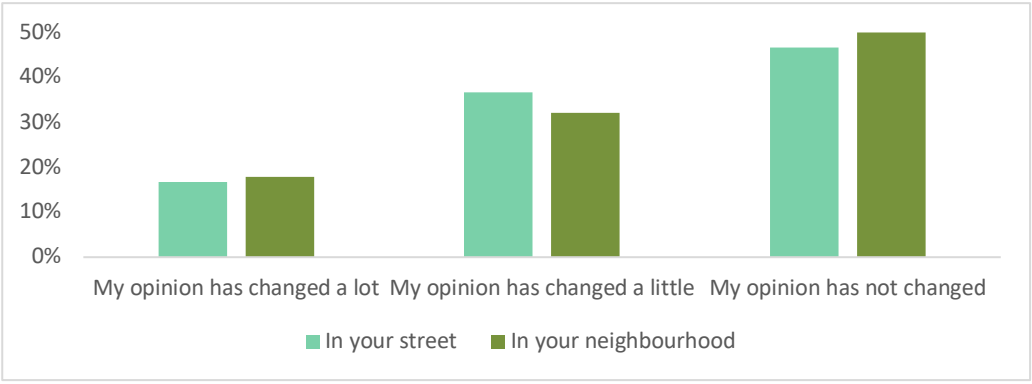

Figure 38 - Change in Cardiff survey respondents' opinions on traffic (N = ave 29).

Similar results can be found in terms of change in how respondents feel, with **47% (N=14) stating that yes, the project has changed how they feel about where they live**, and 53% (N=16) stating the opposite to be true.

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A desire to live on a better street (e.g. with fewer cars), **an increase in awareness** on the issues, and feeling **more engaged and connected** with the community, were among the 'feelings' that had changed.

> *It does help one feel more engaged with the community - we have a WhatsApp group for the street with some good people on it and I've advertised Telraam on there - we have 2 out of 4 segments of the street covered and going for 3 soon. [I also] have my eye on number 4.* (Cardiff20)

> *It has made me feel more connected to others who are also concerned about traffic levels.* (Cardiff26)

Current levels of activism

We did not measure levels of activism before the start of the project or about the current level of activism at a city level. The final survey did ask participants about current levels of local activism, however, with Cardiff respondents expressing various levels of activism related to traffic-related issues (Figure 39). Although the sample size is different, it would appear that Cardiff respondents are somewhat more active in this area than Madrid/Barcelona and Leuven case studies, whose respondents were skewed towards being less active. As mentioned, this may be due to the existing connections the project team had to campaign groups and activists, who subsequently participated in WeCount.

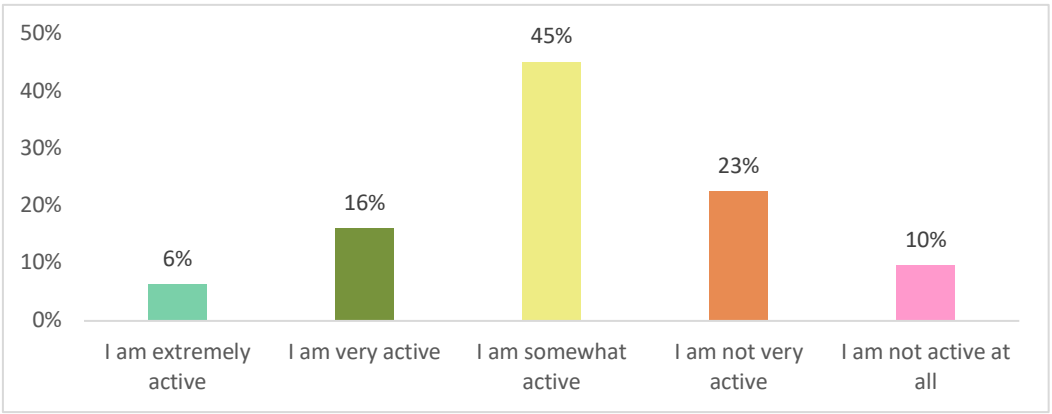

Figure 39 - Current levels of traffic issue activism among Cardiff survey respondents (N=31).

WeCount-related action

Survey respondents were asked whether they acted upon the Telraam data. **Only two (7%) have been forthcoming with actions, while 18 (62%) are still thinking about it and 9 (31%) have not and likely will not act** (Figure 41). Both actions involved lobbying the authorities, although reflecting those yet to act, there is some intrepidation around how much they should do at present as they want more data or to have more time to understand it:

> *[I] have already lobbied for change but need to be clearer about what the data are saying before proceeding again.* (Cardiff25)

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Unsuccessful previous attempts at lobbying the authorities has also put off one participant from acting this time around. This is an all too familiar situation in activism, where after so many failed attempts, motivations begin to wane.

Figure 40 – A Cardiff citizen shared their experience on Twitter.

Several respondents (N=8; 25%) expressed actions they hope to take at some point, including lobbying for speed/traffic calming measures, campaigning for improved cycling provision, reconnecting with fellow citizens/campaign groups to pursue an action, setting up an air quality sensor and taking part in future workshops.

Interviewee responses were mixed, although over half **have acted** in some way:

- One interviewee has nudged their local councillor on social media although they doubt that their individual action (as compared to collective action) will make a difference.
- One has written blog posts and put notebooks and their data on a GitHub repository.
- One interviewee has performed their own analysis on the data and if they get their second Telraam up and running at their institution hopes to use it as a pedagogical tool for their students. The educational merits of Telraam was further emphasised by an interviewee that engaged their child with the technology.
- Lastly, another counter explained how their proactive nature led to more people joining the project:

> *I've been doing bits and bobs, but, like I say,* ***I think it does give an interesting potential boost to your activism… as in its empowering I suppose is the word****…I know at least two other sites have opened up because of my agency, but if I'm going to be recommending people to do that, then it's good to know that it might actually continue too.* (Cardiff Citizen Interview06)

Interestingly, two interviewees reflected on how the project has contributed to a shift in their activism:

> *… I used to be really active until my life took a different turn, and so not active at all, and then* ***this project kind of reminded me that that's my nature, I want to go back to being more proactive about sustainable travel****, promoting this, so yes, thanks for the reminder… We bought a bike for our toddler, so that we can connect it to our old bikes, and I'm already thinking about changing my car to an electric car, if we can afford it, so*

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actively looking, not sitting back, and waiting for things to happen, but let's make things happen. (Cardiff Citizen Interview05)

***[I didn't used to be active], not really, I'll be honest with you, because I didn't think there was anything within my power to change the situation, you know, but there was a consultation after I installed the Telraam… so I did respond to that consultation**. And probably, because I did have the Telraam, it gave me a bit more impetus to do it... There was another [Council] project as well …[where] you could submit comments on that particular area, and …the council was going to look at all the comments and decide where the priorities were…so I also did a lot of that. Before Telraam, I don't think I did anything in particular with traffic in the area, I don't think.* (Cardiff Citizen Interview04)

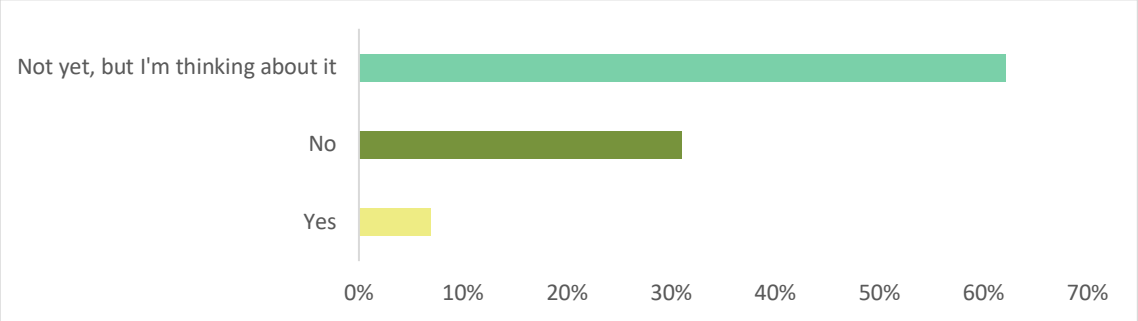

Figure 41 - Action taken based on Telraam data by Cardiff survey respondents (N=29).

23 out of 26 counters (88%) are still counting traffic with their Telraam. This is promising as this case study still has several months of engagement ahead. The three that stopped counting did so because of either: technical issues; they did not want to be involved anymore (no explanation given); or because they understood that they should stop counting as they thought the project had ended.

Future activism

41% (N=12) of survey respondents (total=29) plan to continue counting now that the project is coming to an end. The other 59% are not sure yet (N=17).

One interviewee was hopeful that the data analysis workshop they were about to attend that evening would kickstart more local action, another thinks that having a network of sensors, and being able to see them counting, will fuel their activism fire in the future. For one interviewee, they are anticipating the arrival of an air quality sensor that the Cardiff team is providing. By "marrying" the data this person is hopeful they will have strong evidence to act upon.

Three interviewees (43%) said they want assurance that they can continue using their data after the project ends, with the platform remaining freely available, and that the data will be used to influence and affect change. Another is concerned about the project ending or becoming detached from universities.

Finally, one interviewee does not plan on acting (beyond educating their child):

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I was hoping that [the project] would be able to compile the data and make it available to those who are in a position to collate it all and run with it where necessary. I don't think as an individual user of the system, there's any - I don't think it gives any sort of weight. I wouldn't know who to contact anyway. (Cardiff Citizen Interview02)

COVID-19 pandemic impacts (Citizens' perspective)

As the Cardiff case study began during the pandemic, far fewer respondents felt the project negatively impacted them (Figure 42) compared to the pilot case studies. In fact**, two fifths stated no impact (N=13; 41%)**. Impacts included having more time to dedicate to the project and the inability to meet in person, which would have been preferable (both N=6; 19%).

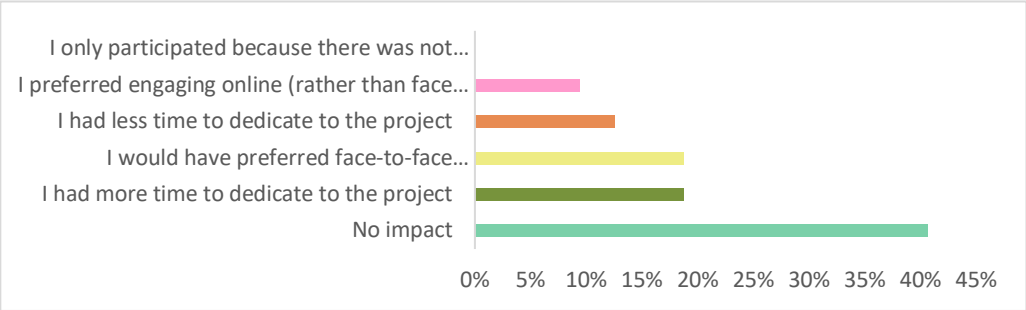

Figure 42 - Impact of COVID-19 Pandemic on survey respondents (N=32).

For one household, checking the Telraam data became a "family ritual" during the pandemic (Cardiff Citizen Interview02). However, inter-household bonding was much harder for many, which had been an initial draw of WeCount.

[The Covid-19 Pandemic] probably did cut out some of the community bit…I think it's inevitably… things are done at arm's length…over Teams and over Zoom and stuff like that, whereas previously I guess we would have had face-to-face workshops and it would have been easier to get the community side up and running. (Cardiff Citizen Interview01)

Improvements

We begin to notice fewer comments on aspects of WeCount that need improving by the time of these last case studies. As with the pilots, "**a mechanism to show if efforts are successful/impactful**" came out on top of the things that could do with improving (N=13; 29%) (Figure 43).

15 suggestions were put forward by respondents to improve the project. These are the need for a better Telraam device with fewer Wi-Fi issues and easier installation process (N=9; 60%), a desire for interim and impact reporting via email or in a digestible format (N=3; 20%), more communications in general (N=2; 13%) and a need to change Kilometers to Miles per hour on the Telraam platform for UK citizens (N=1; 1%).

More comms back from WeCount would be nice: What['s] happening locally and internationally. Also, it might just be me, but I've never seen any of the auto generated emails

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that should flag up when your Telraam isn't uploading data, which lead to a couple of weeks not logging before I noticed the issue. (Cardiff17)

From the responses, it appears that citizens wanted more not less work. Although it is a balance, as one interviewee reflects:

I think… being involved in workshops would be good. Having said that maybe, yes, maybe it would be too much, I wouldn't want to commit too much time... (Cardiff Citizen Interview07)

Interviewees suggested further improvements, including the need for manual counting, more explanation in the instruction manual as to why they had to do certain things, email alerts if sensor is down, night-time data capture and the ability for the sensor to detect electric vehicles. Interestingly, one interviewee mentioned how useful it would be to have **one-to-one local support** (which was the intention of the local champion model), as the online materials did not resolve their issues. Wi-Fi was also mentioned several times over as an issue, although no one knew how to resolve this flaw.

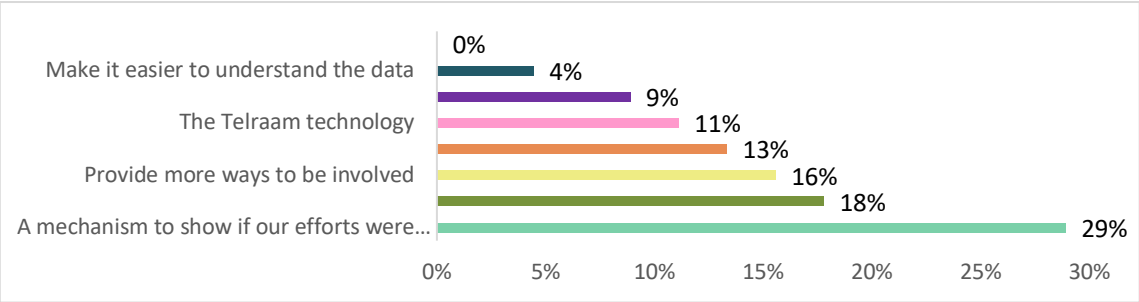

Figure 43 - Cardiff survey respondents' suggestions for improving WeCount (N=45).

For some a sense of community was lacking (N=2; 29%). One interviewee enthused about the upcoming data analysis workshop, as they thought this was a first step toward community building.

*… Maybe there's a Twitter page or maybe there's a Facebook group or whatever where people are talking about their data and I missed that, but **at the moment I don't feel like part of a community** of people in and around Cardiff who have sensors.* (Cardiff Citizen Interview01)

They suggested a monthly newsletter or better communications to keep people in the loop about what is going on in Cardiff and the other cities could go some way towards building community: *Just to give the people who are running sensors **a bit of encouragement, but also some ideas**, what they could do at their end with their data in their communities* (ibid).

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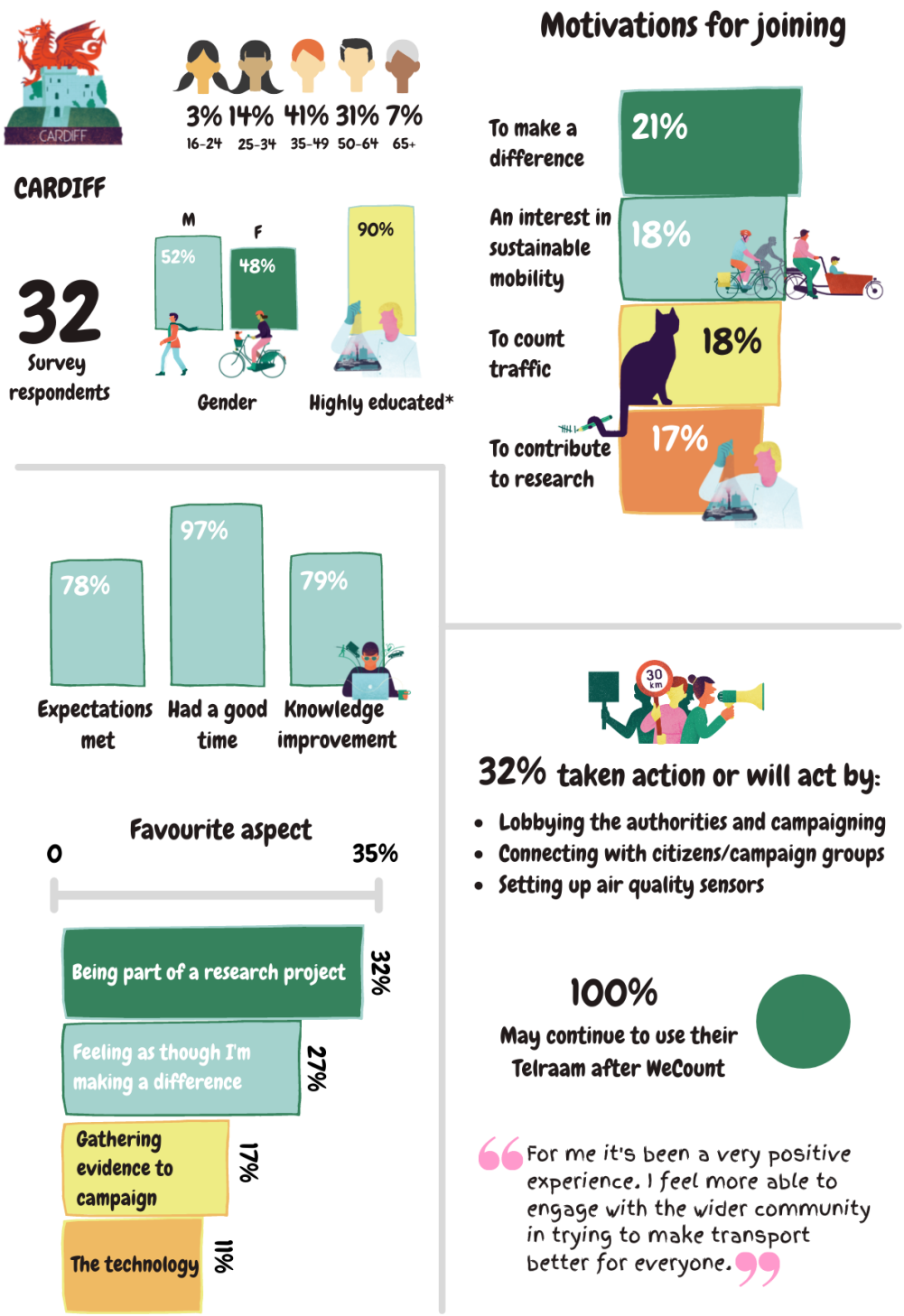
5.4.1.4 Summary of Citizen's experiences of WeCount in Cardiff



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5.4.2 *Dublin*

The Dublin case study had 212 users on the Telraam platform, and 141 counting citizens at the time of writing this report, with 121 still counting. A total of 146 participants were invited to complete the final survey for Dublin, representing all with a traffic counter and those who wanted to volunteer without one. Of all those invited, **53 completed the survey, representing a 36% response rate**. This section of the report presents the findings from the survey, supplementing the evidence with excerpts from citizen interviews.

A total of **eight citizen interviews** were conducted by case study leaders. The citizens were either approached as they offered to be interviewed or were selected as the team thought they best represented a diversity of demographics and participant types.

Learning from our experience in launching the pilot survey in Madrid/Barcelona and Leuven, WP5 included an additional question in the survey of Dublin to ascertain whether or not respondents had attended a Problem Formulation Workshop (Figure 44). It was made clear in D5.2 that levels of WeCount-related activism could have been less than expected in say Leuven as they were yet to have Data Analysis Workshops. Thus, if we asked this question we could find out if there is any correlation between attendance to a Data Analysis Workshop and subsequent action/intention to act. We will explore this possible relationship in D5.4.

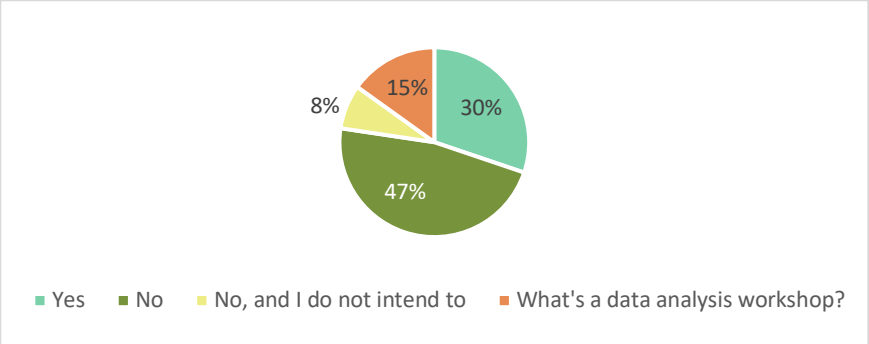

Figure 44 - Attendance of Dublin survey respondents to a Problem Formulation Workshop (N=53).

