Deliverable 6.5

Stakeholders' Feedback and Evaluation of the AI4Gov Use Cases V2

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AUTHORS		
	Name	**Organisation**
Document leader	Danai Kyrkou	ViLabs
Participants	Eri Goga	ViLabs
	Lila Iosif	MINTOUR
	Veroniki Diamantara	MINTOUR
	Konstantina Tsakopoulou	MINTOUR
	Matej Kovačič	JSI
	Kostis Mavrogiorgos	UPRC
	Dimitris Apostolopoulos	VVV
	Alenka Guček	JSI
	Tanja Zdolšek Draksler	JSI
	Celia Parralejo	DPB
	Georgia Panagiotidou	AUTH
Reviewers	Fabiana Fournier	IBM
	Lior Limonad	IBM
	Irina Nicolae	SIE
	Iuliana Stroia-Vlad	SIE
	Spiros Borotis	MAG

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Abbreviations

Abbreviation	Description
AI	Artificial Intelligence
ALTAI	Assessment List for Trustworthy Artificial Intelligence
CSV	Comma-Separated-Values
DGF	Data Governance Framework
DPB	Diputación Provincial de Badajoz
DMP	Data Management Plan
DWTS (or EDAR in Spanish)	Decentralised Wastewater Treatment System
EU	European Union
GDPR	General Data Protection Regulation
GPS	Global Positioning System
HRF	Holistic Regulatory Framework
IoT	Internet of Things
JSI	Jozef Stefan Institute
KPI	Key Performance Indicator
MD	Markdown
MT	Ministry of Tourism
OECD	Organisation for Economic Cooperation and Development
OpenAIRE	Open Access Infrastructure for Research in Europe
OwiD	Our World In Data
PDF	Portable Document Format
PRT	Policy Recommendation Toolkit
RFID	Radio Frequency Identification
SAX	Situation-Aware Explainability
SCADA	Supervisory Control and Data Acquisition
SDG	Sustainable Development Goal
SME	Small Medium Enterprise
SUMP	Sustainable Urban Mobility Plan
UC	Use Case
UEQ	User Experience Questionnaire
URL	Uniform Resource Locator
US	User Stories
VVV	Vari - Voula - Vouliagmeni
WP	Work Package
WWTP (or ETAP in Spanish)	Wastewater Treatment Plants
XAI	eXplainable AI

Abstract

This deliverable, D6.5 "Stakeholders' Feedback and Evaluation of the AI4Gov Use Cases V2", presents the final outcomes of the AI4Gov piloting, validation, and evaluation activities conducted under WP6 – Use Cases Implementation, Validation, and Evaluation over the full project lifecycle (M1–M36). It provides the consolidated evaluation methodology, the final set of evaluation tools, and the results of the second and final validation phase of the AI4Gov tools, ensuring continuity and comparability with the first validation cycle reported in D6.4.

The evaluation followed an iterative, non-linear approach, progressing from a formative first validation to a summative second validation, which allowed feedback from early testing to directly inform tool refinement. Results from the second validation phase (M27–M33) demonstrate improvements in tool maturity (prototypes), usability, transparency, and trustworthiness across most use cases. High User Experience Questionnaire (UEQ) scores confirm satisfactory usability and engagement, while trust assessments indicate increased confidence in data handling and decision-support capabilities. At the same time, the evaluation identified remaining challenges related to efficiency, responsiveness, data quality, and institutional adoption, highlighting the need for complementary organisational and governance measures.

Overall, the findings confirm the effectiveness and added value of the AI4Gov tools for public sector innovation, providing a robust evidence base for future scaling, policy uptake, and the responsible deployment of AI in public governance.

1 Introduction

1.1 Purpose and scope of the deliverable

This deliverable is the result of the work that has taken place under WP6 - Use Cases Implementation, Validation, and Evaluation (M1-M36). It contains the final evaluation results of the pilot activities after the 2nd validation of the AI4Gov tools, presenting also the final version of the AI4Gov evaluation methodology, and the evaluation tools. This is the second and final version of the deliverable on feedback and evaluation of the AI4Gov piloting activities. A similar structure has been adopted for D6.4 and D6.5 to ensure consistency.

1.2 Document structure

The deliverable is structured as follows: Following this introduction, chapter 2 describes the evaluation cycle, the timeline AI4Gov followed, and the evaluation methodology, as well as the contribution of the UCs to the Sustainable Development Goals (SDGs). Chapter 3 presents the results of the 2nd validation phase for each use case (UC) for the period M27-M33, as well as some comparative reflections. Chapter 4 summarises the key findings. Chapter 5 includes the reference list, and finally, chapter 6 is the appendix.

1.3 Relation to other WPs

WP6 interacts closely with all other WPs. By capturing and consolidating user requirements from the pilots, WP6 directly supported the technical development activities in WP2, WP3, and WP4, while also receiving continuous feedback to further refine and specify the needs of the Use Cases. WP6 was also closely aligned with T1.4 (Gender and ethics), T1.5 (Risks and threats of AI), and T2.2 (Holistic Regulatory Framework), ensuring that ethical, legal, and risk-related considerations were systematically integrated into the piloting and evaluation activities. In addition, WP6 maintained strong links with WP5, as the training courses developed within the project were used during the pilot workshops. Finally, WP6 provided key inputs to WP7, contributing both to communication, dissemination, and standardisation activities, and to the evidence base required for developing a robust exploitation and sustainability plan.

1.4 Target audience of the deliverable

This document constitutes the second and final version of the feedback and evaluation of the AI4Gov pilot activities for the period M24-M36. It is an internal guide for the project's pilot manager and all project partners to use it as a reference point for understanding the UC Scenarios and the results of the 1st validation phase after the testing of the AI4Gov tools. In addition, the document can be utilised as a practical tool for "Horizon Europe" pilot managers of on-going and

future projects, who will be willing to explore the AI4Gov pilot strategy and capitalise on it, as well as a control point for the reviewers of the European Commission.

1.5   Evaluation and data protection

The piloting activities of the AI4Gov UCs involved data gathering processes, especially during the evaluation step. To minimise any data related risks, the partners followed the Data Governance Framework (DGF) that was developed within the AI4Gov Project under T3.2 – Data Governance Framework. The DGF is a structured and comprehensive set of guidelines, policies, and procedures designed to manage, share, and protect data in alignment with the EU's legal and regulatory landscape, particularly concerning data protection and privacy. The framework ensures compliance with regulations such as the Data Governance Act, General Data Protection Regulation (GDPR), AI Regulation, EU AI Act, and ALTAI for self-assessment. It emphasises compliance with data protection laws, clear data ownership definitions, data security through measures like encryption and access controls, and maintaining data quality through standards and validation processes. Privacy by design is integral, incorporating safeguards from the outset, and data sharing agreements are established to define the terms of data access and usage. The framework also involves structured data lifecycle management, ethical AI practices to prevent bias, accountability with designated Data Stewards and continuous monitoring and compliance through regular audits and reporting mechanisms.

One of the pieces structuring the DGF is the Data Management plan (DMP) designed under WP1. The DMP outlines the overarching policy and strategy for data management within the AI4Gov project, addressing both administrative and technical aspects. It encompasses topics such as application reconfiguration logs, monitoring metrics collection, the publication and deposition of open data, details about the designated data repository infrastructure, and adherence to the Open Access Infrastructure for Research in Europe (OpenAIRE). In addition, it contains dedicated sections that monitor the UCs to highlight the usability, purpose, and collection procedures that should be implemented on these datasets.

All data management processes in the UCs have been carried out based on these two tools: The DGF and the DMP. During the pilots, all personal data that were collected, including participant feedback, demographic information, and any other identifiable details, were stored securely and used solely to evaluate and improve the project activities. Access to the data was limited to authorised personnel within the project consortium, and no identifiable information was shared with third parties or used beyond the project's scope without explicit consent from participants. Anonymised data may be used in reports or publications to ensure that individual identities are protected. Participants retain the right to access, amend, or request the deletion of their personal data at any time by contacting the project's data protection officer. By participating, individuals confirmed their understanding and agreement to these terms through consent forms.

2   The Evaluation Cycle

The validation and evaluation activities of the AI4Gov project correspond to phases 3 and 4 respectively in the pilot methodology presented in chapter 2. Phase 3 is the pilot implementation spanning from M6 to M33, and phase 4 is the evaluation and optimisation, which began in M6 and lasted until the end of the project (M36). During this last year, three main tasks have been completed in terms of the validation and evaluation of the project tools: The optimisation of the tools (M25-M27), the 2nd validation and evaluation round during the pilot activities (M28-M33), and the analysis of the results (M34-M36) (figure 1).
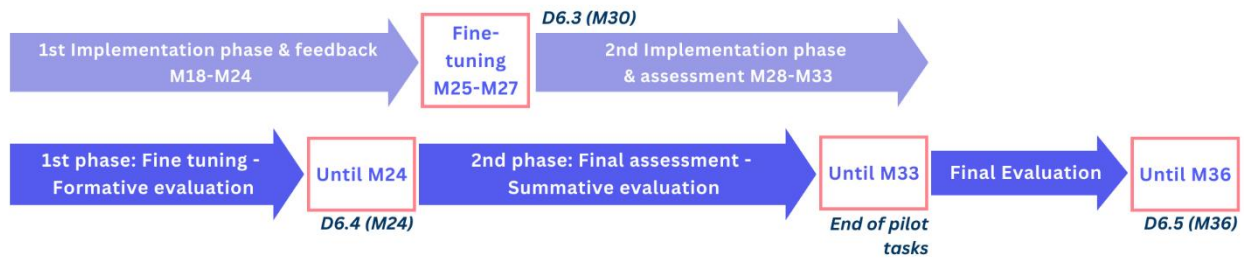
Figure 1 AI4Gov Piloting activities time plan

The results of this 2nd validation and evaluation phase are presented in [Chapter 3](#). In comparison with the 1st phase, the evaluation tools had been updated and optimised, while the target audience included both internal and external stakeholders, leading to more comprehensive and representative feedback on the AI4Gov technologies. Building on [D6.4](#), the updates on the evaluation methodology are presented in the next section.

2.1   Evaluation methodology

The evaluation methodology was based on formative and summative evaluation, as presented in D6.4. The focus in the last 12 months was on summative evaluation. Also, the evaluation tools that were used were the short version of the User Experience Questionnaire (UEQ), and an updated trust questionnaire.

2.1.1   Summative Evaluation

Summative evaluation took place during the 2nd iteration of the piloting activities, to assess the overall effectiveness and impact of the interventions. It focused on outcomes and sought to determine whether the project achieved its intended goals. Summative evaluation is critical for

understanding the long-term value of the project and providing evidence of success. The primary questions guiding the summative evaluation were:

- *To what extent has the project achieved its intended outcomes and impacts?*
- *What is the overall effectiveness of the intervention?*
- *How do the results compare to baseline data and expectations set during the planning phase?*

During the evaluation, a mixed-methods approach was employed, with a focus on robust data collection and analysis to ensure the reliability and validity of findings. This phase included a primary and a secondary approach:

- **Primary | Case Studies:** Same as in the 1st iteration, the testing followed the designated UCs of AI4Gov. Based on these UCs, the evaluation results highlighted successful outcomes, lessons learned, and best practices that can inform future initiatives.
- **Secondary | Comparative Analysis:** The two iterations followed the same structure in terms of testing, even though the evaluation tools were more advanced in the 2nd iteration. Hence, a direct comparison between the two iterations is not correct; however, observing the differences can provide an idea of the scale of the developments that happened during the finetuning.

During this process, qualitative data were used to capture stakeholder experiences and the nuanced impact of the intervention. The results of the summative evaluation showcase the project's impact, while also serving as a valuable resource for scaling or replicating the intervention in other contexts. Additionally, the lessons learned can guide future projects and contribute to the body of knowledge in the field (Prince, 2015). Summative evaluation provided a comprehensive summary of the project's success and emphasized the final outcomes of the project, providing a performance review of the AI4Gov tools.

2.1.2   The evaluation tools

In this 2nd validation phase of the AI4Gov project, the evaluation tools of the UC activities provided quantitative and qualitative data to provide a holistic view of the results of the tools' testing. After the 1st validation phase, the tools were updated for the final second iteration to better reflect the needs of the pilots. Two tools were used: The short version of the User Experience Questionnaire (UEQ), and a trust-dedicated questionnaire.

The UEQ

The UEQ was selected for use in the AI4Gov project to efficiently measure the user experience of the pilot AI tools and gather feedback from participants. Like in the 1st iteration, the short version of the UEQ was chosen to enhance efficiency in data collection while ensuring a high response rate. This tool allowed to assess six critical factors of user experience: Attractiveness, Efficiency, Predictability, Stimulation, Transparency, and Originality.

The UEQ was administered to participants after they had tested the AI4Gov technologies, alongside clear instructions on how to complete the questionnaire. This ensured that respondents were adequately informed about the process and the types of feedback being requested. A full version of the survey, along with the instructions, is provided in [Annex 6.1](#). As described also in D6.4, the short version contained eight specific attributes, which were selected to capture the essence of the six key factors, as outlined below:

1) *Obstructive – Supportive* | 2) *Complicated – Easy* | 3) *Inefficient – Efficient* | 4) *Confusing – Clear* | 5) *Boring – Exciting* | 6) *Not interesting – Interesting* | 7) *Conventional – Inventive* | 8) *Usual - Leading edge.*

These 8 attributes correspond to 2 of the 6 factors of the full version, **Pragmatic quality** (attributes 1 – 4) and **Hedonic Quality** (attributes 5 – 8). The results read as follows:

- Values between **-0.8 and 0.8** represent a **neutral** evaluation of the corresponding scale
- Values **> 0,8** represent a **positive** evaluation
- Values **< -0,8** represent a **negative** evaluation.

The range of the scales is between **-3 (horribly bad)** and **+3 (extremely good)** The standardisation of the UEQ was achieved through its consistent application in previous research, where its psychometric validity and reliability have been well-documented (Schrepp, Hinderks, Thomaschewski, 2017). By adhering to the scale's recommended attributes and scoring range, the AI4Gov project ensures that its user experience data is comparable to existing studies and that the findings can be used to guide future improvements in AI tool development.

Trust questionnaire

In addition to the UEQ, it was critical to examine the trust users had to the AI4Gov tools. A similar questionnaire was used already in the first iteration, but during the fine-tuning phase, the questionnaire was updated based on the available literature. For this to happen, the evaluation team performed a short literature review on existing evaluation methodologies measuring trust in technological solutions. After reviewing the available literature, a notable gap raised: there are no widely validated, standardised tools for measuring trust in AI systems in questionnaire format. Most researchers have developed their own trust metrics by piecing together elements from different scales, which can make it difficult to establish a consistent approach (Hoffman, et.al, 2018). In response to this, AI4Gov chose to get inspiration from the **Recommended Scale for XAI.** This scale was adapted from well-established instruments such as the Cahour-Fourzy Scale (2009), Jian et al. (2000), Schaefer Scale (Schaefer, 2013), and Madsen-Gregor Scale (Hoffman, et.al, 2018), all of which have demonstrated high reliability and content validity in empirical studies.

While the Recommended Scale for XAI offers a reliable and valid framework for assessing trust in AI systems, it is most suitable for solutions that have reached higher Technology Readiness Levels (TRLs), where users have significant experience and exposure to the system (Hoffman, et.al, 2018).

Given that the AI4Gov project focuses on AI tools in earlier stages of development and pilot testing, this scale was not directly applicable to the project's context. Therefore, to better align the scale with the AI4Gov needs, the questionnaire was customised. Most of the customisation was done on the phrasing of the questions, since the Scale for XAI has a rather strong phrasing, while the evaluation team opted for a softer approach. For example, the first question is "*I am confident in the [tool]. I feel that it works well",* which was rephrased as "*I feel reasonably confident in the [tool] at this stage of development. It seems to be working as expected in most cases."*

This adjustment allowed us to gather meaningful insights from participants even in the absence of extensive system exposure, ensuring that the data collected remains relevant and actionable within the scope of the AI4Gov project. Considering their experience during the validation workshops along with their general knowledge and perception of AI and new technologies, they were asked to think *how they would feel about using such a tool in their everyday life*. The responses reflected their opinion on trust, comfort, and familiarity with such technologies, and it became clear to them that there were no wrong and right answers.

To better acquire the necessary feedback from all stakeholders, the trust questionnaire was split into two versions: one for experts, and one for general public/non-experts. The **experts' version** included 10 questions, designed to gather valuable insights on the tools' current performance and usability as part of its pilot testing phase. The questionnaire focused on a range of key areas, providing a comprehensive overview of how the tools performed in each UC. Participants were first asked to reflect on their *level of confidence in the tool at its current stage of development*. This question gauged whether the tool was operating as expected in most situations, offering a sense of its reliability from the user's perspective. Following this, the questionnaire included a question on the *consistency and understandability of the tools' outputs*. Experts were asked to assess whether the results provided by the tool were coherent and easy to interpret, ensuring that its decision-support capabilities were transparent.

The next set of questions centred on the *tools' accuracy and its readiness for pilot testing*. Experts were asked whether the tool was sufficiently accurate to be used in the testing phase, a critical step in determining if it could perform as intended under real-world conditions. Alongside this, participants reflected on their *sense of safety when using the tool* in test scenarios, helping to identify any potential concerns about its operational security. Efficiency was another key area of focus, with users asked to *rate the speed and responsiveness of the tool*. This question aimed to measure whether the tool met performance expectations in terms of how quickly it processed tasks and responded to user input. Conversely, experts were also prompted to share any *scepticism they might have about the tool in its current form*, allowing them to voice any reservations about its capabilities or stability.

The questionnaire also explored *whether the tools were performing at a level comparable to that of a novice human user,* offering a view of how well the tool could replicate or surpass human performance in certain tasks. This question was particularly important for understanding the tools' potential as a decision-support tool. Finally, experts were asked to consider the tool's future potential, evaluating *whether they believed it was progressing in the right direction toward becoming trustworthy and reliable for future operational use*. An open-ended section was included at the end, allowing experts to provide any additional comments, concerns, or suggestions for improving the tools.

The questionnaire directed to the **general public,** was a shorter version of the experts' one, isolating only the questions easily answered by a non-expert end user during the pilot testing. It included four targeted questions, each addressing a different area of the tools' performance and user experience. These questions focused on the *consistency and understandability* of the tool's outputs, the *comfort level with using the tool* in these settings, and the *efficiency, particularly its speed and responsiveness*. The public was also asked the question about *scepticism regarding the tool in its current form,* allowing them to express doubts or concerns. Finally, an open-ended section allowed users to provide any additional comments, concerns, or suggestions. The responses to this questionnaire provided important insights into how the tools are perceived by the general public, helping to ensure that it is both user-friendly and reliable as it moves toward future stages of development. The questionnaire along with the instructions can be found in Annex 6.2.

To address also the pilot-specific KPIs, respective questions were added to each UC's questionnaire. Details on this are included in 2.1.3. The evaluation target was to gather feedback from 100% of the participants. However, there was a 60% minimum in case some of the participants refused to participate in the evaluation. The tables below present the number of participants per UC and the number of responses on the evaluation questionnaires.

Table 1 JSI: UC participants' overview

Top 100 projects	SDG observatory (Rare diseases topic and Alcohol abuse topic)	OECD document analysis
110 submissions (Not applicable for UEQ & Trust questionnaire, open-ended questionnaire only)	22 total (19 answers for UEQ & Trust questionnaire)	23 participants (23 answers for UEQ & Trust questionnaire)

Notes:

- For *Alcohol Abuse*, no UEQ or Trust questionnaire was administered; qualitative feedback was collected through discussions as the involved stakeholders preferred this option.

- For *Top 100 Projects*, UEQ or Trust questionnaire were not used, as the evaluation was done qualitatively, based on questionnaire submissions with open-ended responses.

Table 2: VVV: UC participants' overview

Traffic management	Waste management
27 participants	27 participants

Notes:

One common workshop was organised. 100% of participants completed both questionnaires for the Visualisation Workbench and the Policy Recommendation Toolkit (PRT) & Wallet components.

Table 3: DPB: UC participants' overview

Drinking water	Sewage water
27 participants	27 participants

Notes:

A single joint workshop was conducted, during which all participants completed both the UEQ and Trust questionnaires for both sub-use cases.

2.1.3   Pilot specific Key Performance Indicators (KPIs)

As already presented in D6.4, specific KPIs were put in place for each pilot and were integrated into the evaluation methodology. An overview of these KPIs is presented in table 4. The KPIs were measured through pilot workshops, surveys, the User Experience Questionnaires (UEQ), trust questionnaires, and legal checklists, in addition to literature review and background theoretical work.

Table 4 Pilot KPIs

DPB	VVV/MT	JSI
Integrated and correlated data sources	Integrated and correlated data sources	Integrated and correlated data sources
Decrease in the citizens' taxes via sustainable water management	Visualisation dashboards	Visualisation dashboards
Increase citizens' engagement in policy development	Reduced time in resolving reported incidents	Increased communication and awareness among stakeholders

Increased trust in the policy development process	Reduction of the average cost per incident for the city	Increase geographical inclusivity
Increased number of algorithms / analytics used	Reduction of time to develop a policy	Increase gender representation
Increase efficiency: improve the success rate of new selected citizen groups	Reduced transport operational costs for the city	
Detect "critical citizens" groups and increase their inclusiveness towards a fair supply of drinking water	Reduced transportation cost for the citizens	
	Increased citizens' satisfaction	

2.1.3.1 Policies for Sustainable Water Cycle Management at a Large Scale (DPB)

Integrated and correlated data sources > 3

- Historical datasets, diverse monitoring entities, and a comprehensive time-series repository
- Water quality variables from multiple sources - reliable and holistic data integration
- Advanced time-series forecasting, actionable insights and predictive analytics

Increased number of algorithms/analytics used > 5

- Long Short-Term Memory (LSTM) Recurrent Neural Networks (RNNs) for time-series forecasting in drinking and sewage water UCs: Explainability features, such as the "sufficient reasons" layer, which highlights key variables influencing predictions.
- Blockchain: Integrity and traceability of both predictions and explainability reports.
- XAI approaches: Self-Explaining Neural Networks (SENNs) with Minimal Sufficient Reasons (MSRs), enhancing predictive accuracy and interpretability.

Increase citizens' engagement in policy development > 20%

After this second workshop, the KPIs relating to policy development were updated, with 46.7% of participants agreeing that they understand how the policy development process works, 40% remaining neutral, and 13.3% disagreeing. This implies that users' understanding is at a good level, but further incorporation or explanation needs to be done.

Decrease in the citizens' taxes via sustainable water management > 20%

The AI4Gov project has contributed to more efficient water management processes by optimising the resources needed for both time and costs. Through advanced estimation and prediction models, the project has identified potential cost reductions in both drinking and wastewater

management, which cover 56 municipalities for drinking water and 53 for wastewater. In Spain, the "Vivas donde vivas" initiative ensures that all service users, regardless of their location, pay the same rates for water services. By improving the efficiency of water treatment, distribution, and consumption, AI4Gov tools have the potential to significantly reduce operational costs, which could, in turn, lead to lower taxes for citizens. This efficiency not only benefits municipal budgets but also strengthens the sustainability of water management practices, ultimately contributing to a more equitable tax structure for all residents.

Increased trust in the policy development process > 20%

The trust that citizens place in public institutions is crucial and in AI4Gov it was measured based on the potential of the tools to support the policy development process. When asked about the visualisation workbench, the majority of respondents (55.6%) agreed that the tool helps them to monitor the policy process, while 40% agree that the tool is very easy to use for accessing, filtering, or viewing policy information. Almost 52% of respondents agree, and 22% strongly agree that the tool creates a more transparent environment, highlighting that the project tools significantly improve transparency and help citizens understand how the Diputacion's services work. In addition, regarding the understanding, the responses were mixed: 40.7% agreed that they understood how the policy development process works, 48.1% remained neutral, and 11.1% disagreed.

Regarding the PRT and the wallet, users feel the tools to help them understand the policy development process with many agree responses with 56%, especially for Wallet users. "Nor agree or disagree" was also common with 34%. Also, 68% agreed that the tools improve access to policy information while also the tools are considered useful to track policy progress as 72% agreed that the tools help monitor policies. Neutral responses (20%) indicate that users want more features, deeper explanations, or more guided workflows before fully endorsing the tools. Trust in policymakers was mixed, which is common for governance contexts. In particular, 56% replied positive, 24% neutral, 20% negative, highlighting the general institutional trust levels and non-tool performance. Although institutional trust varies independently of the tools, most participants feel the tools promote accountability and clarity in public-sector processes as 68% positive (Agree + Strongly agree), with only 4% disagreement. This distinction is important, as the tools are perceived as trust-enhancing even if baseline trust is low.

Detect "critical citizens" groups and increase their inclusiveness towards a fair supply of drinking water

One of the key goals of AI4Gov is to address the needs of "critical citizens" groups, such as small municipalities not directly supported by regional or national administrations, rural populations, and individuals who cannot afford the costs of water services or the technologies involved. AI4Gov tools aim to bridge the digital divide by improving public service access for these underserved communities. By using advanced AI technologies to optimise water distribution and ensure fair

access, the project enhances the inclusivity of water services, helping to provide a fairer and more equitable supply of drinking water to those who have historically been left behind. This initiative is particularly impactful for rural populations and low-income groups, ensuring that all citizens, regardless of their economic situation or geographic location, benefit from sustainable and affordable water management.

2.1.3.2   Tourism-driven multi-domain policy management and optimisation (VVV/MT)

Integrated and correlated data sources > 3

Multiple streams of data and correlating them to derive actionable insights: The Timeseries Analyser processes data from smart garbage bins located across the Municipality of Vari-Voula-Vouliagmeni, enabling the training of an LSTM RNN for time-series forecasting. This model predicts bin fill levels and correlates them with citizen flow patterns, identifying areas with high visitor density based on the rate at which bins are filled. Moreover, with respect to the traffic tickets use case fines from the Greek police are integrated with traffic data from the municipality.

Visualisation dashboards > 2

Citizens Feedback Interactive Interface, Traffic Violations Interface, and Waste Management Interface incorporate several different visualisations fostering analytical insights of understanding and explainability of the final results.

Reduced time in resolving reported incidents

The municipality of VVV implements "incident report" tools to acquire citizens' feedback on everyday issues. After the citizens report the incident, the municipality addresses the matter in a timely manner. The AI4Gov tools aim to reduce this time to make the process more efficient. To measure that, the municipality provided the average time needed to address citizens' reports regarding parking violations and then make an estimation of the reduction of time the AI4Gov tools can offer. The goal is to identify the parts of the decision-making process that the tools can intervene in and optimise the process.

The situation for 2024 as regards the reporting system and management of parking violations is the following: (a) all the citizens' reports are gathered to the central Helpdesk from all communication channels (i.e. mobile and web application, phone, email and in-person), they are filtered by type and responsible department, and the pertinent ones are forwarded to the Municipal Police Department, which deals with them according to their urgency and the available resources, (b) the average time needed for addressing parking violations is 4 hours during the two 8-hour working shifts (8:00-24:00), (c) there is no working shift from 24:00-8:00, so no reports can be handled.

It is estimated that with the aid of AI4Gov tools a reduction of 2 hours (50%) can be achieved in the time needed for the municipal police to address citizens' reports regarding parking violations

in non-controlled, free of charge, parking areas during the two 8-hour working shifts (8:00-24:00). This is due to the following reasons: (a) there will be better resource allocation and therefore it will be more possible that the municipal police will be close to the area of the reported incidents, thus reacting faster and more efficiently, and (b) citizens and visitors will be able to find a legal parking spot in less crowded area or to opt for other means of transportation (bicycle, walking et), thus diminishing the total workload of municipal police and subsequently its response time to the fewer reported incidents.

Building on the abovementioned, participants of the 2nd validation presented a strong agreement (95.6% agreed or strongly agreed) that the Workbench can optimise waste management services and traffic management services where 92.5% agreed, and that it could help anticipate or respond faster to citizen reports on waste collection and traffic/parking violations compared to current procedures. This is also one of the strongest responses, with 90-95% agreement on the participants indicating clear expectation that the tool will enhance responsiveness, operational efficiency, and overall service quality.

Reduction of the average cost per incident for the city

Getting as a baseline the number of tickets issued (2 700 tickets) and the costs incurred by the municipal police, namely staff costs, fuel, insurance, maintenance and fees (121 790 €) in 2024, it is concluded that the average cost per incident (traffic violation) of the city is 45.11 €. It is estimated that with the aid of AI4Gov tools a reduction of 14.5% (38.58 €) can be achieved to the average cost per traffic violation of the city, due mainly to the reduction of fuel and maintenance costs and the increase of traffic tickets (raise of productivity) as the municipal police resources (2 vehicles and 8 police staff) will be allocated in an optimum way within the city, acting both proactively and reactively.

Reduction of time to develop a policy > 50%

For this KPI, the municipality provides information about the current process and then explains in which stages the AI4Gov tools can intervene and reduce the time needed to develop a policy. This was an estimation and a prediction in the case of adopting the AI4Gov tools in the municipal operation systems. The Municipality's policy cycle includes the following stages: (a) Policy issues for action, (b) Develop a policy roadmap and choose the policy instruments, (c) Formulate new policy, (d) Review and adopt (Decision Making), (e) Implement and Monitor, and (f) Evaluate. The stages from (a) to (d) constitute the process of developing a policy, whose success is strongly based on the interaction of modalities with stakeholders based on Consultation, Communication, Co-operation and Co-ordination (4Cs).

Policy issues are usually determined by their competences and responsibilities set by the law while the priorities for action are based on several criteria e.g. economic, social, and environmental. Moreover, the available policy instruments are mainly the: Regulations and

programmes and plans. The Municipality regulates matters within its competence by issuing Regulatory Decisions, within the framework of applicable legislation that set rules, determine the method of implementing the necessary measures, and determine the terms and conditions. Moreover, the Municipality devises programmes and plans to set strategic and operational objectives, plan the necessary actions, establish monitoring mechanisms and define evaluation criteria. The AI4Gov tools can reduce substantially the time needed for the stage of the policy development process called "(c) Formulate new policy", in order to develop Municipality's touristic policy and the related policy of waste management, and more specifically the time needed for the: (a) Preparation of supporting studies (feasibility, technical-economical, etc.) and (b) Assessment of the advantages and disadvantages of policy options, that is to say, their potential economic, social and environmental impact (impact assessment).

Getting as a baseline the time spent to develop the "Updated Local Solid Waste Management Plan 2021" of the Municipality and given the fact that the policy issues and instruments had already been selected (Stages a & b), it is estimated that a reduction of 52% in the time (from 180 days to 87 days) needed to formulate a new policy (stage c) can be achieved with the aid of AI4Gov tools (PRT and analytics). More specifically, the policy options, impacts and actions that are assessed and recommended based on real time analytics and evidence, can assist the policy makers to diminish substantially the time for developing a policy, thus addressing the local challenges faster and more efficiently. Although the AI4Gov tools cannot reduce the time needed for consultation with stakeholders, as it is fixed, they can increase substantially the transparency and accountability as well as the trust to the democratic processes.

In addition, although it is out of the scope of this KPI, it is worth mentioning that AI4Gov tools can reduce the time needed for the other stages of policy cycle, namely:" (e) "Implement and Monitor", as they provide proactive evidence-based decisions to optimise resource allocation and usage, while allowing real-time collection, analysis and visualisation of the data, and (f) "Evaluate", as they allow direct feedback regarding the level of endorsement and satisfaction of stakeholders while providing key metrics that assess efficiency, effectiveness and impacts.

Reduced transport operational costs for the city: Fuel & Employees

In the context of minimising resources needed, the AI4Gov tools try to reduce the transport operational costs of VVV. This was proven based on a comparison of the current costs and the prediction of the savings the AI4Gov tools can provide. These costs refer to fuel costs for the municipal police vehicles and the waste collection trucks. The municipality has issued Regulatory Decisions, within the framework of applicable legislation, setting the rules: (a) for the regulation of traffic, the identification and operation of vehicle parking spaces, as well as for the installation and operation of meters and facilities for regulating vehicle parking in public areas, and (b) to maintain cleanliness in public and private outdoor areas, while managing the collection, storage and disposal of their waste. In addition, the municipality has drafted a sustainable urban mobility

plan (SUMP), which is a strategic plan that sets out specific goals, objectives and measures to be funded and implemented over a period of 10 years, seeking to promote alternative means of transportation, such as walking, cycling, and public transport, while reducing the dependence on cars. The plan focuses on the following 4 types of intervention measures: (a) Safe mobility, (b) Sustainable mobility, (c) Smart mobility, and (d) Flexible mobility. Apart from the municipal vehicle fleet, the municipality operates a municipal transport network of buses connecting mostly areas of the city that are not covered by the public transport network. Finally, the municipality operates bicycle, car sharing and electric chargers network promoting alternative modes of mobility and electromobility. All the above determine the transport operational costs for the city, which the AI4Gov tools can try to reduce. This was estimated based on a comparison of the current costs and the prediction of the savings the AI4Gov tools can provide.

The costs incurred by the municipal police, namely staff costs, fuel, insurance, maintenance and fees was 121 790€ in total in 2024. Out of this budget, 13 210€ correspond to the fuel and maintenance costs of the 2 police vehicles. It is estimated that with the aid of AI4Gov tools a reduction of 45.7% (6 040€) can be achieved only to this part of the budget, given the fact that the number of police staff per vehicle is fixed (4 persons) and consequently cannot be reduced. The reduction of transport operational costs is since the municipal police resources (2 vehicles and 8 police staff) will be allocated in an optimum way within the city, thus diminishing the distances needed to be covered to address traffic violations.

As regards waste management, getting as a baseline that the total fuel costs for all routes (64.3 km) are 88.19€ for 15 trucks to collect garbage form bins, it is estimated that with the aid of AI4Gov routing optimisation tool a reduction of 20% (70.55€) can be achieved due to the fact that 3 less garbage trucks will be needed for all routes. Similarly, as the total maintenance costs for all routes (64.3 km) are 1 024€ for 15 trucks to collect garbage form bins, a reduction of 20% (819€) can be achieved. The staff costs cannot be reduced as they are fixed.

Reduced transportation cost for the citizens

This KPI is oriented towards the traffic management UC by addressing the challenge of parking and especially the cost incurred by citizens. It can provide information on the most crowded areas and help drivers avoid them when searching for parking or opting for alternative transportation. In this way, the pilot tried to calculate the average costs of a car while looking for a free-of-charge parking spot or choosing to park in parking areas/spaces with a charge and then make a prediction of how much cost can be saved as a result of the AI4Gov tools. Moreover, the costs of alternative forms of transportation (public transport, cycling, walking) was calculated. Different scenarios were analysed as to the routes as well as the family status and age of citizens.

The Municipality has drafted a sustainable urban mobility plan (SUMP), which is a strategic plan that sets out specific goals, objectives and measures to be funded and implemented over a period of 10 years, seeking to promote alternative means of transportation, such as walking, cycling and

public transport, while reducing the dependence on cars. The plan focuses on the following 4 types of intervention measures: (a) Safe mobility, (b) Sustainable mobility, (c) Smart mobility, and (d) Flexible mobility. It is expected that all these measures can reduce transportation costs for the citizens both directly and indirectly. The AI4Gov tools can complement those measures (smart applications) that promote smart mobility while addressing safety and accessibility issues as well.

Two routes have been analysed (8.8 km and 17.8 km respectively) connecting, to and from, the most central and touristic places of the city (Route 1: Voula-Vouliagmeni and Route 2: Voula-Varkiza) with different means of transportation and costs i.e. private car, public bus (combined with walking), municipal bus, walking, private bicycle, municipal shared electric bicycle, municipal shared electric car, shared electric scooter). In the case of a private car (7lts/100km gasoline fuel consumption) the analysis is conducted for three different scenarios (Scenario 1: find a parking spot free of charge using AI4Gov tools vs Scenario 2: searching for a parking spot for 9 minutes covering a 2-km distance to find an available parking spot vs Scenario 3: choose to pay a parking fee in a controlled parking space/area without searching for a parking spot), for 2 types of citizens regarding the family status and age (Type 1: one adult person vs Type 2: a family with two children between 7-18 years old) and normal traffic conditions. Moreover, apart from the costs of fuel, parking fee, bus ticket, renting shared electric car-scooter-bicycle for 2025, no other costs are considered (cost of maintenance, external costs etc). Finally, a preliminary assessment is made as to way that infrastructure and safety may affect the means of transportation chosen.

The analysis reveals that in the case of the shorter route (Route 1) the transportation costs for both types of citizens (Type 1 and Type 2) when using a private car are reduced by 18.4% (from 1.25€ to 1.02€) when comparing Scenario 1 with Scenario 2, while the reduction reaches to 77.4% (from 4.52€ to 1.02€) when comparing Scenario 1 with Scenario 3. As regards the longer route (Route 2), the costs are reduced by 10% (from 2.29€ to 2.06€) and 63% (from 5.56€ to 2.06€) respectively. It is worth mentioning that for both routes in Scenario 1 and 3 the citizens need less time to find a parking space as compared to Scenario 2.

As for the other means of transportation, the cost for the Type 1 of citizens when using a car is less in Scenario 1 and 2 as compared to the public bus, municipal shared electric car and shared electric scooter, while it is higher as compared to walking, private bicycle and municipal shared electric bicycle. In contrast, in Scenario 3 the cost when using a car is higher as compared to the public bus walking, private bicycle and municipal shared electric bicycle and still remains less as compared to the municipal shared electric car and shared electric scooter. In terms of time, in all Scenarios and Routes, the car (private and municipal shared electric car) is the fastest as compared to the other means (two to three times faster than public bus, private bicycle, municipal shared electric bicycle and shared electric scooter, and four to seven times faster than walking, and five to eight times faster than the municipal bus).

The same results are derived from the analysis for the Type 2 of citizens, where the transportation costs when using a car are less not only in Scenario 1 and 2 but also in Scenario 3 as compared to the public bus and municipal shared electric car, and higher as compared to walking, private bicycle and municipal shared electric bicycle. Similarly, in all Scenarios the car (private and municipal shared electric car) is by far the fastest compared to the other means. For this Type, the cost of shared electric scooter is not calculated as its use is forbidden for persons below 18 years old.

In terms of safety, although cycling and electric scooters may be as fast as public bus especially in the case of Route 1, it is much less safe due to the lack of sufficient bicycle and scooter infrastructure as well as drivers' safety awareness and education.

In conclusion, AI4Gov tools reduce significantly the transportation costs incurred when using a private car to visit the most central and touristic places of the city ranging from middle to large distances (8.8 km and 17.8 km respectively) as they reduce time and costs (fuel and parking fees) for finding a parking spot. Although the use of private cars is more expensive than municipal bus, walking and private bicycles are faster and much safer, especially in the case of cycling and electric scooter due to the lack of sufficient infrastructure and drivers' safety awareness and education. Finally, when using a private car with the aid of AI4Gov tools, the transportation costs are less than public bus (combined with walking) in most scenarios and types of citizens examined.

With AI4Gov, citizens have access to the Visualisation workbench, where they can see the most crowded areas in the municipality and understand that it will be very difficult to park, thus they will search for a parking space in less crowded areas or choose alternative transportation. Based on the results of the 2nd validation, a clear majority (80%) state that, if informed in advance about congestion by the tool they would choose not to use their car, and instead opt for municipal bus services (60%), shared electric bicycles (15%) and shared electric cars (7.5%), etc. Parking difficulty is mainly associated with time loss (88%), fuel costs (52%), and negative mood (55%), which the tool is perceived as capable of mitigating. This indicates practical trust: users are willing to adapt their behaviour based on the tool's information.

Increased citizens' satisfaction

This KPI is mostly related to the overall satisfaction of the citizens when interacting with the AI4Gov tools. This was measured based on citizens' feedback, where they were able to evaluate the efficiency, user-friendliness and overall performance on the current situation, and after using the AI4Gov tools.

Current situation:

- **Effect from tourists/visitors' arrivals**: the majority of the non-visitor/non-tourist participants (residents, the municipality's employees and local businesses) believe that the arrival of tourists/visitors negatively affects the municipal services, especially parking, the

maintenance of beaches and traffic management. Especially in the residents' replies, the percentage reached almost 95%.

- **Waste management**: most of the respondents are quite satisfied with the Municipality's services, especially in the field of recycling and the maintenance of beaches.
- **Traffic management-parking**: Residents and Greek visitors were the least satisfied with traffic management and parking services, whereas foreign visitors and tourists, reported a relatively higher level of satisfaction. Finally, in the case of local businesses, more than 60% stated that they were satisfied with the traffic management and parking services.

After using AI4Gov:

The participants were asked a comparative question during the 2nd workshop on accessibility and usefulness of the AI4Gov tools across use cases. Participants largely considered the tool usable even by non-experts with 75% agreeing and 20% staying neutral, which is consistent with the UEQ usability findings. There is strong agreement (90% agreed or strongly agreed) that the Workbench can optimise waste management services (Γ8) and traffic management services where 88% agreeing, and that it could help anticipate or respond faster to citizen reports on waste collection and traffic/parking violations (Γ15) compared to current procedures. This is also one of the strongest responses, with 90-95% agreement on the participants indicating clear expectation that the tool will enhance responsiveness, operational efficiency, and overall service quality.

2.1.3.3 Sustainable Development and the European Green Deal (JSI)

Integrated and correlated data sources > 3

- Top100 applications (Top100)
- Top100 reviews (Top100)

The 2025 Top100 call searching for ethical AI projects was opened from the beginning of June till November 15th, and 111 applications from all around the world were collected working towards sustainable development goals. The Top100 reviewers then evaluated the projects and reviews are a basis for a dedicated matchmaking process where selected Top100 applicants was introduced to IRCAI's corporate partners, public institutions, grant-making foundations and R&D sponsors (the 2025 numbers are shown here, the numbers from the previous years are reported in the previous WP6 deliverables).

- Patient outcome reports (Rare diseases)
- Traffic accidents (Alcohol abuse use case)
- Traffic violations (Alcohol abuse use case)
- Breathalyser tests (Alcohol abuse use case)

Missing data analysis, which used rare diseases analysis and breathalysers tests analysis collected and integrated several data sources[1]. Rare diseases analysis collected patient outcome reports and for breathalyser test analysis JSI collected and integrated data about traffic accidents, traffic violations (both from the police databases), and breathalyser tests administered by the police.

- OECD AI policy documents (SDG Observatory)

For OECD AI policy documents analysis, JSI has collected and preprocessed AI legal and policy documents published on the OECD website.

Visualisation dashboards > 4

- Missing data about rare diseases
- Traffic accidents, alcohol abuse and breathalyser tests visualisation
- Two visualisations of OECD AI policy documents topics ("SDG Barcode" and "Radar")
- Two visualisations of Top100 data ("Collaboration" and "Relations")
- Visualisation of bias mitigation tools collected by OECD.