5.4.2.1 Participant types

50 (94%) of the participants who responded to the Dublin survey identified as a counter, while three (6%) people stated they are/were local champions.

The **three local champions** that completed the survey identified as such because either they act as a local champion in their current role (N=2) or they are supporting the delivery of a school project (N=1). Their roles have been to spread awareness about the project, encourage others to have a Telraam and to provide technical assistance to people with a Telraam.

5.4.2.2 Survey respondents' demographics

47 (of 53) respondents chose to declare their age, gender and education attainment. As with all of the cities, there is a wide spread of ages among the respondent cohort in Dublin, with **the majority falling in the 35-49 age range** (N=26; 55%) (Figure 45).

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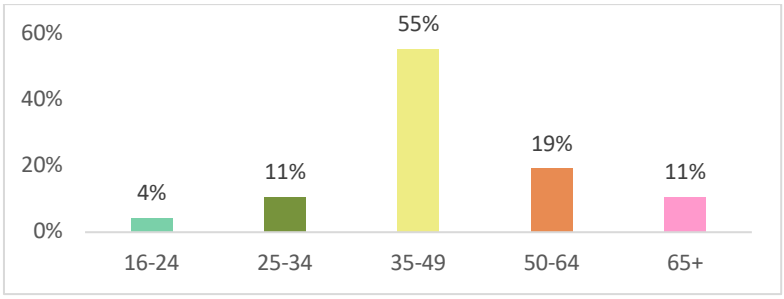

Figure 45 - Age *range of Dublin survey respondents (N=47).*

Similar to the other cities, and citizen science projects, **the majority of respondents identified as male (N=29; 62%)** (Figure 46). The gender balance is more equal across all applicants (M 56:F 44), although still skewed towards male participation (see section 5.1.2)

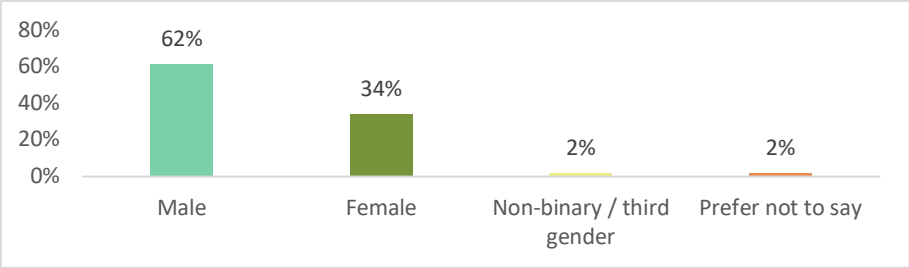

Figure 46 - Gender of Dublin survey respondents (N=47).

Once again, the pattern of educational attainment mirrors the other cities and WeCount Dublin applicants, **with the majority highly educated (university degree or above, N=39; 83%)** (Figure 47).

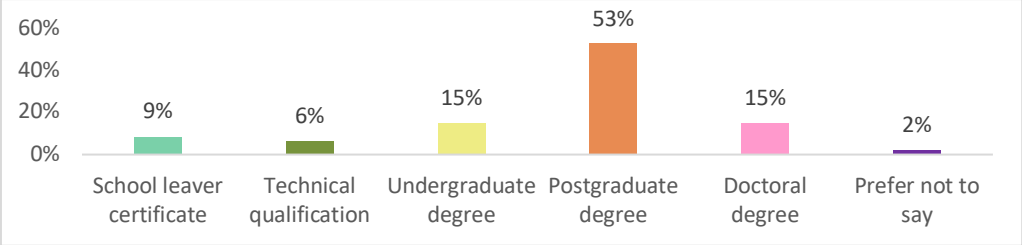

Figure 47 - Educational *attainment of Dublin survey respondents.*

While WeCount (Dublin) may not have broken the mould in terms of representation, it is clear to see that a diversity of ages, genders and educational levels did take part.

5.4.2.3 WeCount experience

Motivations

Motivations for joining the WeCount project were gathered upon registration, during initial workshops and in the final survey. As stated in section 5.1.2, measuring and monitoring the modal distribution and density of traffic came out on top among all applicants, followed by an

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interest in measuring and monitoring local air quality. Workshop participants, meanwhile, expressed an interest in monitoring car speeds and understanding more about local air quality.

According to survey respondents, their main motivations for joining were fairly evenly spread across four categories**: to make a difference (21%; N=40), an interest in sustainable mobility (21%; N=38), to contribute to research (20%; N=37) and to count traffic (18%; N=34)** (Figure 48). An interest in the science/citizen science was next (11%; N=21), followed by an interest in technology (8%; N=15). Motivations are clearly diverse, although the nature of the networked approach was to pin down specific neighbourhood-specific priorities for collective action.

Interviewees took part out of an interest in one or several traffic-related issues and/or an interest in technology. These were counting traffic (N=5; 29%), air quality concerns (N=3; 18%), an interest in active travel (N=2; 12%) or technology (N=2; 12%), gaining evidence to influence change (N=2; 12%), concern their road is a rat run (N=1; 5%), concern about the impact a new housing development would have on their already busy road (N=1; 5%) and concern for their children's safety (N=1; 5%). Many had an underlying interest in either science/citizen science – mentioning they are already signed up to existing university trials or are measuring phenomena – or behaviour change:

> *What I noticed at the school is, people are driving up to the school with big, dirty, old diesel engines and the fumes out of the things are just ferocious.* ***What I want is to try and change the behaviour of people****, that they encourage more cycling, walking, not basically driving up to the school window and leaving your engine running… X is going to send me a pollution sensor and that's really where [sic] we're very interested in. That's really the information we want.* (Dublin Citizen Interview05)

Several interviewees in Dublin reflected on how traffic has changed significantly over time. No longer do people walk several hours to get to places. They want to get to places "fast" in their cars. Ironically, and anecdotally, the increase in driving is making parents in particular concerned for their children's safety, who may choose to drive them a short distance to school then allow them to walk or cycle.

> *I had noticed that the road was much busier, and the main way I noticed it was that the neighbours on both sides of the road had known each other when I moved in, but gradually neighbours only knew the people on their own side of the road because the traffic was heavy. So people seldom crossed - and certainly didn't wander over and have a chat from the middle of the road, the way they did back in 1989.* (Dublin Citizen Interview02)

You cannot help but wonder if their childhood memories, the fondness of playing freely and talking on the streets with neighbours, influenced citizens' decision to get involved.

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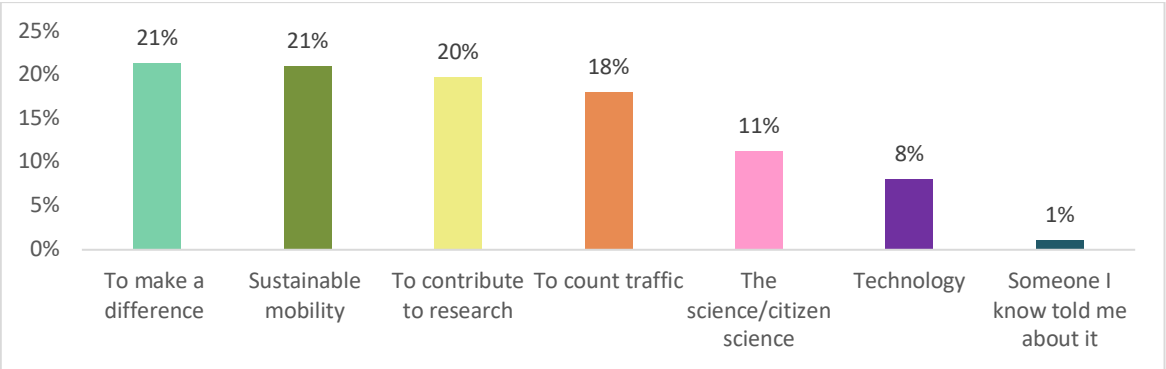

Figure 48 - Motivations for joining according to Dublin survey respondents (N=187).

Expectations

Participants were asked to rank the extent to which their expectations were met during their time on WeCount (Figure 49**). 65% (N=34) of participants believed their expectations were met to a satisfactory level** (25% extremely well and 40% very well). 34% (N=18) were moderately satisfied and one person believed WeCount did not live up to their expectations.

Analysis of open questions reveals a number of aspects that influenced respondent's satisfaction: their love of citizen science projects (N=2 of 12; 17%); the easy set up and clear instructions (N=2; 17%), the great technology and website (N=2; 17%), feeling that their making a difference (N=2; 17%); and the level of data coming from the Telraam (N=4; 33%).

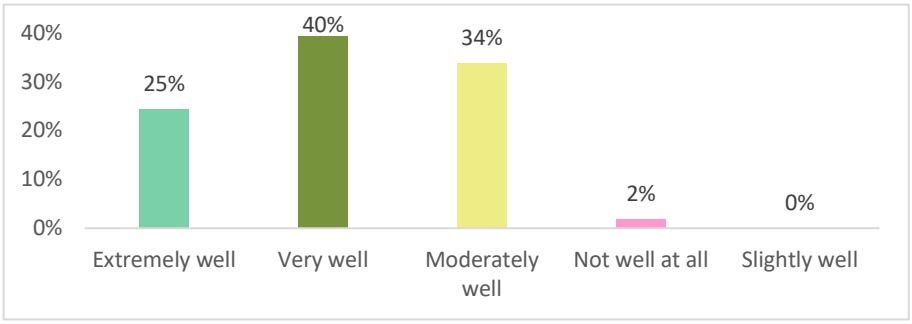

Figure 49 - Extent of expectations met according to Dublin survey respondents (N=53).

Some participants took more of a back-seat role in the project, by sharing data only, while others were more vocal or intent on action from the outset:

> ***We just installed the Telraam and share our data. That is all.*** *No further participation.* (Dublin41)

> ***[I] want to revert the status quo where the car is king and pedestrians are cyclists are last and most vulnerable.*** (Dublin47)

> *I got involved as I wanted authorative, independent data analysis of the nature and speed of vehicular traffic on the road on which I live. I did not appreciate that I am part of a We Count project but I am happy if the data I collect is put to further use.* ***My principal***

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objective is the moderation of the nature, speed and volume of traffic on what is a residential road bordering an outstanding amenity. (Dublin45)

The degree to which participants initial motivations and their intentions for involvement were satisfied, will have had a significant bearing the extent of expectations met.

Rating time on WeCount

Nearly all survey respondents enjoyed their time on WeCount Dublin (N=47; 88%), with the exception of six people (11%) that rated their time as average (N=5) or poor (N=1) (Figure 50**Error! Reference source not found.**).

I think that the technology itself is amazing, and demonstrating putting it in the hands of citizens to collect data was a great proof of concept. (Dublin48)

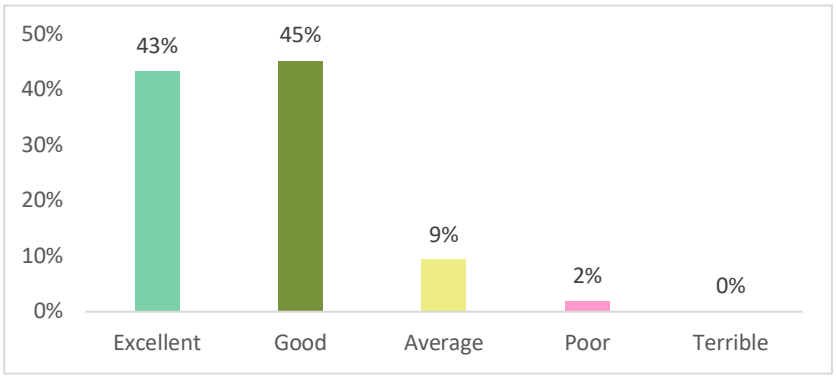

Figure 50 - Rating of time on WeCount Dublin according to survey respondents (N=53).

This finding is corroborated by the interviewees, with a mix of positive and negative reflections. Some preferred the technical aspects, while others found the set up annoying. Seeing the numbers of transport modes and speeds was a particularly enjoyable experience for most – and importantly "useful". One interviewee, who felt entrusted with 12/13 sensors to set up in his community, without being "micro-managed", spoke at length of all the project highlights and how they felt "**empowered**":

I'm really, really grateful for that trust given to me to empower me to go out and do a community-wide experiment. Yes, I love the idea of it… this [has been an] opportunity to build up a really complete picture [of traffic data for our travel advocacy group] over months as well. (Dublin Citizen Interview06)

Favourite aspect of being involved

Following the trend of the three aforementioned case studies, Dublin survey respondents put "**being a part of a research project**" at the top of their favourite pile of involvement (N=34; 32%). **Gathering evidence for campaigning** (N=25; 24%) and **feeling as though they are making a difference** (N=20; 19%) came close second and third (Figure 51). Perhaps it is mere coincidence, but again we see 'making a difference' becoming a more dominant theme in these later case studies.

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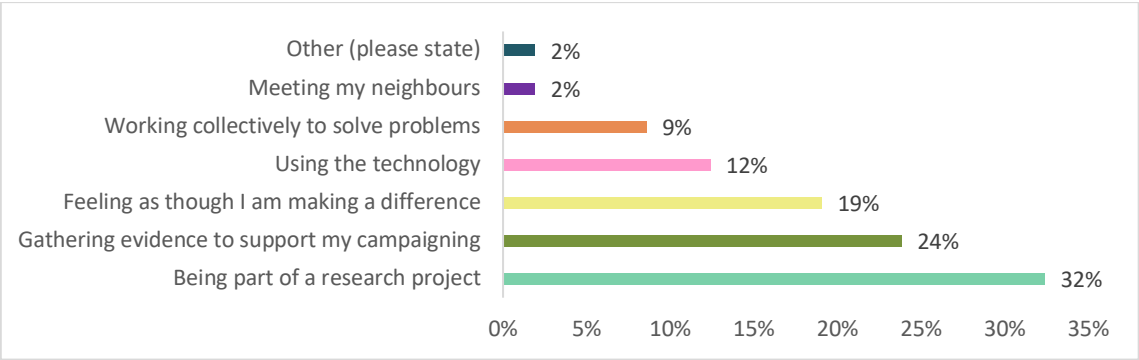

Figure 51 - Favourite aspect of WeCount Dublin according to survey respondents (N=105).

Being able to see the bigger picture was highlighted by one interviewee:

> *It's great to start seeing that community-wide approach, which is so important for traffic, because I noticed that when I was doing my own. It's like you have all these locations and then it was like, well, what's the effect on other locations as well, so it is great to get that higher-level view of things. I guess actions, that's the most important thing out of this.*
> (Dublin Citizen Interview06)

Satisfaction of technical help and support

To ensure citizens had all they needed to get started, the project developed a variety of instruction materials and videos, made available through the Telraam website and FAQ. There is also a helpdesk for citizens to submit tickets, option to reach out via social media and if connected to neighbours who also happen to be a part of WeCount, the ability to also ask them for support.

By and large, **all those that used these channels were satisfied to some degree or their feelings were neutral** (Figure 52). Two people were dissatisfied with the FAQ articles and one person was dissatisfied with the helpdesk. However, overall, the online support at the start of registration (i.e. the registration form) and during Telraam set up and maintenance (i.e. FAQ articles and helpdesk) were deemed the most satisfactory of all channels. 80% (N=36), 63% (N=22) and 74% (N=23), respectively, with favourable reviews.

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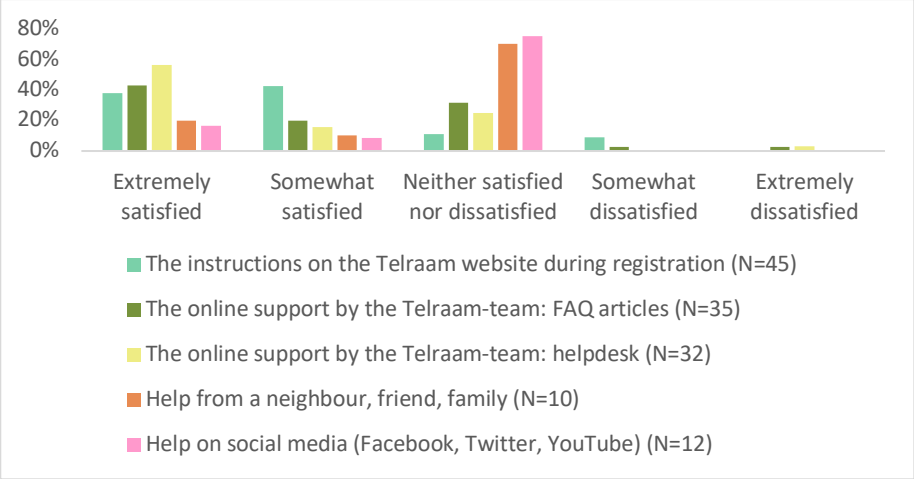

Figure 52 - Dublin survey respondents views on technical help and support provided during WeCount (N=variable).

Telraam data

Welcome pack

Each city had freedom to produce a custom welcome pack for their counters, adapting the content to suit their audiences needs and interests. Some of the counters in Dublin received a welcome pack containing a step-by-step guide on how to assembly and install the Telraam. Of the survey respondents that received a pack (N=43), 16 (37%) thought it was useful and 16 (37%) thought it was moderately useful (Figure 53). 7% (N=3) had neutral or negative views.

Most of the Dublin citizens interviewed found the tech straightforward and easy to use, despite Wi-Fi issues. However, upon analysis of the open questions from the survey on how to improve the pack, the comments largely reflect the need to **improve communication or the technical aspects of set up and registration**, which suggests that these negative/neutral views may have been directed to non-pack related issues.

Aware that remotely on-boarding and engaging with WeCount is not without its challenges, Dublin offered **online support meetings** to resolve issues that may have prevented citizens from counting. It appears they were positively received, as this counter reflects:

> *I struggled to set up initially but that was down to my own misunderstanding. I joined the online support meeting and it helped a lot.* (Dublin13)

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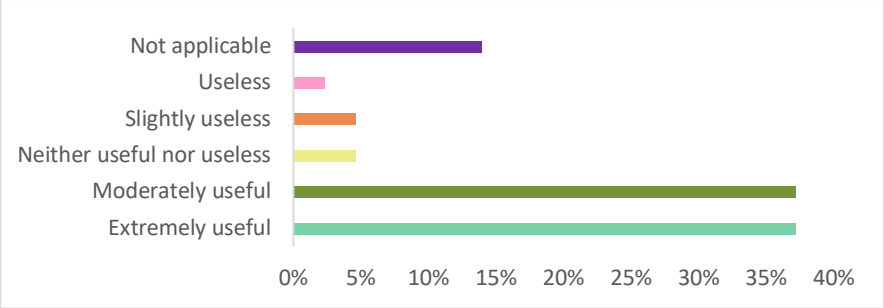

Figure 53 - Usefulness of Dublin welcome pack, according to survey respondents.

Use and rating on online platform

The majority of counting citizens view the Telraam dashboard regularly (N=31; 71%), with 27% (N=12) viewing the platform "now and then". Only one respondent no longer looks at the platform.

Respondents were asked to rank the various aspects of the Telraam platform and associated resources (Figure 54**Error! Reference source not found.**). **Unsurprisingly, the majority of counting citizens rated their own data (N=39; 89%) and that of their neighbours and fellow counters (N=26; 62%) as the most positive of the platforms various features.**

As with the other three case studies mentioned so far, **the majority (N=27; 66%) did not use the API**. As mentioned in D5.2, this is likely because most people do not know what an API is, let alone know how to use it. These results are not surprising as no training has been offered by any case study on how to engage with the API.

It is also interesting to note that **31% (N=13) of respondents did not engage with the excel data**, available for their Telraam. This data is in a raw format, which citizens can analyse if they so wish to answer certain scientific questions they have (e.g. is there any relation between speed and the day of the week?). We would only expect people with a keen interest on analysing the data, and with time on their hands to do so, to engage with the excel.

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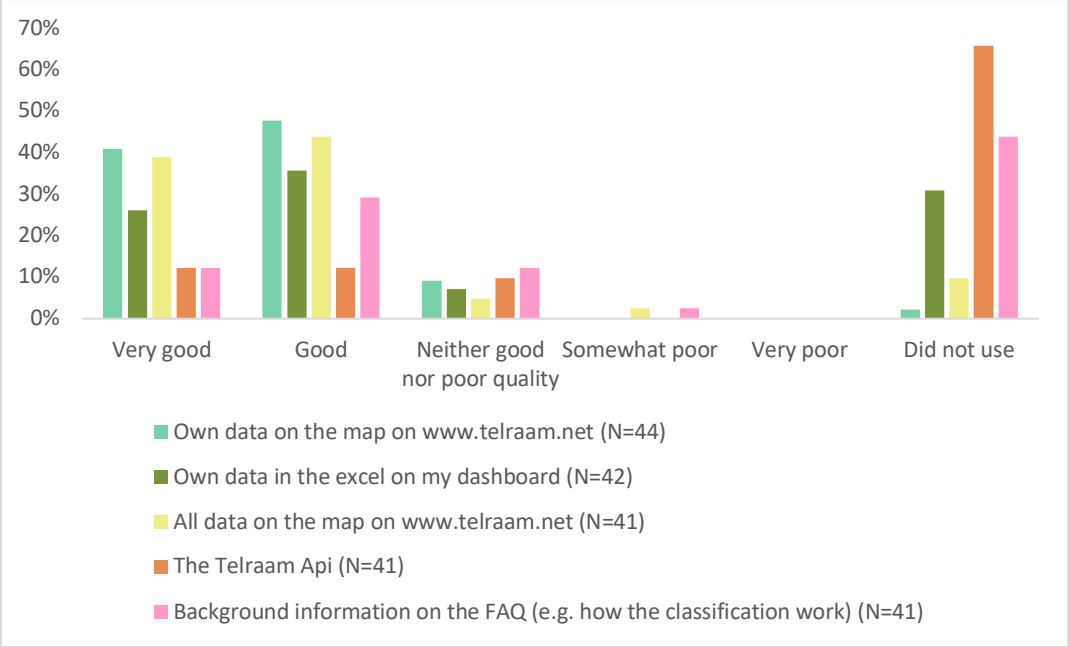

Figure 54 - Rating of Telraam platform and related resources according to Dublin survey respondents (N=ave 41).

Reactions to traffic data and traffic accuracy

76% (N=35) of survey respondents were surprised to some extent by the data they saw for their street/area (Figure 55). Meanwhile, 20% (N=9) thought it was as they expected. At the time of writing, two people are as yet to look at the data.

Many stated in their open responses that they did not realise the situation is as bad as it is (N=7):

> *I was astonished to find that over 200 cars an hour passed my house (despite being used to the constant tyre sounds); I was even more astonished to find that the numbers doubled some days and times after lockdown ended.* (Dublin06)

Some also observed specific issues from viewing the data, such as poor bike infrastructure to support the number of cyclists, the impact of the school run on their estate and the substantial increase of heavy goods vehicles during construction.

The reason why some respondents were not surprised (Total=9) was largely because the data validated existing beliefs (N=7; 78%). Mixed views were also expressed in the interviews, with several stating that what they saw "confirmed" or "consolidated" their beliefs (N=3 of 8; 38%).

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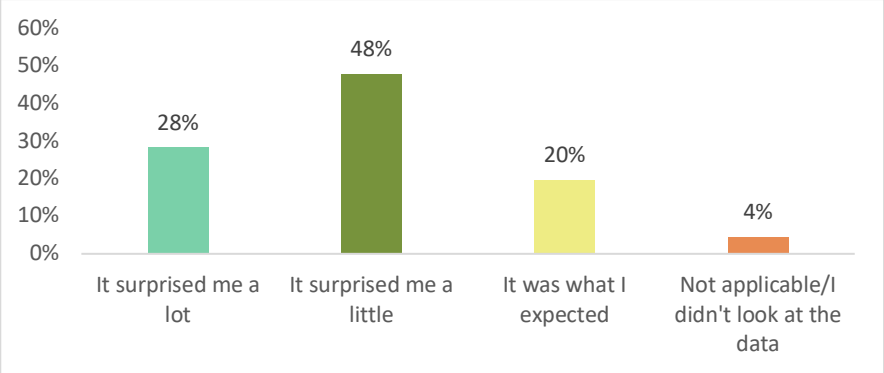

Figure 55 - Reaction to data by survey respondents (N=46).

Far fewer respondents chose to answer the survey question on data accuracy (N=34 of possible 50), however some conclusions can still be drawn. Given Telraam is a low-cost sensor, accuracy will most likely always be questionable. Obstructions in the view, shifts in camera angle, Wi-Fi issues; all these and more contribute to patchy or questionable data. Understandably then, **the majority thought the sensor to be largely accurate (N=20; 59%),** with some slightly more pessimistic (N=2; 6%) and some slightly optimistic (N=12; 35%) stating that they were sure the data is accurate (Figure 56). Inaccuracy (N=31) concerned overcounting (N=16; 52%) or undercounting vehicles (N=7; 23%) or speeds (N=4; 13%). The inability to count in the dark also influenced participants perception of data accuracy (N=4; 13%).

Interviewees expressed similar views on accuracy, varying from "astonishing" to "pretty accurate". One person reflected that accuracy of pedestrians and cyclists is likely to be the most questionable given the fact that Irish houses typically have a front garden, which increases the distance from and visibility of the road and pavement.

Reflecting what was mentioned in the Cardiff chapter, **in future iterations it may be worth investing time in educating some citizens** in how to understand the data as some felt incompetent in determining whether or not the Telraam was accurately capturing traffic numbers:

> *I don't think I have the knowledge to know whether the Telraam is capturing data accurately. Some communication/feedback from organisers after I installed the Telraam would have been helpful. I have looked at my online Telraam account a few times and the position of the camera appears to be right and certainly the Telraam is capturing lots of data but I don't know about the accuracy.* (Dublin52)

Further discussion can be found in the Improvements section.

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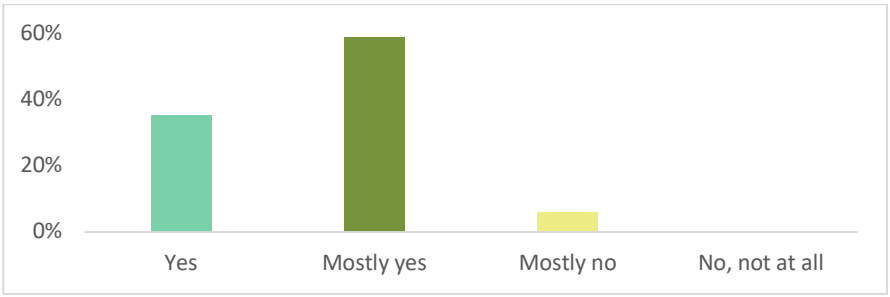

Figure 56 - Perceived accuracy of Telraam data, according to Dublin survey respondents (N=34).

Change in opinions and feelings

Survey respondents were asked whether their involvement had changed their opinion about traffic-related issues, and whether involvement changed how they feel about where they live. **63% (N=29) stated that their opinion on street traffic matters had changed to some degree and 57% (N=25) stated their opinion had changed at the neighbourhood level** (Figure 57).

Two people are considering moving now they have seen the data:

> *While I am grateful to live close enough to the city centre that I do not need a car to get to and from work, it has made me realise that unless access to public transport improves drastically, the traffic outside my door 24 hours a day will only get worse. This has made me question whether I should continue living in this location.* (Dublin06)

For others, interviewees included, it has shed light on the extent of issues:

> *It has made me realise the enormous negative impact on the social fabric of the community. The massive amounts of traffic is bifurcating the community and nudging locals to use cars for all their local journeys too.* (Dublin26)

> *…and the cyclist numbers, they're a lot higher than I thought, and it's heartening to see. It would change my opinion that cycling truly could be a really sustainable thing to do.*
> (Dublin Citizen Interview08)

Among the reasons why some experienced no change in opinion was because they already had strong opinions about the need to support active travel before the project.

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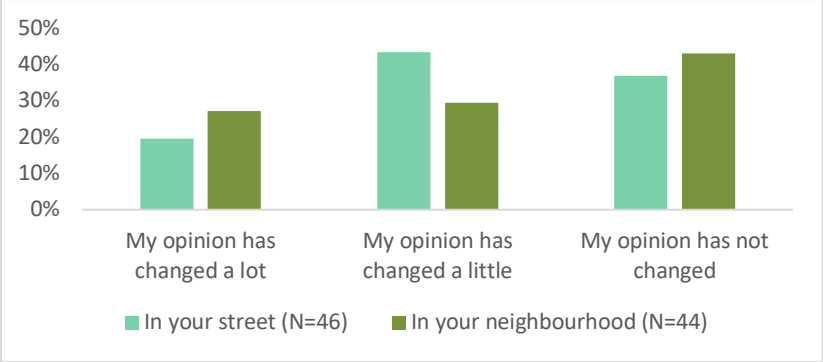

Figure 57 - Change *in survey respondents' opinions about street or neighbourhood level traffic issues (N=variable).*

Meanwhile, **43% (N=20 of 46) of survey respondents believe their involvement in the WeCount project has changed how they feel about where they live**. On the one hand, people felt "**less safe**", "**more worried**" and "**more dissatisfied**" with where they live, spending more time to consider the impact traffic volumes has on their family's quality of life. On the other, they feel the project has made them "**more willing to act**" and given the number of Telraams in operation, "**hopeful**" that many neighbours also want to see traffic managed differently.

According to the four people that explained, the reason why some citizens do not feel different about where they live is that they already feel happy with their surroundings, even if there are certain aspects of traffic that concern them:

> *I am very happy with where I live at present. I have gotten used to the amount of traffic though instances of speeding on the road outside my apartment are of concern to me.* (Dublin52)

Knowledge improvements

Three of the four knowledge categories listed in the survey saw **a significant degree of improvement ("massive"/"a lot")** as a result of WeCount participation (Figure 58): "traffic and mobility in general" (N=33; 66%), traffic at a localised level (N=34; 73%) and "the impact of traffic on air quality and traffic safety" (N=20; 54%). Improvement was made to knowledge on how to act on these issues, but to a lesser extent (N=17; 42%). This may be in part explained by the fact that almost three quarters of survey respondents are yet to attend a Data Analysis Workshop.

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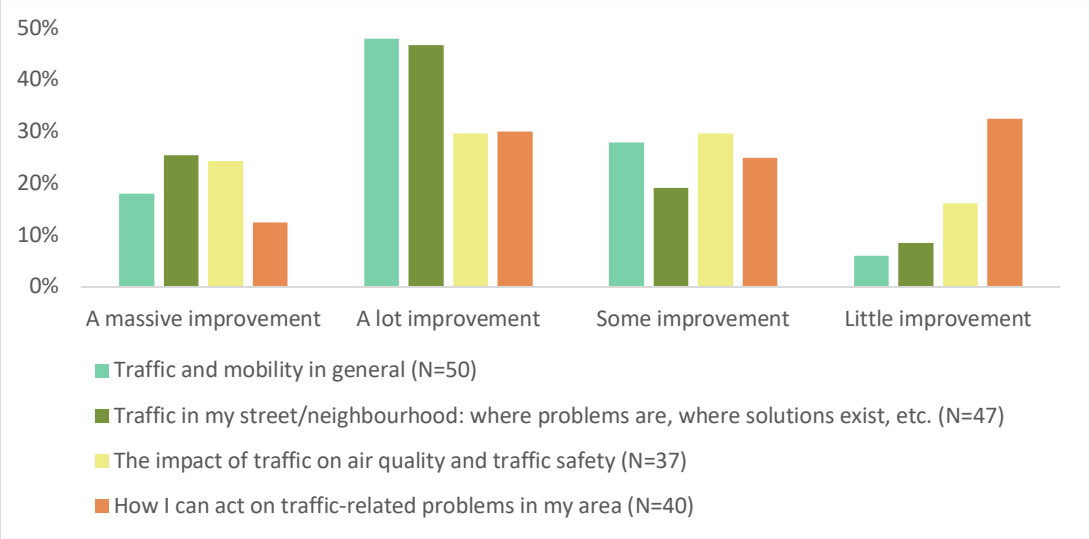

Figure 58 - Knowledge improvement in four categories, according to Dublin survey respondents.

Current levels of activism

As mentioned, we did not measure levels of activism before the start of the project or about the current level of activism at a city level. The final survey did ask participants about current levels of local activism, however, with Dublin respondents expressing various levels of activism related to traffic-related issues (Figure 59). Again, although the sample size is different, it would appear that Cardiff and Dublin respondents are somewhat more active in this area than the Madrid/Barcelona and Leuven case studies.

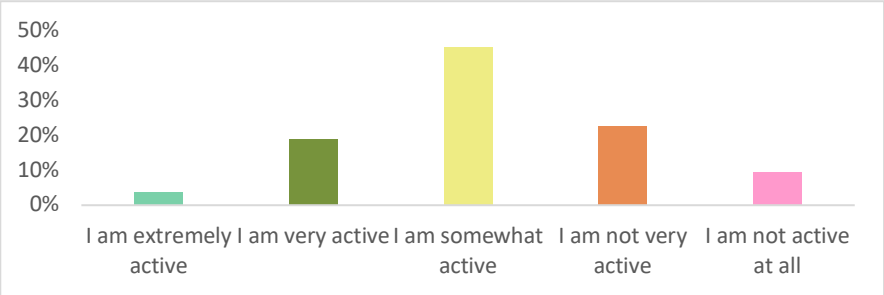

Figure 59 - Current levels of traffic-related activism among Dublin survey respondents (N=53).

WeCount-related action

There are signs that involvement in WeCount had a significant influence on Dublin's citizens' willingness to act:

> *[Before the project] In my estate I'd be very conscious, just the speed of the cars coming in and things. I guess I felt there wasn't a lot I could do about it, but now I think those data can show… Obviously there's information there that I can do something about this; that's actually great, it empowers me a little bit. Especially in the school it's going to be very valuable to change behaviour at the school and that's because I have kids there and it is*

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good. I am very thankful for that opportunity to contribute in that way. (Dublin Citizen Interview05)

I have to say now it's gotten me a little bit more encouraged to maybe join [a local campaign group] and to be a little bit more active and - yes! (Dublin Citizen Interview07)

Seven out of 47 respondents (15%) have already acted as a result of WeCount. Meanwhile, 22 are still thinking about it (47%) (Figure 60). Those that have acted have used the data to inform neighbours (N=3), e.g. to push for traffic calming and cycle lanes, "inform debate" (N=1), support public consultation submissions (N=1), and to inform authorities (N=1) and businesses (N=1).

[I am] citing the data generated in my public consultation submissions on behalf of my active travel advocacy group. Furthermore, [I] will be planning to leverage my position on my local tidy towns steering committee to enact village wide, community driven change to our transportation by (hopefully!!) implementing a one-way system in my village. Reallocating this extra space to pedestrians and cyclists (Dublin26)

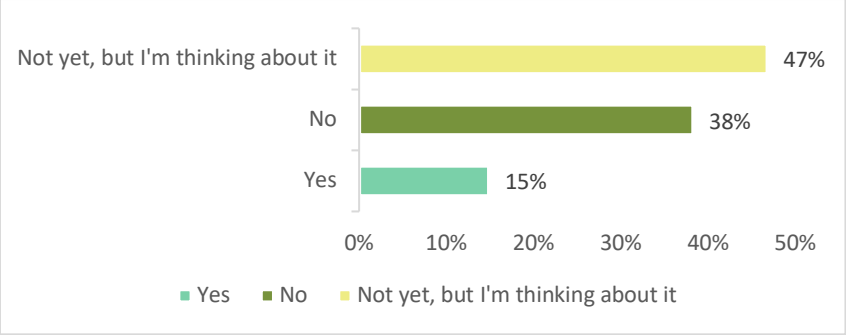

Figure 60 - Action taken by Dublin survey respondents with WeCount data (N=47).

There are signs that many of those that have yet to act will do so in the near future (N=7; 14%) – they have an **intention to act: when the time is right (N=1), when lockdown eases to arrange a residents meeting (N=1) or when there is sufficient data (N=2).** One said they "will" write to councillors (N=1) while others said their efforts are still a "work in progress" (N=2).

Similarly, interviewees intend to analyse the data and present results to neighbours, community action groups (to reduce car speeds and space for cars so space for active travel can increase) or local councillors, share with the university (case study leads) or on Twitter, and submit as evidence for consultations or to help re-open an old train station. One also mentioned how their children's school, which also has a sensor, plans on using the data as evidence to pedestrianise the street. Another, after learning that the sensor counts speed said:

I'm going to actually email the report to my management company and see if I can get them to put in some speed bumps into the estate because people drive very fast through it, yes. It'll be good, so yes, I'll get back to you if I make any progress on that. (Dublin Citizen Interview05)

Ultimately, citizens want data to reduce car usage and car speeds.

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Those who stated "no" (N=18; 38%) said it was because of "no time", because they joined in support of research, "not to take individual action", they saw "no applicable approach" or that they thought their current actions were sufficient, as one respondent commented:

> *I don't have a car and mostly walked in my local area during Covid-19 restrictions.* (Dublin52)

One interviewee added that they feel their efforts would be futile due to the "love of the car" and the associated resistance to change. When they present the facts at meetings it is not enough for them to convince people that cyclists have rights. Others were partaking in WeCount for individual interest and did not see their contributions as 'active' per se, even though one such interviewee wrote an app for Mac OS that pull from the API as a result of their involvement.

All are perfectly valid points as to why some did not 'act' per se, and not everyone needs to, however it would be interesting to know whether all participants have a broad enough understanding of what activism means, in all its guises, and why it is of benefit to society. If all had the same baseline understanding at the start of the project, this may have made it easier to assess why people are not acting. See General reflections section for further explanation.

Future activism

98% of counting citizens from the survey are still counting traffic with their Telraam (N=39). The one person who is no longer counting stopped because of technical issues that could not be resolved. 10 counters did not answer this question. **67% (N=31) plan to continue working with WeCount data once the project ends,** and a further 30% (N=14) might but are currently unsure (Figure 61).

Dublin respondents and interviewees are perhaps the most enthusiastic about WeCount, with a real desire for the project to keep going and to link with local government:

> *The project should be permanent as dealing with the issues that arise, devising policy on traffic management and implementing consequent changes warrants the continuation of the project.* (Dublin45)

> *Please, please expand this project…[I] Think this should be made available to all communities. I can't recommend it enough. I'm so thrilled that I was empowered to go out into my community and quantify the enormous traffic problem in my village… It's such a great initiative and can transform communities by making them aware of how bad the traffic in their community is. Can also provide communities with hard evidence to elicit action from their local governmental authorities.* (Dublin26)

> *I would love to see it maybe happen again and maybe greater outreach into other areas particularly… I was delighted when I was accepted and was able to do it, so I'll keep that Telraam going for months to come* (Dublin Citizen Interview07)

All of the interviewees asked (N=7) wish to continue using their sensor when the project ends, with several mentioning the need to gather data over a longer period to build up the evidence base (to influence consultations, the council, car users, housing estate management companies,

property developers etc.) and observe trends and the influence of certain variables (weather, COVID-19 restrictions, etc.).

For one interviewee, they are hoping that in time the data can begin to show the impacts of active travel interventions like pedestrianisation and bike lanes, as so far they have been unsuccessful in their attempts to take away road space from cars:

> *I have been pressing totally unsuccessfully, but I'm keeping at it, to have a bike lane along this road. Now, the engineers say the road is too narrow but unfortunately, it's not too narrow for [car] parking.* (Dublin Citizen Interview 02)

Meanwhile, **two of the three local champions are certain they will continue with these responsibilities post-WeCount** (likely because it is their day job), while one is still unsure.

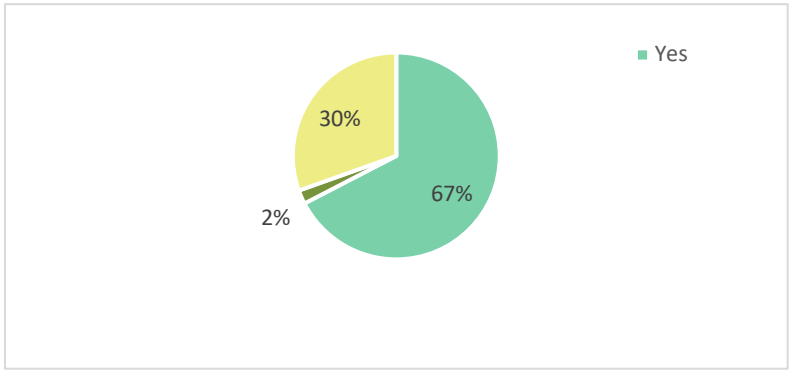

Figure 61 - Dublin survey respondents desire to continue working with WeCount data (N=46).