Partner JSI has prepared several visualisations based on collected data. For rare diseases analysis the visualisation of missing data has been prepared and for breathalysers test the visualisation of rates between accidents, alcohol abuse and breathalyser tests. For OECD AI policy documents JSI prepared "SDG Barcode" and "Radar" visualisations. Also, bias detector toolkit has been updated in the second version – bias mitigation tools collected by OECD were prepared as a visual synthesis of the tools, accompanying the tabular representation at the OECD website with the intention to support the main purpose of the use case.

Increased communication and awareness among stakeholders > 30%

The tools developed in the context of the JSI's pilot are oriented towards sustainability and awareness around fairness and reduced bias technological solutions. The participants in the UC activities evaluated their awareness about these topics and showed increased AI literacy and skills. For instance, for Top100, the results indicated that applicants show a clear commitment to inclusiveness and fairness, with an emphasis on accessibility, multilingual design, bias mitigation, and community engagement, however, they tend to focus more on principles and intentions than on measurable fairness outcomes, governance structures, and risk awareness. They also express awareness of AI bias and report a variety of mitigation strategies however they do not articulate which specific methods and mitigation strategies they intend to use, and they rarely perform systematic bias assessment or formal fairness audits. For rare diseases, the respondents highly

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[1] Dataset available: HYPERLINK "https://github.com/MatejKovacic/alcohol_in_traffic/blob/main/README.md"https://github.com/MatejKovacic/alcohol_in_traffic/blob/main/README.md

valued the transparency on missing data and expressed strong improvement in bias awareness. For breathalysers tests the results clearly exposed hidden bias in police data collection, however the police officers view is that data analysis is more bureaucracy rather than a strategic asset (i. e., they are collecting data primarily because the law requires it, not because they see its value). To sum, the main intention of increasing communication and awareness about AI and bias in AI was successfully achieved with the stakeholders included in the process.

Increase geographical inclusivity > 20%

One of the KPIs for Top100 UC was to increase fair representation among different countries, especially to receive more submissions from non-western countries. The results show that Top100 applications came from various parts of the world: Europe: 43, Americas: 24, Africa: 23, Asia: 19, Oceania: 1, proving representation from all continents with 42% coming from Asia and Africa.

Increase gender representation > 20%

For this KPI, the aim was to increase more balanced gender representation in Top100 applicants, the results show that 34.2% of them are female and 63.9% of them are male.

2.2   From Evaluation to Impact

2.2.1   Impact dimensions

AI4Gov is going beyond evaluating the tools and the UC activities, aiming to translate the results into immediate impact. These results can create six impact dimensions. These six dimensions are **political, socioeconomic, organisational, environmental, technological**, and **legal.** Each dimension was based on a specific question.

Political Dimension: *How do AI4Gov tools optimise the policy design and development process?*

The AI4Gov project significantly optimises the policy development process by introducing AI tools that streamline decision-making, enhance stakeholder engagement, and improve transparency and trust in the governance process, such as the PRT and the Citizens' Wallet. The primary aim of AI4Gov in this context is to raise awareness about policymaking, increase citizens' trust in the process, and optimise policy development through data-driven insights. These innovations are crucial in addressing the needs of local, national, and European policymaking procedures, ultimately enhancing both governmental efficiency and citizen participation.

Reduction in Policy Development Time: The AI4Gov tools contribute to a reduction in the time required to develop policies, particularly during the formulation stage of the policy cycle. In the case of the VVV pilot, AI4Gov tools reduce the time for preparing supporting studies and assessing policy options' economic, social, and environmental impacts by 52%. This is achieved using real-

time analytics and evidence-based decision-making that streamline the assessment process. While AI tools do not shorten the consultation phase, they increase transparency and accountability, thereby fostering greater trust in the policy process. Additionally, AI tools contribute to the implementation and monitoring stages by providing evidence-based decisions that optimise resource allocation, and they assist in the evaluation phase by enabling direct feedback from stakeholders to assess policy effectiveness and satisfaction.

Increased Citizens' Engagement: The tools implemented in DPB and JSI pilots enhance citizen engagement in policy development by providing more transparent, inclusive, and accessible mechanisms for participation. In DPB, the project tracked an increase in citizen understanding of the policy development process, with 46.7% of respondents expressing understanding of the process after participating in workshops. The JSI pilot further supports this by addressing fairness and bias in AI, ensuring citizens' concerns are considered in policy decisions. AI4Gov tools also make policy processes more accessible by offering multilingual designs and bias mitigation strategies, enabling broader participation from diverse demographic groups. These innovations not only improve understanding but also foster inclusivity and better reflect the needs of underrepresented communities.

Increased Trust in the Policy Development Process: By improving transparency and offering tools that allow real-time monitoring of the policy process, AI4Gov significantly boosts citizens' trust in public institutions. In the JSI pilot, 53.3% of participants agreed that the tool helped them monitor the policy process effectively, with 60% agreeing that the tool created a more transparent environment. The ability to easily access, filter, and view policy information directly impacts citizens' perception of the policy development process, creating a more open and accountable governance system. This increased trust in the process encourages more active citizen involvement and strengthens democratic engagement.

Optimising Stakeholder Communication and Awareness: AI4Gov also optimises stakeholder communication by improving the flow of information and ensuring that stakeholders are better informed. In the JSI pilot, the tools helped raise awareness about the importance of fairness and transparency in AI, which is critical for stakeholders engaged in policy development. The pilot demonstrated improvements in bias awareness and the ability to identify potential risks in policy formulation, especially concerning rare diseases and traffic violations. The feedback from participants indicates an improvement in their understanding of the technological and ethical dimensions of AI applications in policymaking, which contributes to more informed and responsible decision-making.

Socioeconomic dimension: *What are the direct and indirect benefits for the citizens?*

The AI4Gov project delivers significant direct and indirect benefits to citizens, focusing on enhancing public services, improving governance efficiency, and promoting fairness and inclusivity in the policy development process. The project's tools are designed to optimise

decision-making, reduce costs, and increase transparency, which ultimately benefits citizens economically and socially.

Sustainable Water Management and Reduced Taxes: The AI4Gov tools have contributed to more efficient water management processes, leading to cost reductions in both drinking and wastewater management. By optimising resource use and implementing advanced estimation and prediction models, the project has identified significant potential for reducing operational costs, which can directly impact tax rates for citizens. Specifically, through the "Vivas donde vivas" initiative in Spain, AI4Gov ensures that all service users, regardless of location, pay the same rates for water services. This can lead to lower taxes for citizens, making the system more equitable and improving the sustainability of water management practices.

Inclusive Access to Drinking Water: AI4Gov also addresses the needs of underserved "critical citizen" groups, including small municipalities, rural populations, and low-income individuals who historically lack access to affordable water services. By leveraging AI tools to optimise water distribution, the project ensures fairer access to drinking water for these vulnerable groups. This is particularly impactful for rural areas and low-income communities, helping to bridge the digital divide and enhance the inclusivity of public services, ultimately contributing to more equitable access to essential resources.

Reduced Transportation Costs and Optimised Mobility: The VVV pilot focuses on optimising transportation costs for citizens, particularly in urban areas. By analysing parking data and alternative transportation options, the AI4Gov tools provide valuable insights into cost savings for citizens using private cars or alternative transportation methods such as public transport, cycling, or walking. For example, the analysis shows that AI4Gov can reduce transportation costs by up to 77.4% when using the tools to identify the most cost-effective routes and parking options. This reduction is particularly beneficial for families and individuals who rely on private cars for mobility, as AI tools help them avoid congested areas and reduce parking-related expenses. Furthermore, the Sustainable Urban Mobility Plan (SUMP) implemented by the municipality is complemented by AI4Gov's smart mobility tools, which promote the use of alternative, more sustainable transportation options, further contributing to reduced transportation costs and improved urban mobility.

Increased Citizens' Satisfaction with Public Services: Through the deployment of AI tools, AI4Gov improves citizens' satisfaction with key public services. The VVV pilot revealed that after the introduction of AI4Gov tools, participants experienced improvements in waste management and traffic management, with 90% of respondents agreeing that the tools can help optimise these services. These improvements in responsiveness, operational efficiency, and service quality have a direct positive impact on citizens' daily lives. Moreover, the use of AI tools allows for faster responses to citizen reports on issues such as waste collection and traffic violations, enhancing the overall citizen experience and satisfaction with local governance.

Geographical and Gender Inclusivity: AI4Gov also contributes to increasing geographical inclusivity by broadening the scope of applications and encouraging participation from non-Western countries. In the JSI pilot, the Top100 initiative attracted applications from diverse regions, including Africa and Asia, ensuring that the platform is accessible and representative of a wide range of global perspectives. Additionally, the project makes strides towards improving gender representation by promoting a more balanced gender distribution among applicants, with 34.2% of female leads in the Top100 initiative. This focus on inclusivity ensures that AI4Gov tools serve a broader, more diverse audience, benefiting citizens from various backgrounds and ensuring that underrepresented groups have a voice in the policy development process.

Organisational Dimension: What are the benefits for the organisation using the tools in their operational systems?

The AI4Gov project introduces a range of tools that significantly optimise operational processes within organisations, particularly in terms of efficiency, resource allocation, and cost reduction. By integrating AI and advanced analytics, AI4Gov tools help municipal governments streamline workflows, enhance decision-making, and improve service delivery. The tools also contribute to reducing the time, personnel, and financial resources required for various public services, which directly benefits the organisations using them by improving productivity and operational sustainability.

Reduced Time in Resolving Reported Incidents: The VVV pilot focused on optimising the process for handling incident reports, particularly those related to parking violations. Currently, the municipal police spends on average 4 hours addressing citizen reports on parking violations. With AI4Gov tools, an estimated reduction of 50% is expected, thanks to better resource allocation and faster decision-making. By predicting where incidents are most likely to occur and optimising patrol routes, the tools enable the municipal police to address incidents more efficiently, thereby freeing up personnel resources and improving overall productivity. This time savings allows police officers to focus on more critical issues, ultimately leading to improved public service delivery.

Reduction of the Average Cost per Incident: AI4Gov tools can also reduce the cost per incident for the city. It is estimated that a reduction of 10% can be achieved to the average cost per traffic violation, due to the optimal allocation of resources.

Reduced Transport Operational Costs for the City: The AI4Gov tools also contribute to reducing transport operational costs within the city, particularly in terms of fuel and vehicle maintenance for municipal fleets. In the VVV pilot, the use of routing optimisation tools helps the municipality save up to 20% on fuel and maintenance costs for waste collection trucks. By optimally allocating vehicles based on real-time traffic data and incident reports, AI4Gov tools ensure that vehicles take the most efficient routes, reducing the distance traveled and fuel consumed. Additionally, the tools help the municipal police optimise the allocation of police vehicles, reducing fuel and maintenance costs by 45.7% for police cars. These savings contribute

to cost-efficient operations and better use of available resources, which ultimately benefits the municipality's budget management.

Enhanced Efficiency in Resource Allocation: AI4Gov tools enable optimised resource allocation across various services, particularly in transportation and waste management. By predicting and analysing the most efficient routes and timing for municipal vehicles, the tools reduce unnecessary travel and ensure that resources are deployed where they are needed most. For instance, the garbage collection process is streamlined by AI4Gov's optimisation algorithms, reducing the number of trucks required and the fuel consumption needed for waste collection. The tools also assist in optimising personnel usage, ensuring that staff are deployed efficiently to meet demand, which reduces staffing costs while maintaining service quality.

Increased Transparency and Accountability: Through the use of AI-powered analytics and real-time monitoring systems, AI4Gov tools increase transparency in decision-making processes. The tools ensure that policy decisions are based on data-driven insights, which makes it easier for organisations to explain the rationale behind their actions and justify their decisions to stakeholders. This is particularly relevant in the context of waste management and traffic regulation, where AI tools help municipal authorities track incidents, monitor performance, and evaluate the effectiveness of policies. The ability to quickly adjust based on real-time data improves the accountability of public services, fostering trust among stakeholders and the public.

Technological dimension: *What technological innovations do AI4Gov tools bring? What is the added value?*

The AI4Gov project brings several technological innovations that significantly enhance the functionality and effectiveness of AI tools in public administration. These innovations primarily focus on increasing transparency, efficiency, and inclusivity within governance processes.

Explainable AI (XAI) Toolkit: The XAI Toolkit aims to provide transparency and trust in AI decision-making. It supports the development of evidence-based policies by leveraging advanced techniques such as Sufficient Reasons and Causal Inference, all aimed at creating trust and explainable AI solutions.

Blockchain-based Information Exchange (BIE): The BIE platform utilises blockchain technology to create a decentralised, transparent, and scalable infrastructure for data and policy management. This ensures data integrity, fosters secure exchanges, and allows for the easy addition of new entities while maintaining full transparency.

Virtualised Unbiasing Framework (VUF): This framework explores and identifies biases in AI and Big Data models by applying both technical and organisational measures. It uses causal models for bias detection and discrimination mitigation, promoting fairness in AI development.

Advanced Machine Learning Models: The project integrates state-of-the-art techniques such as Long Short-Term Memory (LSTM) Recurrent Neural Networks (RNNs) for time-series forecasting,

ensuring the AI models not only provide high performance but also enhance transparency through "sufficient reasons" layers. These layers highlight key variables that impact predictions, making the models more interpretable and trusted by stakeholders.

The added value of these technological innovations lies in their ability to foster trust and transparency in AI systems within public governance, ensuring that AI tools are both effective and ethical. These innovations support data-driven policymaking and evidence-based decision-making, enabling more efficient, equitable, and accountable public services. They also address challenges such as bias, discrimination, and lack of transparency, offering a robust framework for deploying AI solutions responsibly and inclusively in democratic processes. By integrating advanced AI models, regulatory frameworks, and cutting-edge technologies like blockchain, the AI4Gov project sets a new standard for transparent, trustworthy, and sustainable AI in public administration. In addition, technological impact derives from the pilot KPIs.

Integrated and Correlated Data Sources

- **DPB**: The KPI for DPB is achieved through the integration of over three distinct data sources, including historical datasets, diverse monitoring entities, and a comprehensive time-series repository. The integration of water quality variables from multiple sources ensures that the data is reliable and holistic, which supports the development of advanced time-series forecasting models. This integration enables the generation of actionable insights and predictive analytics for water management, improving decision-making and policy recommendations.
- **VVV**: In the VVV pilot, this KPI is addressed through the correlation of multiple data streams from waste management and traffic tickets use cases. The Timeseries Analyser processes data from smart garbage bins, and the resulting insights are used to train LSTM RNNs for time-series forecasting. These models predict bin fill levels, correlating them with citizen flow patterns to identify areas with high visitor density. Similarly, the integration of traffic fines with municipal traffic data enhances predictive accuracy and supports smarter urban planning.
- **JSI**: The JSI pilot integrates diverse data sources such as OECD AI policy documents, Top100 submissions of impactful, ethical AI projects that work toward sustainable development goals, traffic accidents and violations, breathalyser tests, and rare diseases patient reported outcomes. By leveraging data from the various datasets, this KPI reflects the integration of multiple, varied sources to provide rich, multidimensional insights into public policy and societal trends.

Visualisation Dashboards

- **JSI**: At JSI, visualisation dashboards support presentation of complex data from OECD AI policy documents, Top100 submissions, rare diseases, and alcohol abuse in traffic use cases. These dashboards enhance understanding by offering visual insights into data trends, bias, and ethics reviews. The visualisation of policy topics from the OECD and especially Top100 data provide interactive views of these datasets, contributing to more informed policymaking.
- **VVV**: In the VVV pilot, three distinct interfaces (Citizens Feedback, Traffic Violations, and Waste Management Interfaces) were developed to present the results of the analytical models. These interfaces integrate various visualisation techniques to foster a deeper understanding of analytical insights. By incorporating these visualisation tools, the project enhances the explainability and usability of AI outputs, making them more accessible to both policymakers and the general public.
- **Increased Number of Algorithms/Analytics Used (DPB):** This KPI is fulfilled by implementing advanced algorithms, including LSTM Recurrent Neural Networks (RNNs) for time-series forecasting. These models incorporate explainability features via a "sufficient reasons" layer, which identifies and highlights the key variables that impact predictions. The integration of blockchain ensures the integrity and traceability of the predictions and reports, anchoring them securely to prevent tampering. Additionally, the project integrates Self-Explaining Neural Networks (SENNs) with Minimal Sufficient Reasons (MSRs), contributing to more than five advanced algorithms within the project. The use of a variety of sophisticated algorithms, including the combination of XAI approaches, SENNs, and blockchain integration, ensures robust and explainable insights. This highlights the innovation of combining predictive modeling with explainability and transparency, ensuring that the AI systems are not only high performing but also trustworthy.

Environmental dimension: *How do the tools achieve environmental sustainability?*

The environmental dimension of the AI4Gov project is primarily addressed through the technological characteristics of the tools being developed. Sustainability is a critical, non-negotiable criterion that encompasses several key factors, including energy efficiency, data management, and computational complexity. The sustainability of the AI4Gov tools is evaluated across various dimensions, including **Energy Efficiency (EE)**, **Computational Complexity (CC)**, **Model Efficiency (ME)**, **Sustainability of Development (SD)**, **Hardware Optimisation (HO)**, **Scalability (SC)**, **Data Efficiency (DE)**, and **Compliance and Standards (CS)**. Each AI4Gov technology is designed with sustainability in mind, incorporating provisions for these factors either in its current implementation or as part of future upgrades as the tool matures. These

provisions ensure that the tools remain environmentally responsible while also being efficient and adaptable. Table 5 provides a summary of the tools and their associated sustainability features.

Table 5: Overview of the AI4Gov tools and the relevant sustainability requirements

Tool/ component	Relevant Requirements Addressed	Implementations
Project's Infrastructure	EE, CS, SC, SD, HO	The Project Infrastructure is designed to optimise efficiency (EE), scalability (SC), and sustainability (SD) across all components. It incorporates hardware usage and energy consumption monitoring to achieve both hardware optimisation (HO) and energy efficiency (EE), ensuring resource utilisation is both effective and environmentally conscious. Through its containerised approach and the utilisation of Kubernetes, the infrastructure supports streamlined workload deployment and dynamic scaling, enabling efficient management of resources. Its use of modular hardware enhances hardware optimisation (HO) while promoting sustainable development (SD), and compliance with standards (CS) by also enabling easy upgrades and reuse, ensuring adaptability and long-term viability for evolving project needs.
Object Storage	DE, SC, HO, SD	The project's Object Storage environment enhances data efficiency (DE) by employing data compression techniques to minimise storage needs and energy consumption, ensuring faster access to critical information. With regards to scalability (SC), the containerisation and auto-scaling mechanisms dynamically manage resources to accommodate fluctuating workloads, seamlessly integrating the platform with the Data Lake infrastructure. While its sustainable development (SD) is supported by reusable and interoperable metadata and data catalogs, facilitating efficient data organisation and retrieval across systems. While, the hardware optimisation (HO) focuses on tiered storage strategies within the Data Lake, leveraging high-speed devices for frequently accessed data while utilising energy-

		efficient storage for archival purposes, ensuring a sustainable and high-performing ecosystem.
Blockchain	EE, DE, SC, DE, CS	The implementation of permissioned blockchain (Hyperledger Fabric) using PBFT (Proof of Byzantine fault-tolerant) as Consensus Mechanism reduces the carbon footprint by 99% compared to the Proof-of-Work (PoW) mechanism. Also because of permissioned blockchain, no costly mining is required. The solutions enforce the energy efficiency of this solution (EE). Moreover, Hyperledger Fabric is an open-source DLT platform that allows to set up a configurable blockchain infrastructure which integrates Smart Contracts for sustainable development, compliance to standards, data efficiency and business logic (CS, SD, DE). Finally, Hyperledger Fabric blockchain can be scaled horizontally across peer nodes. Additionally, all required services are running in docker container implementation ensuring scalability (SC).
Policy Recommendation Toolkit	EE, DE, SD, SC, CS	This specific tool provides tools for energy consumption monitoring (EE) and integrates blockchain implementation for transparency and immutability of data (DE) , The definition of policies that optimise public processes of Waste Management, Traffic Management etc. lead to the introduction of standard processes (CS) and sustainable development (SD), coupled with the container orchestration (e.g., Kubernetes) and streamlined workload deployment (SC).
Bias Detection Toolkit	EE, CC, SD, SC, HO	The Bias Detection Toolkit is designed to ensure efficiency, scalability, and sustainability in addressing bias in AI systems. The utilisation of open-source development and code/model Reuse (SD) promotes collaboration, transparency, and long-term sustainability, ensuring the toolkit remains adaptable and cost-effective for diverse applications.
AI Models & Policy-oriented Virtual Unbiased Framework	EE, CC, ME, SD, SC, DE, HO, CS	This framework leverages advanced technologies to ensure energy efficiency, scalability, and sustainability in AI-driven decision-making. It utilises PyTorch (CPU-based) for energy efficiency (EE), enabling low-power inference that minimises computational overhead. The efficiency of its models is ensured through fine-tuning pre-trained models from Hugging face with

		transfer learning, thus enhancing performance while reducing training costs, complexity (CC), and resource consumption (HO). The framework employs reusable and open-Source code (SD) to promote long-term development sustainability and collaboration, while its containerised architecture (SC) ensures seamless scalability and modular deployment. Finally, it integrates sustainable data storage solutions (DE) in integration with the Object Storage to optimise data handling, supporting efficient storage and retrieval with minimal environmental impact.
Situational-Awareness Explainability Library (SAX Library)	ME, CC, SD, EE, DE, AUE	The SAX4BPM library has been released to the open source. It promotes the usage of Large Language Models (LLMs) that help provide explanations in natural language, thus, being interpretable by humans. Moreover, the SAX4BPM library implements efficient algorithms for processing mining and causal AI that are complexity bound (ME). The input required in the library consists of process executions of event logs, without any identification of any personal data adhering to GDPR (CS).
Visualisation Workbench	EE, ME, SC, DE, SD, CS	The Visualisation Workbench is designed with a focus on Sustainability of Development (SD), Scalability (SC), and Data Efficiency (DE) to ensure a robust, reusable, and efficient system for visualising and managing data. More specifically, it leverages reusable and open-source code, ensuring long-term maintainability and ease of collaboration (CS). It also ensures model efficiency (ME) by streamlining visualisation models, optimising data pipelines, and leveraging adaptive, modular components that align with workload demands Built on a containerised architecture, the workbench achieves seamless scalability and deployment flexibility. Containers enable modularity, allowing developers to deploy, update, or expand individual components without affecting the entire system. The latter impacts the implementation of a more energy efficient solution. Finally, it employs sustainable data storage solutions to optimise storage costs and minimise environmental impact.

Legal dimension: *What legal and regulatory innovations does AI4Gov introduce?*

The AI4Gov project introduces several innovative legal and regulatory frameworks designed to ensure that AI technologies are deployed in a manner that is ethical, transparent, and aligned

with fundamental rights and democratic principles. The project emphasises compliance with both existing legal standards and the creation of new tools that can adapt to the evolving landscape of AI regulation and ethics. These innovations are crucial for maintaining public trust and ensuring that AI systems do not undermine citizens' rights or democratic values.

Holistic Regulatory Framework (HRF): The central legal innovation introduced by AI4Gov is the Holistic Regulatory Framework (HRF). The Holistic Regulatory Framework (HRF) developed under the AI4Gov project is a comprehensive approach designed to regulate the use of AI technologies in governance. Its primary goal is to ensure that AI systems deployed in public services are ethical, transparent, and compliant with laws such as the GDPR while addressing issues of bias and discrimination. The HRF aligns with key AI regulations, including the AI Act, and incorporates ethical recommendations from influential AI bodies like the High-Level Expert Group on Artificial Intelligence (HLEG). Structured around key dimensions such as fairness, non-discrimination, privacy, human oversight, transparency, and accountability, the framework ensures that AI systems are designed to serve the public good responsibly and equitably. To develop the HRF, a multi-level, mixed-methodology approach was employed, combining literature reviews, expert consultations, and public input through surveys, focus groups, and interviews. This comprehensive process ensures that the HRF is robust, inclusive, and grounded in both research and practical insights. The HRF's core objective is to create a regulatory environment that promotes fairness, equity, and transparency, protects individual rights, and fosters public engagement while encouraging sustainability and societal benefits in AI governance. Details on this framework can be found in D2.2.

Data Governance Framework (DGF): The Data Governance Framework (DGF) is a comprehensive set of guidelines, policies, and procedures designed to govern the entire data pipeline used in AI systems within the AI4Gov project. Rather than focusing on individual data elements, the DGF ensures that all data-related activities align with relevant data protection laws, with a strong emphasis on privacy, security, and ethical sourcing. It establishes a robust structure for managing, sharing, and protecting data, promoting accountability and transparency in AI-driven public sector decisions. By incorporating regulatory compliance by design, the DGF serves as a model for best practices in data governance, ensuring that the rights and interests of individuals are safeguarded while enabling the effective use of data to drive innovation. This framework plays a critical role in navigating the complexities of data management within the EU's legal landscape. Details on the DGF can be found in D3.2.

Self-Assessment Tools for Ethical and Transparent AI: To materialise the HRF, and to further ensure compliance with legal and ethical standards, AI4Gov introduces a set of self-assessment tools that help monitor and assess the ethical and legal aspects of AI system development and deployment. Self-assessment tools are crucial for ensuring the responsible development and deployment of AI systems, particularly in public service contexts. These tools, such as questionnaires and checklists, help developers assess ethical integrity, transparency, and

regulatory compliance of AI technologies, particularly with respect to laws like the EU AI Act and GDPR.

By integrating automated and human-led evaluation frameworks, these tools facilitate adherence to key principles such as fairness, explainability, and privacy protection, while promoting public trust in AI solutions. The design of these tools focuses on clarity, usability, and accessibility, ensuring that developers can easily evaluate AI systems without technical jargon and intuitive interfaces. They also incorporate important considerations like data security and compliance with data protection laws, providing actionable insights through automated reporting. The tools support continuous improvement by offering feedback mechanisms and regularly updated frameworks to keep pace with evolving regulations and technological advancements. With built-in risk assessment models, self-assessment tools categorise compliance levels and highlight areas that require attention, ensuring developers can prioritize corrective actions. Ultimately, these tools foster responsible AI development by enhancing transparency, accountability, and societal benefits, while ensuring AI systems remain aligned with ethical and legal standards. Details on the self-assessment tool are included in [D5.4](#).

"Stop & Think" and "Statement of support": A key concept in ensuring compliance with AI systems with ethical principles and legal regulations is "Trustworthy AI". This concept encompasses a detailed and systematic framework that prioritises ethical standards, transparency, and accountability in the development, deployment, and utilisation of AI systems. As public and charitable funding for AI research and development increases, it is imperative to integrate ethical considerations into funding processes and incentivise AI developers to prioritise responsible and transparent design practices. To this end, AI4Gov provides detailed guidelines for institutions financing AI-related projects, focusing on ethical aspects, checklists, parameters, and criteria for evaluating proposals.

AI4Gov has developed two complementary self-assessment tools designed to strengthen ethical evaluation in AI projects: the "Stop-and-Think" Statement of Support for funding bodies and the Statement of Support for applicants. The first tool assists organisations that finance AI initiatives by offering a structured way to review Trustworthy AI Statements included in project proposals. It highlights the key ethical areas that should be examined, helping funders assess whether a project aligns with fundamental rights, environmental responsibility, and widely accepted principles for trustworthy AI. The second tool guides applicants through the process of preparing a robust Trustworthy AI Statement, encouraging them to reflect potential risks, ethical considerations, and regulatory requirements such as the AI Act and ALTAI.

These tools foster critical reflection at the earliest stages of AI development, where potential harm can still be identified and mitigated. They help funding bodies avoid supporting projects that may later generate ethical, legal, or social problems, while enabling applicants to demonstrate a genuine commitment to responsible innovation. By promoting systematic, transparent, and

forward-looking assessments, both instruments contribute to improving the overall quality of AI proposals and ensuring that emerging technologies are developed in ways that protect human rights, respect the environment, and reduce the likelihood of harmful or discriminatory outcomes. More information about these tools can be found on the AI4Gov website.

Contribution to Standardisation and Intellectual Property Rights: AI4Gov also tried to contribute to standardisation in AI governance by developing frameworks and models that can be used as references for future AI systems, particularly in the context of public administration. Liaisons and connections with standardisation organisations, initiatives, and other EU projects are fructified during the project lifetime and valuable contributions are made to the standardisation and regulations landscape to reflect and advance the field considering the AI4Gov AI solutions and knowledge derived from the project.

Additionally, the project addresses Intellectual Property Rights (IPRs), ensuring that innovations within the project are managed in a way that respects the intellectual contributions of all stakeholders and complies with international IP laws. This includes strategically evaluating appropriate licensing models and leveraging open-source solutions dictating how innovations can be used, shared, and adapted, where they best serve both creators' rights and public interests, promoting transparency, collaboration, and wider accessibility, while still operating under specific licensing frameworks. These contributions are vital for establishing a coherent legal framework for AI in the public sector and ensuring that AI systems are developed with respect to creators' rights and public interests. The management of AI4GOV IP goes further beyond the project lifetime, into the 4-year period after the end of the project. Further details on both the standardisation efforts and IPRs can be found in D7.4.

2.2.2   Towards sustainability: AI4Gov contribution to the SDGs

Already from D6.4, the relevant targets of the SDGs[2] had been identified in the use cases and the most prominent were SDG3 – *Ensure healthy lives and promote well-being for all at all ages*, SDG6 - *Ensure availability and sustainable management of water and sanitation for all*, SDG11 - *Make cities and human settlements inclusive, safe, resilient and sustainable*, and SDG12 - *Ensure sustainable consumption and production patterns*. By integrating AI technologies into public administration, AI4Gov enhances policy development, resource management, and citizen engagement, directly aligning with critical global targets. This work reflects part of the final policy recommendations of the project, in the context of D7.6, and the separate policy brief that will be published on the AI4Gov website. Table 6 is an overview of how the AI4Gov UCs address specific SDGs.

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[2] https://sdgs.un.org/goals

Table 6 SDG contribution

SDGs	Targets	Related UC	Contribution
SGD3: Good health & well-being **SDG5:** Gender equality **SDG9:** Resilient infrastructure, inclusive and sustainable industrialization and innovation **SDG10:** Reduced inequalities	*3.6: Halve the number of global deaths and injuries from road traffic accidents* 3.4. Noncommunicable diseases 3.8. Universal health coverage 5.1. End all forms of discrimination against all women and girls everywhere.	Missing data analysis – alcohol abuse; Missing data analysis – rare diseases; Top100 projects (JSI)	Improve road safety by identifying patterns in traffic violations linked to alcohol consumption. Inform targeted interventions, reduce accidents, promote safer roads, and support healthier and safer communities. Rare diseases use case directly contributes to SDG3, 9 and 10. Rare diseases represent a critical area where equitable health coverage is essential. The use case demonstrated that bias in data collections—particularly data incompleteness—significantly impacts diagnosis, treatment, and policy decisions. Addressing these biases is therefore crucial to ensure that rare disease patients are not excluded from health systems and that universal health coverage truly applies to all populations. By targeting data quality and inclusiveness, this effort contributes to reducing health disparities and improving outcomes for vulnerable groups. Top100 projects directly contributes to SDG5 and 9.
SDG6: Ensure availability and	*6.1: Achieve universal and equitable access*	Water management	Improve water distribution and efficiency directly contributing to

sustainable management of water & sanitation for all	*to safe and affordable drinking water for all*	– Drinking water (DPB)	equitable access to water including rural areas, especially for underserved populations. 53 small rural municipalities affected
	6.3: Improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally	Water management – Sewage water (DPB)	Improve water quality by optimising wastewater treatment processes Reduction in pollution and an increase in recycling and safe reuse of water. Enhance impact assessments and support sustainable practices that reduce water waste.
	6.4: Substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity	Water management – Drinking water (DPB)	Real-time data analytics to enhance water-use efficiency across sectors, addressing water scarcity and reducing the number of people suffering from water shortages.
	6.5: Implement integrated water resources management at all levels, including through transboundary	Water management – Sewage water (DPB) Water management	Effective coordination across regions under the DPB administration, enhancing cooperation in water management, essential for addressing transboundary water issues.

	cooperation as appropriate	– Drinking water (DPB)	Centralised common approach to ensure high water quality in all regions
	6.b: Support and strengthen the participation of local communities in improving water and sanitation management	Water management – Sewage water (DPB) Water management – Drinking water (DPB)	DPB as a local administrative unit with established and operational policies and procedures for participation of local communities in water and sanitation management, using the AI4Gov tools
SDG11: Make cities and human settlements inclusive, safe, resilient and sustainable	*11.2: Provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons*	Traffic management (VVV)	Access to sustainable transport systems by optimising traffic management and improving road safety. Reduction of road accidents
	11.6: Reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management	Waste management (VVV)	Reduction of the environmental impact of cities, from waste reduction, recycling, and reuse. AI4Gov tools optimise the collection, sorting, and disposal of waste, reducing the environmental footprint of urban areas.

SDG12: Ensure sustainable consumption and production patterns	12.5: Substantially reduce waste generation through prevention, reduction, recycling and reuse	Waste management (VVV)	Waste reduction through AI-powered analytics that optimise waste collection routes and processes, reducing the volume of waste generated and increasing recycling and reuse in urban settings.

3 Second Validation phase: Evaluation results

This chapter focuses on the organisation, execution, and outcomes of the 2nd iteration of the AI4Gov validation and evaluation workshops. It is important to mention that the AI4Gov tools were fine-tuned after the 1st iteration, but they were still prototypes and not mature enough to be considered ready as products. The findings from the feedback collected during these workshops were analysed to identify strengths, limitations, and challenges, focusing on the lessons learned and offering valuable insights. In addition, the chapter provides an assessment of the process, focusing on the efficacy of the methodologies employed, the robustness of the feedback mechanisms, and the overall impact of this phase in the development of AI4Gov solutions. Finally, the chapter includes a section on comparative results between the two iterations with some key takeaways.

3.1 Second round of pilot workshops

In this evaluation cycle, the analysis of results is conducted primarily at **tool level rather than per Use Case (UC).** This shift reflects the increased maturity of the AI4Gov tools at the final stage of the project and supports a more results-oriented perspective as the project concludes. Accordingly, evaluations are aggregated by tools across pilots and contexts.

For the two Use Cases of the Spanish pilots, the evaluated tools include:

- the Visualisation Workbench (with the respective interfaces for each use case),
- the Policy Recommendations Toolkit (PRT) and the Citizens' Wallet.

For the two Use Cases of the Greek Pilot, the evaluated tools are:

- The Visualisation Workbench (use-case-specific interfaces),
- PRT, and Wallet

For the Slovenian use cases, the focus was on:

- the Top100 AI questionnaire framework along with Bias, Ethics, and Inclusiveness Assessment Framework (for the Top100 Projects),
- The Visualisation Workbench with the respective interface for the Rare Diseases and Alcohol Abuse Sub-Use Case of the SDG Observatory, which is collectively now referred to as "Missing Data Analysis" rather than SDG Observatory.
- The Visualisation Workbench and specifically the OECD Policy Documents chatbot, part of the *Policy-Oriented Analytics and AI Algorithms* component, for the OECD Policy Documents use case.

For a clearer overview of the AI4Gov tools and components and their correspondence with the individual use cases, Table 7 presents a consolidated mapping across pilots. These components

do not only represent the tools that were directly tested and evaluated, but also the background components included in each UC.

Table 7 Overview of AI4Gov Components per UC

Pilot	UC	Data Lake	Blockchain	PRT	Bias Detection Toolkit	AI Models & VUF	Visualisation Workbench	SAX & XAI
DPB	**UC#1 Water management cycle – drinking water**	✅	✅	✅	➖	✅	✅	✅
	UC#2 Water management cycle – Sewage water	✅	✅	✅	➖	✅	✅	✅
VVV	**UC#1 Traffic Management**	✅	✅	✅	➖	✅	✅	✅
	UC#2 Waste management	✅	✅	✅	➖	✅	✅	✅
JSI	**UC#1 IRCAI global top 100 projects**	✅	➖	➖	✅	➖	✅	➖
	UC#2 Missing Data Analysis	✅	➖	➖	✅	➖	✅	➖
	UC#3 OECD policy documents analysis	✅	➖	➖	➖	✅	✅	➖

3.1.1   Policies for sustainable water cycle management at a large scale

Workshop Overview

The evaluation procedure for the Spanish pilot of AI4Gov was conducted through a joint workshop, reflecting the methodological similarities between the Drinking Water Management and Sewage Water Management use cases. The workshop was organised by DPB and held online on 10 October 2025, from 10:00 to 12:00 CET.

The workshop pursued two primary objectives: (i) to evaluate the AI4Gov tools developed within the project, and (ii) to raise awareness and attract potential adopters. To this end, the AI4Gov project and its technical solutions were presented within their operational context, and participants were provided with supporting project materials, including MOOCs and self-assessment tools. The showcased solutions corresponded to the two Spanish use cases, namely *Drinking Water* and *Sewage Water*. Participants were invited to test and evaluate the Visualisation Workbench, through its respective interfaces for each use case, including the Drinking Water Forecasting and Sewage Water Forecasting functionalities, as well as the Policy Recommendations Toolkit (PRT) and the Citizens' Wallet.

Overall, the workshop attracted 220 participants, including 20 policymakers, 19 representatives from academia, 171 participants from industry, and 10 participants from other affiliations. Of these, 27 participants actively tested and evaluated the AI4Gov tools. The participant profile reflects a diverse and relevant stakeholder mix, representative of municipal operations, water utilities, industry, and public governance.

Participants covered a wide range of professional roles, including:

- municipal employees (6),
- industry stakeholders and entrepreneurs (5),
- researchers (3),
- members of the general public (5),
- policymakers (1)
- Other (7)

The strong representation of municipal and industry professionals aligns well with the operational focus of the AI4Gov tools and ensures that feedback was provided by stakeholders with direct practical relevance. Contributions from researchers and other professionals offered complementary analytical perspectives. However, the limited participation of policymakers indicates a need for further engagement efforts at higher decision-making levels.

Regarding gender distribution, the participant group consisted of 16 male, 10 female, and 1 participant identifying as other, reflecting a relatively male-dominated profile of the water management and technical sectors. Participants spanned a broad range of age groups, with a predominance of mid-career and senior professionals, consistent with typical staffing structures in municipal and utility environments. This enhances the relevance of feedback for assessing tool usability in real operational contexts.

Finally, in terms of prior AI experience, most participants reported limited expertise (Beginner: 14). The presence of participants with intermediate (6) and expert-level (7) experience nevertheless enabled a more informed assessment of the tools' technical adequacy, transparency, and explainability.

3.1.1.1 Visualisation Workbench

3.1.1.1.1 UEQ Results

The UEQ-S results for the Visualisation Workbench (based on **27 respondents**) show that users evaluated the tool **positively overall**, with mixed strengths across pragmatic and hedonic quality dimensions.

The Visualisation Workbench received an overall positive evaluation from users (UEQ-S Overall = **0.85**). Pragmatic Quality was rated as acceptable (**0.56**), indicating that while the tool is generally usable, users perceive room for improvement in terms of clarity, simplicity, and interaction flow. Hedonic Quality was stronger (**1.15**), confirming that users find the Workbench engaging, interesting, and enjoyable to use. Item-level responses highlight that the tool is seen as supportive and exciting, although perceived as confusing and not so easy to use at this stage.

Table 8 UEQ Overall Scales for Visualisation Workbench

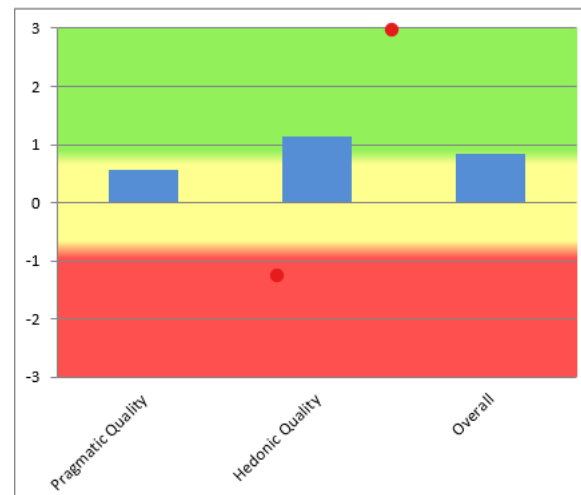| Short UEQ Scales	
Pragmatic Quality	0.556
Hedonic Quality	1.145
Overall	0.849

Figure 2 UEQ Overall Scales for Visualisation Workbench

As shown in figure 2, the overall UEQ-S score (M=0.85) places the Visualisation Workbench in the positive UX range, although not as high as the PRT and Wallet. This reflects a balance between functional usability challenges and strong engagement, and interest generated by the tool. In short, users like using Workbench, but they also signal that **some interactions could be more intuitive**.

Pragmatic Quality – 0.56 (Moderate /Acceptable UX)

The pragmatic quality score indicates a moderately positive user experience regarding clarity, efficiency and ease of use. This suggests that the workbench is generally usable, users can carry out tasks, navigation and interaction are functional but not optimised, some workflows may require additional refinement or simplification.

Hedonic Quality — 1.15 (Good / Positive Emotional Response)

The hedonic quality score reflects a good emotional and experiential reaction from users. Participants found the workbench to be interesting and engaging, exciting rather than boring, somewhat innovative and pleasant to interact with.

This suggests that once users learn how to operate the tool, they tend to enjoy the experience and perceive value in its visual and interactive elements.

Item-Level Interpretation

The item-specific means showcase the tool's strengths and weaker areas. The UEQ-S results for the Visualisation Workbench show that users perceive the tool positively across both usability and experiential dimensions. Table 9 presents the overall scoring of the Visualisation Workbench both across the pragmatic and hedonic qualities:

Table 9 Item Interpretation for Visualisation Workbench

Item	Mean	Variance	Std. Dev.	No.	Negative	Positive	Scale	
1	1.0	3.0	1.7	27	obstructive	supportive	Pragmatic Quality	
2	-0.4	1.9	1.4	27	complicated	easy	Pragmatic Quality	
3	1.3	2.5	1.6	27	inefficient	efficient	Pragmatic Quality	
4	0.3	2.3	1.5	27	confusing	clear	Pragmatic Quality	
5	1.0	2.6	1.6	27	boring	exciting	Hedonic Quality	
6	1.6	2.4	1.6	27	not interesting	interesting	Hedonic Quality	
7	1.0	2.5	1.6	27	conventional	inventive	Hedonic Quality	
8	1.1	3.6	1.9	27	usual	leading edge	Hedonic Quality	

Pragmatic items reveal that the Workbench is viewed as **supportive (1.0**) and **efficient (1.3),** although **somewhat complicated (–0.4)** and only **mildly clear (0.3).** This indicates that the tool is powerful and functional but has a noticeable learning curve, especially for users less familiar with map-based or data-rich interfaces. Hedonic items received stronger evaluations: users found the tool **exciting (1.0)**, **highly interesting (1.6),** and **moderately inventive (1.0–1.1**). These scores show that once users engage with the Workbench, they find it stimulating and valuable.

Overall, the item-level pattern highlights a tool that users appreciate and enjoy, but which would benefit from improvements in simplicity, clarity, and onboarding to reduce perceived complexity.

Comparative Interpretation UEQ-S Scale Scores for UCs

The UEQ-S evaluation shows distinct differences in how the Visualisation Workbench is experienced across the two use cases, as shown in table 10.

Table 10 UEQ-S Scales across the UCs

UEQ-S Scale	Drinking Water UC	Sewage Water UC
Pragmatic Quality	0.458	0.633
Hedonic Quality	1.278	1.039
Overall UX	0.869	0.833

Sewage Water UC participants reported **higher Pragmatic Quality** (0.633 vs. 0.458), indicating that they found the tool more supportive, usable, and operationally aligned. This result is consistent with the more technical background of sewage-related users, who are accustomed to complex GIS layers and infrastructural data. In contrast, Drinking Water UC participants provided notably **higher Hedonic Quality scores** (1.278 vs. 1.039), describing the tool as more exciting, inventive, and leading-edge. Drinking water indicators, which relate directly to service quality, consumption, and household impacts, appear to create stronger emotional engagement. Despite these differences, **overall UX scores are nearly identical** (0.869 vs. 0.833), confirming that the Workbench is positively received in both contexts.

Sewage UC users value its functional usefulness and efficiency, while Drinking UC users emphasise its novelty, interest, and visual appeal. Together, the results demonstrate that the Workbench performs well across diverse user groups, balancing operational functionality with an engaging user experience.

Pragmatic Quality

Table 11 Pragmatic Qualities Comparison between UCs

Item	Drinking UC	Sewage UC	Interpretation
1. Supportive	0.9	1.1	Sewage users feel more supported by the tool.
2. Easy	–0.4	–0.5	Both groups find it similarly complicated, Sewage users slightly more
3. Efficient	1.1	1.4	Sewage Water find it more efficient

Item	Drinking UC	Sewage UC	Interpretation
4. Clear	0.3	0.4	Sewage Water find it slightly more clear.

Table 12 Hedonic Qualities Comparison between UCs

Item	Drinking UC	Sewage UC	Interpretation
5. Exciting	1.2	0.9	Drinking users find it more exciting.
6. Interesting	1.6	1.6	Both equally interested.
7. Inventive	1.2	0.9	Slightly higher for Drinking UC.
8. Leading edge	1.4	0.9	Drinking UC sees it as more innovative.

3.1.1.1.2 Trust Questionnaire Results

Overall, the evaluation of the Visualisation Workbench shows a strong positive acceptance across performance, trust, and usefulness dimensions. Users described the tool as consistent, efficient, and supportive in decision-making, with high agreement that it is moving in the right direction and provides transparency to public-service processes. Neutral responses were more common when assessing the clarity of the policy process behind the tool or comparing its performance to humans, suggesting a need for clearer explanations and onboarding. Although skepticism was low, a small number of comments mentioned difficulties entering the tool or needing more time for exploration. Despite these limitations, participants consistently recognised the Workbench's value for improving access to information, supporting pilot testing, and enhancing transparency, confirming its relevance and strong potential for operational uptake. In particular:

Clarity and Performance (C1-C4)

In details, the results of the tools are consistent and understandable, with 55.6% of participants selecting "Agree". This indicates that users generally find the Visualisation Workbench's outputs coherent and interpretable, though a proportion (**Nor agree or disagree:** 44.4%) remained neutral, probably due to limited prior experience with similar platforms.

Additionally, the majority agreed that **they feel secure/confident using the tool** (Agree: 74.1%, Nor agree or disagree: 22% and Disagree: 3.7%), showing good trust regarding data handling and functionality. These results indicate no major concerns regarding data privacy or system reliability.

In terms of efficiency in speed/responsiveness, there is a strong pattern of "Agree" and several "Strongly Agree" (**Agree:** 56%, **Strongly agree:** 24%, **Nor agree or disagree:** 20%), which indicates that the Visualisation Workbench performs well, is responsive and meets expectations for real-time interaction.

Finally, users generally perceive the tool as helpful, but some hesitate to compare it directly to human performance, as it is indicated by the 44% of responders being neutral that the tool seems to perform at least as well as novice human user, while 22.2% of responders agreed, 11.1% disagreed, and 22.2% strongly agreed (Figure 3).
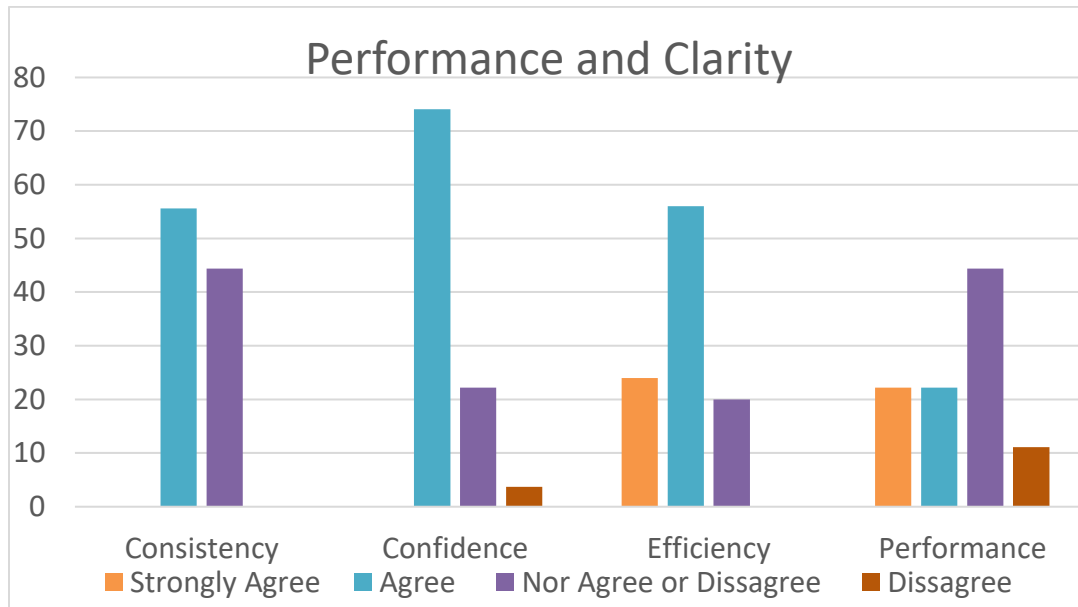
Figure 3 Overview of Performance and Clarity of Visualisation Workbench

Trust and Skepticism (C5-C8)

The users were not distrustful of the tool as most responses were "Nor Agree or Disagree" (33.3%), "Disagree" (25.9%), and a low 6.7% responded that they are skeptical towards the tool. Additionally, the vast majority of users believe that the Workbench has direct practical value in supporting decisions. In particular, 63% responded that they agreed and 14.8% strongly agreed that the tool is useful in decision making. Only 7.4% disagreed, while 14.8% remained neutral.

More than half of respondents consider that the tool is moving in the right direction. The very strong positive pattern (Agree: 37%, Strongly agree: 37%, Nor agree or disagree: 18.5% and only 7.4% disagreed), indicates strong confidence in ongoing development trajectory and potential.

The confidence in the tool, is primarily positive (Agree: 60%) and with some neutrals (Nor agree or disagree: 40.0%). Users feel the Workbench works as expected, though confidence is not yet universal, which is considered normal for the pilot phase of the tool (Figure 4).
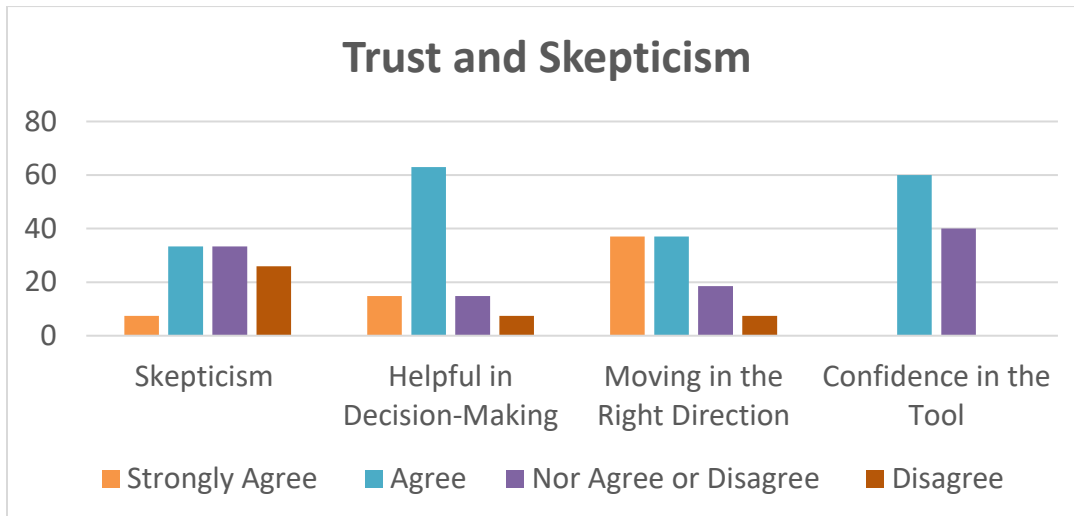
Figure 4 Overview of Trust and Skepticisim for Visualisation Workbench - DPB

Accuracy, transparency, and understanding (C9-C14)

Regarding accuracy, most users agree (44.4%) that the tool is accurate enough to run pilot tests, while only 22.2% disagree with this, and 33.3% remained neutral. Perceived accuracy is acceptable for testing but not yet perceived as "high accuracy" (figure 5).
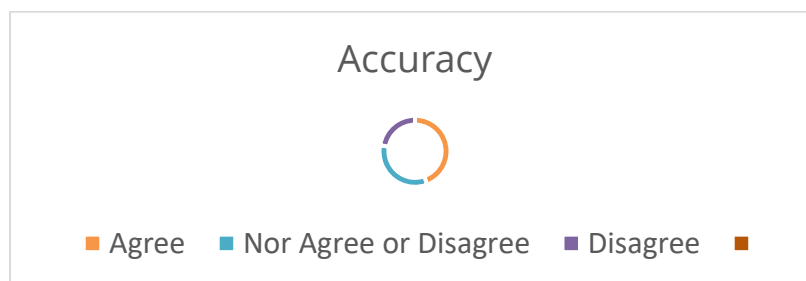

Figure 5 Accuracy of the Visualisation Workbench - DPB

Regarding the understanding, the responses were mixed: 40.7% agreed that they understood how the policy development process works, 48.1% remained neutral, and 11.1% disagreed. This indicates that users lack full clarity on the underlying policy-process representation and highlights the need for improved onboarding or explanation.

Additionally, the responders indicated a public sentiment on the trust towards the policymakers, with 37% staying neutral, and 22.2% disagreeing, 14.8% strongly agreeing and 25.9% agreeing on the trust towards the work of the regional policymakers.

Furthermore, the majority of responders (66.7%) agree that the tools help them to track the process of policies, while 63% agreed that the tools provide strong usability in accessing, filtering or visualizing policy information (C12). The Workbench provides visibility but may need clearer

indicators or workflows. 60% of responders agree and 13.3% strongly agree that the tool creates a more transparent environment, highlighting that the project tools enhance transparency significantly.

Finally, open comments provided by participants reinforce the quantitative findings. Several users indicated that they needed more time to explore the Visualisation Workbench in depth, suggesting that the tool contains complex or unfamiliar features that require additional onboarding or guided support. A few participants also reported technical access issues that prevented them from fully completing the user experience, highlighting the importance of improving entry pathways and system stability. Despite these challenges, the overall sentiment expressed in the comments was positive, with users describing the tool as "very interesting".

3.1.1.1.3 Comparative Interpretation Across Use Cases (UCs)

Although all participants evaluated the same tool, the Visualisation Workbench, the perception of usefulness, clarity, trust, and performance varies across the two UCs because each use case involves different operational workflows, data types, and user expectations.

When comparing evaluations across the Sewage Water and Drinking Water use cases, clear differences emerge in how participants interact with and perceive the Visualisation Workbench. Drinking water participants demonstrated higher confidence in the **clarity, accuracy, and usability of the tool**, reflecting the more intuitive nature of drinking water indicators and visual layers. They also expressed stronger views that the tool enhances transparency and supports policy and operational understanding. In contrast, sewage water participants, who work with more complex network topologies, provided more neutral responses, indicating that they require additional time and contextual information to fully interpret the tool's outputs. Despite these variations, both groups showed low levels of skepticism and agreed that the Workbench is moving in the right direction, can support decision-making, and is suitable for pilot testing.

Overall, the Workbench is positively perceived in both UCs, with higher clarity and trust observed in the Drinking Water UC and a more cautious but constructive stance among Sewage Water users.

3.1.1.2   Policy Recommendation Toolkit (PRT) and Citizens Wallet

3.1.1.2.1   UEQ Results

The UEQ-S evaluation for the Policy Recommendation Toolkit and the Wallet demonstrates an overall positive user experience (M=1.04). As shown in Table 13, Pragmatic Quality (M=0.94) indicates that both tools are generally usable and supportive but still require refinement to improve clarity, guidance, and ease of navigation. Hedonic Quality (M=1.14) reflects that users perceive the tools as interesting, engaging, and moderately innovative.

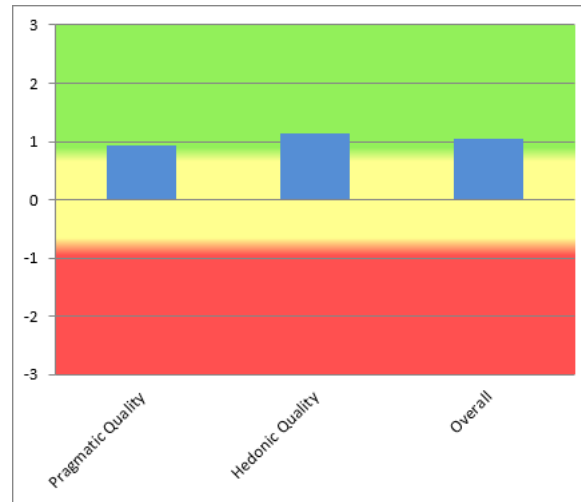| Short UEQ Scales	
Pragmatic Quality	0.940
Hedonic Quality	1.137
Overall	1.037

Figure 6 Overview of the UEQ Scales for PRT & Wallet

These results are consistent with early-stage prototypes: functionally promising, conceptually appealing, yet not fully mature in user interaction design. The Wallet alone, tested by fewer participants, shows slightly lower pragmatic perception due to unfamiliarity with its underlying concepts. Overall, the UEQ-S scores confirm that both PRT and Wallet offer *good* user experience with clear potential for enhancement in future iterations.

Pragmatic Quality – 0.94 (Moderate Positive UX)

The overall score of Pragmatic quality for the PRT and Wallet indicates that both tools are generally understandable, usable at a basic level, and provide functional navigation. On the other hand, users experience room for improvement in areas such as clarity of workflows, smoothness of interaction, predictability of actions, and simplicity of completing tasks.

From these results, we can draw the conclusion that PRT likely requires clearer step-by-step guidance, more intuitive decision pathways, and more informative explanations for choices. Wallet's pragmatic quality tends to be lower because blockchain/provenance features are inherently abstract; users are less familiar with this component. Low usage (only 5 participants) reduces perceived controllability.

Hedonic Quality – 1.14 (Good UX, mild positive emotional response)

PRT and Wallet's hedonic quality reflect attractiveness, innovativeness, stimulation, and user engagement. A score above 1.0 means that users find PRT and Wallet interesting; the innovative features create positive reactions, and tools are not perceived as boring or conventional.

The scores of hedonic quality show that users view PRT as innovative, conceptually interesting, and engaging for exploring recommendations. For the Wallet the scores means that users are curious for its data-traceability functions, recognize its novelty but occasionally they express confusion (which is reflected in pragmatic scores).

Item Level Interpretation

The item-level UEQ-S results indicate that users experienced both the Policy Recommendation Toolkit and the Wallet as predominantly supportive, clear, practical, and generally exciting or interesting to use. Table 14 shows the overall means for all pairs:

Table 14 Item Level Interpretation for PRT & Wallet

Item	Mean	Variance	Std. Dev.	No.	Negative	Positive	Scale	
1	1.1	3.6	1.9	25	obstructive	supportive	Pragmatic Quality	
2	0.3	3.1	1.7	25	complicated	easy	Pragmatic Quality	
3	1.2	2.3	1.5	25	inefficient	efficient	Pragmatic Quality	
4	1.1	1.9	1.4	25	confusing	clear	Pragmatic Quality	
5	0.7	1.6	1.3	25	boring	exciting	Hedonic Quality	
6	1.5	2.2	1.5	25	not interesting	interesting	Hedonic Quality	
7	1.4	1.4	1.2	25	conventional	inventive	Hedonic Quality	
8	1.1	2.7	1.7	25	usual	leading edge	Hedonic Quality	

The four items assessing pragmatic quality yielded positive mean scores ranging from 0.3 to 1.2, indicating that users generally perceive the tools as **supportive, efficient, and clear**. In particular:

- The tools were rated as supportive rather than obstructive (Mean = 1.1) and efficient rather than inefficient (Mean = 1.2).
- Clarity was also evaluated positively (Mean = 1.1), suggesting that users consider the interface and outputs understandable.
- The lowest score within this dimension relates to perceived complexity (Mean = 0.3), which, although still positive, indicates that some users experienced challenges in ease of use. This suggests an opportunity to simplify user flows or enhance guidance for new users.

Overall, the pragmatic quality responses confirm that the tools provide **functionally reliable and useful support** for users in performing their tasks.

Hedonic quality items received **consistently positive evaluations**, with mean values between 0.7 and 1.5. Users rated the tools as:

- **Interesting** (Mean = 1.5 – the highest score across all items),
- **Inventive** rather than conventional (Mean = 1.4), and
- **Leading-edge** (Mean = 1.1).

The tools were also regarded as moderately exciting (Mean = 0.7), reflecting a generally positive emotional and motivational response. These findings indicate that the tools are perceived not only as functional but also as **innovative and engaging**, reinforcing their potential for long-term acceptance and adoption.

UEQ-S Scale Scores Comparison (PRT & Wallet)

The comparison of UEQ-S results for the Policy Recommendation Toolkit and the Wallet across the Water Management and Sewage Water UCs reveals overall positive user experiences, with notable differences in emotional engagement. Pragmatic Quality scores are nearly identical for the two UCs (0.938 for Drinking Water and 0.942 for Sewage Water), indicating that both groups perceive the tools as supportive, efficient, and clear.

Table 15 UEQ-S Scales Comparison between UCs

UEQ-S Scale	Drinking Water UC	Sewage Water UC
Pragmatic Quality	0.938	0.942
Hedonic Quality	1.007	1.256
Overall UX	0.973	1.096

This consistency is reflected in identical ratings on key pragmatic items such as efficiency and clarity. However, Sewage Water UC participants provided significantly higher Hedonic Quality scores (1.256 vs. 1.007), suggesting that they found the tools more exciting, interesting, inventive, and leading-edge. This pattern indicates that while Drinking Water UC users experience the tools as usable and stable, Sewage Water UC users additionally perceive strong innovation and emotional appeal. Consequently, the Overall UX score is higher for the Sewage Water UC (1.096 vs. 0.973). Together, these findings show that the PRT and Wallet tools offer robust usability across both contexts, with the Sewage Water UC demonstrating a more enthusiastic and emotionally positive response to the tools' capabilities and design.

Table 16 UEQ-S Item Qualities Comparison & Interpretation between UCs

Item	Drinking Water UC	Sewage Water UC	Interpretation
1. Supportive	1.0	1.2	Both positive; sewage users feel more supported.
2. Easy	0.5	0.2	Both mildly positive; drinking finds it slightly easier.
3. Efficient	1.1	1.1	Identical efficiency rating.
4. Clear	1.2	1.2	Both UCs find it very clear.
5. Exciting	0.7	0.8	Slightly more exciting for sewage users.
6. Interesting	1.3	1.6	Sewage UC finds it more interesting.
7. Inventive	1.3	1.6	Sewage UC sees it as more innovative.
8. Leading edge	0.9	1.2	Sewage UC sees the tools as more cutting-edge.

From these results, we can draw the following conclusions:

- Sewage Water UC scores higher on almost all hedonic items, meaning they find the PRT/Wallet more interesting, exciting, inventive, and innovative.
- Drinking Water UC scores slightly higher on ease-of-use (Item 2), but the difference is small.
- Both UCs have identical ratings on efficiency and clarity, showing consistent usability perception.

3.1.1.2.2 Trust Questionnaire Results

Users broadly agreed that the tools are consistent, secure, efficient, and capable of performing at least as well as a novice human in relevant tasks. Skepticism was low, while confidence in the tools' utility for decision-making and future operational use was high (C6–C8). Participants also agreed that the tools are sufficiently accurate for pilot testing and assist in understanding and accessing policy-related information. Overall, the trust questionnaire indicates a solid foundation of confidence and acceptance for both tools.

Clarity and Performance (C1-C4)

Users broadly agreed that the tools were consistent and understandable, secure to use, efficient tend responsive and performing as well as a novice human. Across these four items, the results demonstrate **strong perceived reliability and performance** of the PRT and Wallet tools.

- **76%** agreed that the results were *consistent and understandable (C1)*, and no participant expressed disagreement.
- **56%** felt secure and confident using the tools (C2), with **16%** expressing concerns.
- Perceived performance is especially strong: **84%** agreed the tools are *efficient and responsive (C3)*, including 16*% remaining neutral*.
- For C4 (performs at least as well as a novice human), no participants disagreed. **56%** agreed or strongly agreed, while **44%** remained neutral, showing confidence but with some cautious evaluation given the pilot nature of the tools.
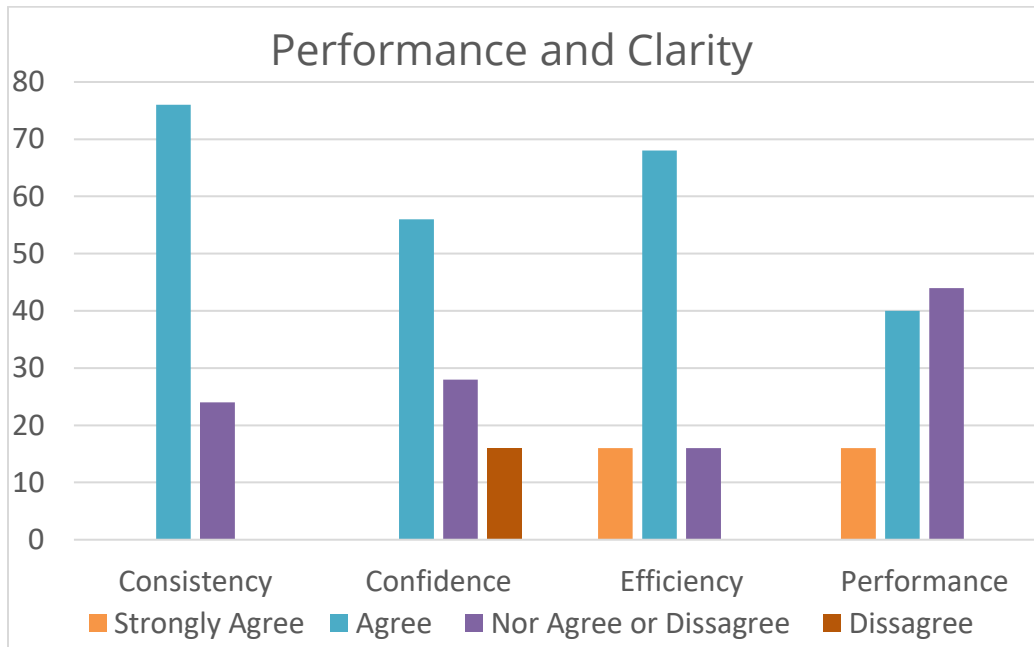
Figure 7 Performance and Clarity of PRT & Wallet

This means that participants experience the tools stable, easy to understand, technically reliable, and sufficiently powerful for the tasks presented. Even where neutrality appears, there is no negative sentiment, indicating that the tools' core functionalities are perceived as solid and trustworthy. Performance is a clear strength, and users already view the PRT and Wallet as approaching novice-level human performance.

Trust & Skepticism

Skepticism levels around the tools are low, given that most participants answered "Disagree" or "Nor agree or disagree". There is a little active doubt about the tools with only a few responses "Agree". Neutral answers reflect users still learning or needing more interaction, not rejection. In particular, the trust-related items clearly show **high acceptance and positive expectations** for the tools.

- **48%** explicitly *disagreed* with being skeptical (C5), and only **16%** expressed skepticism. This indicates a **very low level of doubt** among participants.
- **80%** agreed the tools support decision-making, with 8% disagreement
- **88% positive**, with **36% strongly agreeing** the tools are progressing well toward operational use, making this on one of the strongest results
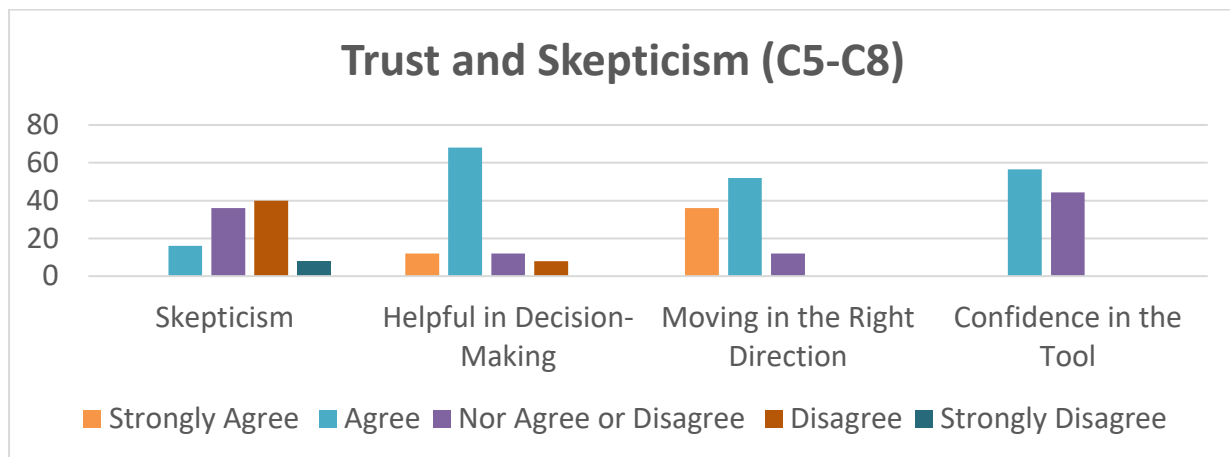- **56%** already feel confident and **44%** neutral that the tools seems to work as expected.

Figure 8 Trust and Skepticism towards PRT & Wallet

These results show that PRT and Wallet enjoy strong user trust, both in their current functionality and future potential. Participants view the tools as **useful, reliable, and promising**, with skepticism almost entirely absent. The results show that the tools have already established a **solid trust foundation**, and users expect them to become even more dependable as development continues.

Accuracy, Transparency & Understanding

Regarding confidence and decision-support potential, there are strong patterns of Agree and Strongly agree for the usefulness of the tool in decision-making, the right direction that the tool is moving towards, and the confidence in the tool. Participants see the tools as valuable in their operational and policy context. Confidence is high, even though some users still rate understanding or operational clarity as "neutral".

Users perceive the tools as **accurate enough for pilot testing**, with most responses being "Agree" or "Nor Agree/Disagree", though some refrain from strong claims until more real-world data are included (**66.7%** agreed the tools are accurate enough, **33.3%** neutral)
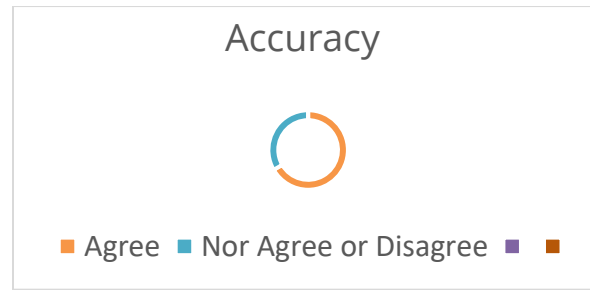
Figure 9 Accuracy of PRT & Wallet

3.1.1.2.3 Comparative Interpretation Across UCs

A comparison of trust and perception results across the two use cases indicates consistently positive evaluations for both the Policy Recommendation Toolkit and the Wallet, with meaningful differences in the strength of responses. Sewage Water UC participants show higher and more stable trust ratings, reflecting a strong belief in the tools' reliability, dependability, and technical correctness. They also express strong agreement across usability and performance items and display very high confidence in the tools' decision-support value and operational readiness. In contrast, Drinking Water UC participants also report overall positive trust and usability perceptions, but with a greater number of neutral responses, suggesting more caution and a need for additional exposure or contextualisation. Both UCs agree that the tools enhance transparency, although this perception is stronger within the Sewage Water group. Overall, the findings show that Sewage Water UC users perceive the tools as more mature and operationally robust, while Drinking Water UC users see them as valuable but are still forming their trust and understanding.

Table 17 Comparison between UCs - Trust Questionnaire

Dimension	Sewage Water UC	Drinking Water UC
Trust	Higher, stable, confident	Moderately high, more neutral
Usability	Strongly positive	Positive but more cautious
Confidence in tool	Very high	High but more neutral
Accuracy perception	Higher	More mixed
Understanding of process	Strong	More neutral
Transparency perception	Higher	Positive but lower
Skepticism	Lower	Slightly higher but still low

3.1.2 Tourism-driven multi-domain policy management and optimization (VVV/MT)

The second validation cycle of the AI4Gov tools for the Greek pilot was conducted through a joint in-person workshop encompassing both pilot use cases: the Waste Management and Traffic Management. In line with the tool-oriented evaluation approach adopted in this phase of the project, the workshop focused on the assessment of the Visualisation Workbench (through its respective use-case interfaces), as well as the PRT and the Citizens' Wallet.

The workshop took place on 2 July 2025 at the Town Hall of Vari–Voula–Vouliagmeni and brought together 27 stakeholders representing a wide range of backgrounds, including policymakers, municipal staff, citizens and visitors, researchers, and industry representatives. Participants actively tested the AI4Gov tools and provided structured feedback on their functionality, usability, and perceived value.

The workshop agenda included an introductory presentation of the AI4Gov project and the Greek pilot use cases by VVV, followed by an overview of the AI4Gov MOOCs and key cross-cutting topics related to trust, bias, and security, delivered by MT and UPRC. Subsequently, UPRC presented the core functionalities of the Visualisation Workbench, while UBITECH presented the PRT and Citizens' Wallet. Participants then engaged in hands-on interaction with the tools, completing the evaluation activities available at the time of the workshop.

Following the practical session, participants completed the evaluation instruments, namely the UEQ and the Trust Questionnaire and took part in an open discussion. This exchange enabled the collection of qualitative feedback on strengths, identified challenges, and suggestions for improving usability, transparency, and perceived trustworthiness.

In the subsequent sections, results are presented separately for the Visualisation Workbench and for the PRT and Citizens' Wallet, alongside research findings related to the quality of touristic services in Vari–Voula–Vouliagmeni and the role of AI in supporting municipal service optimisation.

Participant Profile

A total of **27 participants** responded to the evaluation, representing diverse stakeholder groups, including policymakers, municipal staff, citizens and visitors, researchers, and private-sector representatives. Participants included both men and women, spanned a broad age range (25 to 65+ years), and reported varying levels of familiarity with digital tools and Artificial Intelligence, ranging from beginner to advanced. For the evaluation of the PRT and Citizens' Wallet, 26 participants provided valid responses. The composition of this group is summarized in Table 18.

Table 18 Participant Profile for Greek Use Cases

Type of Audience	Number of Participants
Pilot partner employees involved in the project	1
Pilot partner employees not involved in the project	3
Policymakers	5
Researchers	3
Citizens / Visitors	14
Industry	1
Other	–
Total	**27**

Citizens and visitors constituted the largest group of respondents, followed by researchers, policymakers, and municipal staff. This balanced mix ensured that feedback captured both end-user perspectives and expert and policy-oriented insights. In terms of digital and AI literacy, approximately half of the participants reported intermediate knowledge, around one quarter identified as experts (primarily researchers and municipal staff), and the remaining quarter as beginners, often citizens or senior policymakers. This diversity supported a comprehensive assessment of both accessibility and technical adequacy.

The participant group demonstrated a balanced gender distribution, with approximately 54% men and 46% women, and covered a wide age spectrum, with the highest representation in the 35–64 age group. This heterogeneity reflects real-world user populations and strengthens the validity of the evaluation results.

3.1.2.1 Visualisation Workbench

3.1.2.1.1 UEQ Results

The **overall mean score** of **+2.10** positions the Visualisation Workbench in the **"excellent" range** according to the UEQ benchmark, while also Pragmatic and Hedonic Qualities also ranked high, as shown in table 19. Values above **+2.0** represent a highly positive evaluation that is rarely achieved in comparative studies, highlighting that users view the tool as **very effective and enjoyable to use**.

Table 19 UEQ Scales for Visualisation Workbench

Short UEQ Scales	
Pragmatic Quality	2.130
Hedonic Quality	2.065
Overall	2.097

Pragmatic Quality – 2.13 (Positive UX)

Pragmatic Quality achieved an average score of +2.13, indicating that participants found Visualisation Workbench highly usable, supportive, efficient and easy to navigate in the UCs of Traffic Management and Waste Management.

Hedonic Quality — 2.065 (Positive Emotional Response)

The **Hedonic Quality** scored **+2.065**, reflecting that users perceived the tool as interesting, inventive, and engaging. These results suggest that the tool successfully combines functional clarity with an appealing, motivating user experience.

Item Interpretation

For the **Pragmatic Quality** scale, the confidence interval ranged between **1.8 and 2.46**, confirming a high degree of agreement among users regarding usability and efficiency. The **Hedonic Quality** scale showed a slightly wider but still precise interval (**1.67 to 2.46**), indicating consistent appreciation for the tool's novelty and engagement. The overall user experience confidence interval (**1.76 to 2.44**) further reinforces the robustness and stability of the results (table 20)

Table 20 Item Interpretation Qualities for Visualisation Workbench

Item	Mean	Variance	Std. Dev.	No.	Negative	Positive	Scale	
1	2.3	1.1	1.0	27	obstructive	supportive	Pragmatic Quality	
2	1.9	1.2	1.1	27	complicated	easy	Pragmatic Quality	
3	2.0	1.1	1.1	27	inefficient	efficient	Pragmatic Quality	
4	2.3	0.8	0.9	27	confusing	clear	Pragmatic Quality	
5	1.9	1.7	1.3	27	boring	exciting	Hedonic Quality	
6	2.4	0.9	1.0	27	not interesting	interesting	Hedonic Quality	
7	2.1	1.3	1.1	27	conventional	inventive	Hedonic Quality	
8	1.9	2.0	1.4	27	usual	leading edge	Hedonic Quality	

At the item level, the highest ratings were observed for *"interesting" (2.4)*, *"supportive" (2.3)*, and *"clear" (2.3)*, while even the lowest-rated attributes (*"easy"* and *"exciting"*, both around 1.9) remained firmly positive. This consistency indicates that the tool was **well-received across all evaluated aspects** and performed strongly in terms of both usability and emotional engagement. In the meantime, at the item level, confidence intervals varied from approximately **±0.34 to ±0.53**, suggesting that participants evaluated the tool **consistently and with low variability**. Items such as *"interesting"* and *"supportive"* demonstrated the narrowest confidence ranges, reflecting **particularly strong consensus** around these features. In particular:

- **Supportiveness (Mean = 2.3)** Users perceive the Workbench as highly supportive, helping them achieve their tasks effectively without introducing obstacles.
- **Ease of Use (Mean = 1.9)** The tool is regarded as easy to use, with only minor perceived complexity among some users.

- **Efficiency (Mean = 2.0)** Participants consider the Workbench efficient in handling operations and providing timely outputs.
- **Clarity (Mean = 2.3)** This is one of the highest pragmatic scores, indicating that users found the interface, visualisations, and system feedback very clear and easy to understand.
- **Excitement (Mean = 1.9)** The tool is generally experienced as engaging and motivating rather than boring.
- **Interest (Mean = 2.4 — the highest score across all items)** Participants found the Workbench extremely interesting, reflecting strong engagement and user motivation.
- **Inventiveness (Mean = 2.1)** The tool is seen as inventive and innovative rather than conventional, reinforcing its value as a modern and forward-thinking solution.
- **Modernity (Mean = 1.9)** Users perceive the Visualisation Workbench as a leading-edge tool.

Comparative UEQ Analysis: Traffic Management vs. Waste Management Use Cases

The User Experience Questionnaire (UEQ) results for the Visualisation Workbench reveal consistently strong and positive user perceptions across both the Traffic Management and Waste Management Use Cases. In both evaluations, mean values for all UEQ scales are well above the positive evaluation threshold (+0.8), indicating a high level of user satisfaction regardless of the application domain.

Table 21 Comparison of UEQ Results for the Visualisation Workbench Across Use Cases

UEQ Dimension	Traffic Management	Waste Management	Comparative Observation
Pragmatic Quality	2.13	2.09	Very high in both use cases; Traffic Management slightly higher
Hedonic Quality	2.07	2.01	Strongly positive in both; marginal advantage for Traffic Management
Overall UEQ Score	2.10	2.05	Consistently excellent user experience across domains

Pragmatic Quality Comparison

Pragmatic Quality was rated **very positively** in both use cases, reflecting the tool's effectiveness in supporting task-oriented activities.

- **Traffic Management UC:** Mean = **2.13**
- **Waste Management UC:** Mean = **2.09**

The results are highly comparable, with Traffic Management showing a marginally higher score. In both cases, users perceived the tool as supportive, easy to use, efficient, and clear, suggesting that the core functionalities of the Visualisation Workbench transfer well across different policy domains without loss of usability.

Hedonic Quality Comparison

Hedonic Quality also received **clearly positive evaluations** in both use cases, highlighting the tool's ability to provide an engaging and motivating user experience.

- **Traffic Management UC:** Mean = **2.07**
- **Waste Management UC:** Mean = **2.01**

While the Traffic Management use case again scores slightly higher, the difference is minimal. Users in both contexts perceived the tool as interesting, inventive, and relatively leading-edge, although slightly lower scores on items related to excitement and novelty suggest room for further enhancement of the emotional and innovative aspects of the interface.

3.1.2.1.2   Trust Questionnaire

Across the first block of trust-related questions, results show broadly positive perceptions, with between 80% and 95% of respondents selecting "Agree" or "Strongly Agree". In particular:

Clarity and performance (C1-C4)

Most respondents (90%) **agree or strongly agree** that the tool's results are consistent and understandable, and 81,45% are confident using the tool that it is efficient in terms of speed and responsiveness (93% of participants), and participants largely consider the tool usable even by non-experts with 75% agreeing and 20% staying neutral, which is consistent with the UEQ usability findings.
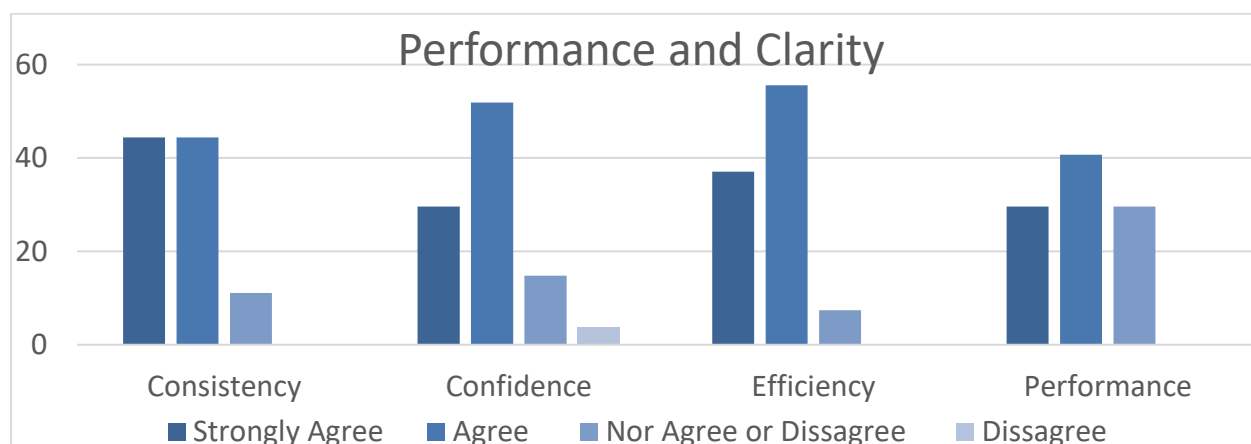
Figure 10 Performance and Clarity of Visualisation Workbench - VVV

Trust and Skepticism (C5-C7, C13)

(C2) Most users feel sufficiently safe/confident using the tool (85%), but a minority remains neutral or cautious, especially regarding personal data and the early-stage nature of the system, even though only 10% expressed skepticism (C5). Additionally, Visualisation Workbench was considered that it can be (C6) useful for decision-making, with 94% of participants agreeing, indicating that the Visualisation Workbench is perceived as highly relevant for supporting strategic and operational decisions. They also believe it is (C7) **moving in the right direction** (92% of participants agreed) and can become **reliable in future daily/operational use** (58.3% of participants strongly agreed and 41.67% agreed).
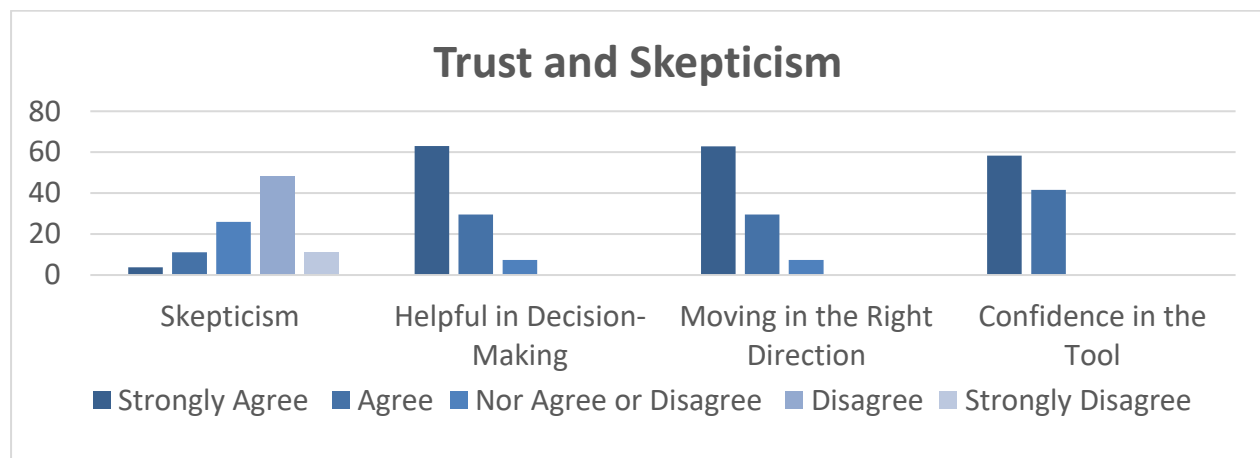
Figure 11 Trust and Scepticism towards Visualisation Workbench - VVV

Accuracy

With similarly positive views on its (C14) **accuracy** (25% strongly agreed and 75%) and alignment with their organisation's requirements. Overall, these answers indicate solid trust in the technical robustness and decision-support value of the Workbench.
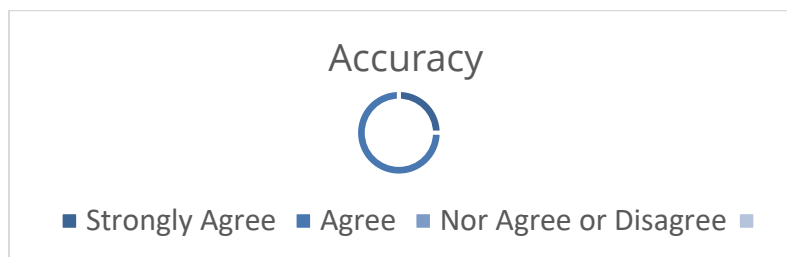
Figure 12 Accuracy of Visualisation Workbench - VVV

Taken together, the Trust Questionnaire results show that users view the Visualisation Workbench as a credible, accurate and operationally useful solution for both traffic and waste management, with high perceived impact on service optimisation and citizen behaviour. Residual

concerns focus on data protection and the maturity of the current prototype, highlighting the need for clearer communication of privacy safeguards, governance processes, and system status to further strengthen trust.