COVID-19 pandemic impacts

The majority of survey respondents time on WeCount was in some way impacted by the COVID-19 pandemic (N=45; 82% - although note multiple answers can be given for this question) (Figure 62). Seven respondents stated that the lockdown had no impact. **The biggest impact was having more time to spend on the project that would have during non-COVID times (N=20; 32%),** followed by thinking they would have preferred engaging with participants and staff in person (N=17; 27%). While receiving far fewer marks, a preference to engage online came third (N=8; 13%). Throughout the survey, several (N=4; 8%) also referred to the impact of lockdown restrictions on traffic levels, which may of course present a distorted view of real traffic numbers:

> *Those are pandemic numbers still. I dread the "going back to normal" ones.* (Dublin36)

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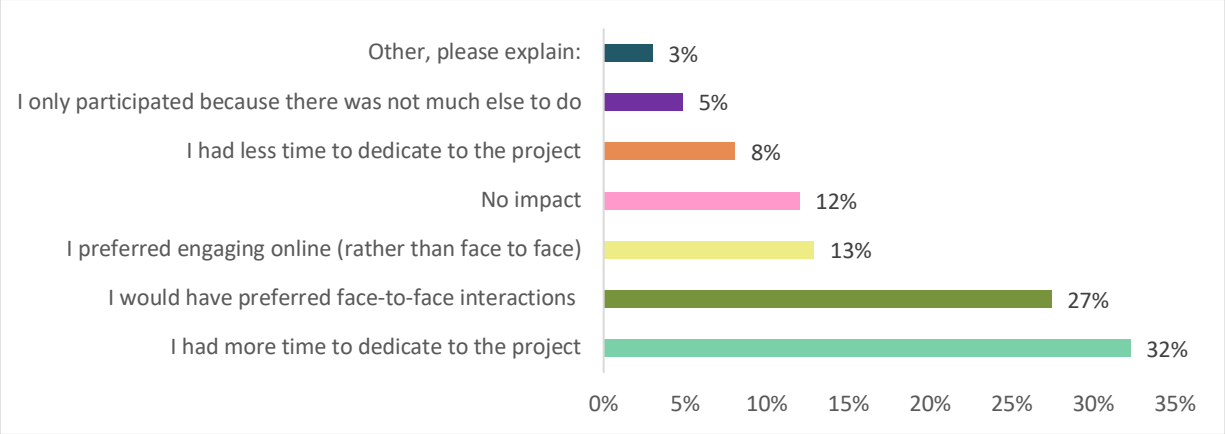

Figure 62 - Impact of the COVID-19 Pandemic on Dublin survey respondents (N=62).

Improvements

Lastly, survey respondents and interviewees in Dublin were asked which aspects of the project needed improvement (Figure 63). **28% (N=22 of 78) stated that the Telraam technology should be given the most attention**, followed by the need for a mechanism to show if efforts were successful/impactful (N=17; 22%), and to make it easier to understand the data (N=15; 19%).

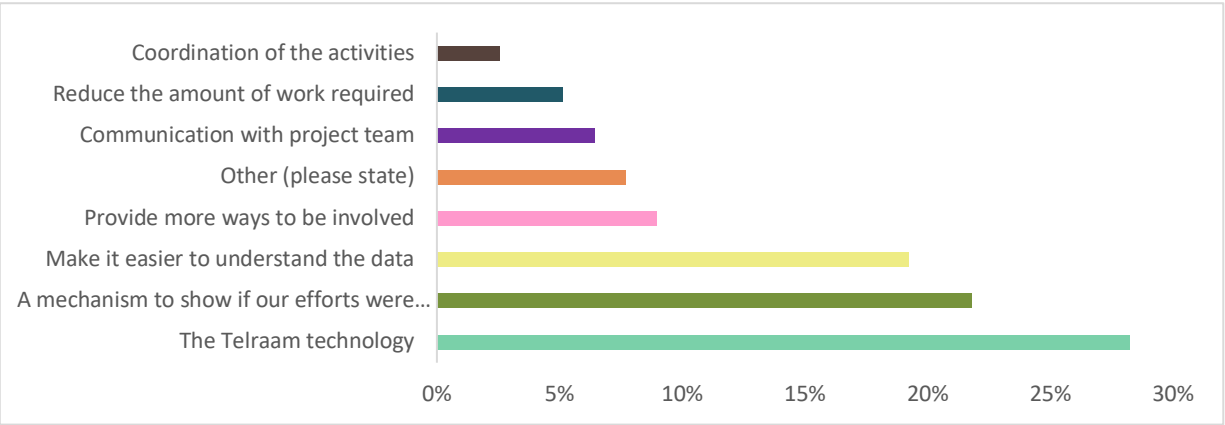

Figure 63 - Aspects of WeCount in need of improvement, according to WeCount Dublin survey respondents (N=78).

From the analysis of the open responses (N=19), the following aspects have been identified as needing the most attention in terms of **project design**: communication (N=8; 42%), reporting (N=8; 42%) and WeCount recruitment (N=3; 16%). Several were also disappointed the project cycle is so short. These points were also echoed by interviewees, with additional mention to the need for greater emphasis on making objectives and community impact more visible.

Suggestions from participants to improve **project design** included: increase the project timeframe; select areas for sensors strategically and tactically; make it clearer that the project is proactively connecting with the Council to integrate Telraam data into development planning; link up with community-wide groups for greater collective action as traffic is seen as a universal problem; bring together clusters for collective action; host neighbourhood forums; increase

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communication and engagement; and provide support for people in how to present and tell stories with their data. Interviewees also expressed that the project could have benefitted from an explanation, early on, about how citizens could play an active role. They also suggested the need for better advertising (e.g. in newspapers) to broaden the coverage of Telraams (and other sensors) across the city and foster community-wide schemes, on the one hand, and to use the data for a general goal (e.g. to present to the Council), on the other. While these improvements are useful, many imply that the onus is placed on the research project rather than the citizens to drive change.

The following **technical aspects** need improvement: Telraam software (N=5; 45%), Telraam hardware (N=3; 27%) and instructions (N=3; 27%). Suggestions were made on how to improve these: add an alert function for when there are issues with the sensor; break down 'heavy goods' into more specific vehicles; reveal more data on the API; improve direct communication (e.g. email, phone, text), especially during initial set up; and provide feedback if citizens put forward ways to improve Telraam (e.g. a reply saying "that's a good/bad suggestion because…"). An interviewee thought it would be useful to add bicycle speeds and there was one suggestion among survey respondents of creating a WeCount app, which could make it easier to interact with the data. Furthermore, many survey respondents felt unable to sense check their data with manual counting (N=8); adding this additional step into future projects could improve calibration and accuracy in the future.

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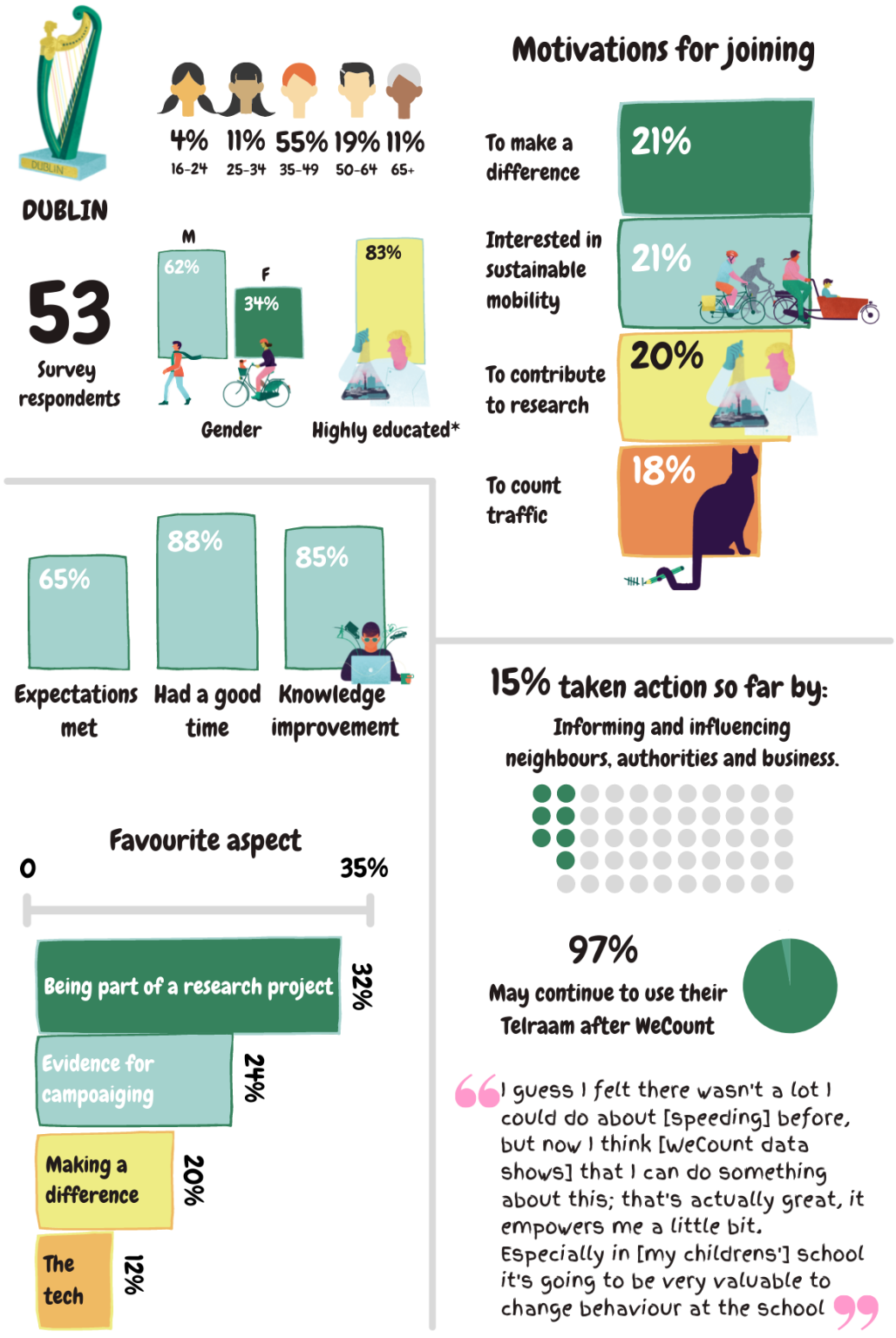
5.4.2.4 Summary of Citizen's experiences of WeCount in Dublin



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5.4.3 *Ljubljana*

WeCount Ljubljana has 126 members, with 84 active Telraams at the time of writing, with 55 users still counting. A total of 163 participants were invited to complete the final survey for Ljubljana; this selection was on the basis of participants who had a sensor installed for at least one month, as well as all that registered as members. Of all those invited, **50 completed the survey, representing a 31% response rate.** This section of the report presents the findings from the survey, supplementing the evidence with excerpts from citizen interviews.

A total of **nine citizen interviews** were conducted by case study leaders in Ljubljana. The citizens were approached proactively by the team, prior to the launch of the survey. Because the Slovenian team chose to ask their own set of questions, we had to retrospectively ask interviewees to answer the official evaluation questions; not many chose to answer these subsequent questions. As such, there are fewer quotes in this chapter.

5.4.3.1 Participant types

The majority of survey respondents categorised themselves as counting citizens (N=41; 82%). Five were involved (10%) but did not have a Telraam, and their involvement included attending workshops (Figure 64). The reason why they did not count was because either their window is not suitable (N=3) or there is no active network in their area (N=1). **One respondent (2%) identified as a local champion**. They organically emerged as a champion during the project and their role was to spread awareness of the project. They are not sure if they will continue with their responsibilities post-WeCount. **Techies, of which there were three (6%)** provided, unsurprisingly, technical support and also attended workshops.

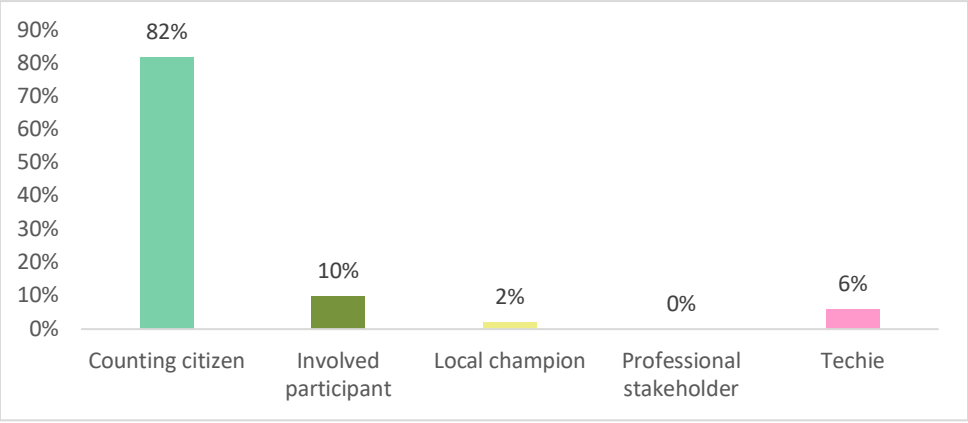

Figure 64 - Participants types in Ljubljana survey (N=50).

5.4.3.2 Survey respondents' demographics

Reflecting most other cities and Ljubljana's demographic data from section 5.1.3, the demographic profile of survey respondents **is predominantly 35-49 (N=19; 43%), male (N=28; 60%) and highly educated (degree or above, N=35; 79%)** (Figure 65, Figure 66 and Figure 67). There is however slightly larger representation from young people in WeCount

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Ljubljana (N=7; 16%) and this may in part be explained by efforts to engage Architecture students at the University of Ljubljana, of which the project team are a part.

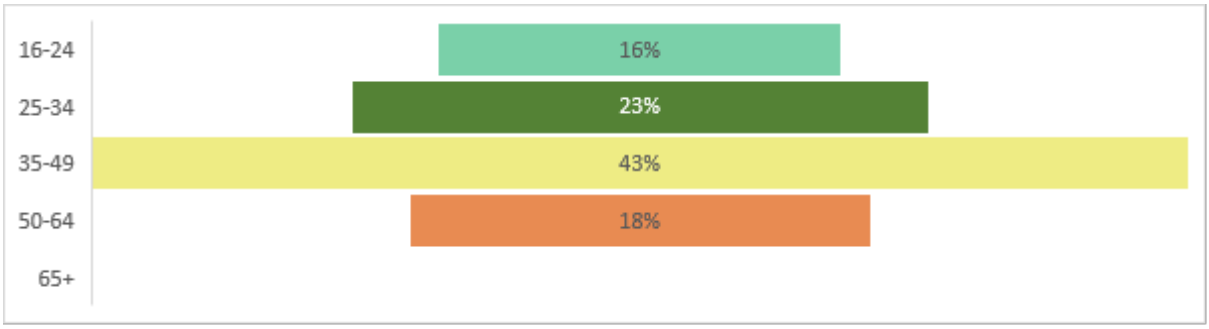

Figure 65 - Age range of Ljubljana survey respondents.

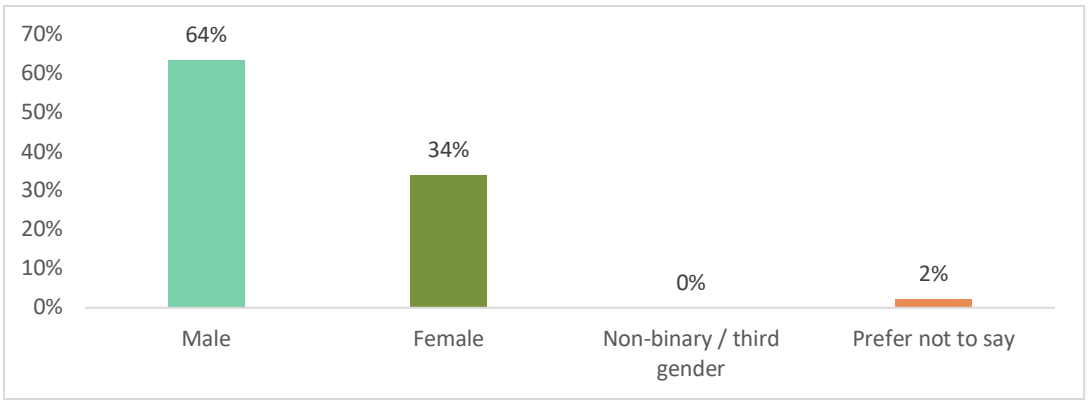

Figure 66 - Gender of Ljubljana survey respondents.

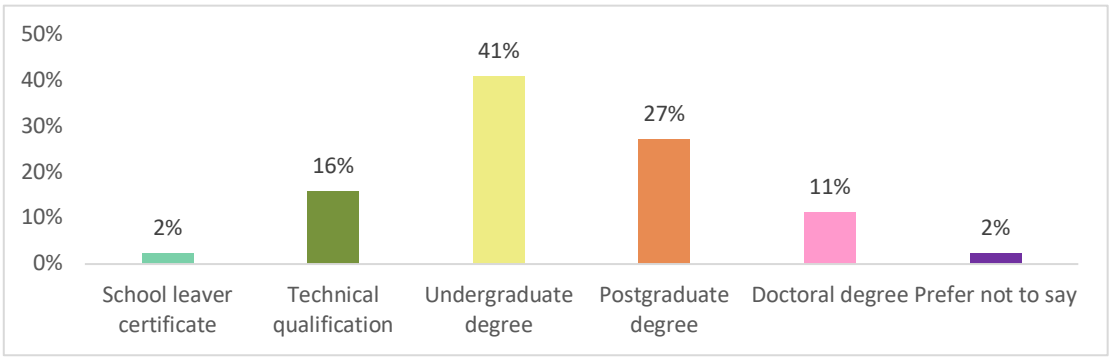

Figure 67 - Educational attainment of Ljubljana survey respondents.

5.4.3.3 WeCount experience

Motivations

As with Cardiff and Dublin, an interest to measure and monitor modal distribution and traffic density was the top motivation for citizens interested in WeCount Ljubljana. Meanwhile, workshop attendees expressed a desire to mainly monitor the speed of cars or lobby local policy makers.

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According to survey respondents, the motivations for joining WeCount Ljubljana, as with most other cities, fall into three main categories: **to contribute to research (N=13; 26%), to make a difference (N=12; 24%) and/or due to a pre-existing interest in sustainable mobility (N=8; 16%)** (Figure 68). Two people mentioned that their motivation for joining was work/learning related ("other" category).

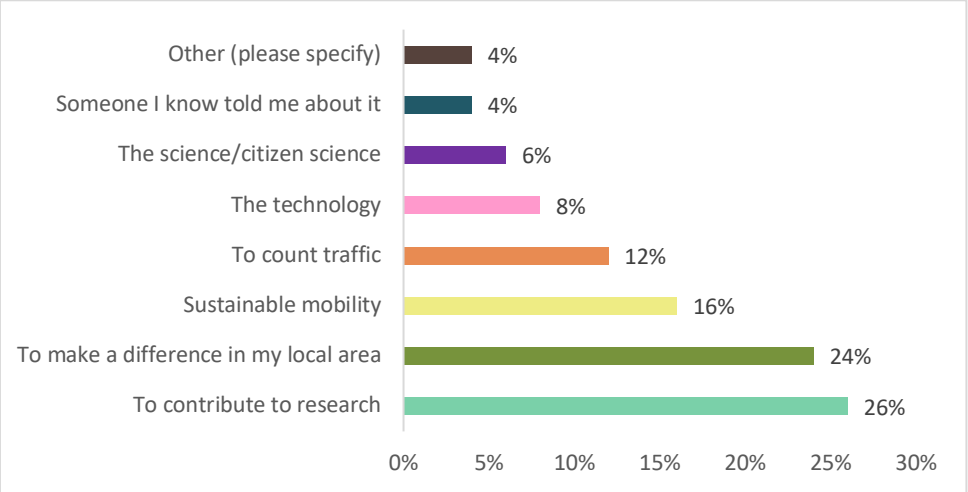

Figure 68 - Ljubljana survey respondents' motivations for joining WeCount (N=50).

Interviewees (N=9) took part out of an interest in one or several traffic-related issues and/or an interest in technology. Some wanted to: count traffic (N=1; 8%); to make their neighbourhood more cycling friendly (N=2; 17%); or wanted proof that road traffic should be diverted and the road improved (N=2; 17%). Others had a professional interest in the data or technology (N=3; 25%), in particular to understand peaks, trends and the broader picture with all the sensors (N=1; 8%), had an interest in the science/citizen science (N=2; 17%) or were in general concerned about speed and congestions (N=1; 8%).

Expectations

In general, the expectations of survey respondents were met through their involvement in WeCount (N=34; 68%) (Figure 69). Expectations of 13 respondents (26%) were partly satisfied, while for three (6%) their expectations were not well met. Only one person expressed why their expectations had been poorly met and it was due to technical problems.

Those whose expectations were met moderately well stated this was because of: issues with the device (N=4 of 11; 36%); disappointment in the low uptake of citizens (N=2; 18%); inaccurate counting (N=1; 9%); disappointment in not being able to count because view not suitable (N=1) a need for more information to make policy changes (N=1); belief that the data will not lead to policy change (N=1); and no expectations to begin with (N=1).

For those whose expectations were met, the reasons explained were: the simplicity of the project (N=2; 20%), ease of installation (N=1; 10%), support and explanation from the team (N=2; 20%) and access to street-level data and new knowledge (N=5; 50%).

> *Very nice project. We installed it in an office overlooking X street... The employees and the clients showed interest, curiosity... Great!* (Ljubljana36, counting citizen)

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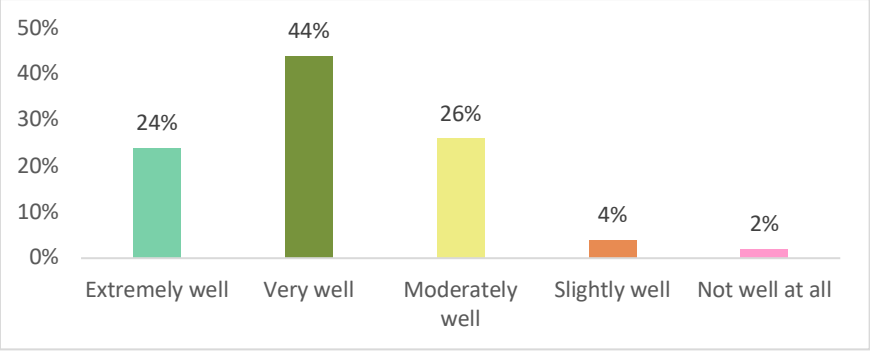

Figure 69 - Degree of expectations met for Ljubljana survey respondents (N=50).

Rating time on WeCount

86% of survey respondents (N=43) rated their time favourably (Figure 70). Four respondents (8%) gave WeCount an average rating and three people (6%) scored it poorly.

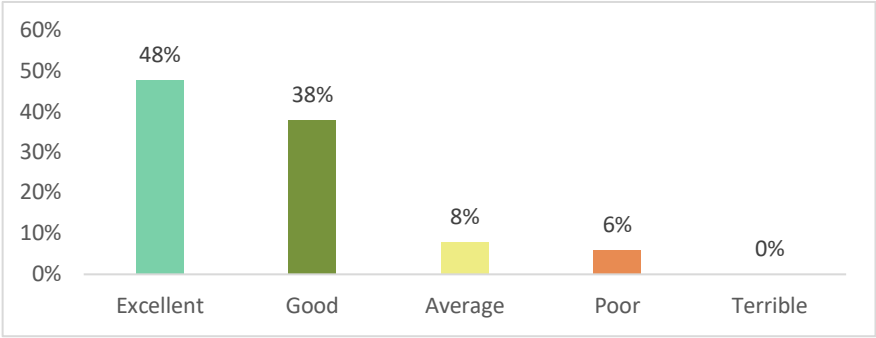

Figure 70 - Rating time on WeCount according to Ljubljana survey respondents (N=50).

Interviewees that were asked (N=5 of 9) had a positive experience overall. Wi-Fi issues and the fact that the device keeps sliding dampened one interviewees time on the project. While another raved about the "compact device" and that "it's a great and simple system".

> *The initial experience was very good as the installation of the Telraam device is really straightforward. The magic of this device is the machine vision algorithm, that works impressively.* (Ljubljana Citizen Interview04)

> *It is quite passive, [the] involvement. I guess it is up to the individual to then be more active and also use the data from the portal and possibly approach decision makers or talk with someone else. The excitement and novelty wears of in few weeks, and then the device kind of just stays in the window passively collecting data. The emails from the local WeCount team were welcome, and especially when the Telraam had stopped measuring, it was nice to receive and email and know that someone has been notified the device does not work, and it is not all up to me to keep an eye on.* (Ljubljana Citizen Interview07)

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Favourite aspect of being involved

Survey respondents in Ljubljana echo all the other cities in stating that "**being part of a research project**" was their favourite aspect of WeCount (N=35; 37%) (Figure 71). The second-best thing, according to 24 respondents (25%), was **being able to use the technology**, and the third best was feeling as though they were **making the difference** (N=19; 20%). As with the other cities, while the technology is not an initial draw, it becomes one of the most intriguing parts of the project. The two participants who marked "other" explained that either their only involvement so far has been installing the Telraam, or that they had a professional/tech interest in comparing the Raspberry Pi technology to a similar machine learning microcomputer.

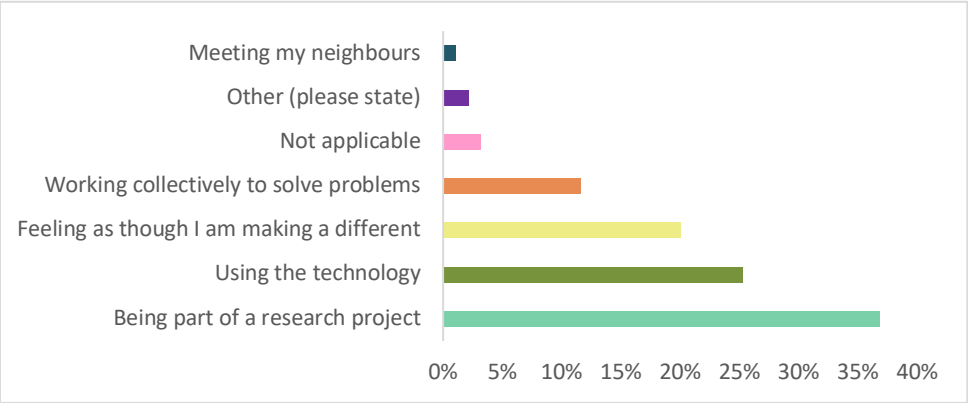

Figure 71 - Favourite aspect of WeCount according to Ljubljana survey respondents (N=95).

One third of the citizens interviewed were academics (from various disciplines). It is useful to have their feedback as a key part of objective one is to expand the knowledge base not only among citizens but among science more broadly. They all enjoyed partaking in the project for professional reasons:

> *With the WeCount project, I got familiar with new method and devices to collect daily traffic data and monitor them, which will help, in my future research and technical projects to use the same way.* (Ljubljana Citizen Interview08)

Satisfaction of technical help and support

Survey respondents in Ljubljana were **largely satisfied with the technical help and support provided**; slightly more so than other cities (Figure 72). The online support, in the form of instructions during registration, FAQ articles and helpdesk support received highest praise – 95% (N=34), 88% (N=29) and 90% (N=27), respectively, of survey respondents were extremely or somewhat satisfied. Help from people they knew or through social media was more neutral, but this may have been due to not engaging with these forms of help.

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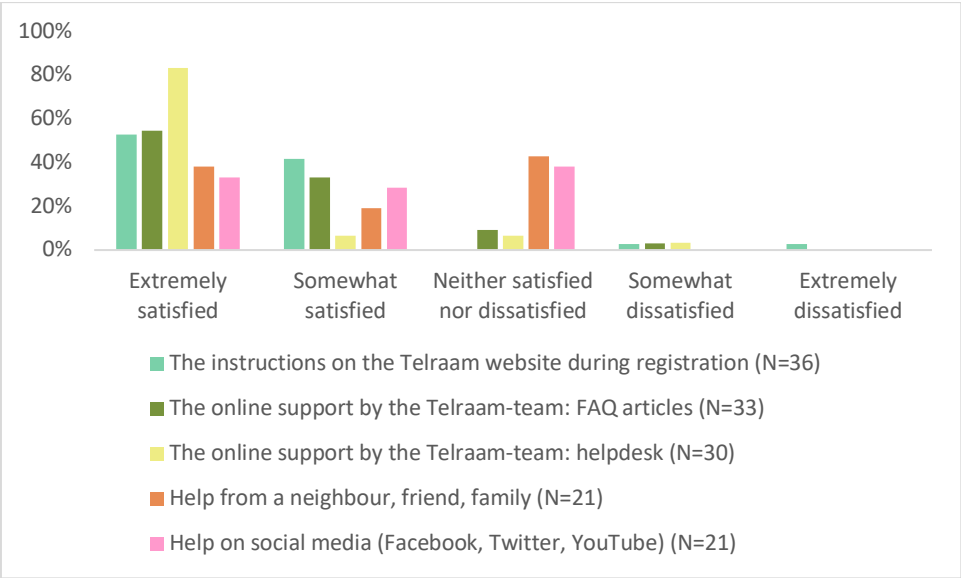

Figure 72 - Satisfaction of technical help and support, according to Ljubljana survey respondents.

Telraam data

Welcome pack

In Ljubljana the welcome pack, a toolkit to set counters up with all they needed to get their Telraam up and running, received largely positive reviews. **88% (N=30) of those that received a pack found it to be useful** (Figure 73). Two respondents, each, found the pack to be either useless in some way or had neutral views.

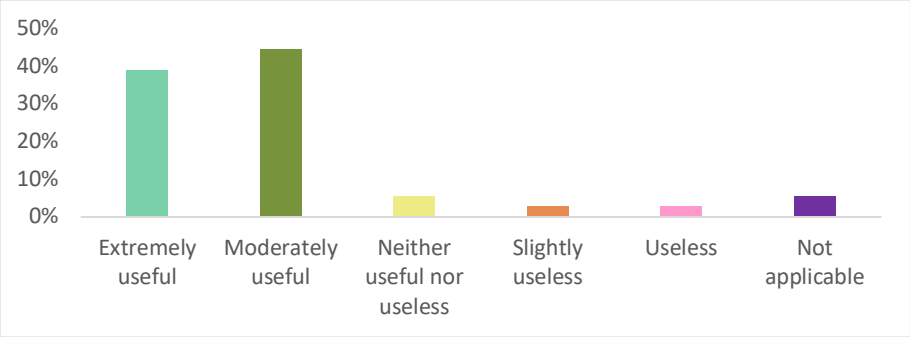

Figure 73 - Usefulness of welcome pack according to Ljubljana survey respondents (N=36).

Some respondents suggested improvements that could be made to the pack, although the majority related to the Telraam itself (N=8), and specifically issues related to sunlight and darkness (N=4 of 8) (see Improvements section). Three people suggested clearer instructions from start to finish.

> *Clearer instructions. I installed the device by myself, using my brain, not really finding the instruction useful.* (Ljubljana07)

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Use and rating on online platform

Survey respondents in Ljubljana were also complementary about the Telraam platform, containing the map, raw excel data, background information and API (Figure 74). Of those that used these features, **91% (N=30) thought their own data on the map to be good/very good, 71% (N=17) thought the same for their own excel data and 88% (N=28) ranked all map data the same.** Half of respondents to this question did not use the background information on the FAQ or the API (both N=16), which is a similar picture to the other cities. However, the other half that did largely expressed good/very good feedback.

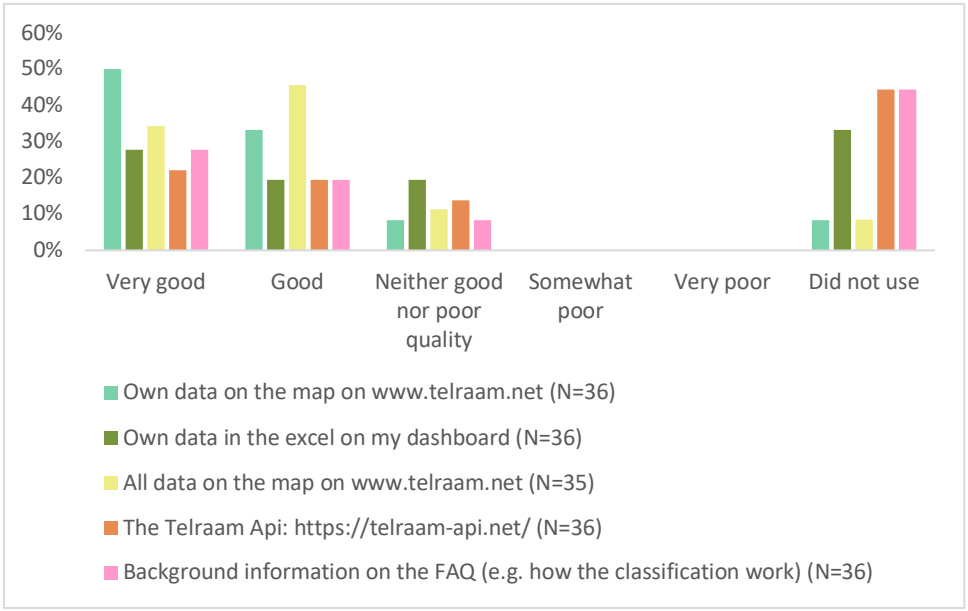

Figure 74 - Ljubljana survey respondents' views on Telraam datasets and resources (N=variable, average 36).

Saying this**, just over half of counting citizens view the Telraam dashboard regularly (N=16; 47%)**, with 35% (N=12) viewing the platform "now and then". Four respondents no longer look at the platform and two never have.

Reactions to traffic data and traffic accuracy

While responses may not fully reflect Ljubljana participants, it is interesting to see that slightly larger numbers are reporting not viewing data or making use of resources compared with other cities. For example, 8 of 42 respondents (19%) did not look at their street/area level data.

> *I set up my own camera and told the neighbours. Nothing else.* (Ljubljana10)

Those that did look at this data experienced a mix of reactions from being really surprised (N=6; 18%), mildly surprised (N=17; 50%) or unsurprised (N=11; 32%) (Figure 75).

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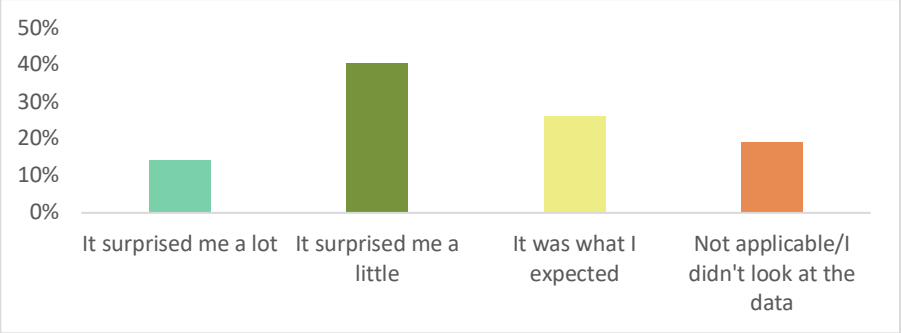

Figure 75 - Reaction of Ljubljana counter respondents to Telraam data (N=42).

Those who reported being surprised were so because: there are more vehicles than expected, be that cars or bikes (N=6) or less than expected (N=2); there is more speeding (N=2); they believe counting to be inaccurate (N=3); there are interesting traffic peaks (N=1); or no preconceived ideas on what the data would reveal (N=1). One respondent carefully articulated what data they saw and what they understand from this data:

> *There are more cyclists than cars, which is perhaps understandable on a one-way road. There is a higher number of cars in the afternoon which shows people use cars for their leisure time activities, that is contradictory with sustainable mobility. The impact of the epidemic was significant, especially on the number of cyclists.* (Ljubljana05)

Inaccurate counting included: miscounting bikes, especially on sunny days; counting vehicles, even though vehicle traffic is not allowed on that particular street; and registering speeds at up to 6x the speed limit, which may be due to poor device placement rather than actual figures.

One of the interviewees, a researcher, reflected on the sometimes-subjective nature of traffic numbers:

> *How people experience [the data] from their homes is a subjective response. I wouldn't dare say it's OK; we need a professional to deal with it, someone who can look into it from a slightly broader perspective, that of traffic and traffic flows.* (Ljubljana Citizen Interview02)

Those who were not surprised (N=11; 26%) and explained why (N=3), stated it was either because the device does not work, the data confirmed their rough estimate of the traffic, or because they had no expectations to begin with (each N=1).

Reflecting the above responses, **80% (N=24) had some question marks over the accuracy of the data coming from the Telraam** (Figure 76). These largely concerned over-/miscounting (N=7); an obscured/incomplete view (N=4); the device not working some of the time (N=2); and the need for ground-truthing (N=1).

> *Some results stood out and did not make sense, I predicted it was because of the twilight, weather or other reasons.* (Ljubljana24)

> *There may have been some errors because my Telraam records the intersection where cars stop because of a traffic light.* (Ljubljana33)

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The two respondents that stated "no, not at all" to the question on data accuracy did so because their device does not work.

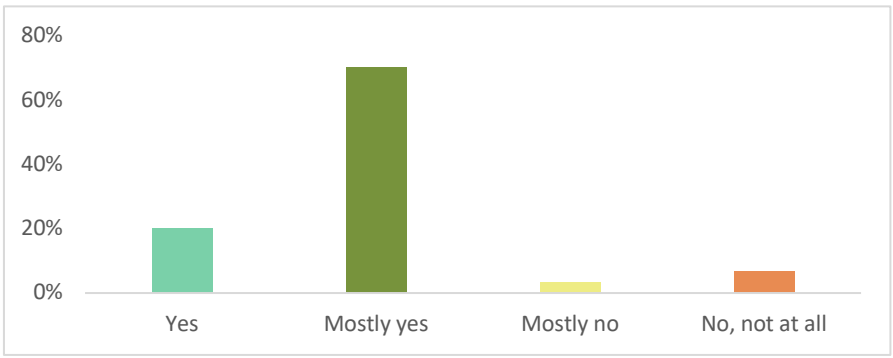

Figure 76 - Accuracy of data according to Ljubljana survey respondents (N=30).

Change in opinions and feelings

In Ljubljana, over half of survey respondents did not think that their overall opinions on street (N=23; 51%) or neighbourhood (N=28; 62%) traffic-related issues had change since their involvement in WeCount (Figure 77). **40% (N=18) experienced a little change in their opinions at a street level and 33% (N=15)** at a neighbourhood level. Meanwhile a much smaller proportion of 9% (N=4) and 4% (N=2), respectively, saw a big change.

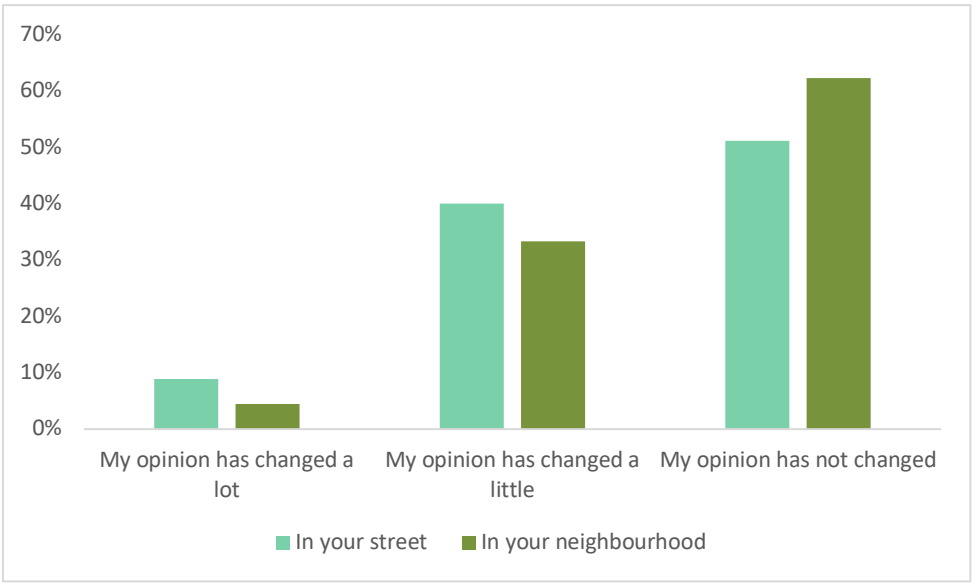

Figure 77 - Change in opinion of Ljubljana survey respondents on traffic-related matters (N=45).

Over half (55%; N=23) stated that no, their feelings did not change about where they live following WeCount involvement. However, this means **45% (N=19) did experience a change in feeling**.

One the one hand, changes relate to **worry**. For one respondent, the inefficient traffic/parking arrangement in their area, the "hospital district" of Ljubljana causes them great concern:

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In my neighbourhood we cannot live normally due to pollution, noise and not sufficient parking places. It is a problem for residents as well as patients who are treated or attend health facilities in this area. (Ljubljana11)

On the other hand, citizens feel more empowered, with greater "attention" to traffic, "hopefulness" in ability to make an impact and increased "awareness" on what can be done:

Awareness that we can contribute to improving the situation on the basis of tangible data. (Ljubljana21)

Knowledge improvement

On average, **44% of survey respondents experienced significant (massive/a lot of) improvement in their knowledge about traffic and mobility issues in general,** traffic problems/solutions in relation to their area, air quality and safety issues related to traffic, and knowledge on how to act on this information (Figure 78). The first two aspects were identified as the areas that saw most knowledge improvement, both scoring 21 marks (47%) in the "massive" or "a lot" categories, combined.