3.1.2.2   Policy Recommendations Toolkit (PRT) and Citizens Wallet

Key Findings

Overall, the evaluation results indicate a high level of acceptance and satisfaction with the PRT and Citizen Wallet tools. Participants described them as supportive, efficient, clear, interesting, and engaging, while also easy to use. The majority agreed that both tools are progressing in the right direction and can become reliable assets for daily operations and policy decision-making. Respondents particularly highlighted the consistency and understandability of the results, as well as the speed and responsiveness of the tools. Even participants with limited technical expertise reported being able to use the tools effectively.

The Citizen Wallet was especially recognised for its potential to enhance civic participation in local decision-making processes. Many participants expressed trust in using it for voting and supporting municipal policies, considering it an innovative channel for citizen engagement and transparent governance.

However, a portion of respondents expressed reservations about the tools in their current form, mainly relating to personal data protection and privacy concerns. Some participants appeared neutral or hesitant regarding their confidence in using the tools, underlining the need for further refinement, enhanced data protection assurances, and clearer communication about how personal information is handled.

3.1.2.2.1   UEQ results

The analysis produced **very positive results across all dimensions**, as shown in table 22 below:

Table 22 Overview of UEQ Scales for PRT & Wallet

Short UEQ Scales	
Pragmatic Quality	2.115
Hedonic Quality	2.269
Overall	2.192

Pragmatic Quality – 2.12 (Positive UX)

Pragmatic **Quality** received an average score of **+2.12**, indicating that users found the tools highly supportive, efficient, clear, and easy to use. This reflects strong usability and a well-designed interaction flow, suitable even for non-expert users.

Hedonic Quality — 2.27 (Positive Emotional Response)

The **Hedonic Quality** achieved an even higher score of **+2.27**, showing that participants perceived the tools as interesting, exciting, and inventive. The combination of functional effectiveness with positive emotional appeal demonstrates that users not only find the tools useful but also enjoyable and engaging to interact with.

The overall UEQ score of **+2.19** places the PRT and Wallet tools firmly in the "excellent" category compared to the UEQ benchmark database. According to the benchmark interpretation, values above +2.0 are rarely achieved and indicate a very positive user experience.
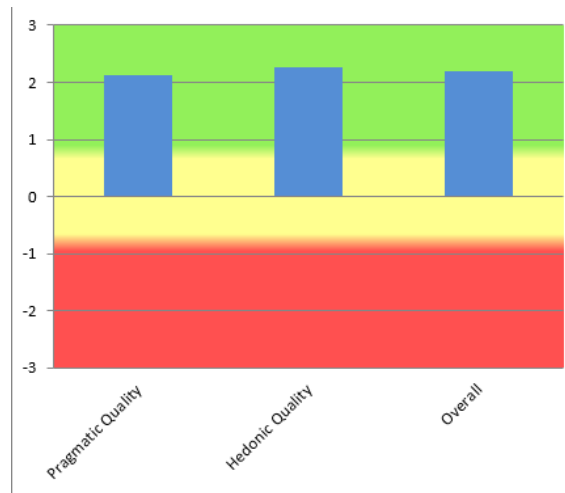
Figure 13 Overview of the UEQ Scales for PRT and Wallet

Item Interpretation

Table 23 Item Interpretation for the PRT and Wallet

Item	Mean	Variance	Std. Dev.	No.	Negative	Positive	Scale	
1	2.3	1.1	1.0	26	obstructive	supportive	Pragmatic Quality	
2	1.9	1.1	1.1	26	complicated	easy	Pragmatic Quality	
3	2.1	1.2	1.1	26	Inefficient	efficient	Pragmatic Quality	
4	2.2	1.1	1.0	26	Confusing	clear	Pragmatic Quality	
5	2.0	1.4	1.2	26	Boring	exciting	Hedonic Quality	
6	2.5	1.0	1.0	26	not interesting	interesting	Hedonic Quality	
7	2.3	1.6	1.3	26	conventional	inventive	Hedonic Quality	
8	2.2	1.9	1.4	26	Usual	leading edge	Hedonic Quality	

At the item level, the highest-rated aspects were *"interesting" (2.5)*, *"supportive" (2.3)*, and *"inventive" (2.3)*, suggesting strong engagement and perception of innovation. Even the lowest mean score (*"easy" at 1.9*) still represents a clearly positive evaluation, confirming consistent performance across all scales. In particular:

- **Supportiveness (Mean = 2.3)** Participants perceive the tools as *strongly supportive*, not obstructive, indicating smooth workflows and effective task enablement.
- **Ease of Use (Mean = 1.9)** The tools are regarded as *clearly easy to use*. This relatively high score suggests that users experienced minimal complexity during interaction.
- **Efficiency (Mean = 2.1)** Respondents perceive the tools as efficient and responsive. This reflects well on system performance and the ability to produce useful outputs quickly.
- **Clarity (Mean = 2.2)** The high clarity score indicates that users found the interfaces and messages easy to understand, with minimal confusion.
- **Excitement (Mean = 2.0)** Users found the tools to be stimulating and engaging rather than boring.
- **Interest (Mean = 2.5), the highest score across all items**. This outstanding result signifies that participants were highly engaged and motivated when using the tools.
- **Inventiveness (Mean = 2.3)** The tools are perceived as inventive and creative, rather than conventional, reinforcing their innovative character.
- **Perceived Modernity (Mean = 2.2)** Users see the tools as *leading-edge*, signaling strong acceptance of their novelty and technological advancement.

Confidence Interval Analysis

To assess the precision and reliability of these results, 5% **confidence intervals** were calculated for both the individual items and overall scales. Narrow confidence intervals indicate high agreement among participants and reinforce the trustworthiness of the mean values.

For **Pragmatic Quality**, the confidence interval ranged from 1.75 to 2.48, confirming a strong and consistent positive perception of usability and task performance. The Hedonic Quality scale showed a slightly wider interval (1.83 to 2.71), reflecting high but more varied enthusiasm toward the tools' innovativeness and excitement. The overall user experience score of 2.19, with an interval between 1.83 and 2.55, demonstrates a robustly positive and stable evaluation across all items.

At the item level, confidence intervals ranged from approximately **±0.38 to ±0.53**, indicating a low level of response variability. Items such as *"supportive"* and *"interesting"* exhibited the narrowest intervals, showing particularly strong consensus among participants.

In summary, both the mean scores and the confidence interval analysis confirm that users consistently evaluated the PRT and Citizen Wallet tools as highly usable, efficient, and engaging. The results demonstrate excellent perceived quality, both pragmatically and hedonically, and underline the robustness and reliability of the collected data. These findings validate the tools' design direction and readiness for wider pilot implementation, with only minor refinements needed to further enhance user trust and transparency regarding data security.

The responses show an overall high level of trust and positive perception toward both tools. Most participants selected "Agree" or "Strongly Agree" for the majority of items, indicating that the PRT and Wallet are perceived as consistent, understandable, efficient, and directionally reliable.

Clarity and Performance (C1-C4)

Consistency and Clarity: The vast majority of respondents (*over 92%*) agreed that the results of the tools are consistent and understandable, showing confidence in the tools' analytical outputs and interface clarity.

Security and Data Confidence: The results indicate a generally high level of perceived security and confidence in using the tool. Overall, 84.62% of participants (*agree* or *strongly agree*) feel confident when interacting with the tool. However, the presence of 12% neutral responses and a small share of disagreement (3.8%) points to some remaining uncertainty.

Efficiency and Usability: High levels of agreement were reported regarding speed, responsiveness, and accessibility for beginners, confirming the tools' ease of use and responsiveness. A combined 92.31% of participants either *agree* or *strongly agree* that the tool is efficient, indicating that system response times and overall performance meet users' expectations during interaction. These perceptions are aligned with the UEQ results, which also emphasize usability and efficiency.

Ease of Use by Beginners: The results indicate a generally positive perception of the tool's usability for beginner users. A combined 72.00% of participants *agree* or *strongly agree* that the tool can be used effectively by users with little prior experience, suggesting that the interface and interaction logic are largely intuitive. However, the relatively high proportion of neutral responses (28.00%) points to a degree of uncertainty among participants. This may be due to limited hands-on time during the evaluation, varying levels of digital literacy, or the absence of dedicated onboarding elements such as tutorials, walkthroughs, or contextual help (Figure 14).
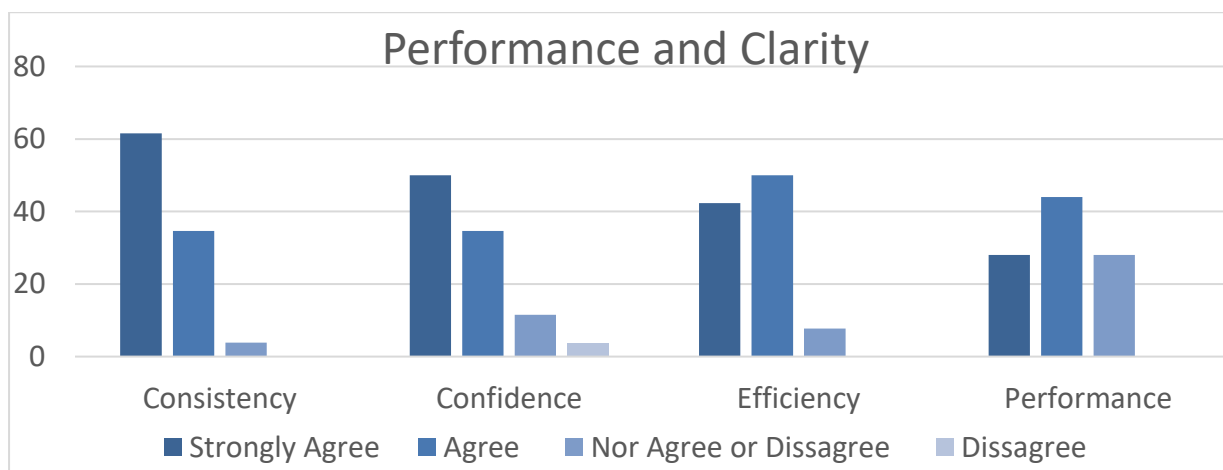
Figure 14 Performance and Clarity of PRT & Wallet - VVV

Trust and Skepticism (C5-C8)

Skepticism: A smaller group (**19.23%** combined *agree* or *strongly agree*) expresses some level of skepticism. While a combined **61.53%** of participants (*disagree* or *strongly disagree*) and a **19.23%** of respondents remain neutral, indicating a degree of cautiousness or uncertainty, which may be linked to limited exposure, the pilot-stage maturity of the tool, or a desire to see further validation in real operational contexts.

Usefulness and Reliability: Nearly all participants agreed that the tools are useful for decision-making and moving in the right direction toward becoming reliable assets for operational use. There is an exceptionally strong and clear consensus regarding the tool's usefulness in decision-making. overwhelming **92.31%** of participants either *agree* or *strongly agree* that the tool can support decision-making processes, highlighting its perceived practical value and relevance, and a combined **96.16%** of participants *agree* or *strongly agree* that the tool is heading in the right direction and can be relied upon for future daily or operational use, indicating that the tool is widely perceived as providing meaningful, relevant, and actionable support for decision-making processes.
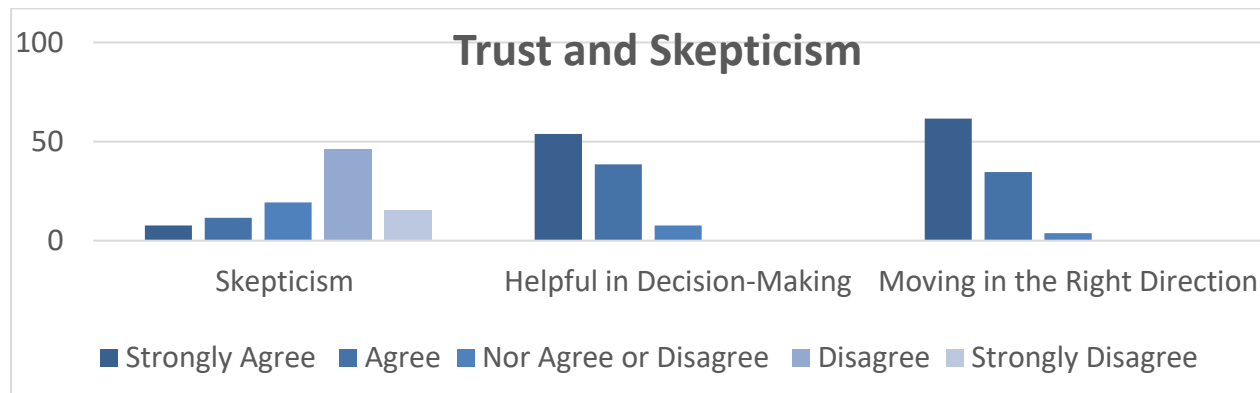
Figure 15 Trust and Skepticism Towards PRT & WALLET - VVV

Accuracy (C9)

Operational Reliability and Accuracy: Participants generally agreed that the tools function effectively and are accurate in meeting the needs of their respective stakeholders (municipalities, citizens, and policymakers). Even though in these questions not all participants replied, still the results remain positive. In particular, a combined **90.91%** of respondents *agree* or *strongly agree* with the statement, suggesting that the tool is perceived as reliable and fit for purpose from an organisational and operational perspective, while there was also a uniformly positive assessment of the tool's accuracy.

Operational Reliability and Accuracy

Legend: ■ Strongly Agree ■ Agree ■ Nor Agree or Disagree ■ Disagree ■ Strongly Disagree
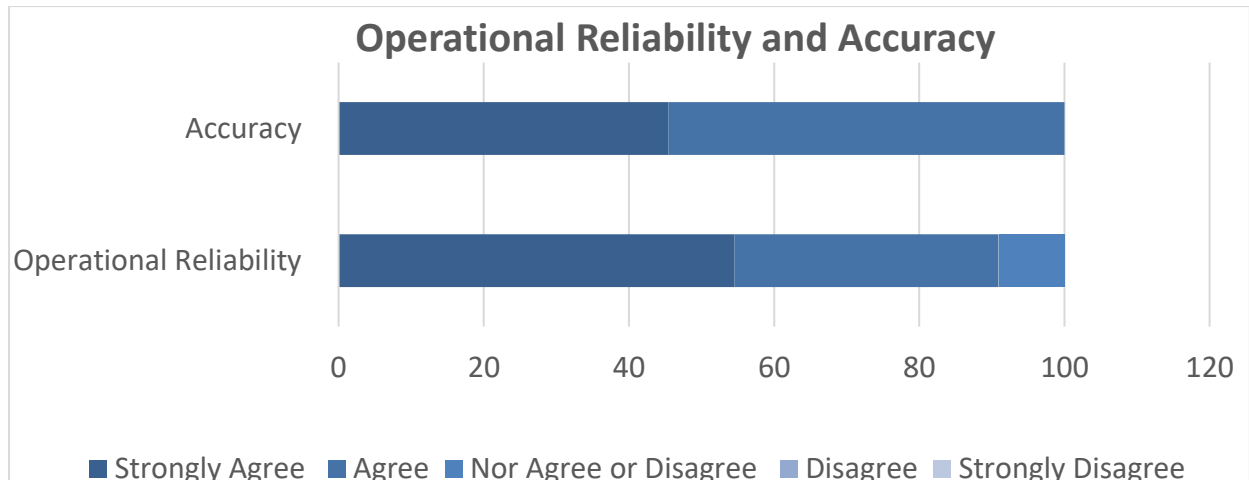
Figure 16 Operational Reliability and Accuracy of PRT and Wallet - VVV

The results indicate a **high level of trust** in the tool for sensitive activities such as voting and policy support. A combined **88.46%** of participants *agree* or *strongly agree* that they trust the tool in this context, suggesting strong confidence in its reliability, integrity, and suitability for supporting democratic and policy-related processes.

The **substantial share of "strongly agree" responses (46.15%)** reflects firm trust rather than cautious acceptance, which is particularly significant given the critical nature of voting-related use cases. At the same time, the presence of a **small neutral group (7.69%)** and a **very limited level of disagreement (3.85%)** indicates that a minority of participants remain cautious, likely due to the high stakes associated with electoral and policy decision-making systems.

(C9) The results indicate an **extremely high level of clarity and transparency** regarding the confirmation of successful vote or support submission. An overwhelming **92.30%** of participants *agree* or *strongly agree* that it is clear when their action has been successfully completed, suggesting that feedback mechanisms and confirmation messages are highly effective.

The majority agreed that the tools **encourage active involvement** in local decision-making, validating their design as enablers of civic participation. A combined **92.31%** of participants *agree* or *strongly agree* that the tool encourages engagement, indicating that it is widely perceived as empowering and supportive of civic involvement. The **very small neutral and negative shares (each 3.85%)** indicate only marginal hesitation or disengagement.

Overall, the Trust Questionnaire results confirm that participants view the PRT and Citizen Wallet tools as trustworthy, reliable, and functionally effective, particularly in terms of consistency, usability, and civic engagement. The main area requiring improvement concerns the communication of personal data protection and security features, as a minority of respondents expressed uncertainty in this regard. Addressing these concerns through clearer privacy

explanations, transparent data policies, and user training, will further strengthen users' trust and adoption readiness.

3.1.2.3 *Primary qualitative and quantitative research on tourism flows, Municipality's services and the role of AI Survey on the quality of the touristic services of VVV & the role of AI*

Within the framework of PILOT #3, the Ministry of Tourism of Greece, as referred in D6.4, conducted primary and secondary research to gather qualitative and quantitative data firstly on tourism flows (profile and preferences) to the Municipality of Vari Voula Vouliagmeni, secondly, on how they assess the municipality's services (waste management and traffic management) and thirdly, to investigate their attitude towards AI and how it can contribute to the improvement of public services through smart AI apps. The full report of the research results can be found in the project repository.

The aim of the research was to support the Municipality's task, by providing the data needed to plan and implement policies for the use of AI in public services, to respond to the citizens' needs in a more effective way.

The key research questions were:

- *What are the key figures concerning inbound tourism and domestic visitor flows to the Municipality of Vari Voula Vouliagmeni?*
- *What are the key factors influencing tourists' satisfaction with tourism services provided at the Municipality?*
- *How do they assess the quality of public services provided by the Municipality?*
- *What is their opinion on Artificial Intelligence?*
- *To what extent could Artificial Intelligence contribute to the improvement of the municipality's services?*

The primary research, as referred in Deliverable 6.4 "Stakeholders' Feedback and Evaluation of the AI4Gov Use Cases V1", was conducted in 2 stages:

At the **1st stage**, the Ministry conducted qualitative research via a series of interviews with key stakeholders (hotel managers, travel agencies and tourist enterprises managers, hotel association representatives) at the municipality. The main aim of this stage was to gather information on the following:

- The profile of the visitors
- Tourism flows in the municipality
- Evaluation of the services offered by the municipality focusing on the topics of the two UCs (waste and traffic management)

The interviews were conducted in the period between 27/05/2024-18/07/2024 online via zoom and in two cases by telephone. During the research process, the protection of personal data and

the conditions of confidentiality were respected. Concerning the visitors' profile the main results were the following:

- Most visitors come from the USA, Western Europe, Middle East countries and Cyprus or are Greek expatriates from the USA, Australia and South Africa.
- The main motivation for visiting during the summer months is leisure but during the winter months, business trips as well as trips for investing in the Athens real estate market are frequent.
- The average duration of stay ranges from 3 to 5 days.
- The most popular activities and points of interest within the municipality are visiting Lake Vouliagmeni, the temple of Poseidon in Sounio, the beaches and the coastal zone and outside the municipality the centre of Athens and the Athens Riviera.

Regarding the evaluation of the municipality's services, most of the key informants expressed satisfaction with the municipality's waste collection and management services. Nevertheless, it was pointed out that the use of AI would be particularly useful to determine the necessity and timing of waste collection to avoid peak hours, so not to cause traffic problems. When asked if they knew of the VVV tools "Pay As You Throw" and the "Novoville" App, the majority stated that they were unaware of their existence and that it needs to be promoted for wider awareness. Lastly, the lack of parking spaces is one of the biggest challenges, especially in popular areas of the municipality such as Vouliagmeni & Kavouri during the hours of high visitor flows (full report can be found in Deliverable 6.4 Stakeholders' Feedback and Evaluation of the AI4Gov Use Cases V1-APPENDIX 6.5).

At the **2nd Stage,** quantitative research was conducted on site by the two external associates of the Ministry who assisted participants in completing an online or printed questionnaire. The two associates visited the points indicated by the project team after securing the necessary permits where necessary. The target audiences were tourists, domestic day visitors from other parts of Athens and Attika, the municipality's residents, the municipality's employees as well as local businesses. Visitors and residents were reached at places of interest such as:

- Vouliagmeni lake
- Hotels (Margi, Amarilia)
- Public squares, cafes & other places of interest
- Popular Beaches
- Astir Marina (Vouliagmeni)

The aim of the quantitative research was to investigate the attitude of visitors/residents/ municipality's employees and local businesses, towards the services of the municipality (waste management, recycling, traffic management, parking) and AI and whether AI can contribute to the improvement of municipal services through the development of smart AI tools.

Two of the questionnaires (visitors and residents) were based on the key insights provided by the qualitative research conducted during the first stage and on the overview of the AI4Gov's Work Packages and deliverables such as, among others, the HRF developed under the project to lay the groundwork for addressing bias in AI by ensuring complying with EU regulations and facilitating the practical application of AI4Gov technologies. Input from UPRC was provided regarding AI questions and the Municipality's use cases (WP6).

In addition, in the framework of the 1st validation workshop organised at the Town Hall of VVV on the 22nd of November 2024, to evaluate the use cases tools' functionality, usability, and relevance to real-world challenges, the third questionnaire was developed for the municipality's personnel. Finally, a fourth questionnaire for businesses located in the Municipality of VVV was developed with aim to assess the impact of visitor flows in specific areas, the Municipality's services as well as the businesses attitude towards AI use of smart tools to improve municipal services. Each questionnaire was tailored to the target population.

The questions included in the four (4) questionnaires focused on the following subjects:

- The most popular places of interest in the municipality
- The effect of the arrival of tourists on services such as waste management, traffic congestion, etc.
- The evaluation of the services offered by the municipality
- The evaluation of the attitude of the participants towards AI and its potential contribution to the improvement of the municipality's services with the use of smart AI tools.

The main results/outputs of the quantitative research in the Municipality of Vari Voula Vouliagmeni are the following:

- **Preferences (visitors-residents)**: Greek visitors stated that they mostly like to visit restaurants and cafes in the municipality, Lake Vouliagmeni and the esplanade, while foreign visitors prefer visiting Lake Vouliagmeni, restaurants and cafes, as well as beaches in the municipality. Permanent residents prefer to visit the esplanade, cafes & restaurants in the area and the Astir Marina. It is obvious that the popularity of certain points of interest creates high pressure on municipal infrastructure and services.
- **Effect from tourists/visitors' arrivals**: the majority of the non-visitor/non-tourist participants (residents, the municipality's employees and local businesses) believe that the arrival of tourists/visitors negatively affects the municipal services, especially parking, the maintenance of beaches and traffic management. Especially in the residents' replies, the percentage reached almost 95%.
- **Waste management**: most of the respondents are quite satisfied with the Municipality's services, especially in the field of recycling and the maintenance of beaches.
- **Traffic management-parking**: Residents and Greek visitors were the least satisfied with traffic management and parking services, whereas foreign visitors and tourists, reported

a relatively higher level of satisfaction. Finally, in the case of local businesses, more than 60% stated that they were satisfied with the traffic management and parking services.

- **Use of AI**: most of the participants stated that they trust AI, while the Municipality's employees are more skeptical in terms of its use. Overall, most of the respondents agree that the use of AI smart tools will improve the Municipality's services in all fields leading to evidence-based decisions. Finally, most of the respondents raised the issue of trust/reliability of AI and protection of personal data.

The quantitative research was conducted both through google forms and printed questionnaires and it was implemented from November 2024 to October 2025. A full report can be found in ANNEX 6.4. Questionnaires were completed anonymously, always with the informed consent of the participants and can be found in ANNEX 6.3.

3.1.3 Sustainable Development and the European Green Deal (JSI)

For the Slovenian use cases, a different approach was adopted compared to the other AI4Gov use cases, as their underlying methodologies differed. Specifically:

- **Top100 Projects**: The additional questions introduced during the first evaluation cycle were incorporated into the latest Top100 AI questionnaire framework, together with the Bias, Ethics, and Inclusiveness Assessment Framework. In the current evaluation cycle, responses to open-ended questions were assessed as reflective inputs regarding inclusiveness, fairness, and bias mitigation.
- **Missing Data Analysis (formerly SDG Observatory)**: In this evaluation cycle, two sub-use cases were assessed and provided valuable insights. These included the *Rare Diseases* sub-use case, through the evaluation of the corresponding interface of the Visualisation Workbench, and the *Alcohol Abuse* sub-use case, which had not been evaluated during the first cycle due to data unavailability and was assessed in this cycle through a qualitative evaluation of its respective Visualisation Workbench interface.
- **OECD Policy Documents Use Case:** The evaluation focused on the Visualisation Workbench, specifically the OECD Policy Documents chatbot, which is part of the Policy-Oriented Analytics and AI Algorithms component.

3.1.3.1 *Top100 projects*

3.1.3.1.1 Overview and Rationale for the Second Evaluation Phase

For the Top100 Projects Use Case, the second evaluation approach deviated from the methodology used in other AI4Gov pilots. Following the first evaluation cycle, the additional ethics and bias-related questions introduced into the Top100 reviewer workflow were **well accepted**,

with strong indications that the format and relevance of these questions met the expectations and needs of the reviewing community.

As a result, and based on explicit reviewer feedback, these questions were fully integrated into the latest Top100 global call, becoming part of the standard evaluation pipeline. Consequently, no new independent evaluation workshop was conducted for the second cycle; instead, the focus shifted toward analysing the open-ended responses submitted by the Top100 applicants themselves. This analysis provides valuable insights into how applicants articulate their approaches to inclusiveness, fairness, and bias mitigation, offering evidence of the field's maturity and highlighting remaining gaps in responsible AI practices.

3.1.3.1.2 Analysis of Inclusiveness and Fairness Approaches (Applicants' Responses)

Across the open-ended responses, applicants demonstrated strong awareness of inclusiveness and fairness principles, but also exhibited inconsistent depth, lack of formal metrics, and limited documentation practices. While most provided general descriptions of inclusive intentions or design features, few offered measurable evidence or systematic methodologies.

Figure 17 Wordcloud for Inclusiveness and Fairness

From the responses, **nine dominant themes** emerged:

Theme 1: Multilingual, Culturally Localised, and Accessible Design (~65–70% of responses)
This was the strongest and most consistent theme. Common approaches included:
- Support for multiple languages, including African, Indigenous, and low-resource languages.

- Use of **voice interfaces** to reduce literacy barriers.
- **Offline**, low-bandwidth, or low-cost deployment modes for underserved communities.
- Cultural adaptation of content (e.g., agricultural advice, educational material).

Theme 2: Bias Mitigation and Fairness Audits (~60–65%)

Applicants frequently stated that they perform bias assessments, but few described methods in detail. Reported practices:
- Bias testing across demographic groups.
- Avoidance of discriminatory features (e.g., excluding postcode, biometrics).
- Human-in-the-loop validation.
- Occasional references to fairness metrics (e.g., equalized error rates), though often nonspecific.
- Use of "representative datasets," though representativeness was seldom quantified.

Theme 3: Diversity, Equity, and Inclusion in Design Teams (~40–45%)
Examples include:
- Women-led and gender-balanced teams.
- Inclusion of disability representatives or minority groups in annotation and testing.
- Multidisciplinary teams combining AI, ethics, and domain expertise.
- Globally distributed collaborators.

Theme 4: Participatory Co-Design with Marginalised Communities (~35–40%)
Applicants frequently described community involvement practices such as:
- Co-design sessions with Indigenous groups, local farmers, or youth organisations.
- Engagement with deaf users or low-literacy communities.
- Incorporation of lived experience into model requirements.

Theme 5: Open Access, Affordability, and Democratization of AI (~30–35%)
Measures included:
- Free or low-cost access to tools.
- Anonymous usage without mandatory log-ins.
- Open datasets and transparent documentation.

Theme 6: Privacy Protections and Ethical Safeguards (~25–30%)
Reported techniques:
- Differential privacy.
- Federated learning.
- Redaction or non-collection of personal identifiers.
- Preference for non-personal or synthetic datasets.

Theme 7: Inclusive Impact and Application Domains (~25%)

Applications focused on:

- Equitable healthcare and diagnostics.
- Inclusive education support.
- Climate justice and conservation tools for underserved regions.

Theme 8: Alignment with Global AI Ethics Frameworks (~10–15%)

Frameworks referenced included:

- UNESCO AI Ethics Recommendation.
- Montreal Declaration.
- AI4People principles.

However, alignment tended to be descriptive rather than operationalised.

Theme 9: Avoiding Human Profiling by Design (~10–12%)

Several ecological, infrastructure, and environmental-monitoring projects emphasised that:

- Their systems analyse non-human data exclusively.
- Therefore, risk of human bias is inherently low.

3.1.3.1.3   Analysis of Approaches to Data and Model Bias Mitigation

Applicants provided a broad range of descriptions concerning how they identify and mitigate bias. Awareness levels were generally high, but methodological detail was inconsistent.
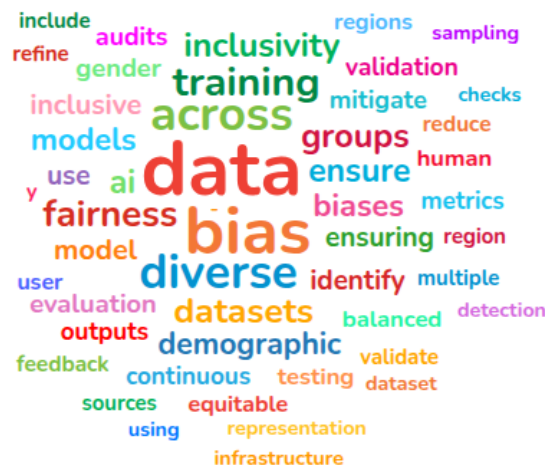
Figure 18 Wordcloud for data and Model Bias Mitigation

Seven thematic patterns emerged:

Theme 1: Data Diversity and Representativeness

Strategies included:

- Geographic diversity across continents or regions.

- Demographic diversity (age, gender, socioeconomic groups).
- Linguistic coverage (dialects, low-resource languages).
- Use of stratified sampling, oversampling, or data augmentation.

A key gap: **Most projects did not evaluate or quantify representativeness**.

Theme 2: Avoidance of Sensitive Data
Many ecological, geological, or industrial projects reported:
- No use of personal data.
- No demographic attributes collected.
- Modelling strictly on technical or environmental signals.

This reduces certain bias risks but does not eliminate structural or deployment biases.

Theme 3: Fairness Metrics and Algorithmic Techniques
Applicants mentioned:
- Generic fairness metrics (often unspecified).
- Demographic parity.
- Reweighting, threshold adjustment.
- Adversarial debiasing.
- Counterfactual data augmentation.

However, only a few offered methodological clarity or reproducible descriptions.

Theme 4: Human-in-the-Loop and Expert Oversight
Common mechanisms:
- Experts validating outputs (clinicians, educators, biologists).
- Continuous annotation and re-labelling.
- User testing and stakeholder feedback loops.
- Real-world pilot deployments.

HITL was one of the most frequently cited safeguards.

Theme 5: Governance, Transparency, and Documentation
Practices mentioned:
- Model cards or transparency statements.
- Open datasets and reproducible pipelines.
- Ethical review processes.
- Responsible AI assessments or risk checklists.

Only a very small group referenced:
- EU AI Act compliance,
- Internal AI governance committees.

Theme 6: Iterative Testing, Auditing, and Monitoring

Applicants described:
- Bias audits (often informal).
- Drift detection and retraining.
- Monitoring subgroup performance.
- Real-world evaluations.

Yet few demonstrated **structured audit cycles** or systematic KPI monitoring.

Theme 7: Conceptual Interpretations of Bias

Applicants understood "bias" in widely different ways, including:
- Representational imbalance,
- Technical performance discrepancies,
- Societal inequity,
- Domain coverage issues.

This variability suggests the need for clearer definitions and guidance.

3.1.3.2   Missing data analysis

3.1.3.2.1   Visualisation Workbench for Rare diseases UC

Workshop Overview

The Workshop for the evaluation of the Visualisation Workbench and its relevant interface to the Rare Diseases use case was implemented in two rounds: the first one in June-July 2025 and the second one in November 2025, with a total of **19 participants** participating in the online workshop and filled in the evaluation questionnaires. The sample was predominantly **female (71%)**, with a smaller share of male respondents (29%).

Most respondents (**62.5%**) were in the **35–44** age group, indicating mid-career professionals or patient representatives. Two participants (25%) were older (45–54), while one (12.5%) was younger (24–34). The majority of respondents (**75%**) demonstrated intermediate technological competence, with only one beginner and one expert.

The sample is strongly oriented toward patient and caregiver advocacy, which aligns with the focus on PRO/CRO[i] data.

Table 24 Rare Diseases Participant Profile

Category	Response Options	Percentage
Gender	Female	62.5%
	Male	25.0%
	Not provided	12.5%
Age Group	24–34 years	12.5%

	35–44 years	62.5%
	45–54 years	25.0%
Technological Literacy	Beginner	12.5%
	Intermediate	75.0%
	Expert	12.5%
Professional Background	Rare disease community representative / person with rare disease	75.0%
	Public servant	25%

The demographic profile of participants indicates that the evaluation primarily engaged female, mid-aged representatives of the rare diseases community with medium technological literacy. The presence of a public servant adds an administrative perspective, while technological literacy levels suggest that the tool was tested by users capable of navigating visual analytics but not necessarily expert users, making the positive results on clarity and ease of use particularly meaningful.

3.1.3.2.1.1   UEQ results

The overall UEQ score of **0.546** reflects a moderately positive user experience for the Visualisation Workbench in the Rare Diseases use case. The results highlight a clear strength in usability, clarity, and ease of use, which are critical for decision-support tools in complex policy and healthcare contexts. At the same time, the findings reveal areas for improvement, particularly regarding system efficiency and perceived innovation, which may affect sustained engagement and user satisfaction, as shown in Table 25.

Table 25 UEQ Scale Overview of Visualisation Workbench - Rare Diseases

Short UEQ Scales	
Pragmatic Quality	0.592
Hedonic Quality	0.500
Overall	0.546

Pragmatic Quality – 0.592 (Moderate /Acceptable UX)

The short UEQ score for **Pragmatic Quality** is **0.592**, which falls within the **neutral range**. This indicates a **moderate evaluation** of the system's task-oriented qualities rather than a clearly positive one. Overall, users neither strongly endorsed nor rejected the pragmatic aspects of the interface.

Hedonic Quality – 0.500 (Moderate /Acceptable UX)

The short UEQ score for **Hedonic Quality** is **0.500**, which also lies within the **neutral range**. This suggests a moderate evaluation of the interface in terms of stimulation, novelty, and emotional appeal.

Overall, the evaluation demonstrates that the tool effectively supports stakeholders in analysing missing PRO/CRO data, offering clarity and practical value, while future iterations could focus on improving performance, interactivity, and visual appeal.
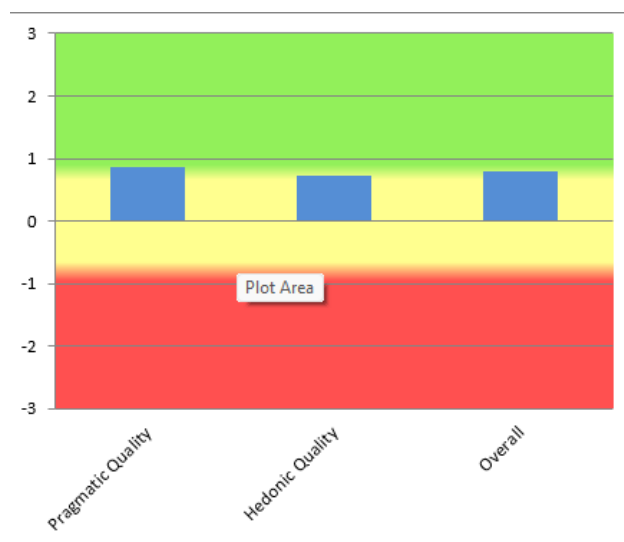
Figure 19 UEQ Overall Scales for Visualisation Workbench - Rare Diseases

Item Interpretation

Table 26 Item Interpretation of Visualisation Workbench for Rare Diseases

Item	Mean	Variance	Std. Dev.	No.	Negative	Positive	Scale	
1	1.1	1.9	1.4	19	obstructive	supportive	Pragmatic Quality	
2	1.4	2.0	1.4	19	complicated	easy	Pragmatic Quality	
3	-1.5	2.9	1.7	19	inefficient	efficient	Pragmatic Quality	
4	1.3	1.2	1.1	19	confusing	clear	Pragmatic Quality	
5	0.3	2.4	1.6	19	boring	exciting	Hedonic Quality	
6	1.3	1.0	1.0	19	not interesting	interesting	Hedonic Quality	
7	1.2	1.4	1.2	19	conventional	inventive	Hedonic Quality	
8	-0.8	2.5	1.6	19	usual	leading edge	Hedonic Quality	

At the item level, the UEQ results indicate a strong pragmatic foundation, characterised by ease of use, clarity, and supportive interaction. However, the negative perception of efficiency emerges as a significant weakness that may affect user satisfaction and task performance.

From a hedonic perspective, the interface is perceived as interesting and somewhat inventive, but it lacks strong excitement and is not clearly seen as leading edge. These findings suggest that while the system performs well functionally, enhancements in performance optimisation and innovative design elements could substantially improve the overall user experience.

- **Obstructive – Supportive (Mean = 1.1, SD = 1.4)** This item received a clearly positive evaluation, indicating that users generally perceive the system as **supportive rather than obstructive** in accomplishing their tasks. The relatively high standard deviation suggests some variability in user experience, but the overall perception points to effective support during interaction.
- **Complicated – Easy (Mean = 1.4, SD = 1.4)** This item achieved one of the highest mean scores among pragmatic aspects, reflecting a strong perception of the interface as easy to use. This result suggests that the system's structure and interaction logic are intuitive and accessible, even for users with limited prior experience.
- **Inefficient – Efficient (Mean = –1.5, SD = 1.7)** This item stands out with a clearly negative evaluation, indicating that users perceive the system as inefficient. The high variance and standard deviation points to divergent experiences, but the strongly negative mean suggests recurring issues related to performance, speed, or effort required to complete tasks. This represents a critical area for improvement in the overall user experience.
- **Confusing – Clear (Mean = 1.3, SD = 1.1)** Users rated the interface positively in terms of clarity, indicating that information presentation and navigation are generally clear and understandable. The relatively lower standard deviation compared to other items suggests a more consistent user perception on this aspect.
- **Boring – Exciting (Mean = 0.3, SD = 1.6)** This item falls within the neutral range, suggesting that users do not perceive the interface as particularly exciting, but neither as boring. The high variability indicates mixed opinions, pointing to limited emotional engagement or stimulation during use.
- **Not Interesting – Interesting (Mean = 1.3, SD = 1.0)** This item received a clearly positive evaluation, showing that users generally find the system interesting. This suggests that the content and functionality of the interface succeed in maintaining user attention, despite limited excitement in terms of emotional appeal.
- **Conventional – Inventive (Mean = 1.2, SD = 1.2)** The positive mean score indicates that users perceive the interface as inventive rather than conventional, highlighting some degree of novelty in the way information is presented or interacted with. However, the moderate standard deviation suggests differing perceptions regarding the extent of this inventiveness.
- **Usual – Leading Edge (Mean = –0.8, SD = 1.6)** This item is positioned at the threshold of negative evaluation, indicating that users tend to perceive the interface as rather usual

than leading edge. The high variance reflects diverse opinions but overall suggests that the system is not strongly associated with cutting-edge or highly innovative design.

The trust questionnaire assesses users' confidence, perceived reliability, safety, efficiency, and overall trust in the analysis generated by the Visualisation Workbench.

Q4a – Confidence in the reliability and accuracy of the results: 57.9% of respondents reported being moderately confident, while **31.6%** were *very confident*. Only **5.3%** reported low confidence, indicating that nearly three-quarters of participants have medium to high trust in the accuracy and reliability of the presented analysis.

Q5a – Confidence that the analysis could support their work: The majority (**52.6%**) were *very confident* and **47.40%** were *moderately confident*, suggesting high perceived usefulness.

Q6a – Awareness of bias two years ago: Awareness levels were mixed: **42.1%** indicated very low prior awareness (score 1), while **47.4%** rated their awareness between 2 and 3. Only **5.3%** reported high awareness (score 5). This showcases that before exposure to today's AI ecosystem, users generally had **low to moderate awareness** of data and model bias.

Q7a – Current awareness of bias: Today, awareness is substantially higher: **44.5%** scored 4 or 5, 38.9% declared moderate awareness and only **16.7%** gave a low score. Users now show **strong awareness of bias**, aligning with the tool's objective of exposing missing-data-driven bias in rare diseases.