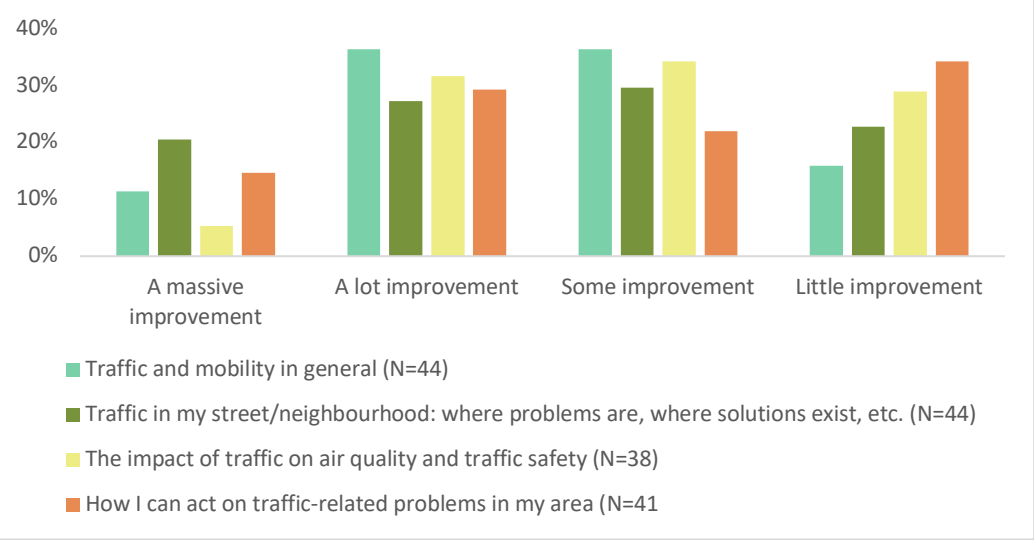

Figure 78 - Knowledge improvement among Ljubljana survey respondents (N=variable).

Current levels of activism

While there are glimmers of hope coming from the sense of empowerment experienced by some survey respondents, overall the cohort is less active (Figure 79) than the other case studies. 70% (N=35) in fact are not very active/active at all. This is likely explained by socio-political and cultural differences in Ljubljana, relative to Dublin, Cardiff, Leuven and Madrid/Barcelona. Namely, it was under Communist control until the 1990s, which restricted community organising and activism.

The Slovenian civil society sector has largely retained its structure from the communist period (1945-1990), when the tradition of a strong and developed civil society sector was interrupted

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and ended, and the public sector took over and controlled more or less all civil society functions. Community organising and activism are characterised by civil society apathy, relatively low interest in participating in events and fear of the possible consequences of critical engagement.

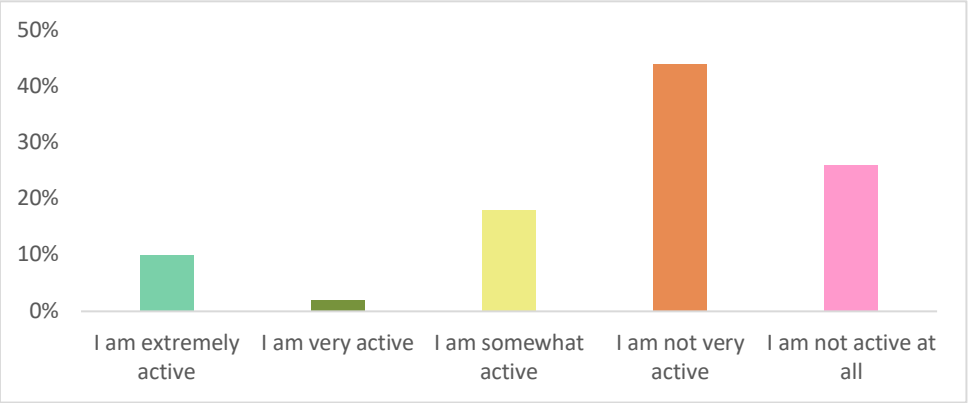

Figure 79 - Current levels of traffic-related activism among Ljubljana survey respondents (N=50).

WeCount-related action

Three out of 42 respondents (7%) have acted based on WeCount data (Figure 80). Few explained their reason for or against acting, or why they are still undecided, but those that did mentioned the following:

Respondents that have acted either 1) alerted the Council for Prevention and Safety in Road Traffic in the municipality and the police station, together with their neighbours, or 2) requested that the Ministry of Infrastructure send a proposal to the Municipality of Ljubljana to consider their data on high active travel use when preparing planned street renovations so that more space is reserved for cyclists and pedestrians.

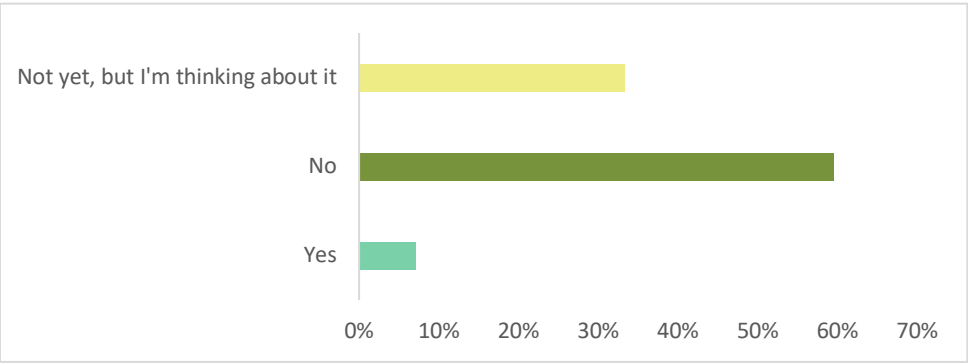

Figure 80 - Action taken by Ljubljana survey respondents (N=42).

Respondents who are on the fence are so because they question the accuracy of the data and therefore its usefulness in influencing the authorities, because they think someone else should send data to the relevant authorities, or a sense that they have ideas but not sure how to make them a reality:

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I want to have [a] sidewalk, for people walking to the bus station, because we do not have one. (Ljubljana06)

There was also mention of continued hope for change, despite so far being unsuccessful in improving traffic safety (e.g. barriers or street closures) and feeling "bothered" by traffic issues (i.e. noise) but not enough to do anything about it. Finally, those that do not plan on acting feel this way because either 1) it is not their responsibility ("area" of expertise), or 2) issues do not affect them personally (i.e. their street is quiet).

Interviewees showed a willingness to act but none have to date. For some it has made them "pay more attention", "monitor events more actively", offered "insight" into local conditions or informed discussions with partners or neighbours. For the researchers involved, the project provides a rich dataset they can use for their work and teaching. One interviewee said they may act if the data is sufficient; another seemed adamant they will act when the time is right:

If it turns out that I have the right data to approach the authorities and demand changes, I may do so in the future. (Ljubljana Citizen Interview04)

*[We] would use the data as an argument against too many vehicles passing by daily given the capacity and quality of the road… **I will prove** that children attending kindergarten and primary school have to cross a very dangerous road (in terms of high traffic) which is not appropriately equipped (no pavement, etc.).* (Ljubljana Citizen Interview06)

While the majority do not plan on acting, six out of seven interviewees (86%) agreed that the involvement of citizens in traffic planning was important:

It's only right that every voice should be heard. (Ljubljana Citizen Interview01)

By enabling citizens to participate in technical solutions like Telraam, [it] brings …broader public awareness of … technologies and the values they bring to the city and its citizens. (Ljubljana Citizen Interview05)

Future activism

88%, or 29 of 33 citizens are still counting traffic with their Telraam. Those that stopped counting either did so because of technical issues that could not be resolved (N=2; 50%) or Wi-Fi-related matters (N=2; 50%).

41% (N=18) are certain that they will continue using WeCount data post-project (Figure 81). However, it is possible that as many as 89% (N=39) could continue to work with the data if you include those currently unsure. 11% (N=5) are certain they will not continue. Only two interviewees were asked if they will continue after the project ends: one said yes, one said no if it meant having to buy one and, anyway, it is a nuisance as it interferes with their Wi-Fi.

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Figure 81 - Willingness of Ljubljana survey respondents to continue working with data post-WeCount (N=44).

COVID-19 pandemic impacts

93% (N=53) of respondents' time on WeCount was in some way impacted by the COVID-19 pandemic. Interestingly, **the majority of survey respondents in Ljubljana preferred engaging online (N=25; 44**%) over in-person (N=8; 14%) and had more time to dedicate on the project (N=13; 23%) as a consequence (Figure 82). This first point contrasts to the other cities, and again could be due to social-cultural factors that mean citizens are generally more introverted. But this is speculation.

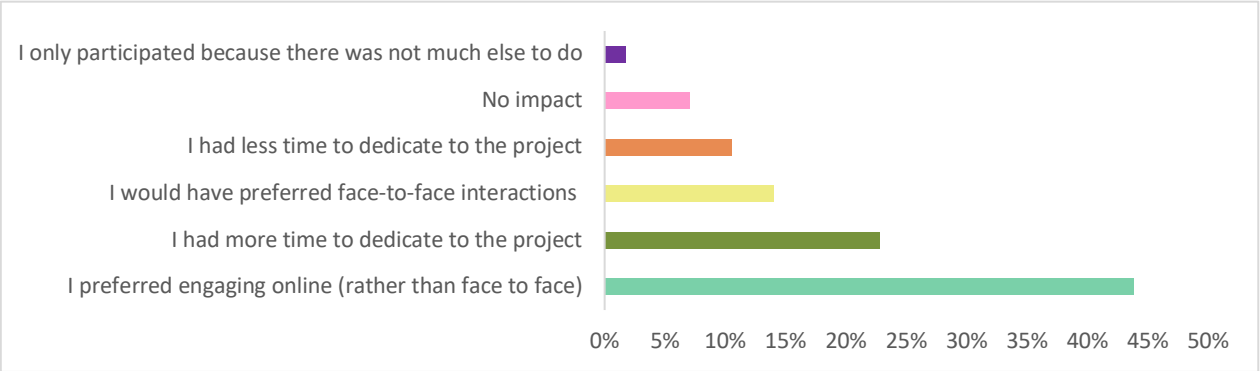

Figure 82 - Impact of Covid-19 Pandemic on WeCount experience according to Ljubljana survey respondents (N=57).

Those that were interviewed about the COVID-19 pandemic impacts stated that the lack of a human touch tainted their overall experience:

> *Moving activities to Zoom doesn't suit me,* ***I prefer genuine contact with people****. Some things are less understandable if we do not observe them live (device installation, etc.).* (Ljubljana Citizen Interview04)

> *I don't think COVID-19 had that big of an impact on my participation. OK, perhaps that a local team member from Ljubljana might have dropped by the device instead of sending it over mail, which would have enabled more interaction and exchange of words and experiences, which would have been nice.* (Ljubljana Citizen Interview07)

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Improvements

As with most other cities, "**a mechanism to show if efforts were successful/impactful**" was ranked top (N=20; 31%) among the improvements WeCount could make in future iterations/before the project ends (Figure 83). There was also a desire to **provide more ways to be involved (N=14; 22%) and to make it easier to understand the data (N=11; 17%)**. We speculate that these two aspects may have been better if the project was delivered in non-COVID times.

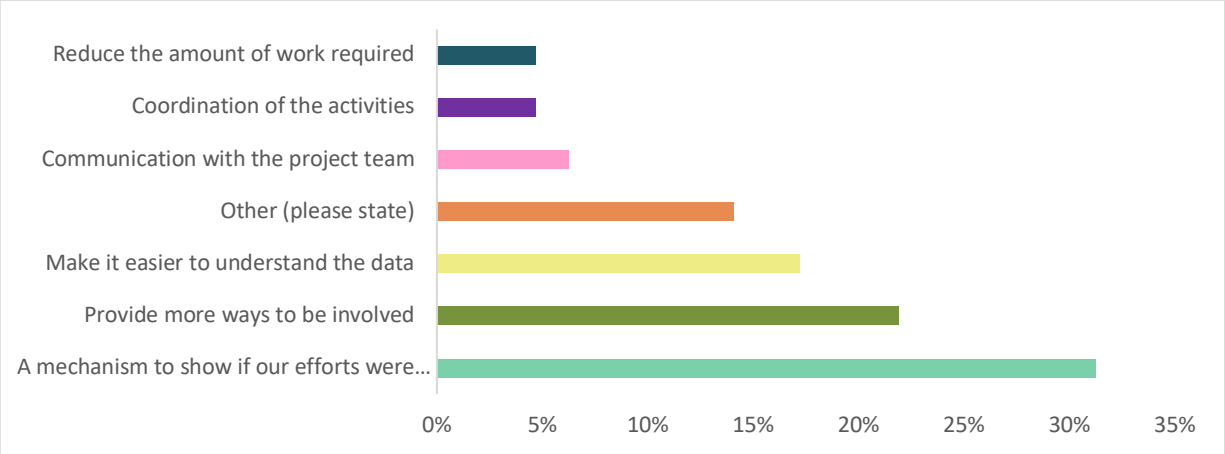

Figure 83 - Aspects of WeCount in need of improvement according to Ljubljana survey respondents (N=64).

"Other" suggestions covered three areas. First, **Telraam sensor specific**, in terms of improving installation instructions, API and sensor quality, as well as additional uplink options (ethernet, LoRa, etc.) and making to possible to have multiple cameras per user to improve data capture (i.e. the view, N=6). Second, **design specific**, in terms of allowing cities around Slovenia to participate and generally promoting the project more to increase participation (N=2). And finally, **privacy specific**, concerning the request to restrict data availability for potential advertisers (N=1). One person though nothing should change. Interviewees added that they would have liked in-person workshops (COVID-19 restrictions permitting), a simpler control panel and registration process, support and communication before and after receiving a Telraam to troubleshoot, and greater effort paid to converting the country specific webpages into Slovenian.

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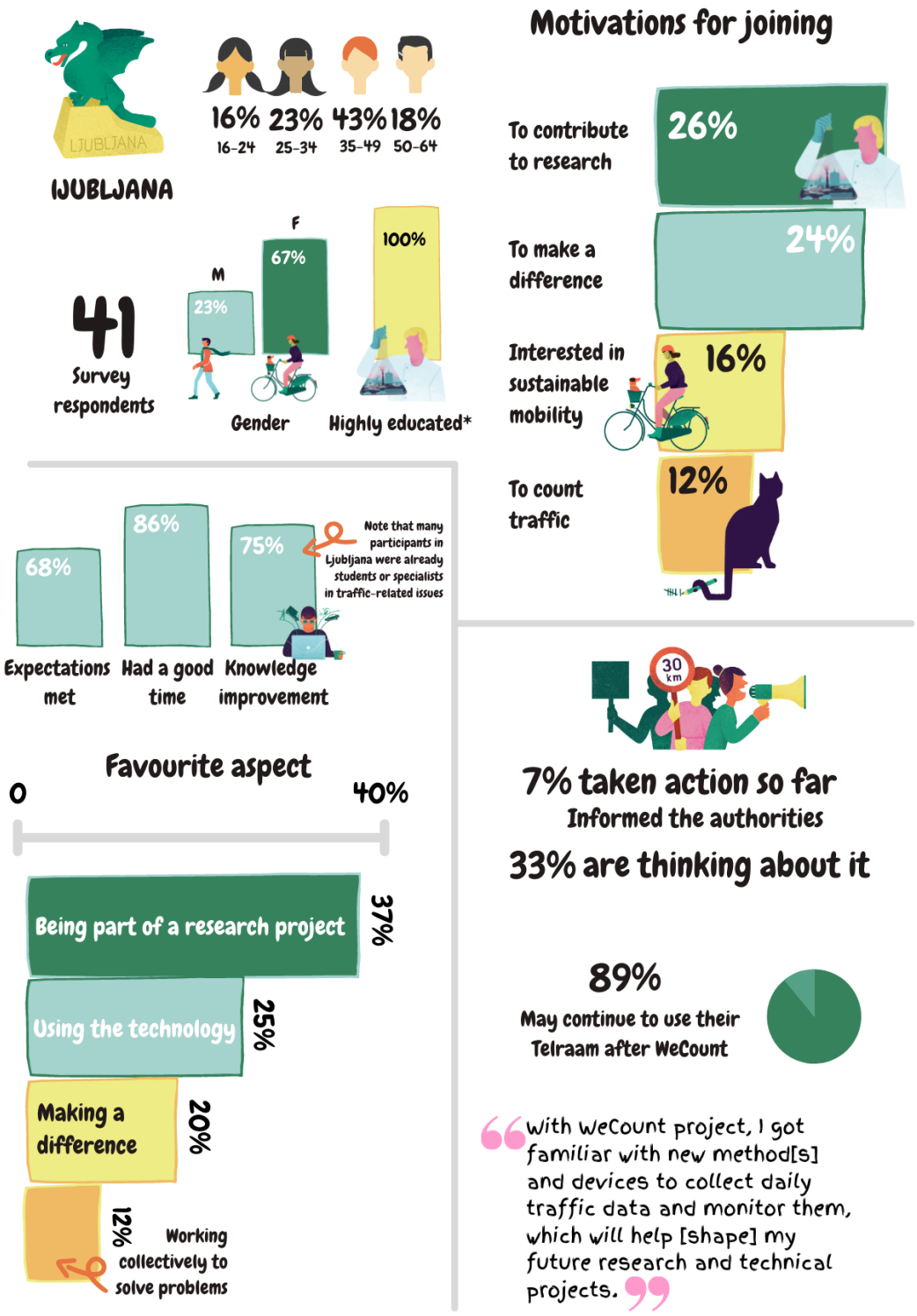
5.4.3.4 Summary of Citizen's experiences of WeCount in Ljubljana



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5.4.4 *Overall themes from the final cities*

From the analysis of survey responses and citizen interviews, it is clear that WeCount recruited participants with **demographics typical of citizen science projects** (Table 11). Across all three case studies, the majority of participants are highly educated and predominantly male. The average age of participants is perhaps a little less than would be expected, and in Ljubljana no one stated their age as 65 or above. The younger profile of the Ljubljana cohort may be an artefact of recruitment, or could be in part explained by lower digital skills among this age group, compared to other cities.

Table 11 - Survey demographic summary of final case studies.

Demographics	Cardiff	Dublin	Ljubljana
Completed surveys and participant types	32 (10% response rate). 96% (N=30) counting citizens, 6% involved (N=2)	53 (36% response rate). 94% (N=50) counters and 6% (N=3) local champions	50 (31% response rate) 82% (N=41) counters, 10% (N=5) involved, 6% (N=3) techies, 2% (N=1) local champion
Active counters	88% (N=23 of 26).	98% (N=39).	88% (N=29 of 33)
Will continue working with data post-WeCount	41% (N=12 of 29) yes; 59% unsure	67% (N=31) yes; 30% (N=14) unsure. 2 local champions plan to stay active	41% (N=18) yes; 48% (N=21) unsure. The local champion is also unsure
Age	41% (N=12) 35-49	55% (N=26) 35-49	43% (N=19) 35-49
Gender	52% (N=15) male	62% (N=29) male	60% (N=28) male
Education	90% (N=26) highly educated	83% (N=39) highly educated	79% (N=35) highly educated

It is apparent that there are **fewer technical teething problems** and **more positive responses to overall experience in the final WeCount case studies, comparing with the pilots (Leuven and Madrid/Barcelona)**. Overall, citizens enjoyed their time, and experienced some knowledge improvement (Table 12). This is understandable given the case studies had time to adjust to working in the pandemic and learn from the experiences of the pilot cities. With a mechanism to carry on counting, **citizens are also keen to keep contributing to data collection once the project ends**. While this demonstrates the benefit of the Telraam technology to society, the overwhelmingly positive feedback relating to the **care and attention paid by staff**, in Cardiff and Dublin in particular, and the **sense of empowerment** felt by many citizens, is in large part thanks to the effort made by staff to design a programme of activities that were able to support, inform, motivate and inspire those involved. The fact that one staff member in Cardiff cycled to each of the counters houses is testament to the project team going the extra mile, and a lesson for future citizen science projects; **citizens want to see researchers "practice what they preach"**.

Interestingly, citizens across these case studies showed an inclination towards "**making a difference**" more so than the pilot cities. Perhaps mere coincidence; perhaps something to do with how the project was marketed in these three case studies. Either way, this initial motivation

could have primed citizens into taking a more proactive role during the project cycle. Several citizens were also re-activated after a hiatus from activism; the opportunity to be part of something that had the potential to affect change restoked their fires. Overall, there was a diversity of reasons why citizens got involved, including an interest in measuring and monitoring air quality. This suggests citizens saw the potential of the project to tackle the myriad issues related to traffic and mobility.

Similar concerns over data accuracy have been expressed by citizens in the final case studies, as with the pilots before them; as too has the sense of **validation** by being able to see the data where they live. The final case studies have also brought to light how some citizens put **blind faith in the data**.

Finally, what has emerged from the analysis from these case studies, and was already becoming apparent in Madrid/Barcelona, is **the potential of WeCount as a pedagogical tool for teachers and parents**. Checking the dashboard became a routine for several families during the pandemic and could be exploited further in the future.

Table 12 - Summary of citizens' experience in final cities.

Experience		Cardiff	Dublin	Ljubljana
Motivations for joining		1) **To make a difference** (21%, N=26) 2) An interest in sustainable mobility (18%, N=23) 3) To count traffic (18%, N=22) 4) To contribute to research (17%, N=21)	1) **To make a difference** (21%, N=40) 2) An interest in sustainable mobility (21%, N=38) 3) To contribute to research (20%, N=37) 4) To count traffic (18%, N=34)	1) To contribute to research (26%, N=13) 2) **To make a difference** (24%, N=12) 3) An interest in sustainable mobility (N=8, 16%)
Expectations met to a satisfactory level		78% (N= 24)	65% (N=34)	68% (N=34)
Enjoyed time on WeCount		97% (N=31)	88% (N=47)	86% (N=43)
Favourite aspect		1) Being part of a research project (N=20, 32%); 2) Feeling as though they are making a difference (N=17, 27%) 3) Gathering evidence to support their campaign (N=11, 17%)	1) Being part of a research project (N=34, 32%); 2) Gathering evidence to support their campaign (N=25, 24%) 3) Feeling as though they are making a difference (N=20, 19%)	1) Being part of a research project (N=35, 37%); 2) Using the tech (N=24, 25%) 3) Feeling as though they are making a difference (N=19, 20%)
Significant knowledge	**Traffic in own street/area**	45% (N=13 of 29)	73% (N=34 of 47)	47% (N=21 of 44)

improvement (a lot/ massively)	**General topic knowledge**	32% (N=12 of 31)	66% (N=33 of 50)	47% (N=21 of 44)
	Traffic-related air pollution and safety	17% (N=4 of 24)	54% (N=20 of 37)	37% (N=14 of 38)
	How they can act	40% (N=11 of 27)	43% (N=17 of 40)	46% (N=18 of 41)
Change in opinion about traffic issues	**Street level**	Yes = 53% (N=16)	Yes = 63% (N=29)	Yes = 49% (N=22)
	Neighbourhood level	Yes = 50% (N=14)	Yes = 57% (N=25)	Yes = 37% (N=17)
Change in feelings about where they live		Yes = 47% (N=14) **A desire to live on a better street** (e.g. with fewer cars), **an increase in awareness** on the issues, and **more engaged and connected with their community**	Yes = 43% (N=20) **Less safe, more worried, more dissatisfied** where they live; **more hopeful** and **more willing to act**	Yes = 45% (N=19) **Worry** and **attention** to traffic**, hope** in ability to make an impact and **awareness** on what can be done
Actions taken		N=2 have lobbied the authorities (7%). 18 (62%) still thinking about acting (i.e. need more time and data) and 9 (31%) have not and likely will not act	N=7 (15%) to inform and influence debate, neighbours, authorities (including public consultations) and business. N=22 (47%) still thinking about it.	N=3 (7%) informed the council or police

5.4.4.1 COVID-19 pandemic impact

The majority of citizens' experiences of the WeCount project in Cardiff (59%; N=19), Dublin (82%; N=45) and Ljubljana (93%; N=53) were impacted by the COVID-19 pandemic. All case studies reported having more time to dedicate to the project as a key impact, and for Cardiff and Dublin meeting in-person would have been preferable if they were able to. Saying that, there were participants from both these case studies that actually preferred engaging online (N=11; 12%) and in Ljubljana it was the statement that received the most votes (N=25; 44%).

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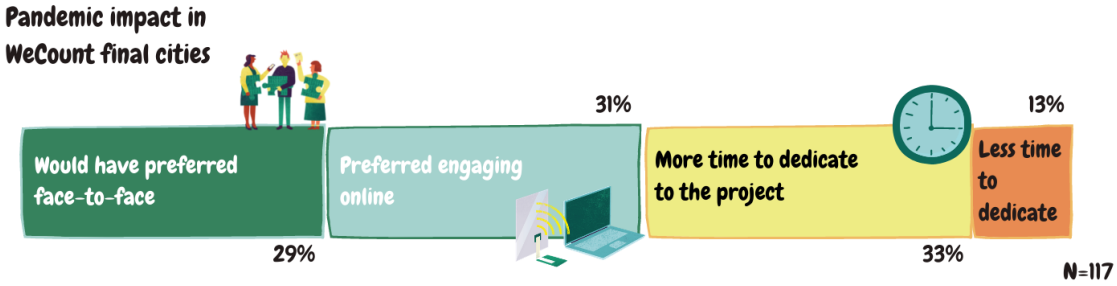

5.4.4.2 Telraam feedback

While there are obvious limitations with the technology, both in terms of ease of use by non-'techie' people the fact it is a low-cost sensor without the precision some might expect, overall the Telraam was received positively by citizens in the final WeCount case studies. Indeed, some commented that they are aware the tool is by no means perfect but it can at least contribute towards existing datasets, spark conversations and fuel activism. The Welcome Packs offered to counters and the online support available was helpful overall and the map data on the Telraam website was rated as good/very good by most. Very few people believed the Telraam data to be 100% accurate, which is a good thing as they were able to be critical about what they were seeing, and most of the remaining counters thought the data to be mostly accurate.

In Dublin they felt that the Telraam and associated technology should be given the most attention when improving the project, while for the other two cities they believe that "a mechanism to show if efforts are successful/impactful" is where attention needs to be given. For more feedback on the Telraam sensor see Table 13.

Table 13 - Feedback on Telraam and suggested WeCount improvement from survey respondents in final cities.

Telraam element		Cardiff	Dublin	Ljubljana
Usefulness of Welcome Pack		89% thought the pack was useful (N=24 of 27)	74% thought the pack was useful (N=32 of 43)	88% (N=30 of 36)
Satisfaction of support:	online	87% satisfied (ave N=16)	72% (ave N=27)	91% (ave N=30)
	social media	72% satisfied (N=7)	25% satisfied (N=3), 75% neutral (N=7)	62% (N=13)
	from people they know	77% satisfied (N=5)	30% satisfied (N=3), 70% neutral (N=9)	57% (N=12)
Dashboard usage		71% view regularly (N=20), 25% (N=7); view "now and then"	71% view regularly (N=31); 27% (N=12) view "now and then"	47% (N=16) view regularly; 35% (N=12) view "now and then"
Rating	Own map data	96% (N=26 of 27)	89% (N=39 of 44)	91% (N=30 of 36)

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	Own data in excel	66% (N=17 of 27)	43% (N=26 of 42)	71% (N=17 of 36)
	Map data of all counters	88% (N=23 of 27)	62% (N=26 of 41)	88% (N=28 of 35)
	FAQ information	100% (N=15 of 15); 44% (N=12 of 27) did not use	41% (N=17 of 41); 44% (N=18) did not use	85% (N=17 of 20); 44% (N=16 of 36) did not use
	API	98% (N=8 of 9); 65% (N=17 of 26) did not use	71% (N=10 of 14); 66% (N=27 of 41) did not use	75% (N=15 of 20); 44% (N=16 of 36) did not use
Reaction to data		74% (N=22) surprised to some extent.	76% (N=35) surprised to some extent.	68% (N=23) surprised to some extent
Belief in accuracy of data		20% (N=5). Inaccuracies in e.g. over or undercounting	35% (N=12). 59% (N=20) thought mostly yes.	7% (N=2). 70% (N=21) mostly yes. 10% (N=3) mostly no/no.
Suggested improvements		29% (N=13) a mechanism to show if efforts are successful/impactful; coordination of the activities 18% (N=8); provide more ways to be involved 16% (N=7)	28% (N=22 of 78) said the Telraam technology should be given the most attention; a mechanism to show if efforts were successful/impactful (N=17, 22%); and to make it easier to understand the data (N=15, 19%).	31% (N=20) a mechanism to show if efforts are successful/impactful; provide more ways to be involved (N=14, 22%) and to make it easier to understand the data (N=11, 17%)

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6 Reflections

6.1 Meeting evaluation objectives

Research question 1: Are we engaging citizens who provide meaningful representation of local populations (gender, social deprivation, education, income etc.)? While a diversity of ages, genders and educational backgrounds partook in WeCount, there is an older, well-educated, male bias. Perhaps it is simply the case that these types of people seek out citizen science projects and it is therefore inevitable that they will skew the demographics; or perhaps it is a general image problem of citizen science projects. However, as mentioned in D5.2, there are successful attempts of involving marginalised communities in citizen-led science projects and there is always more that can be done to find ways to involve them. The pandemic inevitably impacted upon recruitment; future iterations should use these findings as a baseline upon which to monitor progress towards greater diversity and inclusion.

Research question 2: Are the tools/technology sufficiently robust, yet engaging and simple to use? Through machine learning and efforts made by the technical team, the functionality of Telraam technology continues to improve. However, the technology threshold of the project remains relatively high. If this threshold was crossed, citizens found the platform and associated resources (e.g. map and excel) to be easy to use and engaging. However, the API was rarely used, perhaps due to its exceptionally high technological threshold.

Research question 3: Are the data generated and the engagement activities being used by citizens themselves? Citizens are sparking conversations with neighbours and contacting the authorities about the data they obtain. Some have been hesitant to share the data due to concerns over accuracy, previous failed attempts at convincing the authorities or the belief that individual action is futile. Many are wanting to see the WeCount project team to take forward the data to relevant authorities. The sensors and the data generated throughout the project are also being put towards schools' engagement activities. We will report on schools' engagement in D5.4.

Research question 4: Are new WeCount communities emerging that are self-sustaining with minimal central support? Not clear at this stage. From the analysis, we are not sure if lasting connections have been made. However, citizens are keen to continue using the data and have been talking to neighbours. We will see if we can explore this question further in D5.4.

Research questions 5 (impact on staff) and **6** (optimising WeCount) will be addressed in D5.4. However, a few takeaways have emerged from our analysis regarding RQ6:

1) there is a desire for the "human touch" when first engaging with the project, to settle concerns and build confidence;

2) online aspects (planned to be face-to-face) are not always inferior to in-person. Objectives can still be met and connections made;

3) points one and two suggest that a hybrid approach may be the way forward: with in-person drop-off moments, occasional community events/street parties, and an end of project celebration, with the majority of check-ins and training online, and a technical triage that could be online or in-person where a staff member/local champion pays a home visit.

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6.2 General reflections

This analysis has revealed an interesting theme related to responsibility. It is clear to see that some citizens are self-confessed activists, keen to lobby authority figures. It is also clear that others are keen to play their part in contributing to research (that can go on to influence the authorities). However, question marks remain for some over who they think is responsible in initiating change. Some people feel guilty that they cannot do more (thinking the onus is on them); others think it is not their responsibility to do anything with the data (thinking it is the responsibility of WeCount/authorities). And some are not even aware that they are already taking action, be that through community conversations or educating their children.

This plurality of perspectives on responsibility leads one to ask "what is activism, anyway". Activism comes in various forms, on a spectrum from passively informing to more proactively organising communities for collective action. There is no one way to do activism, and nor is one 'better' than the other. All types of activist are needed. And as was mentioned by the citizens who became inactive for some time, activism often cannot be sustained indefinitely; it is often short-lived and ebbs and flows with life and with moments that signal a call to action for individuals, groups and organisations.

6.3 Next steps

Where next for WeCount? There is an overwhelming appetite that the project continues; that people are supported in developing their data stories and taking forward actions. Citizens want to see more networks, more people involved, and want to see momentum build not dissipate. While the community aspect has not been a draw for all, the potential loss of nodes in the network as motivation dwindles and the Telraam starts to gather dust, may lead to a loss in valuable data collection and community bonds.

There are still some months left of the project and the hope is that by November there will have been more data analysis workshops to inspire further action and, in Cardiff in particular, there are policy workshops planned, which hope to equip citizens with the skills they need to present their data to the authorities. While actions taken so far may be low (see Table 12), the case studies are hopeful that more will emerge over the coming months, as citizens gather more evidence and now that lockdown restrictions are easing.

6.3.1 *WeCount 2.0*

The **recruitment and engagement** of citizens to WeCount was significantly hampered by the pandemic although fewer participants felt adversely affected by it in these final cities as they had already adapted to life during COVID-times (e.g. working online, managing other responsibilities). Having learnt from recruiting and engaging online and in-person (from previous experience), the project is in a good place from which to refine and develop WeCount 2.0. WeCount has added to a body of evidence showing that having **face-to-face contact** with researchers, **peer support** and **consistent attention to participants** is crucial for building trust, confidence, sustaining motivation and adding to overall project enjoyment in citizen science projects (Cappa et al. 2016; Deutsch and Ruiz-Córdova 2015; Laut et al. 2016). While, at

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the same time, it has shown how a **hybrid model** to citizen science may improve accessibility (Kleinhans et al. 2015; Pina et al. 2017) especially in terms of **neurodiversity**, in particular those with social anxiety, and should not be underestimated in the future. For greater chances of engaging people with low-socioeconomic status, more time and energy will need to be ploughed into community building, as mentioned in D5.2. All WeCount cities have or are in the process of **engaging schools** directly with Telraam, and they have a suite of educational materials in the pipeline. With these resources, future iterations could target parents and schools, with a focus on schools in lower socio-economic areas (determined by country-specific indicators), in a bid to develop more 'self-sustaining' networks of citizens, and contribute to enhanced citizenship among younger audiences.

Expectations could have been better met during the project, whether that was through better communication, a smoother installation process or a better device (i.e. with no wi-fi issues). **Communication**, as mentioned in D5.2, did not turn out the way the cities had hoped due to the COVID-19 pandemic, however as most communication is done online these days there is still work that can be done to improve for next time. Interim reporting, newsletters to inspire and share success stories from across Europe or even 'meet the team' style communications could all help to address some communication shortfalls while at the same time building the sense of community that some were craving. Many **technical improvements** are already in the pipeline. An element of hand-holding is recommended in the early stages for some citizens, with options for pre-assembled sensors and additional free training to equip them with the technical skills and confidence. Training could include how to sessions on setting up the device and on how to understand, interpret, think critically, and act upon the data. These elements could also go some way to improving knowledge among participants, which is perhaps lower than the project would have hoped. Training in community organising or how to be an active citizen early on, may also have paid dividends. Telraam could also tap into the 'internet-of-things' trend in households to control their environments. Perhaps these type of monitoring tools could even be integrated in the future, allowing households to measure activity within and outside of their homes all through a centralised device or app.

Citizens have highlighted the untapped potential of WeCount, in Dublin and Ljubljana in particular. To further expand the networks, re-invigorate existing counters and keep the momentum alive, perhaps the project could learn from other citizen science projects that offer **annual opportunities to crowdsource data collection** (e.g. iNaturalist). Additional events and activities (such as school resources) could also be developed, and targeted to specific community groups to further improve diversity and inclusion.

In D5.4 we will take a closer look at existing citizen science models and see whether we can offer additional insight as to how WeCount can evolve and sustain itself. However WeCount evolves, the key is that is **remains free for citizens to take part and that the data remains open source**.

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8 Appendices: Evaluation Toolkit

8.1 Information Sheet

City Case Study Lead Contact details

e.g. Professor Enda Hayes
University of the West of England, UK
enda.hayes@uwe.ac.uk

WeCount: Citizens Observing Urban Transport

You are being invited to take part in this project and research study as a resident of Cardiff. Please do ask us if there is anything that is not clear or if you would like more information, using the details above.

WeCount is a citizen science project, providing citizens with the tools to measure traffic and footfall on your street.

You will be asked to install a Telraam device on your window, which will count traffic passing by your house/workplace. The Telraam device data is compiled from five cities across Europe: Cardiff, Dublin, Leuven, Ljubljana, and Madrid. Data from the device does not store any visual information on your street or specific location, and will be stored on a secure server meeting EU General Data Protection Regulation (GDPR) conditions. We do not foresee any risks from participating in this project.

Each city will then use this data to discuss traffic issues relevant to each city. This may include car vs bike traffic, traffic speed, air pollution, and road improvements for active mobility.

You will be asked to take part in up to three (online) workshops discussing with other participants about your experience and opinions on traffic on your street, as well as how you found using the Telraam device. The workshops will take 1-2 hours and will be 6 months apart; the workshops will be audio recorded. You will also be asked to give your opinions on participation in the project through online surveys.

All personal details will be stored securely and separately to your opinions according to the GDPR code. Your personal comments will not be identifiable to you and will be grouped thematically with other participants for reporting. Overall outcomes from the project will be published in reports to the European Commission, on the WeCount website, in academic journals and conferences, and through wider media.

It is up to you to decide whether or not to take part. If you do decide to take part you will be given this information sheet to keep and asked to give your consent regarding the use of the information that you provide. If you decide to take part you are still free to withdraw up until the city case study closes.

Thank you for your time.

This study was given ethics consent by the Faculty Research Ethics Committee of the University of the West of England, UK, on behalf of the European Commission: researchethics@uwe.ac.uk

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8.2 Information Sheet (Interviews)

Dr Margarida Sardo
University of the West of England, UK
margarida.sardo@uwe.ac.uk

WeCount: Citizens Observing Urban Transport

You are being invited to take part in this research interview as a community member. Please do ask us if there is anything that is not clear or if you would like more information, using the details above.

WeCount is a citizen science project, providing citizens with the tools to measure traffic and footfall on your street.

You will be asked to take part in up to two interviews and possibly complete a reflective logs about your experience and opinions on running the Telraam devices and city case study. The interviews will take half an hour and will be 6 months apart; the interviews will be audio recorded. Reflective logs will be sent to you via email.

Your personal comments will not be identifiable to you and will be grouped thematically with other participants for reporting. All personal details will be stored securely and separately to your opinions according to the GDPR code. Overall outcomes from the project will be published in reports to the European Commission, on the WeCount website, in academic journals and conferences, and through wider media.

It is up to you to decide whether or not to take part. If you do decide to take part you will be given this information sheet to keep and asked to sign a consent form regarding the use of the information that you provide. If you decide to take part you are still free to withdraw up until May 2021 when we start report writing.

Thank you for your time.

This study was given ethics consent by the Faculty Research Ethics Committee of the University of the West of England, UK, on behalf of the EU Commission: researchethics@uwe.ac.uk

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8.3 Interview schedule (citizens)

Notes for interviewers:

Make sure participants read the information sheet and that you obtain written consent prior to commencing the interview.

Each interview has an unique reference. The interview reference is written in the top right corner of the interviewee's consent form (or similar in the digital format); quote this at the start of each interview (during recording). For example: Madrid01 could be the reference for the first interview with a citizen from the Madrid Case Study.

Ask: Can I please start recording?

If the participant gives consent, press record and read the interview unique reference.

Along with asking questions from either section A, B, C or D, please also ask the questions in section E for each participant

Thank you very much for agreeing to participate in this interview. It won't take very long and I'd appreciate it if you could be as honest as possible regarding your views and thoughts about the WeCount project. There are no right or wrong answers and we are really interested in capturing your thoughts and views.

Let's start by thinking about your involvement in the WeCount project. Which of the following best describes your involvement:

→ I am counting traffic with a Telraam (go to section A)

→ I am counting traffic/collecting data without a Telraam (go to section B)

→ I am a local champion (go to section C)

→ I took part in an event but don't have a Telraam (go to section D)

→ I am involved as a professional stakeholder (go to section E)

--- SECTION A ---

For counting citizens (with a Telraam/manual counting)

1. Can you please explain how you originally got involved in the WeCount project? What motivated you to be a part of WeCount?
2. Overall, how have you found it being involved? Has it lived up to your expectations?
3. And what have been some of your highlights? The most positive aspects of being involved?
4. From your experience, what aspects of the project do you think could be improved? (e.g. technology, communication)
5. What has been your experience been of using the digital technology? (e.g. the Telraam devise, website and dashboard)
6. What did you think of the data you found?

a. Do you hope to do anything with the data? (please explain)

7. How active around traffic-related issues in your street/neighbourhood would you say you were before WeCount?
8. Has your involvement in WeCount changed your level of activity?

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a. In what way?