Consistency, Clarity and Performance

Confidence in the analysis at this stage: 42.1% of participants agree and **36.8%** completely agree, while **21.1%** are neutral. Most users express **confidence**, though many remain cautious, likely due to the pilot stage.

Results appear consistent and understandable: Overall, respondents evaluated the results of the analysis positively. A clear majority (**73.7%**) either *strongly agree* or *agree* that the analysis results are consistent and understandable, while **26.3%** expressed a neutral stance. confirming the **clarity strengths** identified in the UEQ.

Accurate enough for pilot testing: A strong majority of respondents expressed confidence in the accuracy of the analysis for pilot testing. Overall, 78.9% of participants either *strongly agree* or *agree* that the analysis is sufficiently accurate at this stage, while 21.1% remained neutral. No negative responses were recorded.

Feeling confident using the analysis: Respondents reported a high level of confidence when applying the analysis in test scenarios. Overall, **78.9%** of participants either *strongly agree* or *agree*

that they feel confident using the analysis, while 21.1% expressed a neutral position. No negative responses were observed.
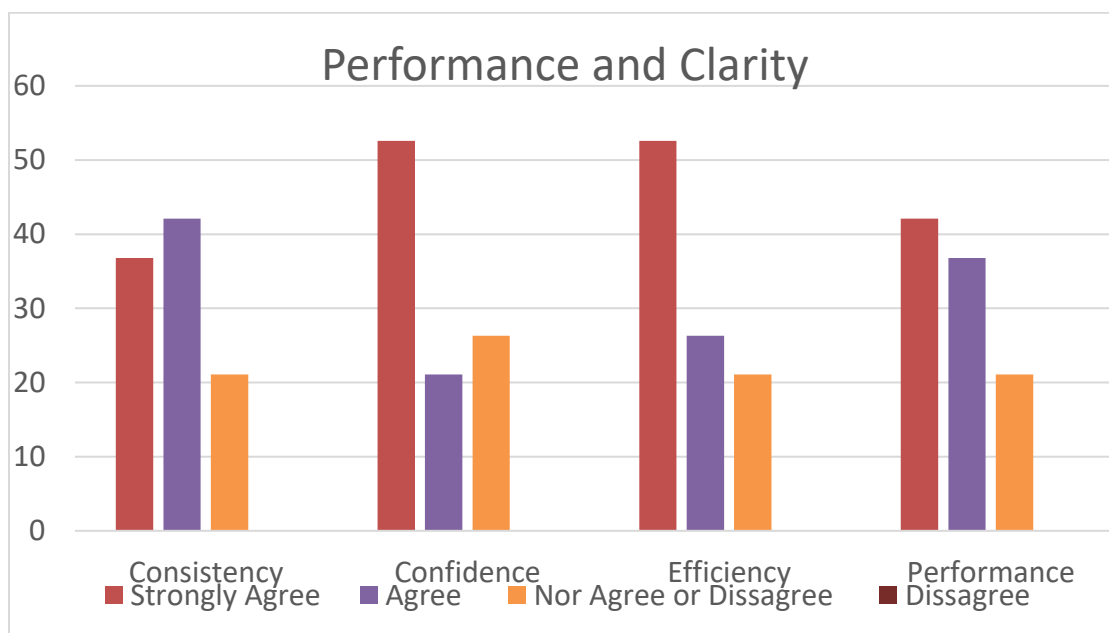
Figure 20 Performance and Clarity of Visualisation Workbench for Rare Diseases

Trust and Skepticism

Efficiency in speed and responsiveness: Respondents evaluated the analysis very positively in terms of speed and responsiveness. Overall, 84.2% of participants either *strongly agree* or *agree* that the analysis is currently efficient, while only 15.8% expressed a neutral position.

Skepticism about the analysis (negative statement): Responses indicate **low levels of skepticism** toward the analysis in its current form. A clear majority (63.2%) of respondents *disagree* or *strongly disagree* with the skeptical statement, while 10.5% express agreement and 26.3% remain neutral.

Performs at least as well as an inexperienced user: Overall, respondents evaluated the performance of the analysis tools positively, even at the pilot stage. In total, 73.7% of participants either strongly agree or agree that the tools perform at least as well as an inexperienced user in certain tasks, while 26.3% expressed a neutral position.

Value for decision support: Respondents expressed a clearly positive perception of the value of using the analysis to support decision-making. Overall, 73.7% of participants either *strongly agree* or *agree* with the statement, while 26.3% remained neutral.

Moving toward a reliable and trustworthy tool: Respondents expressed strong confidence in the future direction and reliability of the analysis approach. Overall, 73.7% of participants either

strongly agree or *agree* that the approach is progressing in the right direction and will become reliable and trustworthy, while 26.3% reported a neutral position.
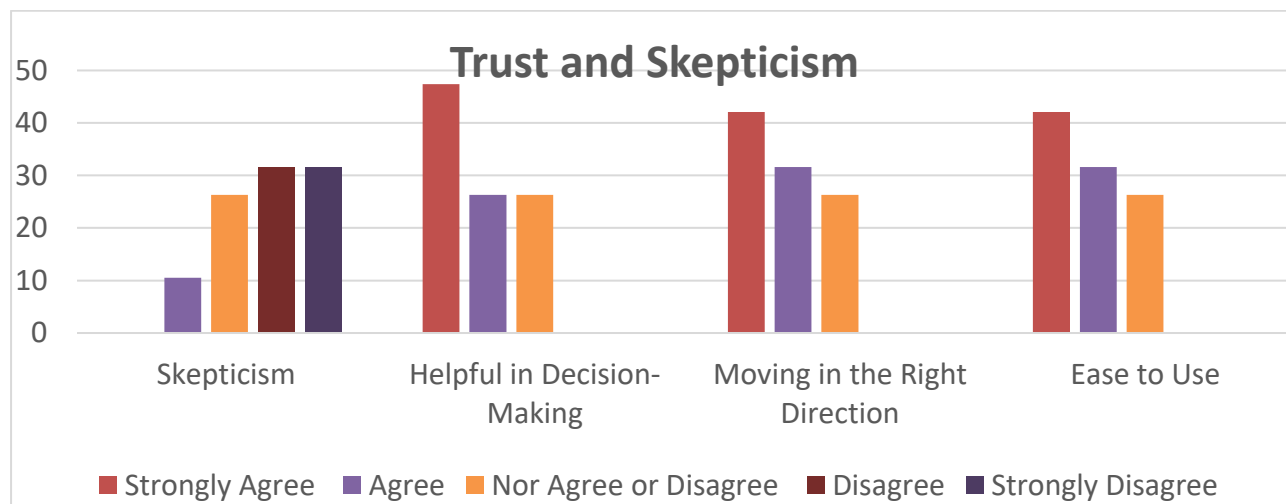
Figure 21 Trust and Skepticism of Visualisation Workbench for Rare Diseases

Accuracy

Confidence in the reliability and accuracy of the results: 57.9% of respondents reported being moderately confident, while **31.6%** were *very confident*. Only **5.3%** reported low confidence, indicating that nearly three-quarters of participants have medium to high trust in the accuracy and reliability of the presented analysis.
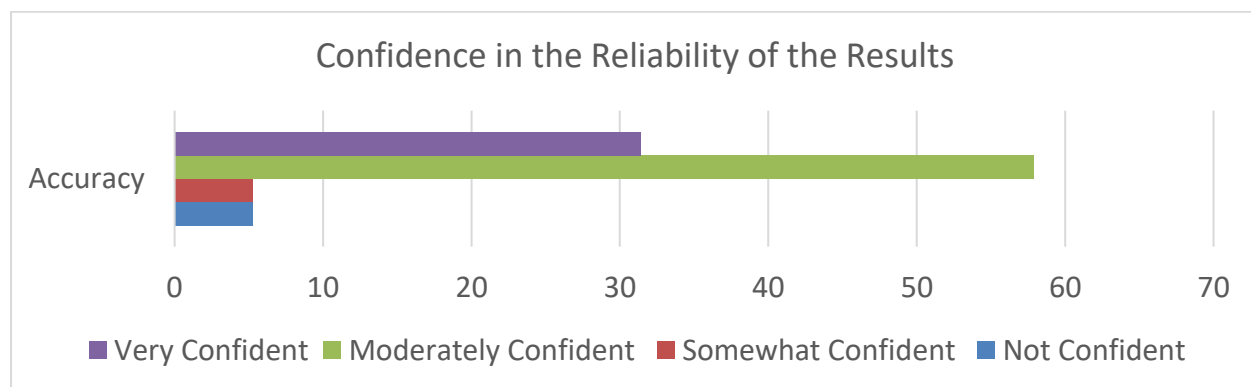
Figure 22 Confidence in the Reliability of Results of the Visualisation Workbench for Rare Diseases

Lastly, participants suggested improving the methodology by clarifying or optimising the approach to estimating disease prevalence, particularly by identifying which data registries should be considered authoritative reference sources.

3.1.3.2.2   Alcohol abuse

As described in D6.4, the Alcohol Abuse Sub-Use Case could not be evaluated during the first cycle due to missing and incomplete datasets. Also, it is a sub-case that was added later in the project, to further test the rare diseases methodology for detecting and visualisation of missing data.

As planned, the evaluation activities were resumed in early 2025, beginning with a dedicated workshop held on 22 May 2025 at the Ljubljana Police Headquarters. The session involved two active police experts, with additional insights gathered through subsequent discussions with a retired police data analyst experienced in traffic-related datasets. The police officers were not willing to fulfill the questionnaire and so the decided format was the focus group format, and the collaborators were involved in interactive discussions to gather their opinions.

The team performed country-level prevalence estimates for a broad set of rare diseases and applied systematic procedures to identify geographic gaps and under-reported cases. This approach enabled an assessment of where disease burden may be underestimated due to incomplete or uneven data coverage. To evaluate the generalisability and robustness of the methodology, they applied the **same analytical framework to Alcohol Abuse Sub-Use Case** - independent dataset about alcohol abuse in traffic and breathalyser tests conducted by the police. This secondary analysis served as a **cross-domain validation**, demonstrating how the proposed methodology performs in a different context and with distinct data characteristics. Together, these two use cases demonstrate the **flexibility of the proposed methodology for detecting and characterising missing data across different contexts.**

The AI4Gov project's ethical principles, bias considerations, training materials, and the broader set of use cases were presented. The breathalyser Sub-Use Case was then presented in detail, outlining methodological assumptions, expected analytical outputs, and the data requirements needed to support meaningful evaluations. The purpose was to validate the feasibility of the use case, assess real data practices, and identify organisational or procedural challenges that influence data quality and analytical readiness. The key results and insights derived from the workshops are presented below (the original dataset is available for usage).

3.1.3.2.2.1   Key Results

Data Ecosystem and Completeness

Discussions revealed that breathalyser data in Slovenia is generated through two operational pathways with very different levels of completeness. Tests conducted as part of traffic accident investigations are relatively reliable, as officers are legally required to test all involved parties when injuries, fatalities, or suspected intoxication occur. These records include both positive and negative results, making them comparatively comprehensive.

In contrast, breathalyser tests performed during routine traffic controls are documented inconsistently. While officers systematically record cases in which violations are detected, negative test results are frequently omitted. This selective recording produces substantial structural bias, making it impossible to determine the true prevalence of alcohol consumption among drivers and severely limiting the representativeness of the available dataset. The inconsistency between the two data sources was identified as a major obstacle for any analytical or AI-based assessment.

Organisational and Procedural Factors

A significant contributor to missing data is an internal shift toward "debureaucratisation," which has reduced mandatory administrative reporting obligations. Officers are no longer required to document every operational detail, and information not directly tied to enforcement outcomes, such as negative breathalyser tests, is often left unrecorded. This institutional stance reinforces a longstanding view that operationally relevant data consists primarily of offences that lead to fines. As a result, large portions of routine control data remain unreported, creating systemic gaps that hinder accurate, data-driven analysis.

Institutional Attitudes Toward Data and AI

The workshop also highlighted a broader cultural barrier. Police representatives expressed limited enthusiasm for data analysis or AI-supported approaches, seeing such methods as additional administrative burdens rather than tools that could support decision-making. Data collection is primarily understood as a legal obligation rather than a knowledge-producing activity, and the value of analytical insights is not widely recognised within policing routines. According to the retired expert, this scepticism is deeply embedded and has long shaped how data is collected, used, and prioritized.

Stakeholder Engagement Challenges

The evaluation process was further affected by low stakeholder engagement. Although participants were invited to complete a Slovene-translated version of the online evaluation questionnaire, none responded despite repeated reminders. A second workshop, planned with the Maribor Police Administrative Unit to gather additional regional perspectives, was declined on the grounds that the Ljubljana session was sufficient. These limitations constrained the breadth of the evaluation and confirmed the low prioritisation of data analysis activities within police institutions.

Workshop Overview

The evaluation of the Visualisation Workbench's component developed under the OECD Policy Documents use case was conducted through an online workshop that took place on December 1st, 2025, with a diverse group of **23 participants**, representing a range of professional backgrounds, age groups, and levels of technological expertise. During the workshop, the tools were presented to the participants who were then given access to the platform to test it.

The sample was predominantly composed of **researchers (74%)**, complemented by members of the **general public (22%)** and a **policy maker (4%)**, ensuring a blend of expert and non-expert perspectives. Participants exhibited a relatively balanced gender distribution, with **57% male**, **39% female**, and **4% non-binary** respondents. In terms of age, the majority fell within the **25–34** and **35–44** brackets, reflecting a primarily mid-career demographic. Importantly, the group demonstrated high digital literacy, with **87%** self-identifying as *intermediate* or *expert* users of technological tools and AI applications.

Almost all respondents (22 out of 23) evaluated the Policy-Oriented Analytics and AI Algorithms component specifically, ensuring strong consistency across the feedback. This demographic composition provides a robust basis for interpreting user perceptions, particularly from individuals with substantial research and analytical experience.

3.1.3.3.1   UEQ results

To assess the user experience of the Visualisation Workbench's component developed under the OECD Policy Documents use case, participants completed the User Experience Questionnaire (UEQ), providing feedback across both pragmatic and hedonic dimensions of interaction. The results reflect user perceptions of the system's usability, clarity, efficiency, innovativeness, and overall appeal. With **consistently positive mean scores** across all scales, the evaluation indicates that users experienced the chatbot as both **functional and engaging**. Table 27 below summarizes the aggregated scores for the Pragmatic Quality, Hedonic Quality, and Overall Experience scales, offering a concise overview of the tool's performance from the users' perspective.

Table 27 UEQ Overview for the Visualisation Workbench for OECD Policy Documents

Short UEQ Scales	
Pragmatic Quality	1.707
Hedonic Quality	1.543
Overall	1.625

The overall score of **1.625** reflects a strong and well-balanced user experience across both pragmatic and hedonic aspects. This suggests that the chatbot not only supports users effectively in completing tasks but is also viewed as enjoyable and appealing to interact with.

The high **Pragmatic Quality score (1.707)** indicates that users found the chatbot usable, intuitive, and helpful for navigating or retrieving policy document information.

Similarly, the **Hedonic Quality score (1.543)** demonstrates that users perceived the chatbot as fresh, engaging, and modern, enhancing its attractiveness as a tool for policy-related information retrieval

Item Interpretation

Table 28 Item Interpretation for Visualisation Workbench - OECD Policy Documents

Item	Mean	Variance	Std Dev	No.	Negative	Positive	Scale	
1	1.7	0.6	0.8	23	obstructive	supportive	Pragmatic Quality	
2	1.9	1.0	1.0	23	complicated	easy	Pragmatic Quality	
3	1.4	1.2	1.1	23	inefficient	efficient	Pragmatic Quality	
4	1.8	1.3	1.1	23	confusing	clear	Pragmatic Quality	
5	1.7	1.3	1.2	23	boring	exciting	Hedonic Quality	
6	1.9	1.0	1.0	23	not interesting	interesting	Hedonic Quality	
7	1.5	1.3	1.1	23	conventional	inventive	Hedonic Quality	
8	1.1	1.3	1.1	23	usual	leading edge	Hedonic Quality	

All mean values fall between 1.1 and 1.9, which are solidly positive. In particular:

- **Obstructive – Supportive (+1.7):** Users consistently felt guided and assisted during interaction, suggesting that the chatbot provides useful prompts and understandable responses.
- **Complicated – Easy (+1.9):** This is one of the highest-scoring items, indicating that the system is highly intuitive, requiring minimal effort to use. Users perceive the chatbot as straightforward and user-friendly.
- **Inefficient – Efficient (+1.4):** Participants found the chatbot reasonably efficient in helping them complete tasks. It delivers information without unnecessary delays or complications.
- **Confusing – Clear (+1.8):** Clarity is another strong point. Users reported that the chatbot's responses were understandable, well-structured, and easy to follow, reducing cognitive load.

- **Boring – Exciting (+1.7):** Users found the interaction engaging rather than dull, demonstrating that the chatbot stimulates interest during use.
- **Not Interesting – Interesting (+1.9):** This is the highest-scoring hedonic item, showing that the tool keeps users intellectually engaged and curious.
- **Conventional – Inventive (+1.5):** The chatbot is seen as offering a degree of creativity and novelty, rather than being perceived as a routine, conventional tool.
- **Usual – Leading Edge (+1.1):** While still positive, this is the **lowest of the item scores**. Users see the chatbot as somewhat innovative but not fully at the cutting edge of technological advancement. This may reflect expectations for more advanced AI capabilities or richer features.

The UEQ results demonstrate that the chatbot offers a **high-quality user experience**, characterized by **strong usability** and a **positive emotional response**. The tool is perceived as supportive, clear, efficient, and easy to use, qualities that are essential for an AI assistant dealing with complex policy documents. At the same time, its hedonic qualities, being exciting, interesting, and inventive, show that users see added value beyond mere functionality. No elements of the experience were judged neutral or negative, indicating broad user acceptance and satisfaction. These findings support the chatbot's usability and relevance for assisting stakeholders in navigating OECD policy materials.

Lessons Learnt

The results of the UEQ assessment provide several important insights that can inform the further development and refinement of the chatbot within the OECD Policy Documents use case.

1. Usability remains a critical success factor: The high Pragmatic Quality score demonstrates that users place considerable value on systems that are easy to use, intuitive, and efficient. The chatbot's strong performance in these areas confirms that clear interaction flows and well-structured responses are essential for supporting users in navigating complex policy content.

2. Engagement enhances user acceptance and perceived value: Positive hedonic evaluations indicate that users appreciated interacting with a tool that was not only functional but also engaging and enjoyable. This highlights the importance of designing conversational experiences that sustain user interest and create a positive emotional response, particularly in administrative or information-heavy contexts.

3. Expectations for innovation are increasing: Although hedonic scores were overall positive, the relatively lower score for the "leading-edge" item suggests that users expect more advanced capabilities from AI-driven tools. Future enhancements may need to focus on strengthening the system's perceived innovativeness, for example through more dynamic conversation features or improved contextual reasoning.

4. Clear and understandable communication is essential for complex domains: Strong scores related to clarity indicate that users value responses that are easy to interpret and free of ambiguity. This underscores the need for ongoing attention to clarity, summarisation quality, and explanation-based interaction when presenting policy-related content.

5. A balanced user experience contributes to broader acceptance: The overall positive rating confirms that the chatbot successfully combines functional usability with an engaging and appealing interaction style. Such a balanced experience is likely to support continued use and acceptance among diverse user groups.

6. Consistent satisfaction across participants reflects system robustness: The absence of neutral or negative scale evaluations suggests that the chatbot delivers a reliably positive experience across users with different backgrounds and levels of expertise. This consistency is an encouraging indicator of the tool's potential scalability and suitability for deployment in broader policy-related contexts.

3.1.3.3.2 Trust Questionnaire

Overall, the results of the trust questionnaire show **high levels of trust**, with certain areas reflecting strong confidence and others indicating opportunities for improvement.

Perceived reliability, clarity and performance

Regarding Perceived Consistency and Understandability (C1), participants generally found the tool's results **consistent and understandable** (95.7% of participants agree or strongly agree), suggesting that the chatbot communicates clearly and provides predictable outputs. Only a few "Neutral" responses (4.3%) were recorded, and no negative trend is visible. This suggests that users trust the chatbot to deliver clear and coherent information and demonstrate stable behavior.

On the perceived Security and Confidence in Use (C2), most users agreed (60.9% agree and 34.8% strongly agree) that they feel **secure and confident** using the tool, particularly regarding personal data, showing that the chatbot inspires confidence in its handling of interactions and does not raise notable privacy concerns.

Additionally, there is a **predominantly neutral and mixed evaluation** of the tool's efficiency in terms of speed and responsiveness. More than half of the participants (**52.2%**) neither agreed nor disagreed, indicating uncertainty or limited confidence in this aspect of the tool, possibly due to uneven performance, limited interaction time, or differing usage conditions.

Positive responses (*Agree* and *Strongly agree*) represent **26.1%** of the total, suggesting that only a minority of users clearly perceived the tool as efficient. At the same time, **21.7%** of respondents expressed negative views (*Disagree* or *Strongly disagree*), pointing to noticeable performance-related concerns among a non-negligible share of participants.

Overall, these findings indicate that **speed and responsiveness constitute a weaker dimension** of the tool compared to other evaluated aspects, highlighting an area where technical optimisation and clearer communication of system capabilities may be necessary to improve user confidence in future evaluation cycles.

Regarding the usability for beginners (C4), participants overwhelmingly agreed that beginners would be able to use the chatbot effectively (43.5% strongly agree and 30.40% agree), which indicates that the tool requires minimal prior knowledge, an important factor for widespread

Feature	First Validation Cycle	Second Validation Cycle
Evaluation Type & Purpose	Formative Evaluation: rapid feedback to identify weaknesses and guide iteration	Summative Evaluation: assess effectiveness, outcomes, and goal attainment
Timing	M12-M24	M28-M33
Scale	Small; mainly pilot-organisation participants	Broader; tests fine-tuned tools and collects wider feedback
Agenda	Testing and Feedback session.	
Focus	Early tool assessment	Performance review and overall outcomes of AI4Gov prototypes
Evaluation Tool (UEQ)	UEQ Short version	
Evaluation Tool (Trust)	3-item trust survey/ focus-group/trust board template	Literature-based tailored trust survey
Analysis Perspective	Use-case level	Tool level

 adoption.
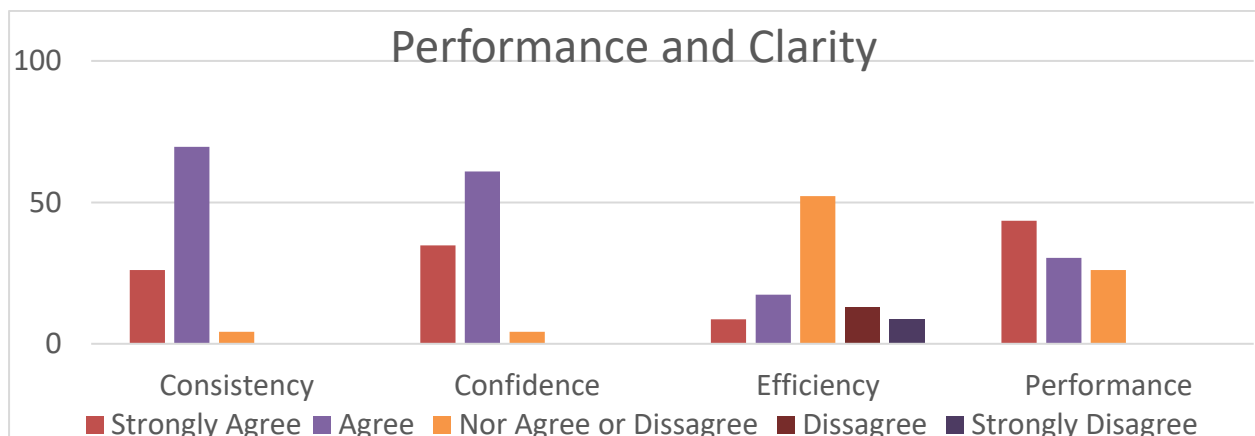
Figure 23 Performance and Clarity of Visualisation Workbench for OECD Policy Documents

Trust and Skepticism

Additionally, 47.8% of users do not feel skeptical about the tool in its current form (C5) , while regarding its usefulness for decision-making (C6), 87% of the participants consistently agree that the **can support decision-making**, with very few neutral responses (13%), which shows that the tool is viewed as valuable and practically applicable in policy contexts.

Regarding the Trust in Future Reliability (C7), most users (52.2% agree and 39.1% strongly agree) expect the tool to evolve in the right direction and become reliable for **future operational use**.

Regarding the confidence that the tool meets the organisational requirements (C8), while largely positive (50% agree and 27.8% strongly agree), there are slightly more neutral responses (22%) compared to other trust dimensions. This indicates that the respondents see organisational value, but some require further evidence or performance improvements before giving strongest endorsement.
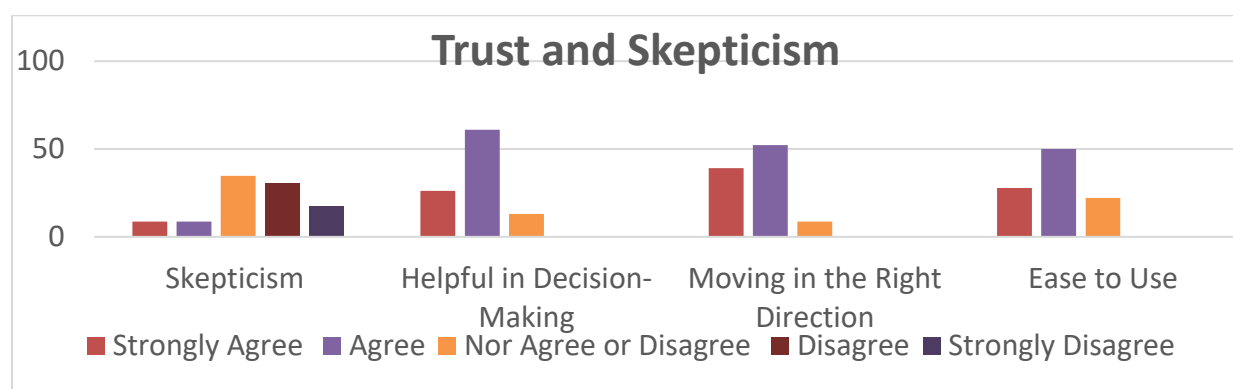
Figure 24 Trust and Scepticism of Visualisation Workbench for OECD Policy Documents

Accuracy

Lastly, regarding the perceived accuracy of the tool (C9) Accuracy is widely recognized as a strong point, with 50% of responders agreeing and 27.8% strongly agreeing. Users trust that the tool provides correct and relevant information, a core requirement for policy-support tools.
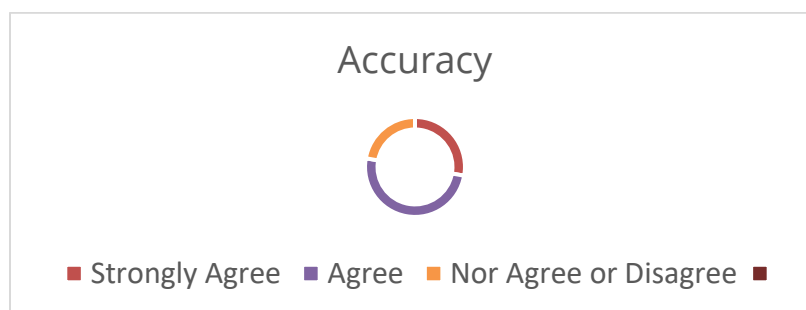
Figure 25 Accuracy of Visualisation Workbench for OECD Policy Documents

Across all dimensions, the tools receive predominantly positive evaluations, with particular strong results in security and confidence, usefulness for decision-making, future reliability and direction, accuracy and beginner usability.

The only areas reflecting more mixed perceptions are:

- **Efficiency / speed (C3)**: largely neutral

- **Organisational fit (C8)**: generally positive but not unanimously strong

Importantly, skepticism (C5) is consistently low, reinforcing that users trust the tool and view it positively in its current state.

3.2 Reflections comparing the two validation phases

The evaluation structure of the AI4Gov project deliberately utilised the feedback received from the First evaluation cycle (reported in D6.4) to inform and drive the fine-tuning phase (M25-M27) before the final Second Evaluation Cycle (M27-M36). The differences between the two iterations stem directly from this preparatory sequence, resulting in significant shifts in methodology, tool maturity, and evaluation outcomes.

3.2.1 Execution process and Evaluation of validation workshops

The execution and evaluation of the validation workshops were structured around two distinct cycles, utilizing complementary methodologies to support the iterative development of the tools.

Table 29 Execution Process and Evaluation Comparison

Feature	First Validation Cycle	Second Validation Cycle
Evaluation Type & Purpose	Formative Evaluation: rapid feedback to identify weaknesses and guide iteration	Summative Evaluation: assess effectiveness, outcomes, and goal attainment
Timing	M12-M24	M28-M33
Scale	Small; mainly pilot-organisation participants	Broader; tests fine-tuned tools and collects wider feedback
Agenda	Testing and Feedback session.	
Focus	Early tool assessment	Performance review and overall outcomes of AI4Gov prototypes

Evaluation Tool (UEQ)	UEQ Short version	
Evaluation Tool (Trust)	3-item trust survey/ focus-group/trust board template	Literature-based tailored trust survey
Analysis Perspective	Use-case level	Tool level

The evaluation methodology was intentionally non-linear, allowing phases to overlap, with the V1 evaluation process designed to inform and optimise the subsequent approach for V2. This iterative approach ensured that the feedback collected in V1 provided the necessary input to the technical partners to refine the tools before their final assessment in V2.

3.2.2 Comparison of UCs Results

It is important to mention that the AI4Gov tools have been tested in two different maturity levels, meaning that the reflections from each cycle are according to the maturity level of each interaction. A direct comparison between the two cycles is not entirely appropriate because the tools were assessed at different readiness levels. Table 30 below compares the results from the initial version of the tools evaluated in V1 - D6.4 (formative assessment) to the fine-tuned versions assessed in V2 (summative assessment), showcasing the progression in performance and acceptance.

Table 30 Comparison of Results per UC

DPB			
Dimension	**1st Validation Cycle (V1)**	**2nd Validation Cycle (V2)**	**Summary**
Overall UX	Positive (Drinking Water: 1.350; Sewage Water: 1.713)	**Positive/Acceptable** (Visualisation Workbench: 0.85; PRT & Wallet: 1.04)	Overall positive reception was maintained, demonstrating fundamental usability
Trust and Security	**Major Concerns.** Trust was conditional, with major reservations about **cyber-attacks, data misuse, and security.**	**High Confidence.** 74.1% of participants felt **secure/confident** using the Workbench. **Transparency** greatly improved, with 60% agreeing that the tool creates a more transparent environment.	V2 showed that the security and trust concerns highlighted in the formative V1 assessment were successfully mitigated, leading to strong user confidence in data handling and increased transparency
VVV			

Overall UX (UEQ Score)	**Positive** (Traffic: 1.781; Waste: 1.639), Weakness noted in Efficiency.	**Excellent** (Visualisation Workbench: **+2.10**; PRT & Wallet: **+2.192**)	Both tool categories achieved scores highly positive (above +2.0), demonstrating a transformation to a highly positive and excellent user experience
Trust and Security	**High concern** over privacy and security (63.7% to 70% concerned), Confidence in reliability/accuracy was mixed.	**Very High Confidence in Performance.** 94% of users agreed the Workbench is useful for decision-making. 96.16% agreed the PRT/Wallet is progressing in the right direction. Security concerns were largely mitigated	Users demonstrated high practical trust in V2, indicating they were willing to rely on the fine-tuned tools for operational decision-making, validating the improvements made post-V1
JSI			
Top100 Projects	Overall UEQ: 0.76 (Neutral). Focus was on evaluating the utility of the supplementary bias/ethics questionnaire.	Evaluation methodology shifted to **qualitative analysis** of applicant submissions. Analysis showed **high commitment to inclusiveness/fairness** in applications but a lack of systematic methodological detail.	The evaluation successfully transitioned from measuring user perception of the tool (V1) to measuring the tool's impact on stakeholder behavior (V2), confirming applicants' awareness of bias/ethics issues
Missing Data Analysis / Rare Diseases	Overall UEQ: 0.977 (Predominantly Positive). Weaknesses in Clarity and Ease (Neutral range).	Overall UEQ: 0.546 (Moderately Positive). Critical weakness: **Inefficient (-1.5)**. Strengths maintained in clarity and ease (1.3 to 1.4).	While the V2 tool maintained clarity, the efficiency score was negative (-1.5), dragging the overall UX score down. However, V2 successfully showed a strong improvement in **bias awareness** among participants.
Missing Data Analysis / Alcohol Abuse	Not evaluated.	**Qualitative Evaluation.** Confirmed that police data collection practices are inconsistent (negative tests often omitted),	V2 completed the planned assessment, validating the initial data concerns and exposing organisational challenges related to data-

		creating structural bias. Found institutional skepticism toward data analysis, viewing it as a bureaucratic burden.	driven governance within the police institution
OECD Policy Documents Chatbot	Overall UEQ: -0.154 (Slightly Negative). Critical weakness: **Inefficient (-1.3)**.	Overall UEQ: **1.625** (Strong Positive). PQ: 1.707. Efficiency scored positively (+1.4).	**Improvement.** Successful fine-tuning directly addressed the critical efficiency issue, shifting the overall user experience from negative/neutral to positive, with yet some issues on responsiveness

3.2.3 Overall Effectiveness of the Intervention

The overall effectiveness of the AI4Gov intervention, as assessed through the final validation phase, was encouraging and demonstrated significant success in developing solutions that provide potential and added value for public sector innovation. The tools showed substantial progress in functionality, usability, and acceptance following the refinement phase informed by the initial evaluation (V1). The overall effectiveness can be summarized across user perception, political and organisational impact, and adherence to technological and ethical standards.

Use perception and tool performance

The final evaluation confirmed that the fine-tuned AI4Gov tools achieved a **generally positive user experience (UX)**, fulfilling both functional usability and emotional engagement criteria.

- **High User Experience Scores (UEQ):** The tools demonstrated strong performance, particularly in the Greek pilot (VVV/MT), where the Visualisation Workbench and the Policy Recommendation Toolkit (PRT)/Wallet achieved scores in the **"excellent" category** (Overall UEQ score for PRT and Wallet: +2.192; Workbench: +2.10). For the Spanish pilot (DPB), the tools were consistently rated in the **positive/acceptable UX range** (Overall UEQ score for PRT and Wallet: 1.04).
- **Strong Usability and Appeal:** Users consistently praised the tools for their **hedonic qualities** (excitement, interest, inventiveness), indicating strong emotional engagement. Furthermore, pragmatic qualities (usability and clarity) were strong, supporting effective task performance. For example, the OECD Policy Documents Chatbot (JSI) achieved a high Pragmatic Quality score of 1.707 in V2, reflecting improved ease of use and clarity, although some persistent issues towards responsiveness and speed.
- **Trust and Transparency:** Stakeholders expressed **strong confidence** in the tools' ability to support decision-making and believed the tools were progressing in the right direction

toward future operational use. The project tools were found to **significantly improve transparency** in the policy process, with 60% of DPB participants agreeing that the tool created a more transparent environment

Areas Requiring Further Improvement

While overall effectiveness was high, the final assessment highlighted critical areas where the intervention's effectiveness was incomplete or conditional:

- **Efficiency Gaps:** Despite general positive UX scores, some specific UC interfaces were perceived as inefficient or slow. For example, the Missing Data Analysis Visualisation Workbench for Rare Diseases (JSI) received a clearly **negative evaluation for efficiency** (-1.5 mean score) in V2. Speed and responsiveness were also noted as weaker dimensions for the OECD Policy Chatbot.
- **Data Quality and Structural Bias:** In the Alcohol Abuse use case, the intervention exposed **structural bias in police data collection**, where negative breathalyser test results were frequently omitted. This inconsistent reporting severely limits the representativeness of the dataset, despite the utility of the methodology.
- **Institutional Adoption and Skepticism:** In the Alcohol Abuse UC, police representatives showed limited enthusiasm for data analysis, viewing it primarily as an **additional administrative burden** rather than a valuable decision-support tool.
- **Conditional Trust:** Trust remained **conditional** on data reliability, security, and transparency, underscoring the necessity of continuously implementing robust privacy safeguards and clearer communication, especially concerning personal data protection.

4 Conclusion

D6.5 "Stakeholders' Feedback and Evaluation of the AI4Gov Use Cases V2", concludes the piloting, validation, and evaluation activities of the AI4Gov project carried out under WP6 between M25 and M36. It presents the final pilot methodology, the consolidated evaluation framework, and the results of the second and final validation cycle, including comparative reflections with the first validation phase documented in D6.4. Together, these elements provide a comprehensive assessment of the AI4Gov tools at their current Technology Readiness Level and mark the formal completion of the project's piloting activities.

Overall, the evaluation results confirm that the AI4Gov intervention has been **effective, impactful, and directionally sound**. The iterative evaluation approach—moving from a formative first cycle to a summative second cycle—proved effective in improving tool maturity, usability, and stakeholder acceptance. The second validation phase demonstrated clear progress across most use cases, with significant improvements in user experience, perceived usefulness, transparency, and trust, particularly following the fine-tuning phase informed by the first evaluation. High UEQ scores, especially in the VVV pilot, and strong positive feedback on decision-support capabilities underline the added value of the AI4Gov tools for public sector innovation.

At the same time, the evaluation provides a realistic and balanced view by identifying remaining challenges. Issues related to efficiency, responsiveness, data quality, and institutional readiness, highlight that technological maturity alone is not sufficient and must be complemented by organisational change, data governance improvements, and capacity building. Importantly, the project also demonstrated the value of AI as a **diagnostic and reflective instrument**, capable of revealing structural biases, data gaps, and governance limitations that may otherwise remain hidden.

In conclusion, the AI4Gov tools have shown strong potential to support **transparent, evidence-based, and trustworthy policymaking**, while also advancing political, organisational, technological, and socioeconomic objectives. The evaluation outcomes provide a solid foundation for future scaling, further refinement, and policy uptake. The lessons learned from the two validation cycles not only strengthen the AI4Gov results but also offer transferable insights for other initiatives aiming to deploy responsible and effective AI solutions in public governance.

5 References

AI Observatory - 2021. AI Observatory. (n.d.). https://eujapan.ijs.si/dashboards/Main/Index?visualization=MAG--country-indicators

Bhat, B. A., & Bhat, G. J. (2019). Formative and summative evaluation techniques for improvement of learning process. *European Journal of Business & Social Sciences, 7*(5), 776-785.

Dolin, J., Black, P., Harlen, W., & Tiberghien, A. (2018). Exploring relations between formative and summative assessment. *Transforming assessment: Through an interplay between practice, research and policy*, 53-80.

OECD. (n.d.). https://www.oecd.org/

Prince, D. R. (2015). Approaches to summative evaluation. In *Manual of Curatorship* (pp. 690-701). Routledge.

Redefining civic engagement. Novoville. (n.d.). https://www.novoville.com/

Schrepp, M., Hinderks, A., & Thomaschewski, J. (2017). Design and evaluation of a short version of the user experience questionnaire (UEQ-S). *International Journal of Interactive Multimedia and Artificial Intelligence, 4 (6), 103-108.*

Schrepp, M. (2015). User experience questionnaire handbook. *All you need to know to apply the UEQ successfully in your project*, 50-52.

Use the power of AI to turn news content into actionable insights. Event Registry. (n.d.). https://eventregistry.org/

Hoffman, R.R., Mueller, S.T., Klein, G., and Litman, J. (2018). "Measuring Trust in the XAI Context." Technical Report, DARPA Explainable AI Program.

Cahour, B., and Forzy, J. F. (2009). Does projection into use improve trust and exploration? An example with a cruise control system. Safety Science, 47, 1260-1270.

Jian, J. Y., Bisantz, A. M., and Drury, C. G. (2000). Foundations for an empirically determined scale of trust in automated systems. International Journal of Cognitive Ergonomics, 4(1), 53-71.

Schaefer, K. E. (2013). The perception and measurement of human-robot trust. Doctoral dissertation, University of Central Florida Orlando, Florida

United Nations (n.d.). The 17 Goals. https://sdgs.un.org/goals

6 Annex

6.1 The UEQ – Short version

Thank you for taking the time to test our tools. Your feedback is valuable in helping us refine and optimise our solutions. Please complete this brief questionnaire to evaluate your experience. Your insights will directly contribute to the improvement of our technologies.

Instructions

For the assessment of the tool, please fill out the following questionnaire. The questionnaire consists of pairs of contrasting attributes that may apply to the product. The circles between the attributes represent gradations between the opposites. You can express your agreement with the attributes by ticking the circle that most closely reflects your impression.

Example: attractive □ ▣ □ □ □ □ □ unattractive

This response would mean that you rate the application as more attractive than unattractive.

Please decide spontaneously. Don't think too long about your decision to make sure that you convey your original impression. Sometimes you may not be completely sure about your agreement with a particular attribute, or you may find that the attribute does not apply completely to the particular product. Nevertheless, please tick a circle in every line. It is your personal opinion that counts. Please remember: there is no wrong or right answer!

Please assess the tool by ticking one circle per line.

		1	2	3	4	5	6	7	
1	Obstructive								Supportive
2	Complicated								Easy
3	Inefficient								Efficient
4	Confusing								Clear
5	Boring								Exciting
6	Not interesting								Interesting
7	Conventional								Inventive
8	Usual								Leading edge

6.2 Questionnaire on trustworthiness of New Technologies

The purpose of this questionnaire is to gather feedback on the users' perspective on New Technologies, such as the tool you tested today. Your responses reflect your personal opinion on trust, comfort, and familiarity with the tools. There are no wrong and right answers.

When providing your feedback, please keep in mind that the tools are still on a **research level and not ready to be fully operational**. Your opinion will help us understand if we are moving towards the right direction:

1. I feel reasonably confident in the [tool] at this stage of development. It seems to be working as expected in most cases.

[ ] Strongly agree   [ ] Agree   [ ] Nor agree or disagree   [ ] Disagree   [ ] Strongly disagree

2. The outputs of the [tool] appear consistent and understandable

[ ] Strongly agree   [ ] Agree   [ ] Nor agree or disagree   [ ] Disagree   [ ] Strongly disagree

3. So far, the [tool] seems accurate enough for pilot testing.

[ ] Strongly agree   [ ] Agree   [ ] Nor agree or disagree   [ ] Disagree   [ ] Strongly disagree

4. I feel reasonably safe using the [tool] in test scenarios.

[ ] Strongly agree   [ ] Agree   [ ] Nor agree or disagree   [ ] Disagree   [ ] Strongly disagree

5. The [tool] currently seems efficient in terms of speed and responsiveness.

[ ] Strongly agree   [ ] Agree   [ ] Nor agree or disagree   [ ] Disagree   [ ] Strongly disagree

6. I am sceptical of the [tool] in its current form.

[ ] Strongly agree   [ ] Agree   [ ] Nor agree or disagree   [ ] Disagree   [ ] Strongly disagree

7. Even in its pilot version, the [tool] seems to perform at least as well as a novice human user in certain tasks.

[ ] Strongly agree   [ ] Agree   [ ] Nor agree or disagree   [ ] Disagree   [ ] Strongly disagree

8. I see value in using the [tool] for decision-making support

[ ] Strongly agree   [ ] Agree   [ ] Nor agree or disagree   [ ] Disagree   [ ] Strongly disagree

9. I believe this tool is progressing in the right direction toward being trustworthy and reliable in future operational use.

[ ] Strongly agree   [ ] Agree   [ ] Nor agree or disagree   [ ] Disagree   [ ] Strongly disagree

10. *Please provide any additional comments, concerns, or suggestions:_____*

6.3 Questionnaire Forms for Quantitative research on tourism flows, municipality's services and AI

6.3.1 Questionnaire for VVV employee

The purpose of this research is to investigate the attitude of the employees of the Municipality of Vari Voula Voulagmeni towards AI and to what extent do employees feel AI can contribute to improve municipal services by developing smart applications. This research is part of the HORIZON project AI4GOV, where the Ministry of Tourism of Greece and the Municipality of Vari Voula Vouliagmeni participate as partners. The project aims to put forward the potential of AI and Big Data technology for the public sector and enhance their use so that public services respond to citizens' needs in a more effective way. Your responses will only be reported in aggregate form and will solely be used for research purposes (Law 3832/2010).

Since when you have been working at the Municipality?	

In which Municipality Department do you work?_____

To what extent do you agree or disagree with the following statements?

The arrival of tourists/visitors negatively affects:	Very	Enough	Little	Not at all	I don't know/ I don't answer
1. Waste Management					
2. Traffic congestion					
3. Parking					
4. Recycling					
5. Beaches					

Do you know what Artificial Intelligence is?	Yes	No
If so, do you trust it?	Yes	No

The application of AI in the Municipality of VVV, through the development of smart tools, could contribute towards:	Fully disagree	Disagree	Neither Disagree Nor agree	Agree	Fully agree
Improving waste management					
Improving Recycling services					
Improving traffic regulation/parking					
Reducing bureaucracy and delays in public procedures.					
improving safety in public spaces (e.g. AI cameras, automatic hazard notification).					
Enhancing decision-making based on the available data.					
The application of AI in public services should be accompanied by strong measures to protect personal data.					

Sex: □ Man □ Woman □ Other □ Prefer not to answer

Education Level: □ Secondary □ Post-secondary □ Higher □ Postgraduate □ Doctoral Diploma

Age: □ 18-25 □ 26-45 □ 45-55 □ 56-65 □ 66 plus

6.3.2 Questionnaire for the Visitors

The purpose of the research is to explore the attitude of tourists/visitors towards municipal (Municipality of Vari Voula Vouliagmeni) services and artificial intelligence (AI) and to what extent AI can contribute to the improvement of municipal services in the area through the development of smart applications. This research is part of the HORIZON project AI4GOV, where the Ministry of Tourism of Greece and the Municipality of Vari Voula Vouliagmeni participate as partners. The project aims to put forward the potential of AI and Big Data technology for the public sector and enhance their use so that public services respond to citizens' needs in a more effective way. Your **responses will only** be reported in aggregate form and **will** solely be **used** for **research purposes**.

Is this your first visit to the area (Vari-Voula-Vouliagmeni)?	Yes	No	If NO. How many times have you visited the municipality in the past?	Number of visits

What is the purpose of your visit?

- Holidays/Leisure
- Business
- Investment in real estate market
- Other (specify)_____

How did you get to Athens?

- Directly from my country of residence by flight to Athens's airport.
- From a country other than my country of residence, as part of a multi-destination trip
- By boat, to Athens, from another Greek destination.
- Other (specify)_____

How do you travel?

□ Alone □ With family □ With friends □ As a couple □ With colleagues for business purposes
□ Other

Which of the following places of interest in the area have you visited or would you like to visit?

1. Lake of Vouliagmeni
2. Beaches in Vouliagmeni/Voula/Varkiza
3. The esplanade
4. Restaurants/Cafes
5. Astir Marina Vouliagmeni's
6. Other ………………………………………………………………………………

Please rate your level of expectation VS your actual experience on the below statements using a 5-point scale where 5= Much better than expected and 1 = Much worse than expected":

	Much better than expected	Better than expected	As expected	Worse than expected	Much worse than expected
Accommodation					
Variety of available activities					
Local cuisine / Gastronomy					
Shopping					
Nightlife					

Nature					
Transportation					
Overall quality of services					

How likely is it to visit Greece for future vacations?

□ Very unlikely □ Unlikely □ Neutral □ Likely □ Very likely

How likely is it for you to recommend Greece as destination to your friends/ acquaintances?

□ Very unlikely □ Unlikely □ Neutral □ Likely □ Very likely

And now, we would like your opinion. To what extent do you agree or disagree with the following statements?

How do you evaluate the services offered by the Municipality, specifically:	Very good	Good	Fair	Poor	Very Poor	N/A
1. Waste Management						
2. Traffic Regulations						
3. Parking						
4. Recycling						
5. Beaches						
6. Roadworks (street surface, pavements)						
9. Accessibility (people with disabilities)						

Do you know what Artificial Intelligence is?	Yes	No
If so, do you trust it?	Yes	No

The application of AI in the area (Vari Voula Vouliagmeni) by developing smart tools, could contribute towards	Fully disagree	Disagree	Neither Disagree Nor agree	Agree	Fully agree
Improving waste management					
Improving Recycling					

Improving traffic regulations/parking					
Reducing bureaucracy and delays in public procedures.					
Improving safety in public spaces (eg AI cameras, automatic hazard notification).					
Enhancing decision-making based on the available data.					
The application of AI in public services should be accompanied by strong measures to protect personal data.					

Sex: □ Man □ Woman □ Other □ Prefer not to answer

Education Level: □ Secondary □ Post-secondary □ Higher □ Postgraduate □ Doctoral Diploma

Age: □ 18-25 □ 26-45 □ 45-55 □ 56-65 □ 66 plus

Profession: ....

Country of residence: ....

6.3.3 Questionnaire for Permanent Residents

The purpose of this research is to investigate the attitude of the permanent residents of the Municipality of Vari Voula Voulagmeni towards AI as well as towards the municipality's services. Also, to what extent do residents feel AI can contribute to improve municipal services by developing smart applications. This research is part of the HORIZON project AI4GOV, where the Ministry of Tourism of Greece and the Municipality of Vari Voula Vouliagmeni participate as partners. The project aims to put forward the potential of AI and Big Data technology for the public sector and enhance their use so that public services respond to citizens' needs in a more effective way. Your responses will only be reported in aggregate form and will solely be used for research purposes. Before you answer our questionnaire, I would like to ask you:

Are you a permanent resident of the Municipality of Vari-Voula-Vouliagmeni?	Yes	No	If YES. Since what year have you lived in the municipality?	Year

Which of the following places of interest at Vari Voula Vouliagmeni do you like to visit?
1.   The Lake of Vouliagmeni
2.   Beaches open to the public
3.   The esplanade
4.   Restaurants/Cafes
5.   Astir Marina Vouliagmenis
6.   Other

....

To what extent do you agree or disagree with the following statements?

The arrival of tourists/visitors negatively affects:	Very	Enough	Little	Not at all	I don't know/ I don't answer
1 Waste Management					
2. Traffic congestion					
3. Parking					
4. Recycling					
5. Beaches					

Concerning municipal services, to what extent do you agree or disagree with the following statements?

How do you evaluate the services offered by the Municipality, specifically:	Very good	Good	Fair	Poor	Very Poor	I don't know/ I don't answer
1. Waste Management						
2. Traffic Regulations						
3. Parking						
4. Recycling						
5.Novoville application						
6. Beaches						

7. Roadworks (street surface, pavements)					
8. Accessibility (people with disabilities)					

Do you know what Artificial Intelligence is?	Yes	No
If so, do you trust it?	Yes	No

The application of AI in the Municipality of VVV, through the development of smart tools, could contribute towards:	Fully disagree	Disagree	Neither Disagree Nor agree	Agree	Fully agree
Improving waste management					
Improving Recycling services					
Improving traffic regulation/parking					
Reducing bureaucracy and delays in public procedures.					
improving safety in public spaces (e.g. AI cameras, automatic hazard notification).					
Enhancing decision-making based on the available data.					
The application of AI in public services should be accompanied by strong measures to protect personal data.					

Sex: □ Man □ Woman □ Other □ Prefer not to answer
Education Level: □ Secondary □ Post-secondary □ Higher □ Postgraduate □ Doctoral Diploma

Age: □ 18-25   □ 26-45   □ 45-55   □ 56-65   □ 66 plus

Profession: ………………………………………………………………………………………………

6.3.4   Questionnaire for local businesses

The purpose of this research is to investigate the attitude of the local businesses of the Municipality of Vari Voula Voulagmeni towards AI as well as towards the municipality's services. Also, to what extent do local businesses feel AI can contribute to improve municipal services by

developing smart applications. This research is part of the HORIZON project AI4GOV, where the Ministry of Tourism of Greece and the Municipality of Vari Voula Vouliagmeni participate as partners. The project aims to put forward the potential of AI and Big Data technology for the public sector and enhance their use so that public services respond to citizens' needs in a more effective way. Your responses will only be reported in aggregate form and will solely be used for research purposes. Before you answer our questionnaire, I would like to ask you:

Are you a permanent resident of the Municipality of Vari-Voula-Vouliagmeni?	Yes	No	If YES. Since what year have you lived in the municipality?	Year

Which of the following places of interest at Vari Voula Vouliagmeni do you like to visit?
1. Lake of Vouliagmeni
2. Beaches open to the public
3. The esplanade
4. Restaurants/Cafes
5. Astir Marina Vouliagmenis
6. Other ……..

To what extent do you agree or disagree with the following statements?

The arrival of tourists/visitors negatively affects:	Very	Enough	Little	Not at all	I don't know/ I don't answer
1 Waste Management					
2. Traffic congestion					
3. Parking					
4. Recycling					
5. Beaches					

Concerning municipal services, to what extent do you agree or disagree with the following statements?

How do you evaluate the services offered by the Municipality, specifically:	Very good	Good	Fair	Poor	Very Poor	I don't know/ I don't answer
1. Waste Management						
2. Traffic Regulations						
3. Parking						

4. Recycling						
5.Novoville application						
6. Beaches						
7. Roadworks (street surface, pavements)						
8. Accessibility (people with disabilities)						

Do you know what Artificial Intelligence is?	Yes		No
If so, do you trust it?	Yes		No

The application of AI in the Municipality of VVV, through the development of smart tools, could contribute towards.	Fully disagree	Disagree	Neither Disagree Nor agree	Agree	Fully agree
Improving waste management					
Improving Recycling services					
Improving traffic regulation/parking					
Reducing bureaucracy and delays in public procedures.					
improving safety in public spaces (e.g. AI cameras, automatic hazard notification).					
Enhancing decision-making based on the available data.					
The application of AI in public services should be accompanied by strong measures to protect personal data.					

Sex: □ Man □ Woman □ Other □ Prefer not to answer
Education Level: □ Secondary □ Post-secondary □ Higher □ Postgraduate □ Doctoral Diploma

Age: □ 18-25   □ 26-45   □ 45-55   □ 56-65   □ 66 plus

Profession: ……………………………………………………………………………………………

HELLENIC REPUBLIC

MINISTRY **OF** **TOURISM**

Report - Research Results – AI4GOV-Trustworthy data-driven tourism policies

MINISTRY OF TOURISM

DIRECTORATE OF RESEARCH NOVEMBER 2024-OCTOBER 2025

Contents

7.1 Introduction

Within the framework of the AI4GOV Project (Pilot 3 "Trustworthy data-driven tourism policies"), of the European Union's Horizon Europe Programme for funding and innovation, the Ministry of Tourism conducted primary qualitative and quantitative research aimed **at understanding the attitude of the municipality and visitors of Vari-Voula-Vouliagmeni regarding the use of Artificial Intelligence tools to address public space management problems and security issues that may be affected by visitor flows in a touristic municipality.**

The object of the research is to examine **the quality of services provided by the Municipality of Vari-Voula-Vouliagmeni in relation to the flows of visitors and permanent residents** and whether the use of Artificial Intelligence provides the possibility of upgrading the services offered.

With the aim to provide a solid theoretical foundation, identify and understand the positive and negative parameters related to the use of artificial intelligence in touristic municipalities, a review of the recent international literature was conducted. In addition, available quantitative data was collected, and secondary sources (bibliography, publications, websites of local stakeholders) were studied to capture the current situation regarding the tourism development of the municipality of Vari-Voula-Vouliagmeni.

The results of the literature review were then used to plan the research which was conducted in the following stages:

- Primary qualitative research (May-July 2024), during which 14 semi-structured interviews were conducted with key stakeholders.
- On site quantitative research was conducted with the distribution of questionnaires to residents, Greek and foreign visitors, employees at the municipality of VVV and local businesses.

7.2 Literature review on the use of AI in local authorities

Public administration internationally, to manage major economic, social and environmental challenges, is increasingly turning to/ αξιοποιεί AI tools. (A. Yigitcanlar T., Desouza K.C., Bulter L., Roozkhosh F., 2020). The use of AI tools by national and local authorities is steadily increasing, with countries such as China, the USA and the UK leading in areas such as the utilization of large amounts of information, the simplification of administrative tasks, traffic and waste management (Yigitcanlar T., David A., Li W., Fookes C., Bibri S.E, Ye X., 2024).

Nevertheless, the main challenge in using this unique tool is finding the balance between two often conflicting goals: on the one hand, the obligation of the authorities to protect the citizens from the potential risks associated with AI and, on the other hand, the need to improve the efficiency, effectiveness and transparency of the public sector (B. Kuziemski M., Misuraca G., 2020 και Kalliontzi V., Voulgarakis V., Delinavelli G., 2024:86-87).

To better understand the challenge, the main conclusions of the recent international literature on the opportunities and challenges of the use of AI to improve municipal services are analysed in the following chapters.

7.3   Opportunities for the uses of AI tools

7.3.1   Economic and administrative dimensions

The use of AI tools contributes decisively to the reduction of bureaucratic burden and costs by the automation of repetitive administrative tasks, such as the processing of invoices and application forms. The elimination of the human factor also leads to a significant reduction in errors during data entry and in document processing time (Yigitcanlar T., David A., Li W., Fookes C., Bibri S.E, Ye X., 2024:1592). At the same time, pattern recognition becomes possible, mainly with regard to the identification of cyberattacks, errors and inadequacies (Yigitcanlar T., Desouza K.C., Bulter L., Roozkhosh F., 2020:10-11).

In a broader context, AI tools can assist decision-making processes by analyzing large amounts of data from multiple sources, drawing conclusions based on logic and by automating the decision-making process. As a result, it is possible to improve efficiency and reduce errors (Yigitcanlar T., Desouza K.C., Bulter L., Roozkhosh F., 2020:10-11).

7.3.2   Social dimension

AI can contribute decisively to a series of social services offered by local government bodies and aimed at improving the wellbeing of residents. In the field of education and training, the development of personalized curricula is possible through the use of AI tools. Their contribution to the health sector is particularly important. More specifically, thanks to AI tools, the following are possible:

- The development of models that capture the spread of viruses such as **COVID19** (Yigitcanlar T., Desouza K.C., Bulter L., Roozkhosh F., 2020:11-12)**.**
- Combined with sensors, cameras and other data collection devices, AI can be leveraged to monitor the health and well-being of residents. Especially in remote areas, the use of personal devices that monitor the citizens' basic vital data and can alert municipal authorities that someone is exhibiting symptoms that require immediate assistance is extremely useful (one popular example is that of Australia) (Yigitcanlar T., Desouza K.C., Bulter L., Roozkhosh F., 2020:11-12).
- By using chatbot and digital assistants, citizens can receive real-time information regarding the available health services, to schedule and attend appointments, while the initial triage (διαλογή) of patients becomes easier by the reduction of the administrative burden on healthcare staff, by improving the patients' access to health services and by ensuring timely assistance to citizens (Yigitcanlar T., David A., Li W., Fookes C., Bibri S.E, Ye X., 2024:1592).
- Improving recreational infrastructure and services by making easier to maintain parks, sport facilities, libraries etc. through continuous monitoring and the use of predictive analysis processes to predict maintenance needs. A typical example is the municipality of Stirling (Western Australia) where a chatbot was used and with the use of QR codes placed in public recreation facilities citizens can inform municipal authorities on the state of the facilities (Yigitcanlar T., David A., Li W., Fookes C., Bibri S.E, Ye X., 2024:1593-4).

7.3.3   Environmental dimension

One of the areas in which the application of AI is particularly useful is the environmental dimension, by contributing to the improvement of the quality of life of residents. An example if the use of smart

energy systems to optimise energy and water consumption and production, identify vulnerabilities in water and electricity networks, electric vehicle charging, as well as making an informed identification of needs (Yigitcanlar T., Desouza K.C., Bulter L., Roozkhosh F., 2020:11-12 και Kalliontzi V., Voulgarakis V., Delinavelli G., 2024:88-90).

The use of AI is also common in waste management and leads to improved efficiency in waste collection, processing and sorting. More specifically, the use of smart waste management systems is possible in the following levels:

- At the chemical analysis of waste with the conversion of waste into energy, the optimization of the pyrolysis process etc.
- At optimizing the collection collection process (reducing the distance travelled, cost and collection time by identifying optimall routes and collection times) with the use of smart bins, waste monitoring systems with sensors and the use of models to predict the volume of waste produced.
- At addressing the problem of illegal waste dumping and landfills.
- At the level of waste sorting with the use of robots.

Emphasis is placed on the use of smart bins that record the garbage filling level by automatically notifying the competent services that can plan their itineraries. The high cost of smart bins is often a key obstacle to their adoption (Fang B., Yu J., Chen Z., Osman A.I, Farghali M., Ihara I., Hamza E.H., Rooney D., Yap P.S., 2023:1959-1964).

About urban transportation, AI can contribute to the following (Yigitcanlar T., David A., Li W., Fookes C., Bibri S.E, Ye X., 2024:1592):

- Improving the flow of vehicles, through real time analysis of the traffic flows and the adjustment of traffic lights.
- Improving public transport by optimizing routes and itineraries, by identifying the most efficient means depending on demand and traffic congestion.
- The implementation of smart parking solutions.
- The introduction of micro-mobility options.
- The management of road network maintenance needs.

At the same time it is possible to develop parking tools for predicting the availability of parking space with the aim to reduce search time, or smart applications for managing parking spaces for the disabled (Kalliontzi V., Voulgarakis V., Delinavelli G., 2024: 88-90).

Improving urban transportation contributes to the reduction of the distances travelled, time, energy, gas emissions, noise pollution, traffic congestion and can address problems such as the lack of parking space, finding optimal routes in real time etc. (Yigitcanlar T., David A., Li W., Fookes C., Bibri S.E, Ye X., 2024:1592).

Another field of application is the monitoring of changes in key environmental indicators (such as exhaust gas volume, temperature increase, water pollution, fish stocks etc) with the aim of finding the appropriate balance between environmental protection and the social and economic well-being of residents (Yigitcanlar T., Desouza K.C., Bulter L., Roozkhosh F., 2020:11-12). At the same time it can contribute at the improvement of environmental management by identifying the pollution sources and by improving waste management, sewage and water supply systems (Yigitcanlar T., David A., Li W., Fookes C., Bibri S.E, Ye X., 2024:1592-3).

7.3.4 Governance and urban planning

In safety issues. AI can contribute to the following (Yigitcanlar T., Desouza K.C., Bulter L., Roozkhosh F., 2020:12-13):

- Improving safety using urban areas monitoring technology (motion detectors, drones) with the aim of identifying criminal acts (fraud, terrorist attacks etc.) as well as accidents, fires, predicting criminal acts and the optimal allocation of human resources (crime law enforcement).
- Addressing cyberattacks by identifying abnormal behaviors and security threats, improving transparency and trust in online systems.
- Improving citizens' online participation in public affaires (e.g. online voting).
- Given the large volume of data that can be utilized in real time, it is possible to develop in real time scenarios to address threats of all kinds (natural disasters, fires etc.) and to deal with them promptly and effectively.

Additionally, chatbots and digital assistants can leveraged to provide real time information and assistance to citizens. AI applications are also used to prioritize emergency calls, reduce response time and optimally distribute the available human resources during emergencies (Yigitcanlar T., David A., Li W., Fookes C., Bibri S.E, Ye X., 2024:1592, 1594).

At the level of urban planning, AI helps in the formulation of scenarios for the development of infrastructure, in the optimization of the urban layout to improve the mobility of residents, the codification of urban planning regulations and even the assessment of the vulnerability of buildings in natural disasters such as floods (Yigitcanlar T., David A., Li W., Fookes C., Bibri S.E, Ye X., 2024:1592-3).

The choice of the sectors in which AI is applied as well as the tools chosen depend on the following factors (Yigitcanlar T., David A., Li W., Fookes C., Bibri S.E, Ye X., 2024:1595):

- The needs and priorities of each municipality based on characteristics such as population and demographics, location, level of economic activity
- The goals of political leadership
- The human, natural and financial resources available
- The particular challenges it faces (crime, environmental problems etc.)
- The current regulatory framework
- The preferences of all stakeholders.

7.4 Challenges

The use of AI poses a series of challenges for local governments at multiple levels.

Firstly, the systemic resistance of bureaucratic mechanisms to the implementation of nes AI technologies (Kuziemski M., Misuraca G., 2020:3-4), bureaucratic inertia (Mikalef P., Fjortoft S.O. and Torvatn H.Y., 2019:9) and the limitations imposed by established and institutionalized practices (Kalliontzi V., Voulgarakis V., Delinavelli G., 2024:87) often do not allow their application. Given that AI tools will need to be integrated into existing administrative structures, interoperability and communication between existing and new systems must be ensured (Yigitcanlar T., David A., Li W., Fookes C., Bibri S.E, Ye X., 2024:1596). The negative attitude towards AI tools is exacerbated by the lack of skills and the technological illiteracy of employees, as well as the ability to assess the potential

consequences of AI on values such as fairness, transparency and equality (Kuziemski M., Misuraca G., 2020:3-4).

Due to the lack of expertise and digital skills among the municipal staff, the management of AI tools is often outsourced and therefore difficult to control. The increasing reliance on private companies to develop and implement the tools raises questions of transparency and accountability (Diran D., van Veenstra A.F., Timan T., Testa P. and Kirova M., 2021).

Especially in the case of small and medium sized municipalities, limited human and financial resources do not allow them to have access to the necessary data and technologies for the implementation of AI tools.

Another important challenge is data poisoning, synthetic data and fake data (Yigitcanlar T., David A., Li W., Fookes C., Bibri S.E, Ye X., 2024:1596) that call into question the quality of the data used when training AI tools (Mikalef P., Fjortoft S.O. and Torvatn H.Y., 2019:9).

Given that AI tools rely heavily on the exploitation of large amounts of data, the protection of personal data and other sensitive information constitutes a significant challenge for public authorities. This issue is also related to broader ethical concerns and the need to maintain the citizens' trust in administrative and political authorities. Another issue that must be addressed is the possible unintentional introduction of biases into AI tools (Yigitcanlar T., David A., Li W., Fookes C., Bibri S.E, Ye X., 2024:1596) as well as AI's inability to perceive social values such as justice, transparency and equality (Kuziemski M., Misuraca G., 2020:3-4).

Therefore, it is necessary that an effective regulatory and legislative framework especially regarding issues of personal data protection and the ownership and use of data (Yigitcanlar T., David A., Li W., Fookes C., Bibri S.E, Ye X., 2024:1596) as well as a range of other issues related to the conflict of interests, bias and transparency (Diran D., van Veenstra A.F., Timan T., Testa P. and Kirova M., 2021).

The high cost of adopting AI solutions given the limited financial resources of local governments constitutes another significant challenge. The evaluation of the potential positive impacts of the use of AI tools must be done in relation to the cost of their implementation so as not to waste resources that could be utilized in other public policies (Yigitcanlar T., David A., Li W., Fookes C., Bibri S.E, Ye X., 2024:1596 και Diran D., van Veenstra A.F., Timan T., Testa P. and Kirova M., 2021).

At the same time, it is extremely difficult to measure, control and evaluate the inputs, outputs and impacts of public services that use AI tools, given that relevant tools and methods are not currently available (Kuziemski M., Misuraca G., 2020:3-4).

An important dimension of the utilization of AI technologies, and especially of the so-called Generative AI, is related to their predictive ability. Their utilization within the framework of Anticipatory Urban Governance aims to produce vision/scenarios for the future of a city by utilizing a large number of data. The resulting visions then determine the public policies that will be implemented. However, the reliance on AI brings significant risks such as (Gugurullo F. and Xu Y.,2024):

- The strict technocratic and deterministic approach that undermines the treatment of visions/scenarios as issues for consultation and consideration but instead considers them optimal solutions.
- It is not possible to control and determine the ways in which AI analyses the available data and formulates the proposed scenarios. AI tools is often a black box that absorbs information, processes it and then through an often obscure epistemological process produces new information through opaque processes.

- The possibility that political authorities or other powerful stakeholders will use AI to promote a specific vision/scenario.
- The long-term predictive ability of AI tools is being questioned.
- The tools used by Artificial Intelligence to collect data such as cameras and sensors create a panopticon that is able to exercise constant control over citizens.
- The marginalization of the human factor and stakeholders, especially citizens themselves, in the process of shaping public policies. This undermines participatory democracy and fundamental human capacities such as critical thinking or the combination of heterogeneous ideas.

Addressing the aforementioned challenges requires careful consideration and strategic planning (Yigitcanlar T., David A., Li W., Fookes C., Bibri S.E, Ye X., 2024:1596), the development of the so-called "digital literacy" but convincing all stakeholders for the need and positive impacts of the use of artificial intelligence tools and ensuring their active involvement in all stages of their development and implementation (Kalliontzi V., Voulgarakis V., Delinavelli G., 2024:86-87).

7.5 Secondary research on tourism in the Municipality of Vari-Voula-Vouliagmeni

7.5.1 Statistical data - Municipality of Vari-Voula-Vouliagmeni

In the first chapter, the available statistical data for the Municipality of Vari-Voula-Vouliagmeni are presented.
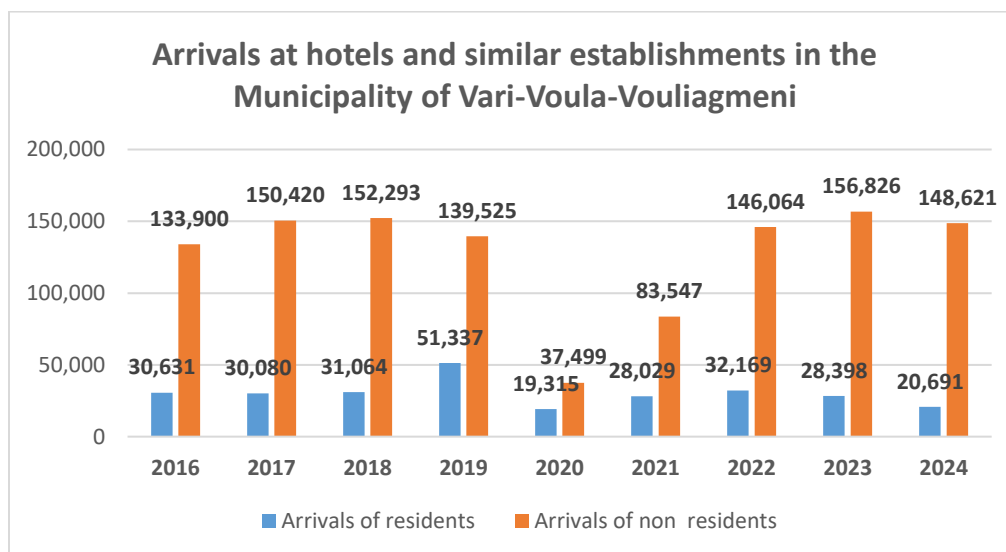
Graph 1. Arrivals at hotels and similar establishments in the Municipality of Vari-Voula-Vouliagmeni. Source: Hellenic Statistical Authority, Survey on Arrivals and Nights Spent in hotels, similar establishments, and tourist campsites

Regarding **arrivals at hotel-type accommodations in the Municipality of Vari-Voula-Vouliagmeni,** according to the available data from the Hellenic Statistical Authority:

- During **the period 2016-2019,** the arrivals of foreigners and Greeks were relatively stable, with small fluctuations. More specifically, in the year 2018 the highest number of arrivals of

foreigners (152 293) was recorded and in the year 2019 the highest number of arrivals of Greeks (51 337).

- In **2020**, due to the pandemic, a significant decrease in the number of arrivals of both Greeks and foreigners was recorded compared to the previous year. More specifically, foreign arrivals decreased from 139 525 in 2019 to 37 499) in 2020 (a decrease of 73.1 and, respectively, domestic arrivals from 51 337 to 19 315 (a decrease of 62.4%). However, already in **2021**, a significant recovery was recorded, especially in foreign arrivals (83 547).
- In the period **2022-2024**, the arrivals of domestic and foreign nationals reached pre-crisis levels. In fact, in 2023, arrivals of foreign nationals are the highest recorded in the period 2016-2024.

Another interesting element is the considerable gap between the percentage of domestic and foreign arrivals, which demonstrates that the Municipality of Vari-Voula-Vouliagmeni **attracts mostly foreign visitors**. More specifically, with the exception of the year 2020 in which the percentage of domestic visitors was 34% and of foreign visitors 66%, due to the pandemic which led to a significant decrease in inbound tourist flows, the percentage of domestic varies from 15.3% (2023) to 26.9% (2019). Correspondingly, the percentage of foreign visitors varies from 73.1% (2019) to 84.7% (2023).
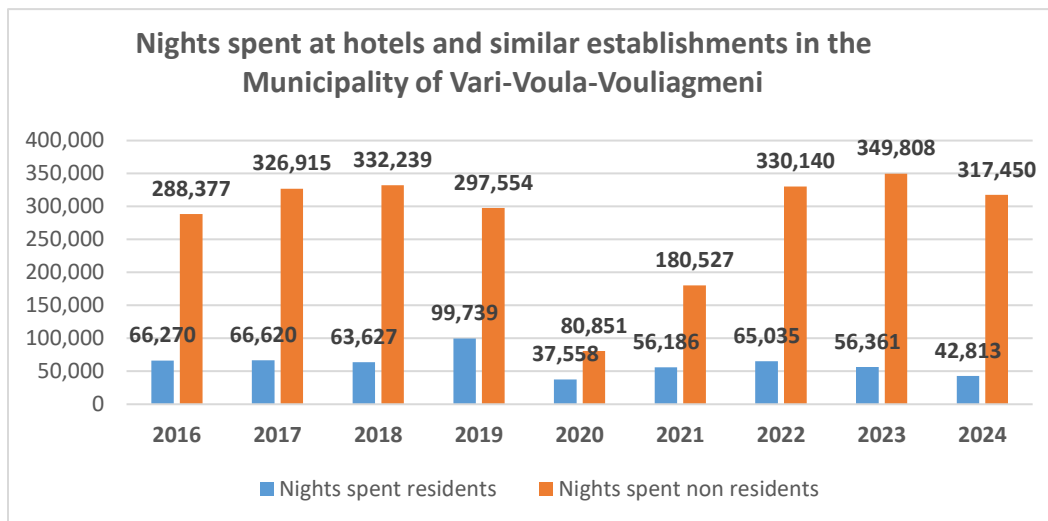
Graph 2. Nights spent in hotels and similar establishments in the Municipality of Vari-Voula-Vouliagmeni. Source: Hellenic Statistical Authority, Survey on Arrivals and Nights Spent in hotels, similar establishments, and tourist campsites.

Regarding **nights spent in hotel-type accommodations in the Municipality of Vari-Voula-Vouliagmeni**, according to the available data from the Hellenic Statistical Authority, the following are recorded:

- During the period **2016-2019,** nights spent by Greeks and foreigners in hotels and similar accommodations in the Municipality of Vari-Voula-Vouliagmeni were relatively stable with minor fluctuations. More specifically, the year 2018 recorded the highest number of nights spent by foreigners (332 239) and the year 2019 the highest number of nights spent by Greeks (99,739).
- In **2020**, due to the pandemic, nights spent by both Greeks and foreigners decreased significantly compared to the previous year. More specifically, nights spent by Greeks decreased from 99 739 to 37 558 (a decrease of 62.3%) and nights spent by foreigners from

297 554 to 80 851 (a decrease of 72.8%). However, already in 2021, a significant recovery has been recorded, especially in nights spent by foreigners.

- In the years **2022-2024,** nights spent by domestic and foreign tourists reach pre-crisis levels and especially in 2023, nights spent by foreign tourists are the highest in the period 2016-2024. A slight decrease is recorded in 2024 compared to the previous year in both residents and non residents.

In line with arrivals at hotel-type accommodations, it is noted that in 2020, due to the pandemic, the percentage of nights spent by domestic residents was the highest in the period 2016-2023 (31.7%). In the remaining years of this period, the percentage of overnight stays by domestic residents ranges from 13.9% (2023) to 25.1% (2019) and the percentage of overnight stays by foreigners from 86.1% (2023) to 74.9% (2019). A slight decrease is recorded in the year 2024 (37.3%) compared to the previous year (42.2%).
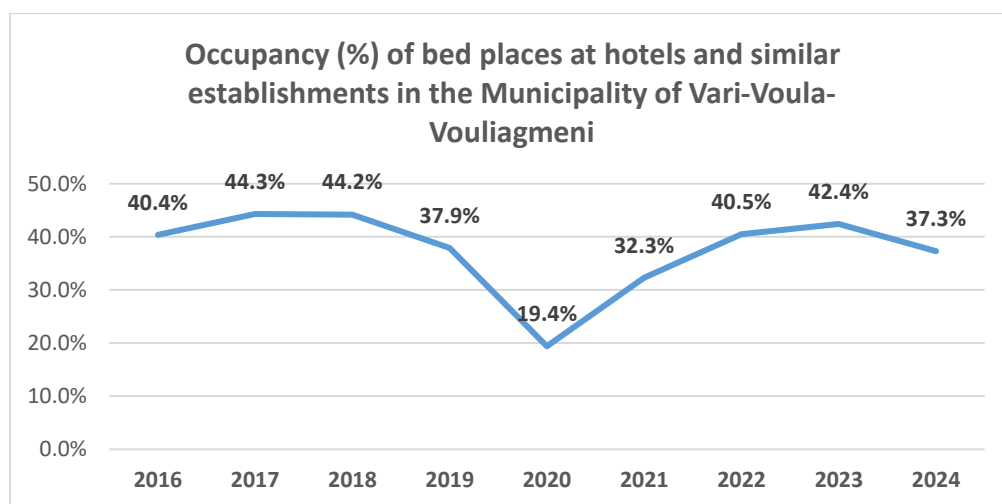
Graph 3. Occupancy of bed places (%) at hotels and similar establishments in the Municipality of Vari-Voula-Vouliagmeni. Source: Hellenic Statistical Authority, Survey on Arrivals and Nights Spent in hotels, similar establishments, and tourist campsites.

Another interesting element is **the occupancy rate of hotel-type accommodations in the Municipality** of Vari-Voula-Vouliagmeni, which is constantly below 50%, which is probably due to the fact **that many hotel-type accommodations do not operate throughout the year.** More specifically, with the exception of 2020, a year in which the occupancy rate was only 19.4%, the occupancy rate during the period 2016-2024 ranges between 32.3% (2021) and 44.3% (2017). It is noted that after the pandemic, the occupancy rate **has been steadily increasing with the exception of the year 2024 (37.3%).**

7.6   Tourist profile of VVV Municipality

In recent years, the Municipality of Vari-Voula-Vouliagmeni has transformed from a short stopover before or after the transition to the main destination **into an autonomous tourist destination that attracts many domestic and foreign visitors**. The great investment interest in the wider area of the so-called Athenian Riviera, i.e. the coastal front of Athens, and the creation of luxury residences, hotel facilities as well as other types of recreational facilities, especially in the nearby area of Elliniko, is

expected to strengthen the consolidation of the Municipality as a pole of attraction for visitors from all over the world (INSETE, 2021: 7, 46 and Karadimitriou N., Guelton S., Pagonis A., Sousa S., 2022:8). It is characteristic that according to a key informant who participated in the Primary Qualitative Research conducted by the Research Directorate regarding tourist flows in the Municipality of Vari-Voula-Vouliagmeni (Results Report with A.P. 2459/31-10-2024), **the duration of stay in the Municipality is steadily increasing and** it is estimated that in the coming years **it will increase by one day.**

The consolidation of the Municipality, as a popular tourist destination, is due to a series of significant **comparative advantages:**

- The coastal character, the 28-kilometer coastline and the multitude of beaches.

- The proximity to Athens International Airport and the port of Piraeus.

- The mild climate and good weather conditions that prevail most of the year

- The cosmopolitan character of the area, with a multitude of high-end gastronomy catering businesses that have received significant domestic and international distinctions (e.g. Michelin Stars, Golden Hat) that attract domestic and foreign visitors (NouPou, 6/9/2024). Also, the area offers numerous options for entertainment (cafes, clubs, nightclubs, etc.) throughout the day and night (INSTETE, 2021:7).

- The abundance of cultural and natural resources, points of interest as well as the modern port facilities (Astir Marina), which are presented below.

- The existence of high-level and internationally renowned hotel infrastructure as well as other types of accommodation, such as luxury Glamping facilities (91 Athens Riviera) that include luxury tents, tennis courts, a fully equipped gym, and a spa (Perimeni Georgia, 26/4/2024).

7.6.1   Cultural resources

The Municipality of Vari-Voula-Vouliagmeni has interesting cultural resources. More specifically (Official Tourism Portal of the Municipality of Vari-Voula-Vouliagmeni, 2016):

- **The temple of Apollo Zostera**, located within the premises of Asteras Vouliagmeni. It was the sanctuary of the ancient Municipality of Aixonides.

- **The archaeological site at Agios Nikolaos Pallon.** Finds from the classical, Roman and Byzantine periods have been identified at the site. The site can only be visited after consultation with the competent antiquities office.

- **The Ancient Road at Megalo Kavouri beach.** This is the carriage road that connected the center of the ancient municipality of Aixonides Alon with the port on the coastal front.

7.6.2   Natural resources

The good climatic conditions prevailing in the region, with an average annual temperature of 18.3 °C, the rich ecosystem, and the large areas of urban and suburban greenery, contribute to ensuring a high standard of living for permanent residents and visitors (Economou A., Mitoula R., 2018:1147-1149).

Lake Vouliagmeni is **a recognized natural thermal resource**. It is a karst coastal brackish lake with a lagoon character which is fed by underground springs and has a particularly interesting underwater ecosystem. The lake is part of a wider area that has been included **in the Natura 2000** Network as a Special Conservation Area (GR3000006 "Ymittos-Kaisariani Aesthetic Forest-Lake Vouliagmeni") in accordance with Directive 92/43/EEC and in 2003 it was classified as **a Protected Natural Monument** and protection zones have been defined (Government Gazette 51/D/4-2-2003) (Website for Wetlands of Greece, 2017). The lake is managed by a company and a restaurant and spa operate on site (Official Website of Lake Vouliagmeni, 2024). Thanks to its unique character, Lake Vouliagmeni contributes to the emergence of the area as a pole of attraction for domestic and foreign visitors interested in **wellness services** with significant potential for further development.

According to data from the Hellenic Society for the Protection of Nature (HSPN), National Operator of the International "Blue Flag" Program, the Municipality of Vari-Voula-Vouliagmeni has three Blue Flag-awarded beaches in 2024. More specifically, these are the following beaches (Official Website of the Hellenic Society for the Protection of Nature, 2024):

- Astir Beach Vouliagmenis
- Voula A
- Vouliagmeni

The Hill of Faskomilia is a forest area of 1,200 acres a short distance from Lake Vouliagmeni. It is included in the national NATURA 2000 list and thanks to its great natural beauty attracts many visitors for hiking, running and cycling (Koutlianis, 18/09/2021).

7.6.3　Marinas

A major attraction for the Athenian Riviera is the new Astir Marina Vouliagmeni, which has 103 berths that can accommodate yachts up to 50 meters in length, as well as hotels, restaurants and retail stores of major international brands. The marina, which has been designed based on the principles of sustainability, will be the spearhead in the effort to develop luxury yachting and marine and coastal tourism in general as an integral part of the wider network of marinas on the Attica coastline.

In the Varkiza area there is also the Varkiza fishing shelter, which has 116 berths for boats up to 20 meters in length (Official Tourism Portal of the Municipality of Vari-Voula-Vouliagmeni, 2016).

7.6.4　Special forms of tourism in VVV Municipality

7.6.4.1.1　Sports Tourism

The Municipality of Vari-Voula-Vouliagmeni has prioritized the development of sports tourism since 2015 by organizing international sporting events that attract a large number of visitors throughout the year, extend the tourist season and strengthen the local economy (VIMAONLINE, 20-10-2024).

The flagship of the effort to promote the Municipality as a sports tourism attraction is the triathlon event, IRONMAN® 70.3®, which has been held since 2019 in the Vouliagmeni area (Municipality of Vari, Voula, Vouliagmeni, 2023). The event attracts 5,000 athletes and visitors from all over the world and takes place in October, a period during which tourist flows to the Municipality are reduced. As part of this specific event, individual events are also held, such as the Night Run Vouliagmeni race along the Vouliagmeni coastline (Runner Magazine, 6/10/2024).

Other important events taking place in the area are the following:

- The XTERRA Greece event hosted on Vouliagmeni beach and includes off-road races for triathletes, such as the XTERRA Swim Challenge, the XTERRA TRIATHLON.

- The Run the Lake – Vouliagmeni race, which is organised annually in December. It is noteworthy that in 2023, athletes from 30 countries and 5 continents participated in the event.

- The international track and field competitions "DROMEIA" BRONZE INTERNATIONAL SPRINT AND RELAY MEETING (in Vari), the Ladies Run, the BIBA 3x3 tournament, etc. (VIMAONLINE, 20-10-2024)

- The OCEANMAN Vouliagmeni - Greece 2025 event

7.6.4.1.2   Activities Tourism

The area has a long coastline with numerous beaches where visitors can swim, as well as participate in sea and coastal activities such as water skiing, beach volleyball (INSETE, 2021:7), tennis and pedalo, windsurfing, kitesurfing and surfing. The last three activities are extremely popular among locals and foreign visitors in the areas of Vouliagmeni and Varkiza due to the favorable conditions (high intensity winds and wind direction). In addition, activities such as scuba diving in the visitable caves of Lake Vouliagmeni as well as in the Ports of Vouliagmeni attract many divers from all over the world.