9. Has your opinion changed about traffic related-issues in your street or neighbourhood? (please explain)

10. Do you have plans to continue using the Telraam now that the project has ended? (please explain)

--- GO TO SECTION E ---

--- SECTION B ---

For involved citizens (without a Telraam)

1. Can you please explain how you originally got involved in the WeCount project? What motivated you to be a part of WeCount?

2. In what ways were you involved in the project?

3. Overall, how have you found it being involved? Has the project lived up to those expectations?

4. And what have been some of your highlights? The most positive aspects of being involved?

5. From your experience, what aspects of the project do you think could be improved?

6. Can you explain why you didn't have a Telraam?

7. Did you find out about the data collected from your area?

a. (if yes,) …What did you think?

b. Do you hope to do anything with the data? (please explain answer)

8. How active around traffic-related issues in your street/neighbourhood would you say you were before WeCount?

9. Has your involvement in WeCount changed your level of activity?

a. In what way?

10. Has your opinion changed about traffic related-issues in your street or neighbourhood? (please explain)

11. Do you plan to remain involved in local action on traffic-related issues (or similar) now that the project has ended? (please explain)

--- GO TO SECTION E ---

--- SECTION C ---

Questions for local champions

1. Can you please explain how you originally got involved in the WeCount project? What motivated you to be a part a local champion?

2. In what ways were you involved in the project (what were your main responsibilities)?

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3. Overall, how have you found it being involved? Has the project lived up to those expectations?

4. And what have been some of your highlights? The most positive aspects of being involved?

5. From your experience, what aspects of the project do you think could be improved?

6. What has been your experience been of using the digital technology? (e.g. the Telraam devise, website and dashboard)

7. Did you find out about the data collected from your area?

a. (if yes,) …What did you think?

b. Do you hope to do anything with the data? (please explain answer)

8. How active around traffic-related issues in your street/neighbourhood would you say you were before WeCount?

9. Has your involvement in WeCount changed your level of activity?

a. In what way?

10. Has your opinion changed about traffic related-issues in your street or neighbourhood? (please explain)

11. Do you plan to remain involved in local action on traffic-related issues (or similar) now that the project has ended? (please explain)

--- GO TO SECTION E ---

--- SECTION D ---

Questions for local policy-makers and stakeholders

1. Can you please explain how you originally got involved in the WeCount project? What motivated you to be a part of WeCount?

2. In what ways were you involved in the project?

3. Overall, how have you found it being involved? Has the project lived up to those expectations?

4. And what have been some of your highlights? The most positive aspects of being involved?

5. From your experience, what aspects of the project do you think could be improved?

6. Did you have a Telraam? If no,

a. Can you explain why you didn't have one?

b. Would you have liked to have had one if you could?

7. Did you find out about the data collected from residents?/what did you find out from your dataset?

a. (if yes,) …What did you think?

b. Do you hope to do anything with the data? (please explain answer

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8. How active around traffic-related issues in your street/neighbourhood would you say you were before WeCount?

9. Has your involvement in WeCount changed your level of activity?

a. In what way?

10. Has the project influenced your work in any way? (e.g. provided evidence, enhanced community connections, improved understanding, etc)

11. Has your opinion changed about traffic related-issues in your city? (please explain)

12. Do you plan to remain involved with WeCount (staff, technology) or the citizens involved now that the project has ended? (please explain)

--- GO TO SECTION E ---

--- SECTION E ---

We are almost done, only a few more questions to go.

What is your age (in years): 16-24; 25-34; 35-49; 50-64; 65+; Prefer not to say

What is your gender: Male; Female; Other ; Prefer not to say

What is your highest level of education? School leaver certificate; Technical qualifications; Undergraduate degree; Postgraduate degree; Doctoral degree; Prefer not to say

Is there anything else you would like to add about the WeCount Project?

Thank you very much for your time and feedback, it's very much appreciated. Have a good day.

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8.4 Online survey (citizens)

Note: Online surveys were set up online using Qualtrics. The template shared here showcases the content of the surveys, not the style and formatting.

We would like to evaluate your recent experience with the WeCount project through a few questions, which will take no longer than 15 minutes to complete and will help us improve future projects.

We will hold your data securely and confidentially. If you have a Telraam, your views will be linked to your original Telraam information, however all comments will be anonymised and grouped together for reporting so you are not identifiable. Completing this survey indicates that you give consent for this data to be used in this research study.

Thank you for your time.

This study was given ethics consent by the Research Ethics Committee of the University of the West of England, UK . For information on the research please contact margarida.sardo@uwe.ac.uk

Section A: Your involvement

Choose the option that best describe your involvement in WeCount: (L)

I have a Telraam (Counting Citizen) -> go to Questions for counting citizens)

Please provide your Telraam number:

I live in a neigbourhood where traffic counting took place but I don't have a Telraam myself -> go to Questions for involved citizens

I have been facilitating community conversations and championing the project (with or without a Telraam) -> go to questions for local champions

Please provide your Telraam number:

I took part in an event but I don't have a Telraam

I am not involved as a citizen but as a professional stakeholder (researcher, member of the Council, etc) and took part in some events -> go to questions for 'stakeholders' (local policy makers and stakeholders, techies and local geeks)

Section B: questions for different participant groups

Questions for Counting Citizens

About the WeCount project:

What motivated you originally to participate in the WeCount project? (L)

I wanted to count traffic

I wanted to contribute to research

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I want to make a difference in my local area

I am interested in sustainable mobility in general

I am interested in technology for good

I am interested in the science/citizen science

My neighbour/family asked me personally/told me about it

Other. Please specify:_____

Overall, how would you rate your experience in the WeCount project: (L)

Excellent (5)

Very Good (4)

Good (3)

Not good (2)

Not good at all (1)

What was your favourite aspect about being involved in the WeCount project? (tick all that apply) (L)

Meeting my neighbours

Working collectively to solve problems

Being part of a research project

Feeling as though I am making a difference

Using technology for good

Gathering evidence to support my campaigning

Not applicable

Other (please state)

What aspect about being involved in the WeCount project would you improve? (L)

Communication with project team

Coordination of the activities

Reduce the amount of work required

Provide more ways to be involved

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Make it easier to understand the data

A mechanism to show if our efforts were successful/impactful

Other (please state):

_____

How well would you say were your expectations met? (L)

Very well (5)

Quite well (4)

Okay (3)

Not well (2)

Not at all (1)

Please explain your answer: _____

In your opinion, has participating in WeCount improved your knowledge about: (L)

	No improvement at all (1)	**Little improvement (2)**	**Some improvement (3)**	**A lot of improvement (4)**	**Extreme improvement at all (5)**
Traffic and mobility in general					
Traffic in your street/neighbourhood: where problems are, where are bottlenecks, where can we find good examples, etc.					
The impact of traffic on air quality and traffic safety					
How you can take action about traffic in your area					

How much action would you say you are currently taking with regards to traffic issues in your local area? (this can include talking about the issues to friends or Councilors, campaigning, distributing flyers, hosting events, or other activities) (L)

Extremely active(5)

A lot of action (4)

Some action (3)

A little action (2)

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No action (1)

Please add your Telraam number here:_____(L)

Is your Telraam currently still counting? (L)

1 Yes

2 No

3 I don't know

If not, why did you stop counting? (L)

1 Technical issues that I could not solve myself

2 I didn't want to be involved anymore (please explain)_____

Other reasons _____

Do you think the Telraam sensor is accurately capturing traffic numbers in your street?

Yes

Mostly

Mostly not

No

Don't know

Please explain

…...

In general, how satisfied are you with: (L)

	Did not make use of it (0)	Not satisfied at all (1)	Not very satisfied (3)	Satisfied (3)	Very satisfied (4)	Extremely satisfied (5)
The instructions on the Telraam website during registration						
The online support by the Telraam-team: FAQ-articles						
The online support by the Telraam-team: helpdesk						
Help from a neighbour, friend, family						

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Help on social media (Facebook, Twitter)						

How often do you look at the Telraam dashboard with the traffic data of your and other Telraams? (L)

I look at the data more than once a week

I look at the data only a few times a month

I look at the data only now and then

I looked at first but then stopped looking after some time

I have never looked at the data

In the Telraam toolkit you may have received printed materials in addition to your Telraam. How useful were these add-ons for you?

- Letter worth explanation about the project and tips to take action

Very useful

Somewhat useful

Not really useful

Not useful at all

Did not use

NA

- Flyers for your neighbours

Very useful

Somewhat useful

Not really useful

Not useful at all

Did not use

NA

- Poster 'here I count' to put at your window

Very useful

Somewhat useful

Not really useful

Not useful at all

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Did not use

NA

Do you have any suggestion to make this toolkit better?

How do you rate the following data sources? (L)

	Rating scale (1-5) **0 Did not use** **1 very poor; 2 poor, 3 ok; 4 good; 5 very good**
Own data on the map on www.telraam.net	
Own data in the excel on my dashboard	
All data on the map on www.telraam.net	
The Telraam Api: https://telraam-api.net/	
Background information on the FAQ (eg how the classification work): https://telraam.zendesk.com/hc/nl	

Thinking about the WeCount/Telraam data for your street or area: (L)

It surprised me a lot

It surprised me a little

It was what I expected

Not applicable/ didn't look at the data

Please explain your choice:_____

Has WeCount changed your overall opinions about traffic-related issues?

	No (1)	**My opinion changed a little (2)**	**My opinion changed a lot (3)**
In your street			
In your neighbourhood			

Has your involvement in WeCount changed how you feel about where you live?

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Yes/No

Please explain…

Did you take any action based on Telraam data?

Yes

No

Not yet, but I am thinking about it.

If yes, please state what action:

Now that the project has ended, will you continue to work with the WeCount data and/or research team:

Yes

No

Not sure yet

If you have anything to add about the WeCount project please add your comments here:

Thank you.

Questions for Involved Citizens

About the WeCount project:

What motivated you originally to participate in the WeCount project? (L)

I wanted to count traffic

I wanted to contribute to research

I want to make a difference in my local area

I am interested in sustainable mobility in general

I am interested in technology for good

I am interested in the science/citizen science

My neighbour/family asked me personally/told me about it

Other. Please specify:_____

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Overall, how would you rate your experience in the WeCount project: (L)

Excellent (5)

Very Good (4)

Good (3)

Not good (2)

Not good at all (1)

What was your favourite aspect about being involved in the WeCount project? (tick all that apply) (L)

Meeting my neighbours

Working collectively to solve problems

Being part of a research project

Feeling as though I am making a difference

Using technology for good

Gathering evidence to support my campaigning

Not applicable

Other (please state)

What aspect about being involved in the WeCount project would you improve? (L)

Communication with project team

Coordination of the activities

Reduce the amount of work required

Provide more ways to be involved

Make it easier to understand the data

A mechanism to show if our efforts were successful/impactful

Other (please state):

_____

How well would you say were your expectations met? (L)

Very well (5)

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Quite well (4)

Okay (3)

Not well (2)

Not at all (1)

Please explain your answer: _____

In your opinion, has participating in WeCount improved your knowledge about: (L)

	No improvement at all (1)	**Little improvement (2)**	**Some improvement (3)**	**A lot of improvement (4)**	**Extreme improvement at all (5)**
Traffic and mobility in general					
Traffic in your street/neighbourhood: where problems are, where are bottlenecks, where can we find good examples, etc.					
The impact of traffic on air quality and traffic safety					
How you can take action about traffic in your area					

How much action would you say you are currently taking with regards to traffic issues in your local area? (this can include talking about the issues to friends or Councilors, campaigning, flyering, hosting events, or other activities) (L)

Extremely active(5)

A lot of action (4)

Some action (3)

A little action (2)

No action (1)

How were you involved in the WeCount project?

I counted manually

I attended a workshop or event

Other, please state

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Why did you not have a Telraam?

Window not suitable

Not interested in the technology

Data privacy concerns

I don't think I would be able to install it / I'm no good with technology

There is no Telraam network active in the place where I live

Other, please state

Did you find out about the data collected from your area?

Yes/No

(if yes) What did you think about the findings?

It surprised me a lot

It surprised me a little

It was what I expected

Not applicable/ didn't look at the data

(if yes to above) Did you take any action based on Telraam data?

Yes

No

Not yet, but I am thinking about it.

If yes, please state what action:

Has WeCount changed your overall opinions about traffic-related issues?

	No (1)	**My opinion changed a little (2)**	**My opinion changed a lot (3)**
In your street			
In your neighbourhood			

Has your involvement in WeCount changed how you feel about where you live?

Yes/No

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Please explain...

Now that the project has ended, will you continue to work with the WeCount data and/or research team:

Yes

No

Not sure yet

If you have anything to add about the WeCount project please add your comments here:

Thank you!

Questions for Local Champions

What motivated you originally to participate in the WeCount project? (L)

I wanted to count traffic

I wanted to contribute to research

I want to make a difference in my local area

I am interested in sustainable mobility in general

I am interested in technology for good

I am interested in the science/citizen science

My neighbour/family asked me personally/told me about it

Other. Please specify:_____

Overall, how would you rate your experience in the WeCount project: (L)

Excellent (5)

Very Good (4)

Good (3)

Not good (2)

Not good at all (1)

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What was your favourite aspect about being involved in the WeCount project? (tick all that apply) (L)

Meeting my neighbours

Working collectively to solve problems

Being part of a research project

Feeling as though I am making a difference

Using technology for good

Gathering evidence to support my campaigning

Not applicable

Other (please state)

What aspect about being involved in the WeCount project would you improve? (L)

Communication with project team

Coordination of the activities

Reduce the amount of work required

Provide more ways to be involved

Make it easier to understand the data

A mechanism to show if our efforts were successful/impactful

Other (please state):

_____

How well would you say were your expectations met? (L)

Very well (5)

Quite well (4)

Okay (3)

Not well (2)

Not at all (1)

Please explain your answer: _____

In your opinion, has participating in WeCount improved your knowledge about: (L)

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	No improvement at all (1)	Little improvement (2)	Some improvement (3)	A lot of improvement (4)	Extreme improvement at all (5)
Traffic and mobility in general					
Traffic in your street/neighbourhood: where problems are, where are bottlenecks, where can we find good examples, etc.					
The impact of traffic on air quality and traffic safety					
How you can take action about traffic in your area					

How much action would you say you are currently taking with regards to traffic issues in your local area? (this can include talking about the issues to friends or Councilors, campaigning, flyering, hosting events, or other activities) (L)

Extremely active(5)

A lot of action (4)

Some action (3)

A little action (2)

No action (1)

What is your Telraam number?

…

I didn't have a Telraam

How did you become a local champion for WeCount? (L)

It emerged organically during the project

I put my name forward

A friend put my name forward

I was approached by a member of the project team

Other (please explain)…

What were your main responsibilities? (L)

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Spreading awareness

Encouraging others to have a Telraam

Organising local events

Providing technical assistance to people with a Telraam

Other (please explain)…

Do you plan to continue as a local champion now that the project is over?

Yes

No

Not sure

Please explain

Thinking about the WeCount/Telraam data for your street or area:

It surprised me a lot

It surprised me a little

It was what I expected

Not applicable/ didn't look at the data

Please explain your choice:_____

Has WeCount changed your overall opinions about traffic-related issues?

	No (1)	**My opinion changed a little (2)**	**My opinion changed a lot (3)**
In your street			
In your neighbourhood			

Has your involvement in WeCount changed how you feel about where you live?

Yes/No

Please explain...

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Did you take any action based on Telraam data?

Yes

No

Not yet, but I am thinking about it.

If yes, please state what action:

Now that the project has ended, will you continue to work with the WeCount data and/or project team:

Yes

No

Not sure yet

If you have anything to add about the WeCount project please add your comments here:

Thank you.

Questions for Local policy-makers & stakeholders

What is your area of work?

Policy

Planning

Research

Business

Other (please explain) ….....

In what ways did you interact with the WeCount project?

I attended public events/workshops

I attended consortium/project meetings

I connected with local participants for my own research/professional interests

I connected the team with local contacts

Other (please explain)

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How has the project influenced your work?

Greater community connections

Greater professional connections

It has provided me with evidence to support my work

It has improved my understanding of traffic-related issues

I have shared the projects findings with colleagues

Anything else, please add here:

Now that the project has ended, will you continue to work with the WeCount data and/or project team:

Yes

No

Not sure yet

Did you take any action based on the WeCount findings?

Yes/no

Please explain ….

If you have anything to add about the WeCount project please add your comments here:

Thank you.

Questions for Professionals, Techies & local geeks

What motivated you originally to participate in the WeCount project? (L)

I wanted to count traffic

I wanted to contribute to research

I want to make a difference in my local area

I am interested in sustainable mobility in general

I am interested in technology for good

I am interested in the science/citizen science

My neighbour/family asked me personally/told me about it

The WeCount Project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 872743

Other. Please specify:_____

Overall, how would you rate your experience in the WeCount project: (L)

Excellent (5)

Very Good (4)

Good (3)

Not good (2)

Not good at all (1)

What was your favourite aspect about being involved in the WeCount project? (tick all that apply) (L)

Meeting my neighbours

Working collectively to solve problems

Being part of a research project

Feeling as though I am making a difference

Using technology for good

Gathering evidence to support my campaigning

Not applicable

Other (please state)

What aspect about being involved in the WeCount project would you improve? (L)

Communication with project team

Coordination of the activities

Reduce the amount of work required

Provide more ways to be involved

Make it easier to understand the data

A mechanism to show if our efforts were successful/impactful

Other (please state):

_____

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How well would you say were your expectations met? (L)

Very well (5)

Quite well (4)

Okay (3)

Not well (2)

Not at all (1)

Please explain your answer: _____

In your opinion, has participating in WeCount improved your knowledge about: (L)

	No improvement at all (1)	**Little improvement (2)**	**Some improvement (3)**	**A lot of improvement (4)**	**Extreme improvement at all (5)**
Traffic and mobility in general					
Traffic in your street/neighbourhood: where problems are, where are bottlenecks, where can we find good examples, etc.					
The impact of traffic on air quality and traffic safety					
How you can take action about traffic in your area					

How much action would you say you are currently taking with regards to traffic issues in your local area? (this can include talking about the issues to friends or Councilors, campaigning, flyering, hosting events, or other activities) (L)

Extremely active(5)

A lot of action (4)

Some action (3)

A little action (2)

No action (1)

<u>In what ways did you interact with the WeCount project (tick all that apply)?</u>

I offered technical support

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I attended a WeCount event

I helped to hack the data

I provided industry connections

I used Telraam data (api) to create an application (or something else?)

Other (please state):

Has WeCount changed your overall opinions about traffic-related issues?

	No (1)	**My opinion changed a little (2)**	**My opinion changed a lot (3)**
In your street			
In your neighbourhood			

Now that the project has ended, will you continue to work with the WeCount data and/or research team:

Yes

No

Not sure yet

If you have anything to add about the WeCount project please add your comments here:

FOR ALL SURVEYS: Section C: About you

Age (year): (L)

1 16-24

2 25-34

3 35-49

4 50-64

5 65+

6 Prefer not to say

Gender: (L)

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1 Male

2 Female

3 Other

4 Prefer not to say

What is your highest level of education? (L)

1 School leaver certificate

2 Technical qualifications

3 Undergraduate degree

4 Postgraduate degree

5 Doctoral degree

6 Prefer not to say

We might be conducting additional telephone/online interviews to collect feedback from participants. If you're interested in being interviewed, please leave your email address below:

Thank you for your time and feedback.

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8.5 Self-Reflective log template

Guidance:

1. Take a look at this reflective log **ahead** of your workshop/event.

2. **After you finish** your workshop or event (after participants leave), take 15 min to reflect on how it went. Please log in to your email account or laptop, etc. and complete the self-reflective log.

3. Send your reflections via email to your WP5 Mentor. You will receive a reminder if you forget, don't worry.

4. Please complete the template in English.

5. Please avoid printing the log and filling it in by hand, as it's much harder to extract data from it.

Template:

General information

Event name:

Location:

Date:

Time:

Brief event description (type of workshop/event, duration, online or face-to-face, etc.):

Communication channel(s) used to reach participants:

If face-to-face: Brief description of your venue (venue type, atmosphere, etc.):

Why did people want a Telraam?

People use my area as a rat run	Our community is not safe	I want to monitor cars speeding	I want to get an idea of local air quality	I love tech
I want to encourage cyclists	I want to encourage walkers	I will use the data to lobby local policymakers	I will use the data for my school or group	

Strengths - What went well?

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Weaknesses - What didn't go so well?
Improvements - In your opinion how could the event be improved? What could you have done differently?
Engagement - How easy or difficult was it to engage with the participants? (reflect only on those that apply to your activity) 1. Talk to your participants 2. Get the participants to talk to you 3. To get participants to do the activity
Were the participants knowledgeable? What kinds of knowledge or understanding of the topic did they have?
Please add any other thoughts, comments or reflections about the event.

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