The large local water sports community, the Vouliagmeni and Voula nautical clubs, as well as the existence of numerous equipment rental and sales businesses and water sports schools create a dynamic ecosystem that provides visitors with a wide range of options.

7.6.5   Proximity to points of interest

Special mention should be made of the Municipality's proximity to points and areas of great tourist interest, which makes it an ideal starting point for visitors. Indicatively:

- The Temple of Poseidon in Sounion. The Temple is an emblematic monument of Attica and attracts a large number of visitors on an annual basis.

- The Archaeological Site of Thorikos in Lavrio (ancient theater, mines, the so-called "industrial settlement", etc.) (INSETE, 2021:8).

- The vineyards and visitable wineries of Attica.

- The islands of the Argosaronic Gulf that are suitable for day or short-day excursions.

- The historic center of Athens.

- Glyfada shopping center.

- Attica's waterfront, the Flisvos and Zea Marinas as well as the Stavros Niarchos Foundation Cultural Center in Kallithea.

7.7   Qualitative research with semi-structured interviews

During the first stage, qualitative research (May-July 2024) with a series of semi-structured interviews were conducted with key stakeholders. Key stakeholders were contacted via e-mails. An Interview Guide was used during the interviews (Annex I), which was adapted to each key stakeholder category. The Interview Guide ensured that during the interviews all topics were covered, and enough flexibility was provided to allow key informants to freely express their views on the subject. The Interview Guide attempted to gather information on the following topics:

• Customers' profile.

• Characteristics of tourism flows in the Municipality of Vari Voula Vouliagmeni.

• Assessment of municipal services and infrastructure.

• Assessment of Pay As You Throw (PAYT) pilot action and Novoville app.

In total, fourteen (14) interviews were conducted with key stakeholders (an anonymized list of key stakeholders is included in Table1). Efforts were made to ensure that key stakeholders from Hotels, Hotel Associations, Tourist Enterprises and Travel agencies based and operating in the Municipality of Vari Voula Vouliagmeni were included. The interviews were conducted in the period between 27/05/2024-18/07/2024 online via zoom and in two cases by telephone. During the research process, the protection of personal data and the conditions of confidentiality were respected.

The on-site survey was conducted between November 2024 and October 2025 using questionnaires, among permanent residents, visitors and tourists, the Municipality's employees, and local businesses.

The primary research attempted to answer the following questions:

- What are the visitor and resident preferences and degree of satisfaction with the municipal services offered in the area.

- To what extent do residents/local businesses/the Municipality's employees believe that visitors' flows burden public space.

- To what extent do visitors/residents/local businesses/the Municipality's employees, believe that the use of Artificial Intelligence provides the opportunity to upgrade public space and municipal services.

The results of the interviews were used in the development of the questionnaires.

7.8   Quantitative Field Research

7.8.1   Scope and objectives of the research

Subsequently, quantitative field survey with the aim of understanding the attitudes of visitors, permanent residents, local businesses and employees of the Municipality of Vari-Voula-Vouliagmeni regarding the use of Artificial Intelligence tools to address public space management problems and security issues that may be intensified by visitor flows in a tourist area, was conducted.

The questions asked the following themes:

1) How do residents, visitors, local businesses and the Municipality's employees evaluate the services offered by the Municipality, specifically:
- Waste Management
- Traffic management
- Recycling
- Beaches
- Road works (roads, sidewalks)
- Accessibility

2) Do residents, visitors, local businesses and Municipality's employees believe that the use of AI tools can contribute to the improvement of municipal services through the development of smart applications?

3) Questions on the profile and preferences of visitors.

7.8.2   Design and implementation of the research

7.8.2.1   Literature Review

Taking into consideration the **extensive exploratory review of the recent international academic literature (chapter** 1. Literature review on the use of AI in local authorities) on issues surrounding municipal services, key issues in the provision of municipal services, were identified. More specifically:

- Waste Management
- Traffic Management
- Parking
- Recycling
- Beaches
- Roadworks (roads, sidewalks)
- Accessibility

Issues regarding **the attitude of tourists/visitors/residents/Municipality's employees/local businesses, towards Artificial Intelligence** and whether it can contribute to the improvement of municipal services through the development of smart applications were also identified.

Moreover, in order to formulate the relevant questions, **a review of the Work Packages and deliverables of AI4GOV** was carried out, such as, among others, the "Holistic Regulatory Framework" (WP2) developed within the framework of the project with the aim of laying the foundations for addressing bias and discrimination in Artificial Intelligence by ensuring compliance with EU regulations and facilitating the practical implementation of AI4Gov technologies.

7.8.2.2   Sampling method

The survey is addressed to residents and visitors of the Municipality of Vari-Voula-Vouliagmeni, the Municipality's employees and local enterprises, aged 18 and over. Due to the difficulty of approaching such a large population, the **convenience sampling method** was used, in which participants are selected based on the ease with which we can approach them.

The results of convenience sampling are not representative of the entire population and there is a risk of bias, as the subjects approached by the researcher may choose to participate precisely because they have specific opinions on the topic under investigation that they want to express. Subjects who do not have an "interest" - in the broad sense of the term - may not accept the researcher's invitation to participate.

In order to limit these disadvantages, to make the sample as diverse as possible and to increase the participation, considerable effort was made to collect responses on different days and times at different points of interest in all three communities of the municipality. The selection of the survey sites was based on the results of the qualitative research, which identified areas that attract the interest of visitors, such as: Lake Vouliagmeni, the Municipality's beaches, areas with shops and cafes, the coastal front, marinas and hotels.

In cases where the questionnaires were distributed in private spaces (e.g. Vouliagmeni Lake, Marinas, hotels, Vouliagmeni Beach), special permission was requested and secured from those in charge.

7.8.2.3   Questionnaires Structure

In early November 2024, the questionnaires were formulated to be distributed to the following target groups:

- Permanent residents (Greeks and foreigners)
- Visitors (Greeks and foreigners)

During the research, two additional questionnaires were formulated, which were addressed to the municipality's employees and local businesses. The formulation of the questionnaires was carried out by the project team of the Ministry of Tourism, namely:

- Konstantina Tsakopoulou, Deputy Head of the Department of Studies and Documentation
- Paraskevi-Maria Stroumbou, former Deputy Head of the Department of Monitoring of European Commission Programs
- Evangelia Iosif, employee of the Department of Monitoring European Commission Programmes
- Veroniki Diamantara, employee of the Department of Studies and Documentation
- Zacharenia Golemi, AI4GOV project contractor

The design of the questionnaires was based on the conclusions of the first stage of the research (qualitative research) as well as on the review of recent academic literature and the press. The questionnaires include a prologue presenting the purpose of the research, while the questions included in them were clear and placed in such an order as to ensure thematic flow and smooth completion of the questionnaire. It was ensured that the duration of its completion by the respondent did not exceed 10 minutes. The questionnaires mainly included closed-ended questions (yes/no, multiple choice, Likert interval scale questions). More specifically, the questions mainly concerned the evaluation of the municipality's services and Artificial Intelligence in general, their evaluation of the municipality as a destination as well as basic demographic data of the respondents.

More specifically regarding the four types of questionnaires:

- **The questionnaire for permanent residents** was written in Greek and translated into English in order to be completed by foreign permanent residents. It includes a total of 13 questions (10 closed-ended questions and 3 open-ended questions). The questions concern, among

others, popular places to visit in the Municipality, the assessment of the impact of visitors on specific areas (noise pollution, parking, etc.), the assessment of the services of the municipality in specific areas (cleanliness, recycling, Novoville application, etc.), the assessment of the potential of Artificial Intelligence in improving municipal services. Questions concerning basic demographic data of the survey participants are also included.

- **The questionnaire for visitors** was written in Greek and translated into English to enable its distribution to Greek and foreign visitors. It includes a total of 18 questions (15 closed-ended questions and 3 open-ended questions). It includes questions regarding the demographic characteristics of the respondents, their tourism experience, the evaluation of municipal services as well as an assessment of the potential of Artificial Intelligence to contribute to the improvement of municipal services in specific areas.

- T**he questionnaire for employees of the municipality of Vari-Voula-Vouliagmeni** was written in Greek and translated in English (official project language) and includes a total of 9 questions (2 open-ended and 7 closed-ended). The questions concern the assessment of the impact of visitor flows in specific areas as well as the assessment of Artificial Intelligence in general and the ability of smart tools to contribute to the improvement of municipal services.

- **The questionnaire for businesses located in the Municipality of Vari-Voula-Vouliagmeni** was written in Greek and translated in English (official project language) and it includes a total of 12 questions (10 close-ended and 2 open-ended). The questions aim to assess the impact of visitor flows in specific areas, the Municipality's services as well as the use of smart tools to improve municipal services.

The questionnaires were posted on Google forms but were also available for completion in printed form, where this was deemed necessary. The Google forms platform was chosen because it offers the possibility of completing the questionnaires by a large number of participants, the answers are automatically recorded, and the processing and analysis of all data is easier. The questionnaires were completed anonymously, always with the informed consent of the participants.

7.8.2.4   Conducting the survey

Concerning the questionnaires for residents and visitors, from 20/11/2024 to 2/12/2024, **invitations to participate** in the quantitative survey were sent to targeted businesses and organisations with the aim of obtaining permission to allow our partners to distribute questionnaires to visitors on specific dates and times. At the same time, telephone contact was made with the managers of these businesses and organisations in order to assure them that the presence of our partners on their business premises would not disrupt the proper functioning of their business.

More specifically, invitations were sent to the following businesses:

- Amarilia Hotel
- Vouliagmeni Lake
- The Margi Hotel
- Somewhere Boutique Hotel
- Blazer Suites Hotel
- Island Club Restaurant
- Astir Marina
- Vouliagmeni Beach

It is noted that we did not receive a response from the Island Club Restaurant and the Somewhere Boutique Hotel.

At the same time, in the case of the Amarilia hotel, which was closed (seasonal hotel) at the beginning of the quantitative research, the hotel manager was contacted, who is also a resident of the area, and agreed to send the residents' questionnaire via email to her acquaintances who are residents of the area. As a result, we received a satisfactory number of filled in questionnaires via email. Regarding the visitors' questionnaires, it was arranged with the Amarilia hotel manager to be distributed to their guests by the Ministry's associates when the hotel re-opened in April. Similar arrangement was made with the manager of Margi hotel, where the questionnaires were distributed on the hotel's premises by our associates.

Finally, arrangements were made with the manager of Astir Marina and the organisation that manages Vouliagmeni Beach (Hellenic Public Properties) to obtain permission to allow our partners to distribute questionnaires to both places following certain protocols.

Based on the positive responses we received from the managers of Lake Vouliagmeni, Astir Marina, Margi Hotel, Amarilia Hotel, Vouliagmeni Beach, as well as after selecting specific popular sports events in the Municipality and other points of interest (central squares, cafes etc.) the quantitative research calendar was set as follows:

- Saturday 30/11/24: Lake Vouliagmeni and Vouliagmeni Square (paper questionnaires)
- Sunday 1/12/24: Varkiza Square and Vouliagmeni Square (paper questionnaires)
- Saturday 7/12/24: Varkiza Square (paper and electronic questionnaires)
- Sunday 8/12/24: Hotel (The Margi) (paper and electronic questionnaires)
- Saturday 14/12/24 Astir Marina Vouliagmeni (paper questionnaires)
- Saturday 21/12/24: Hotel (The Margi) (paper and electronic questionnaires)
- Sunday 22/12/24: Astir Marina Vouliagmeni (paper and electronic questionnaires) questionnaires)
- Saturday 28/12/24: Vouliagmeni Central Square (paper and electronic questionnaires)
- Sunday 29/12/24: Imion Square and Voula Central Square (paper and electronic questionnaires)
- Saturday 4/1/25: Vouliagmeni Central Square (paper and electronic questionnaires)
- Sunday 5/1/25: Imion Square and Voula Central Square (paper and electronic questionnaires)
- Saturday 8/3/25: Margi Hotel & Vouliagmeni Central Square (paper and electronic questionnaires)
- Sunday 9/3/25: Vouliagmeni Lake & Vouliagmeni Central Square (paper and electronic questionnaires)
- Saturday 15/3/25: Vouliagmeni Lake (paper and electronic questionnaires)
- Sunday 16/3/25: Vouliagmeni Lake (paper and electronic questionnaires)
- Saturday 26/4/25: Vouliagmeni Beach (paper and electronic questionnaires)
- Sunday 27/4/25: Vouliagmeni Central Square (paper and electronic questionnaires)
- Sunday 11/5/25: Varkiza Square and Vouliagmeni Square (paper questionnaires)
- Sunday 18/5/25: Varkiza Square and Vouliagmeni Square (paper questionnaires)
- Saturday 24/5/25: Varkiza Beach & Vouliagmeni Lake (paper questionnaires)
- Sunday 25/5/25 Varkiza Square and Vouliagmeni Lake (paper questionnaires)
- Sunday 1/6/25: Varkiza Square (paper questionnaires)

- Saturday 14/6/25: Vouliagmeni Beach (paper and electronic questionnaires)
- Sunday 15/6/25: Varkiza and Vouliagmeni Beach (paper questionnaires)
- Saturday 21/6/25: Vouliagmeni Lake (paper questionnaires)
- Saturday 5/7/25: Varkiza Square (paper and electronic questionnaires)
- Sunday 6/7/25: Varkiza Square (paper and electronic questionnaires)
- Saturday 19/7/25: Vouliagmeni Beach (paper and electronic questionnaires)
- Sunday 20/7/25: Voulα Beach (paper and electronic questionnaires)
- Monday 28/7/25: Vouliagmeni Beach & Square (paper and electronic questionnaires)
- Saturday 2/8/25: Amarilia Hotel, Margi Hotel, Vouliagmeni Lake (parer questionnaires)
- Sunday 3/8/25: Amarilia Hotel, Vouliagmeni Beach & Square (paper and electronic questionnaires)
- Friday 8/8/25 & Saturday 9/8/25: Amarilia Hotel (parer questionnaires)
- Monday 25/8/25: Amarilia Hotel (paper and electronic questionnaires)
- Tuesday 26/8/25: Voula & Vouliagmeni Beach (paper and electronic questionnaires)
- Wednesday 27/8/25: Vouliagmeni and Varkiza Square (paper and electronic questionnaires)
- Friday 29/8/25: Amarilia Hotel & Municipality of VVV (paper questionnaires)
- Saturday 30/8/25: Margi Hotel & Vouliagmeni lake (paper questionnaires)
- Saturday 6/9/25: Vouliagmeni Beach (paper and electronic questionnaires)
- Sunday 7/9/25: Vouliagmeni Beach (paper and electronic questionnaires)
- Saturday 11/9/25- Sunday 12/9/25: Vouliagmeni Beach (paper and electronic questionnaires)
- Friday 19/9/25: Vouliagmeni Lake (paper questionnaires)
- Saturday 20/9/25, Sunday 21/9/25: Vouliagmeni Beach (paper and electronic questionnaires)
- Saturday 27/9/25: Amarilia Hotel & Vouliagmeni Square (paper and electronic questionnaires)
- Sunday 28/9/25: Margi Hotel (paper questionnaires)
- Tuesday 30/9/25: Vouliagmeni Beach (paper and electronic questionnaires)
- Saturday 4/10/25 & Saturday 11- Sunday 12/10/25 : Amarilia Hotel, Vouliagmeni Beach & Square (paper and electronic questionnaires)
- Sunday 5/10/25: Vouliagmeni Lake & Margi Hotel (paper questionnaires)
- Saturday 11/10/25 & Sunday 12/10/25: Amarilia Hotel, Vouliagmeni Beach & Square, Vouliagmeni Lake, Margi Hotel (paper and electronic questionnaires)

The distribution of the questionnaires was carried out by the two external associates of the Ministry of Tourism, who went to the points indicated by the project team after securing the necessary permits, where necessary. The associates provided the necessary assistance to the respondents so that the questionnaires could be completed correctly. In cases where paper questionnaires were completed, after the end of their on-site work, the associates transferred the answers to the Google forms platform, so that their final processing could be possible.

In the case of the **questionnaire aimed at the municipality's employees** links to the questionnaires were sent on 17/12/24 to employees across multiple municipal departments, that is the VVV Directorates of Administration, Finance, Municipal Police, Development, Cleaning, Green, Social Policy, Education, Technical, Construction, Sports & Culture as well as multiple hierarchical levels. The initial response was low, and a new attempt was made during the summer months of 2025. Data was

collected using a combination of methods: (a) e-mail distribution of the structured questionnaire and (b) telephone follow-ups to encourage participation, and (c) face-to-face meetings with employees at the town hall during the 2nd AI4GOV iteration workshop organised on July 2nd 2025. This multi-channel approach was intended to maximise the response rate, reduce non-response bias, and ensure consistency in the completion of the questionnaire across participants.

Finally, regarding the **questionnaire distributed to local businesses**, data collection was conducted using two channels: (a) e-mail distribution of the questionnaire and (b) telephone calls with the respondents. Purpose of this multi-modal approach was to maximise response rate and minimise non-response bias, while ensuring that the same structured questionnaire was completed in a consistent manner by all participants. On the 5th of January 2025, emails were sent to 187 businesses by the project contractors. A reminder email was sent on the 10th of January 2025. Apart from sending the questionnaire via email to be filled in online, members of the research team contacted businesses over the phone to explain the purpose of the research and encourage managers and owners to fill them in. The questionnaire contained closed-type items with pre-defined numerical scales, allowing subsequent statistical analysis of the responses. The sample consisted of firms operating in the private sector and the data collection phase was completed within the planned timeframe with low response.

The following table displays the total number of **518** filled in questionnaires (on-site survey and completed questionnaires sent to us via email):

Questionnaire type	Number of filled in questionnaires
Visitor questionnaires (Greek language)	130
Visitor questionnaires (English language)	139
Resident questionnaires (Greek language)	143
Resident questionnaires (English language)	1
Employee questionnaires	71
Business questionnaires	34

7.9   Data Analysis

7.9.1   Questionnaire results for permanent residents

A **total of 144 questionnaires** for permanent residents were completed (143 in Greek and one in English). The **11 questionnaires to which a negative answer was given** were included in the analysis concerning the questionnaires for visitors/tourists, therefore the following analysis was based on the **133 questionnaires.**

To the open question **"If you are a permanent resident, since which year have you been residing in the municipality",** 14 gave irrelevant answers or didn't answer at all. The answers are presented in percentages in the graph below (Graph 1):
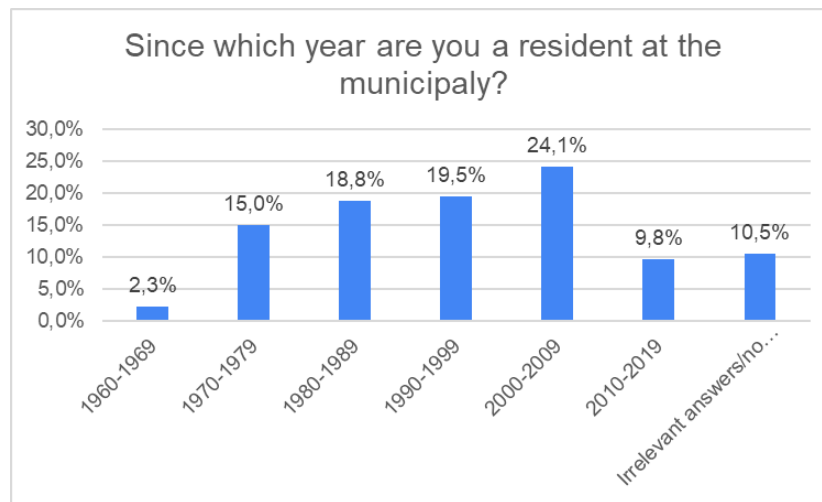
Graph 4: Since which year are you a resident at the municipality?

In the question "**Which of the following places in the Municipality do you like to visit?**" it is found that, both in the individual answers (Graph 2) and in the combined answers (i.e. in the case where the respondent marked two or more options) (Graph 3), the most popular were:

- the restaurants/cafes in the area,
- walks along the beach (esplanade).

In the case of the combined answers, in first place is the option esplanade, followed by the option "restaurants and cafes" in the municipality, followed by visiting beaches in the municipality and Lake Vouliagmeni.
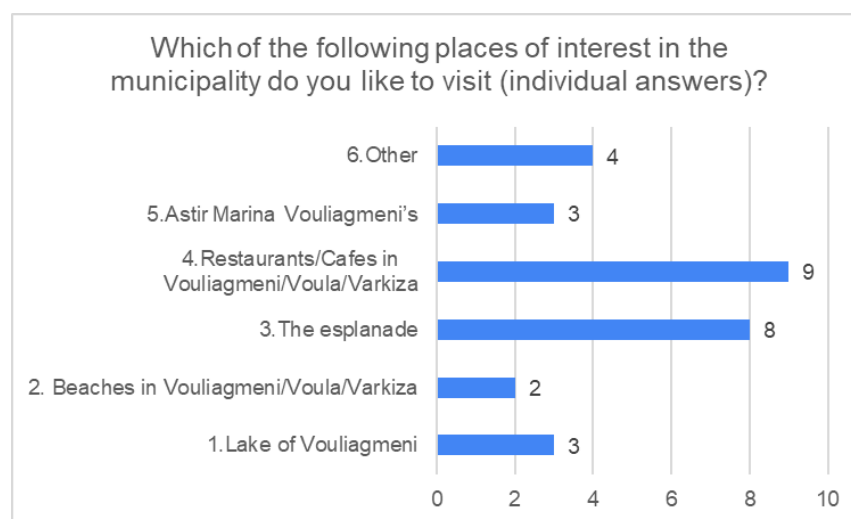
Graph 5: Which of the following places in the Municipality do you like to visit (individual answers)
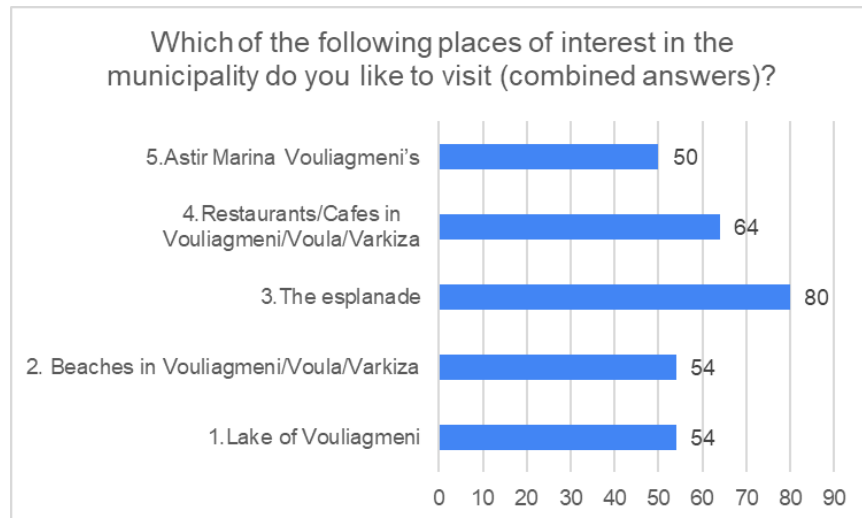
Graph 6: Which of the following places in the Municipality do you like to visit (combined answers)?

A series of questions followed regarding **the negative impact that the arrival of tourists has on specific issues such as noise pollution, traffic regulation, parking, recycling, and beaches.** The respondents' answers are reflected in the graph below as a percentage of the total:
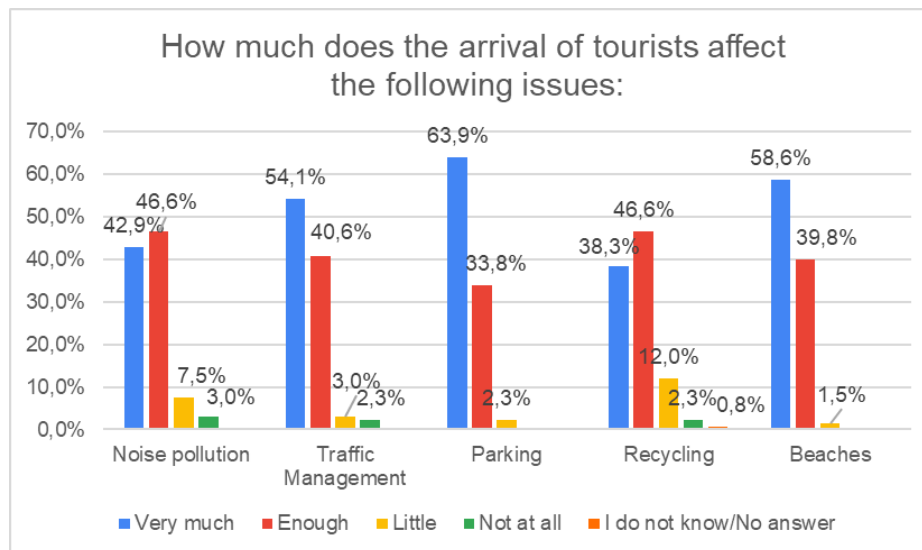
Graph 7: How much does the arrival of tourists affect the following issues (%).

It is found **that the percentage of respondents who answered that the impact of the arrival of tourists/visitors is very negative** is extremely high in the areas of:

- parking (63.9%),
- beaches (58.6%)
- traffic management (54.1%).

Additionally, the questionnaire included a series of questions regarding the evaluation of services provided by the Municipality of Vari-Voula-Vouliagmeni in the areas of waste management, traffic

management, parking, recycling, the Novoville application, beaches, road works (sidewalks, roads) and accessibility. The main conclusions are the following (Graphs 5 and 6):

- Regarding **waste management**, 53% of the respondents rate the municipality's services as good and 34% as average (fair). The percentage of respondents who characterise as very good 4,5%, somewhat good (4%) and not at all good (2%) is low.
- In **traffic management,** 42% state that they are quite satisfied with the municipality's services ("good"). 41% characterize the services in this sector as average ("fair") and 7,5% as "poor". The percentage of respondents who consider them very good or not at all good is extremely low (1,5% in both cases).
- In **parking,** it is found that 38% of permanent residents evaluate the municipality's services as average ("fair"), 16% as very poor and 11% as poor. Only approximately 35% provided a positive assessment ("good" and "very good").

- In **the recycling** sector, 48% evaluated the municipality's services as good and 9% as very good. 29% characterize them as average ("fair"), 8% as poor and almost 4% as very poor.
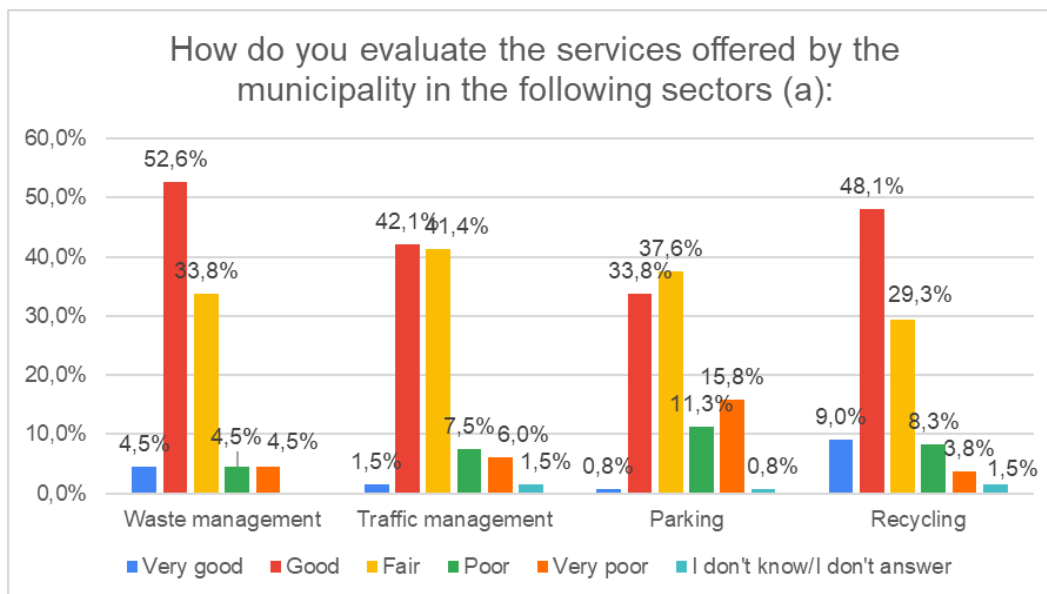
Graph 8: How do you evaluate the services offered by the municipality in the following sectors (waste management, traffic management, parking, recycling).

- Regarding **the Novoville application**, 35.3% described it as good and 8.3% as very good. It is noted that a significant percentage (19.5%) responded "I don't know/don't answer", which indicates that they probably have no knowledge of the application, something that was also observed during the primary qualitative research.

- Regarding **the beaches,** 53.4% evaluated the municipality's services as good and 10.5% as very good. 23.3% of respondents described them as average ("fair"), 6.8% as a poor and only 6% as very poor.

- In **the field of road works**, 39.8% of respondents described the municipality's services as good and 38.3% as average ("fair"). On the contrary, 10.5% rated them as very poor, 8.3% as poor and only 3% considered them very good.

- On the **issue of accessibility for people with disabilities**, 36.8% characterized the municipality's services as good and 36.8% as mediocre ("fair"). 19.8% of respondents rated them as poor and 12% as very poor. Only 1.5% of respondents rated their satisfaction very high (answer "very good"). It is noted that 3% of respondents selected the option "I don't know, I don't answer".
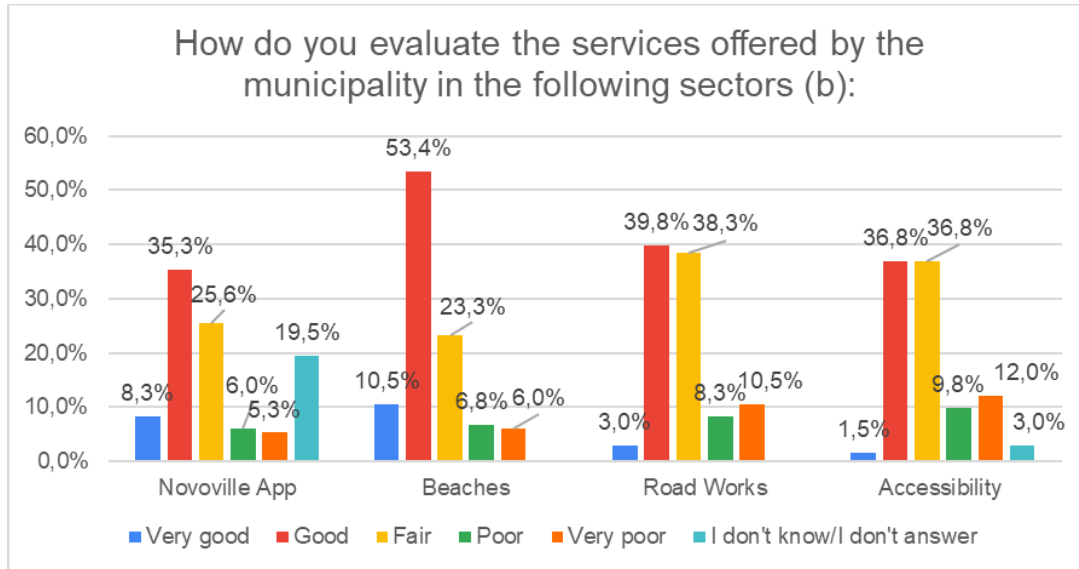
Graph 9: How do you evaluate the services offered by the municipality in the following sectors (%). Part B.

This was followed by questions on **Artificial Intelligence**. The first question concerned whether respondents knew what Artificial Intelligence was. Most respondents answered positively (98%) (Graph 10).
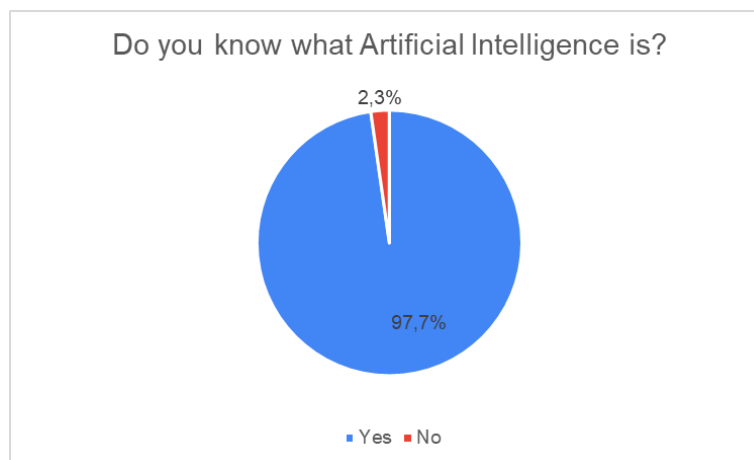
Graph 10: Do you know what Artificial Intelligence is?

Subsequently, those who gave a positive answer to the above question (i.e. a total of 130 respondents) were asked **to state whether they trust Artificial Intelligence** (Graph 8). Slightly more than half of the respondents answered positively (58%), but the percentage of negative answers was quite high (42%).
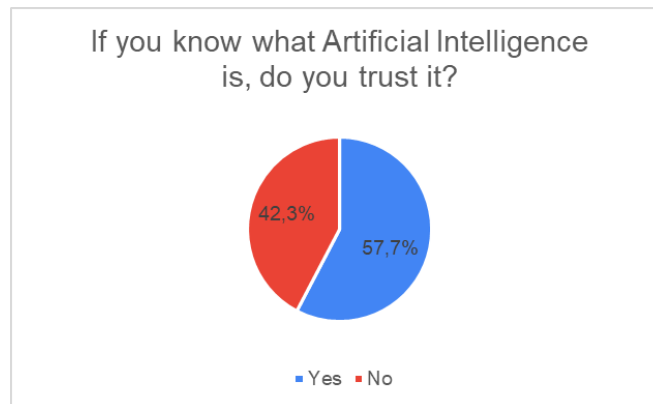
Graph 11: If you know what Artificial Intelligence is, do you trust it?

Respondents were then asked to **express their opinion on whether the implementation of Artificial Intelligence in the Municipality of Vari-Voula-Vouliagmeni through the development of smart tools will contribute to the improvement of the following areas:**

- Waste Management
- Recycling system
- Traffic and Parking Management
- Reduction of bureaucracy and delays in public procedures
- Security in public spaces
- Making informed decisions by municipal authorities based on available data

In the same cluster of questions the participants were asked whether **its use in public services should be accompanied by strong measures to protect personal data**.

Overall, it is found that the majority of respondents agree that Artificial Intelligence can contribute to the improvement of the aforementioned sectors. The highest percentages are recorded for the sectors of bureaucracy and delays in public procedures (60.2%), improving safety in public spaces (57.1%), traffic regulation and parking (57.1%), while the lowest percentage was recorded in the sector of improving the recycling system (42.9%).

The two relevant graphs follow (Graph 9 and 10).
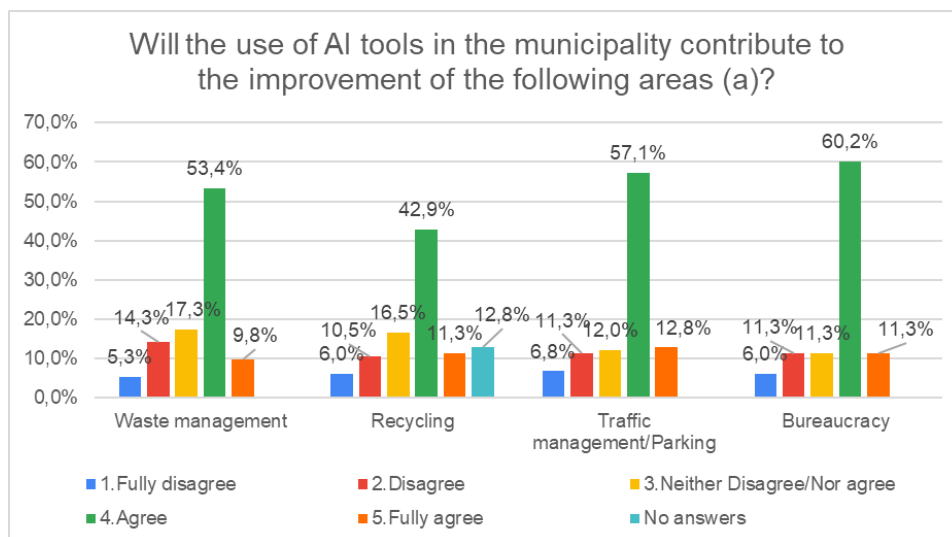
Graph 12: Will the implementation of AI in the municipality of Var-Voula-Vouliagmeni through the development of smart tools contribute to the improvement of the following areas (waste management, recycling, traffic management/parking, bureaucracy)? Part A.
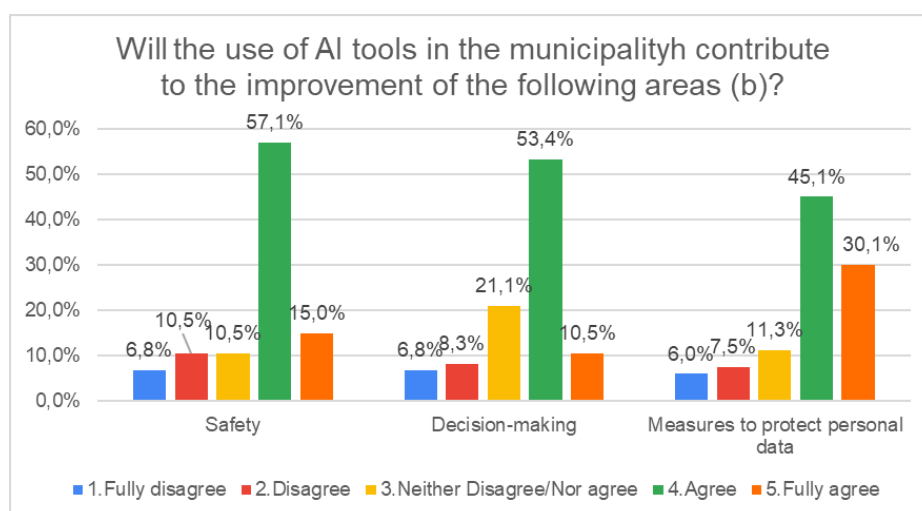
Graph 13: Will the implementation of AI in the municipality of Var-Voula-Vouliagmeni through the development of smart tools contribute to the improvement of the following areas (safety, decision making). Should the use of AI in public services be accompanied by strong measures to protect personal data? Part B.

Regarding the last question on whether **the use of Artificial Intelligence in public services should be accompanied by strong measures to protect personal data**, it is reported that the majority of respondents responded that they fully agree (30.1%) or agree (45.1%). 11.3% of the participants stated that they neither disagree nor agree and only 7.5% and 6% respectively stated that they disagree or fully disagree.

At the end of the questionnaire, **four questions were included regarding the demographic data of the participants in the survey.** More specifically, they concerned gender, age, level of education and

profession. Regarding gender, it was found that 51.9% of the respondents were women and 48.1% were men (Graph 12), while regarding their age profile, the majority belonged to the age group of 45-55 years (44.4%), followed by the categories 26-45 (36.1%) and 56-65 (12.8%) (Graph 13).
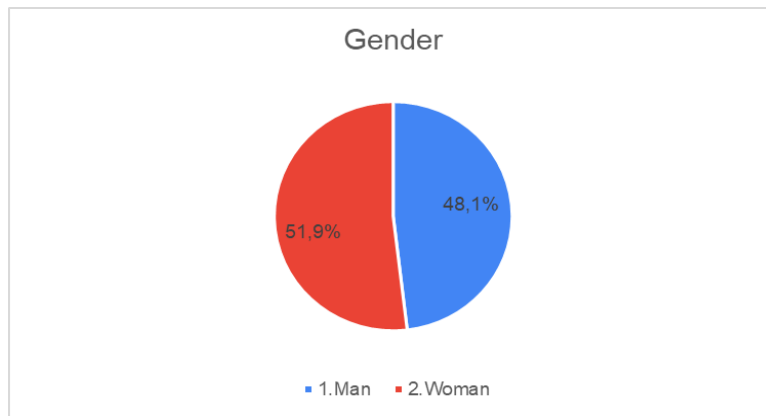
Graph 14: Gender
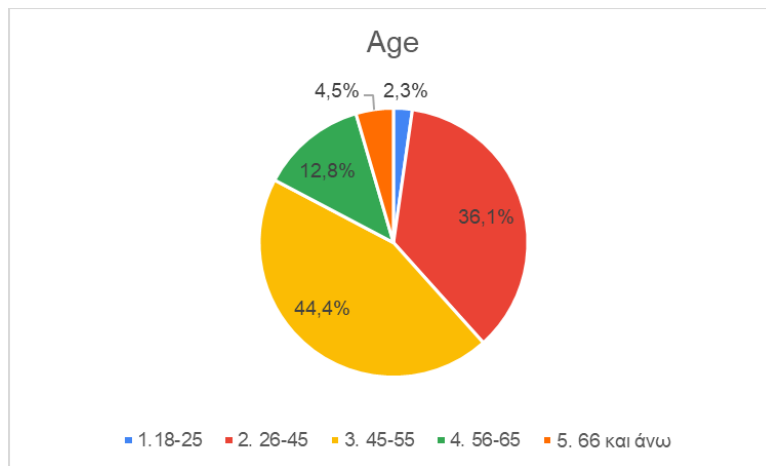
Graph 15: Age

Regarding **the level of education** of the respondents, this is quite high. More specifically, 51.9% have a master's degree, 33.8% have completed higher education and 4.5% have received a doctorate. Only 3% stated that they have received only secondary education and 6.8% have post-secondary education.
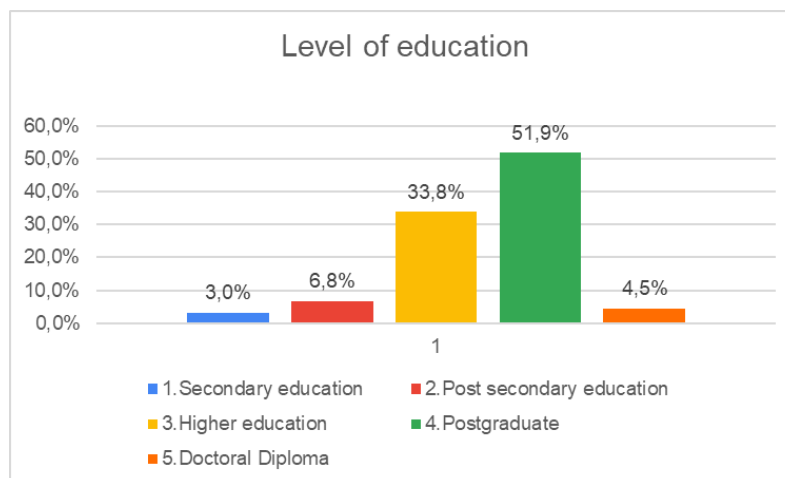
Graph 16: Level of education

Lastly, regarding the profession of the participants, the majority were employees in the private sector and the public sector. A large number worked as freelancers.
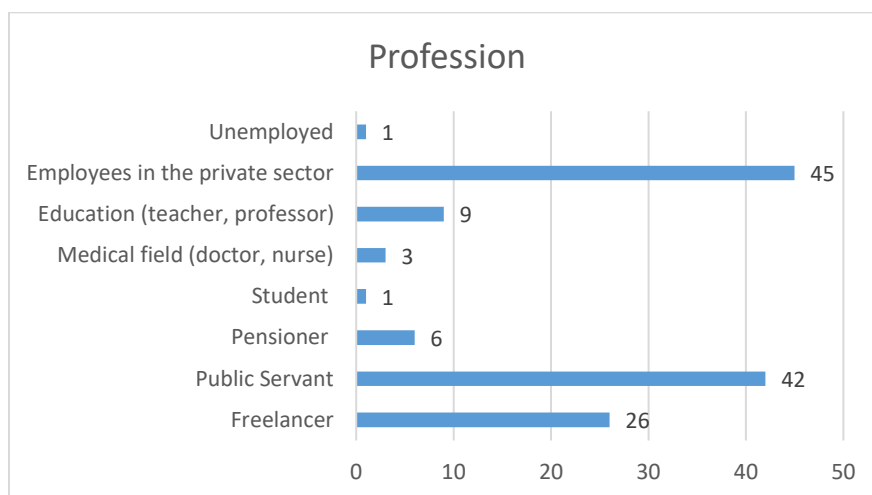
Graph 17: Profession

7.10 Questionnaire results for Greek visitors in the municipality

A total of **130 questionnaires** were filled in by Greek visitors in the municipality (questionnaires in Greek). It is noted that **11 people who completed the questionnaire for permanent residents** (see above) **answered negatively** to the first question of the questionnaire ("Are you a permanent resident of the Municipality of Vari-Voula-Vouliagmeni"). The answers to the **common questions** of the two questionnaires (permanent residents and visitors) are counted in the analysis of this chapter (total number:141). The total number of answers is explicitly stated in each question.

To the first question ("Is this your first visit to the area"), the majority of the answers were negative (60.8%) (total number of answers:130).
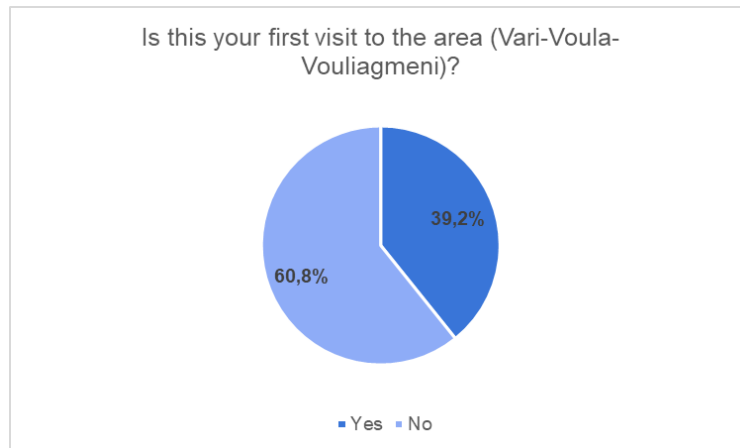
Graph 18: Is this your first visit to the area?

A question followed asking **for clarification on the frequency of visits to the area in the past, for those who declared that have visited the area in the past (total number of responses 79).** The majority of the responders (39.2%) declared that they have visited the municipality 4-10 times in the past. The results are presented in detail in the graph below (Graph 16:
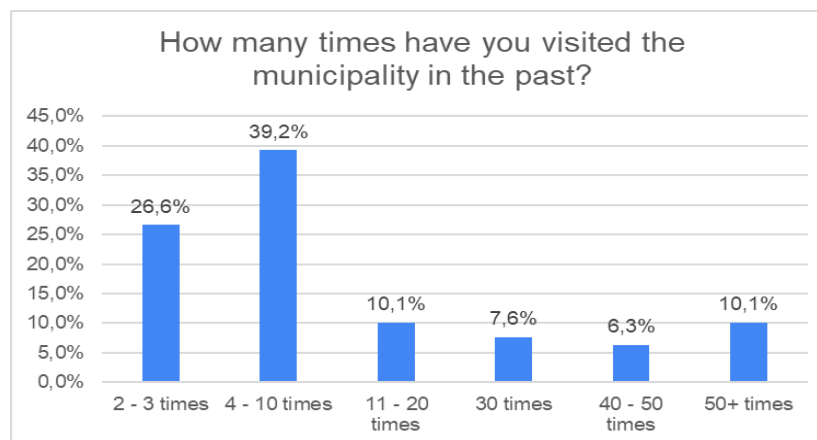
Graph 19: How many times have you visited the municipality in the past?

A question followed regarding the purpose of their visit to the municipality of Vari-Voula-Vouliagmeni. The vast majority (80.8%) stated that they visited the municipality for recreational reasons/holidays, while 14.6% for business reasons (total number of answers: 130).
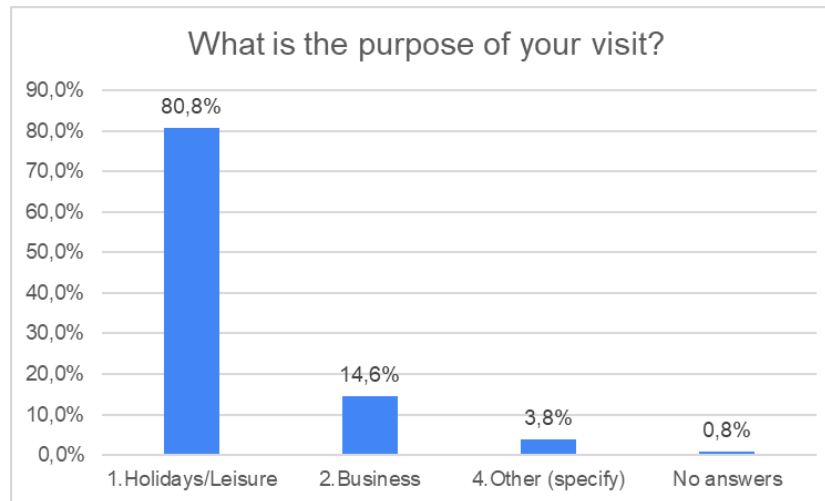
Graph 20: What is the purpose of your visit?

In the question "How did you get to Athens", 58.5% declared that they came from their country of residence by plane and 31.5% by other means, implying that they might be permanent Greek residents in other municipalities.
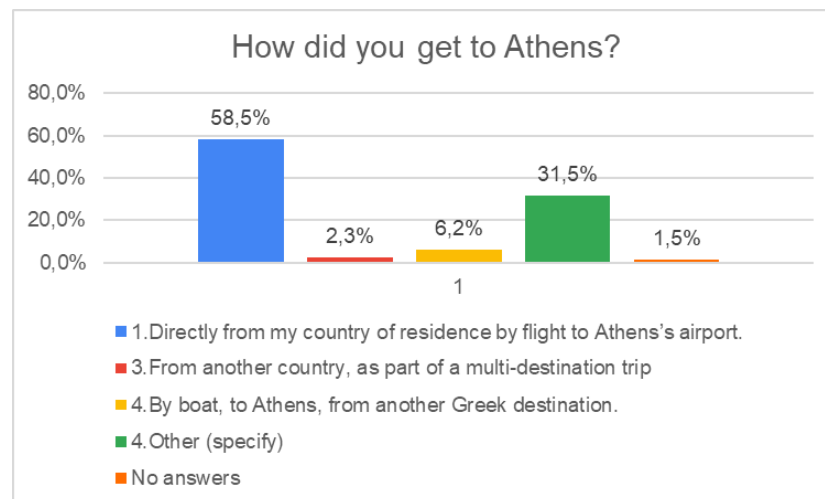
Graph 21: How did you get to Athens?

The next question concerns **whether they traveled alone or were accompanied by someone (total number of responses: 130).** It was found that the majority of respondents traveled as a couple (50.8%), followed by those who traveled with their friends (16.2%) or alone (15.4%). Only 4.6% stated that they traveled with colleagues for business purposes.
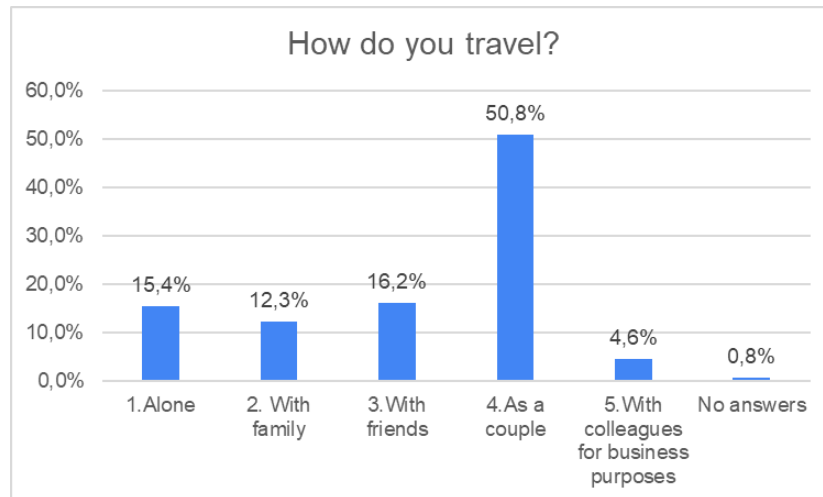
Graph 22: How do you travel?

In the question "**Which of the following places in the area would you like to visit or have you already visited?"** The most popular options in order of ranking were (individual answers):

- Lake Vouliagmeni
- restaurants and cafes in the Municipality of Vari-Voula-Vouliagmeni
- the esplanade
- Beaches
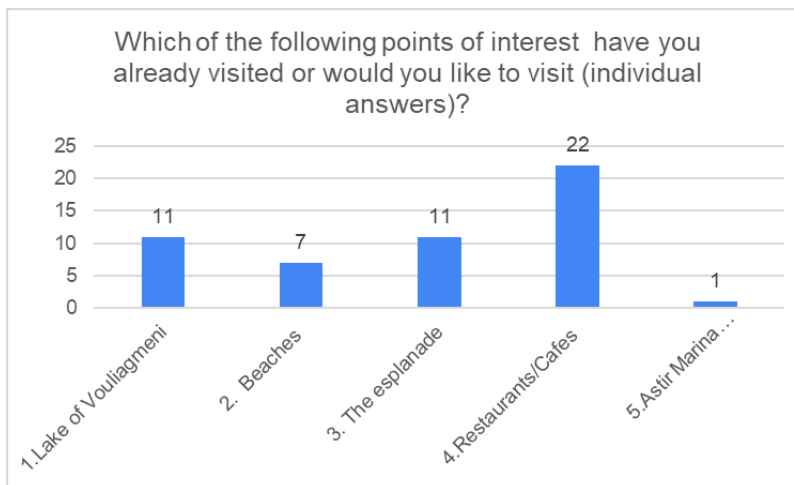
Graph 23: Which of the following points of interest have you already visited or would you like to visit (individual answers)?

In the case of combined answers the most popular choices are restaurants and cafes, lake Vouliagmeni and the esplanade.
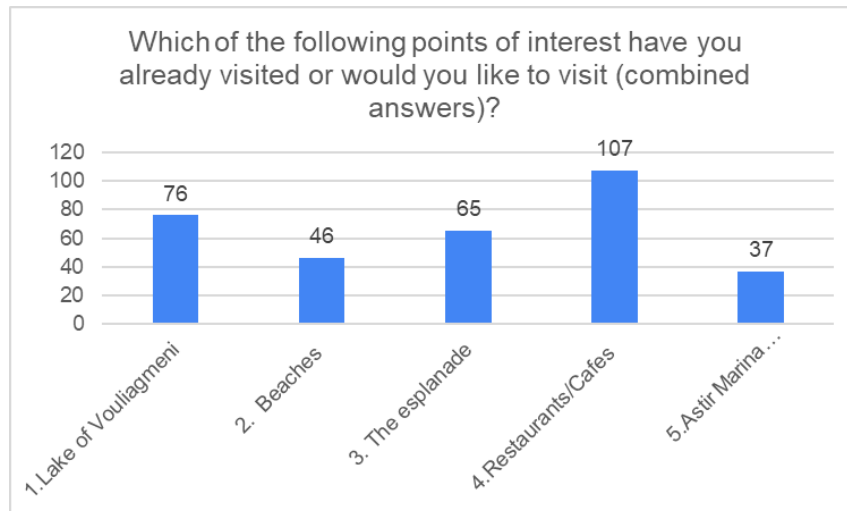
Graph 24: Which of the following points of interest have you already visited or would you like to visit (combined answers)?

In the question "how likely is it to visit Greece for future vacations", 53.1% answered that it is very likely and 38.5% that it is likely.
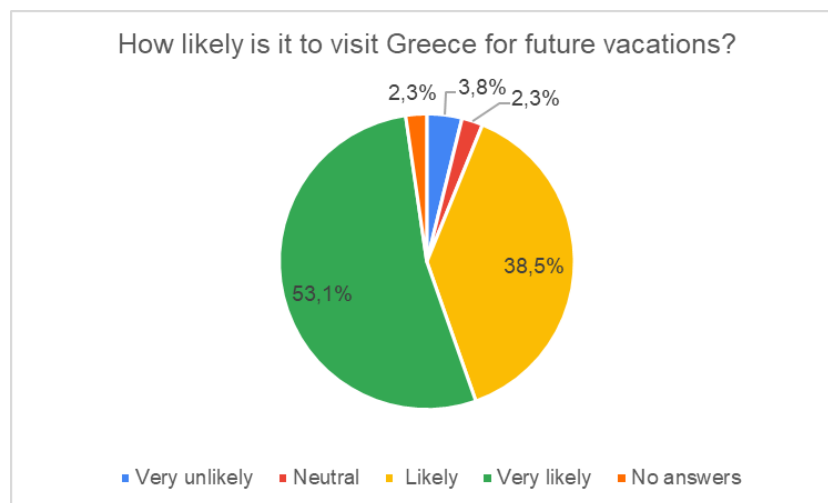
Graph 25: How likely is it to visit Greece for future vacations?

The following question is "How likely is it for you to recommend Greece as a destination to friends/acquaintances". 53.1% responded that it is very likely and 34.6% that it is likely.

How likely is it for you to recommend Greece as a destination to friends/acquaintances?
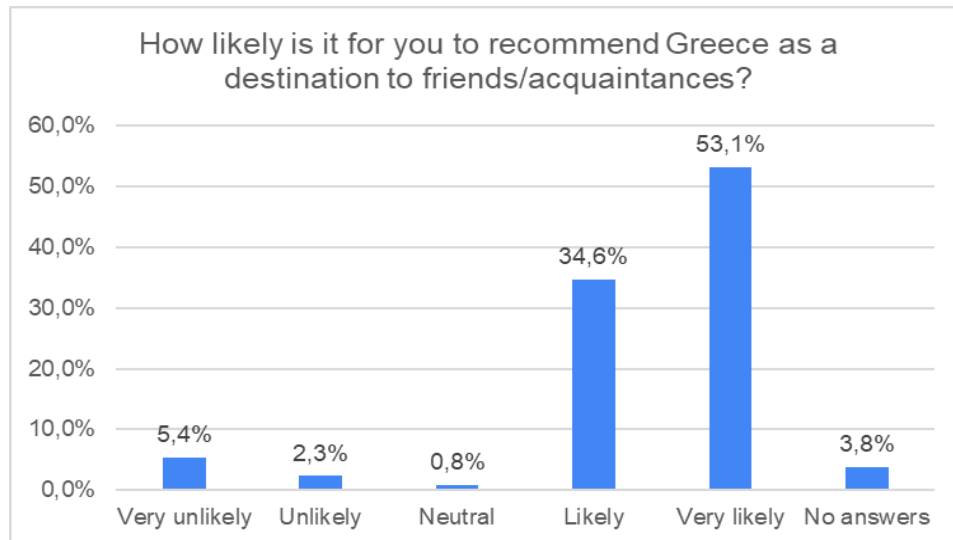
Graph 26: How likely is it for you to recommend Greece as destination to friends/acquaintances?

A series of questions followed in which respondents were asked to **evaluate the level of their expectations in relation to their actual experience in a series of services and activities**. More specifically (total number of answers:130):

- Regarding **accommodation**, the majority of the respondents responded that it was as expected (62.3%).

- Regarding **the variety of activities available**, 57.7% responded that this was as expected and 9.2% that it was much better than expected.

- For **local cuisine and gastronomy**, 57.7% stated that their experience was as expected, while 11.5% described it as much better than expected and 26.2% as better than expected.

- Regarding **shopping,** 65.4% evaluated their experience as expected and 19.4% as better than expected.
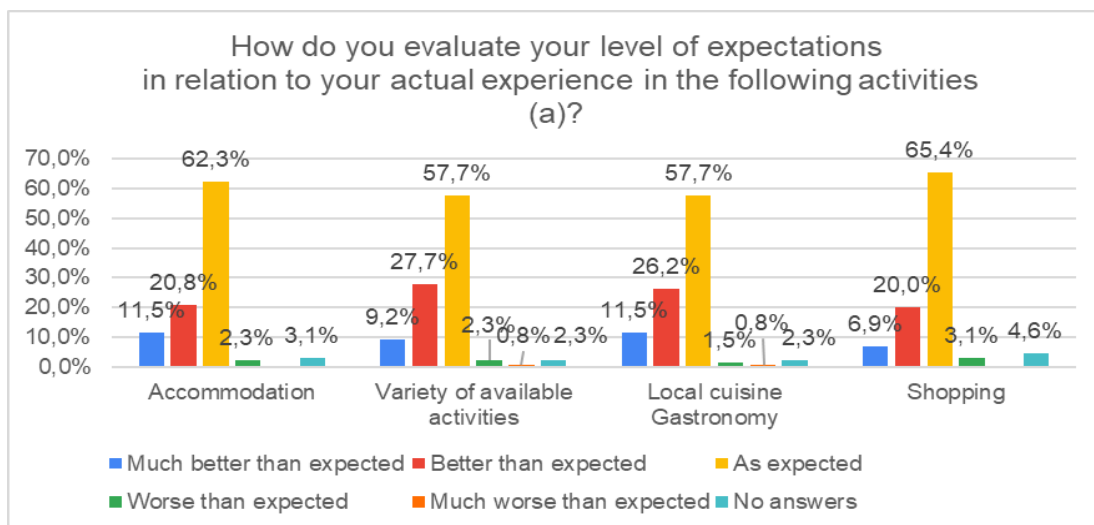
How do you evaluate your level of expectations in relation to your actual experience in the following activities (a)?

- For **nightlife,** 60% said their experience was as expected, 24.6% said it was better than expected and 6.9% said it was better than expected.

- Regarding **nature**, 56.9% of the respondents said their experience was no different from what was expected, 10.8% said it was much better than expected and 25.4% said it was better than expected.

- Regarding **transportation,** for 58.5% the experience was no different from what was expected, for 6.9% it was much better than expected and for 23.1% it was better than expected.

- Regarding **the overall quality of services,** 60.8% said it was as expected, 10% said it was much better than expected, and 23.8% said it was better than expected.
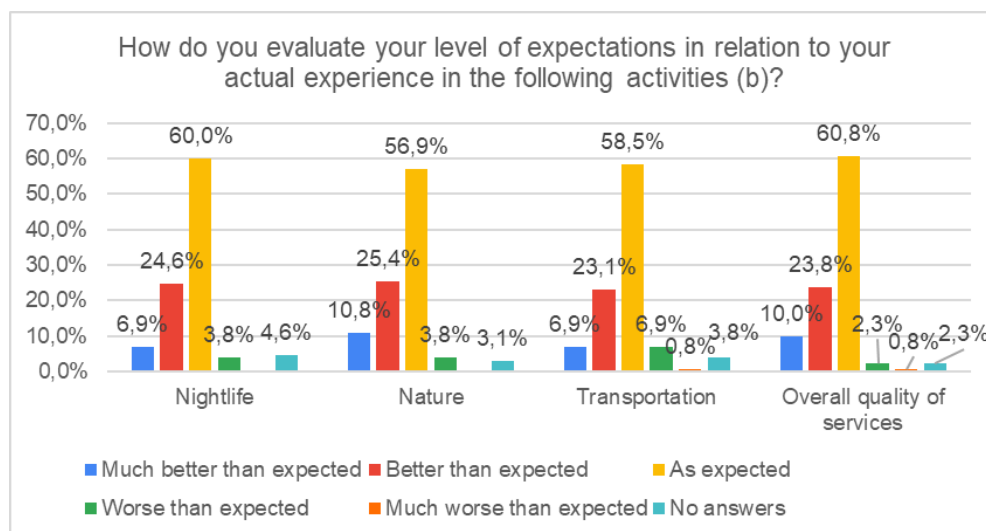
Graph 28: How do you evaluate your level of expectations in relation to your actual experience in the following activities (b)?

A series of questions followed in which respondents were asked to evaluate **the services provided by the Municipality of Vari-Voula-Vouliagmeni in the areas of waste management, traffic management, parking, recycling, beaches, road works (sidewalks, roads) and accessibility** (total number of answers:141). The main conclusions that emerged are the following:

- In **the area of waste management,** 46.1% rated municipal services as good and 7.8% as very good. For 36.9%, waste management services are rated as average ("fair"), for 2.8% as poor and for 2.8% as very poor.

- Regarding **traffic management,** 38.3% of respondents described the municipality's services as good. 39.7% regard the services as average ("fair").It must be noted that 9.9% characterized the municipality's services as poor.

- On **the issue of parking**, it is found that 32.6% of respondents rate the municipality's services as good and 5% as very good. A negative opinion was expressed by 7.8% (poor) and 10.6% (very poor).

- On **the issue of recycling**, 40.4% evaluated municipal services as good and 39% as average ("fair"). Only 5.7% evaluated them negatively ("poor").
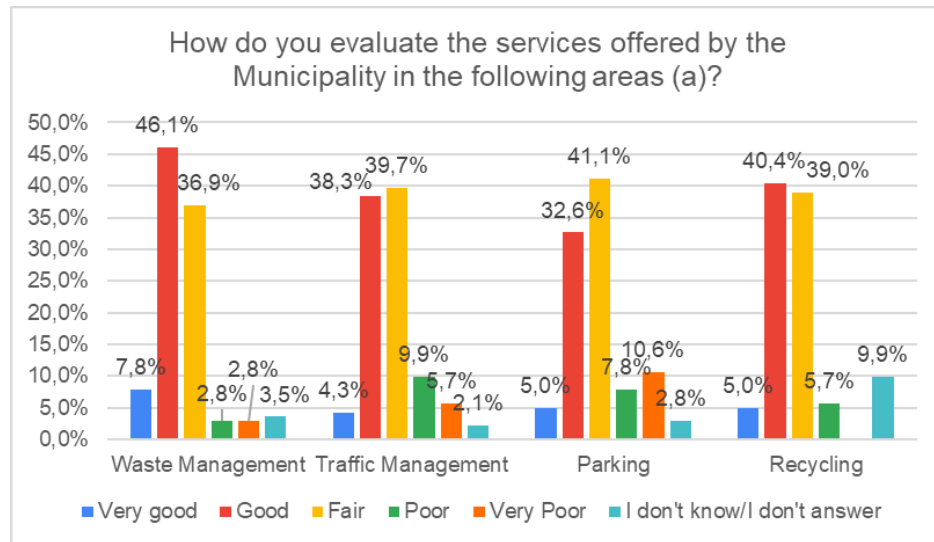
Graph 29: How do you evaluate the services offered by the municipality in the following areas (a)?

- Regarding **beaches,** 44% described the municipal services related to them as good and 9.9% as very good. 36.2% evaluated them as average while only 5% (poor) and 1.4% (very poor) expressed a negative opinion.

- On **the issue of road works** (road surface and sidewalks), 40.4% described the municipality's services as average ("fair"), 35.5% as good and 5.7% as very good. 9.9%% described them as poor and 5.7% as very poor.

- Regarding **accessibility,** it is found that 39.7% described the municipality's services as mediocre ("fair"). A positive opinion was expressed by 34.8% (good) and 4.3% (very good), and a negative opinion was expressed by 8.5% (poor) and 6.4% (very poor).
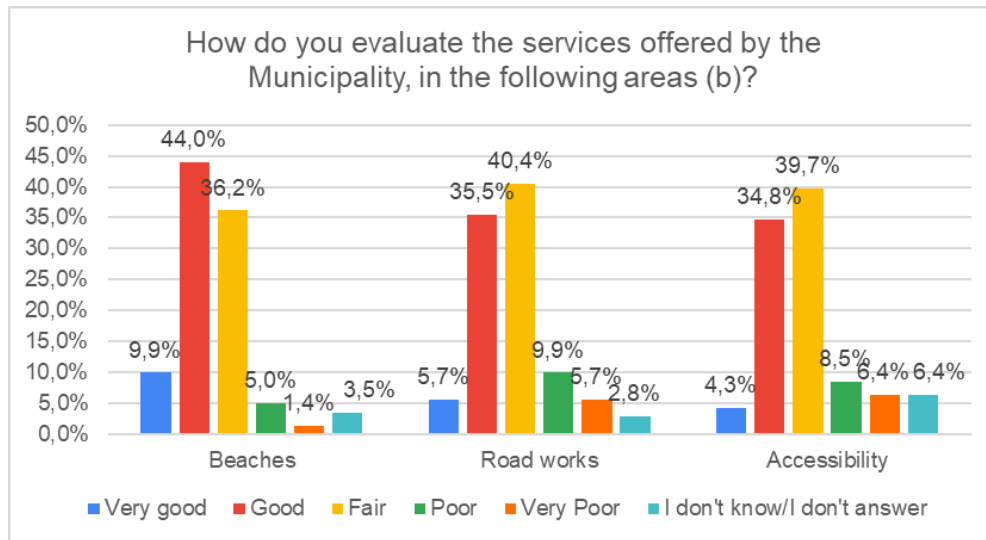
Graph 30: How do you evaluate the services offered by the municipality in the following areas (b)?

A **series of questions related to Artificial Intelligence followed**. The first question concerned whether they knew what Artificial Intelligence was and the vast majority of respondents (98.6%) answered positively (total number of answers:141).
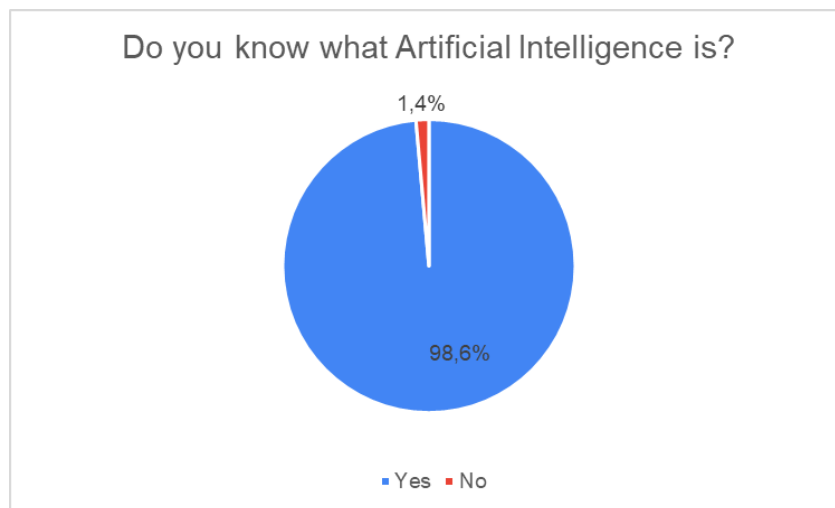
Graph 31: Do you know what Artificial Intelligence is?

Subsequently, those who answered positively to the above question were asked to state whether they trust it. 70% of respondents answered positively and 29.3% stated that they do not trust it.
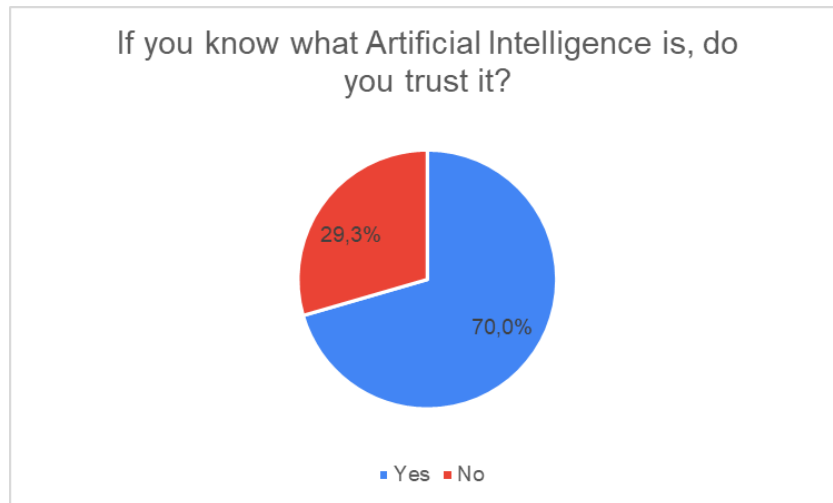
Graph 32: If you know what Artificial Intelligence in, do you trust it?

In addition, respondents were asked to assess whether **the implementation of Artificial Intelligence in the Municipality of Vari-Voula-Vouliagmeni** through the development of smart tools will contribute to improving recycling, traffic management and parking, reducing bureaucracy and delays in public procedures, safety in public spaces and making informed decisions by municipal authorities based on available data (total number of responses:141). The main conclusions that emerged are the following:

● In all the areas examined, the largest percentage of respondents responded positively ("agree"), with the highest percentages recorded in recycling, safety and decision-making.
● Negative responses ("fully disagree" and "disagree") were extremely low in all areas.
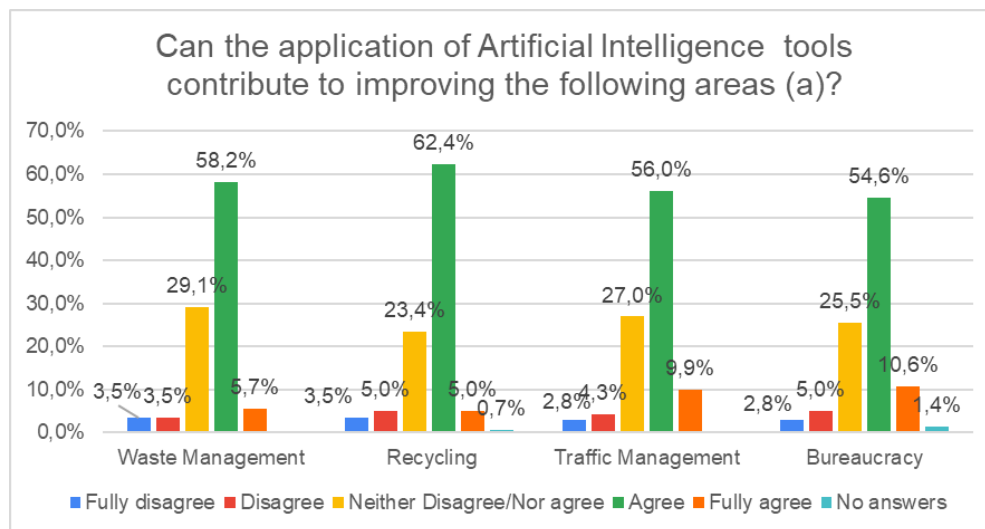
Graph 33: Can the application of Artificial Intelligence tools contribute to improving the following areas (a)?
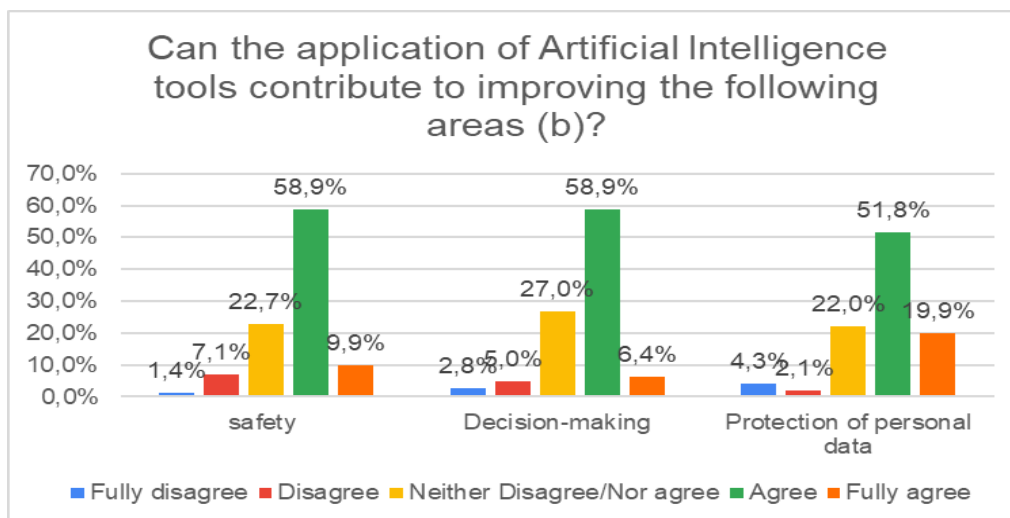
Graph 34: Can the application of Artificial Intelligence tools contribute to improving the following areas (b)?

In this cluster of questions, the participants were also asked whether t**he use of Artificial Intelligence in public services should be accompanied by strong measures to protect personal data."** The majority of respondents responded that they full agree or agree (19.9% and 51.8% respectively) with the above statement.

The questionnaire was completed with four questions on the demographic data of the 141 responders (gender, level of education, age, country of residence). Regarding gender, it is found that 48.5% of the respondents were men, 47.7% were women.

The questionnaire was completed with four questions on the demographic data of the respondents (gender, level of education, age). Regarding gender, it is found that 46% of the respondents were men, 43.2% were men and 1.4% chose the response "other".
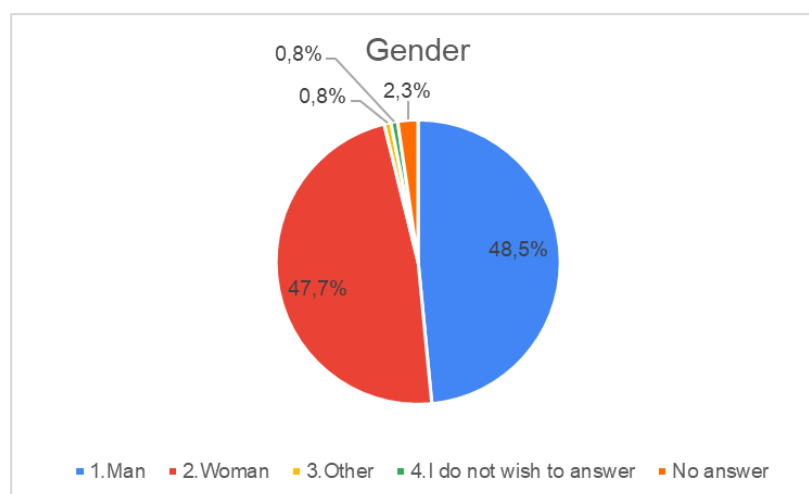
Graph 35: Gender

The next question concerned their **level of education.** It was found that the educational level of the respondents is particularly high, with 68.8% having a master's degree and 85.7% a doctoral degree.
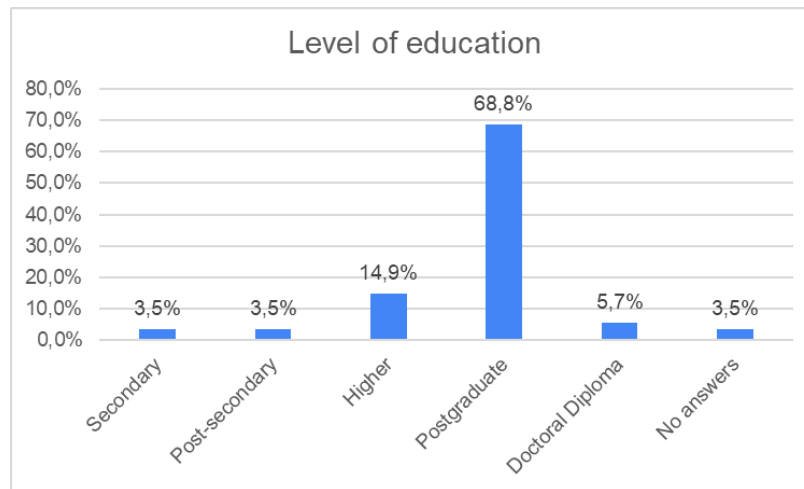
Level of education

Graph 36: Level of education

Regarding **the age profile** of the respondents, it was found that 61.7% belonged to the age group 26-45 and 28.4% to the age group 45-55. The percentages of respondents belonging to the categories 18-25 (2.8%), 56-65 (5%) and over 66 (0.7%) were low.
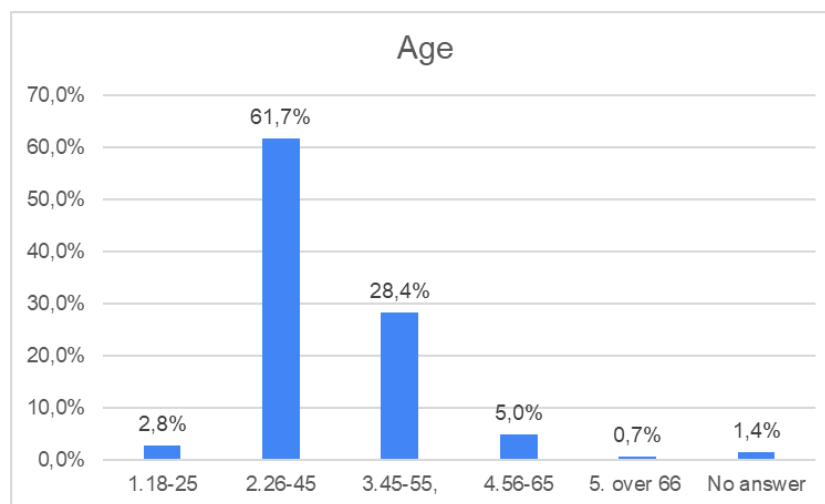
Graph 37: Age

In the question "what is your country of residence" (total number of answers:130), the majority of the respondents (90%) answered Greece, as expected.
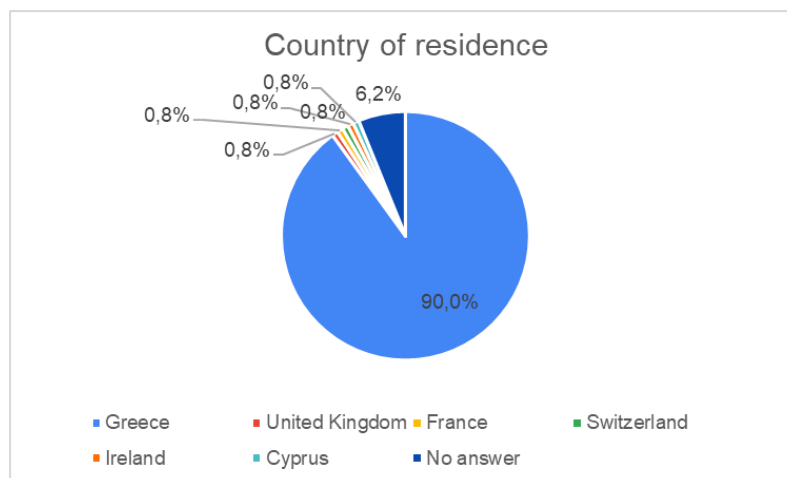
Graph 38: Country of residence

Lastly, the majority of respondents are employees in the private sector (45.4%) and freelancers (19.1%).
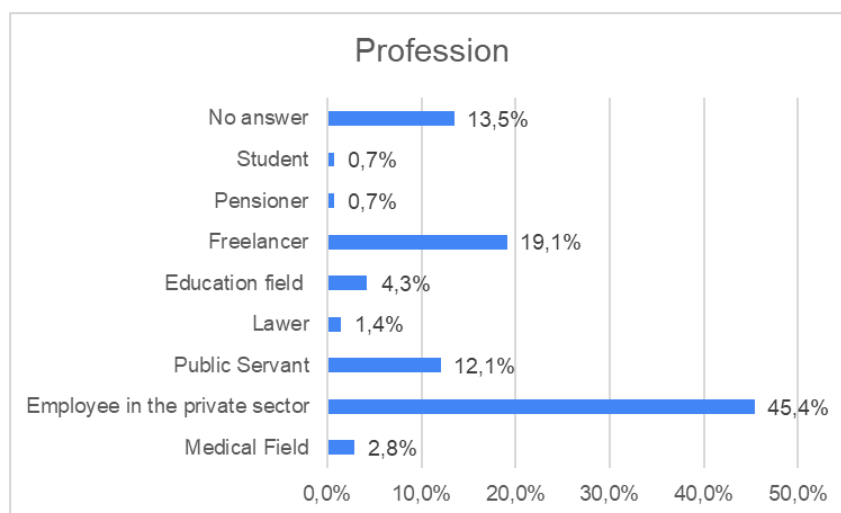
Graph 39: Profession

7.10.1 Questionnaire results for foreign visitors

A total of 139 questionnaires for foreign visitors were filled in (questionnaires in English). **To the first question** ("Is this your first visit to the area"), the majority of the answers (83.5%) were positive, and only 23 people (16.5%) stated that they have visited the area before.
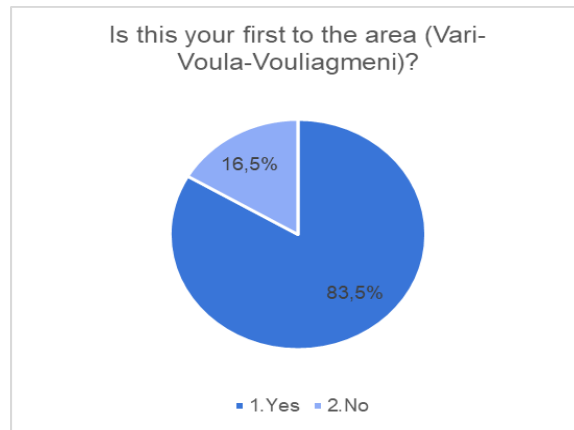
Graph 40: Is this your first visit to the area?

A question followed asking **for clarification on the frequency of visits to the area in the past, for those who declared that have visited the area in the past (total number of responses is 23).** It is noted that the number of people who have visited the area two or three times is significant. The results are presented in detail in the graph below (Graph 16):

Graph 41: If no, how many times have you visited the Vari-Voula-Vouliagmeni area in the past (in absolute numbers)?

A question followed regarding the purpose of their visit to the municipality of Vari-Voula-Vouliagmeni. The vast majority (84.2%) stated that they visited the municipality for recreational reasons, while 10% for business reasons and 3% in order to invest in the Greek real estate market.
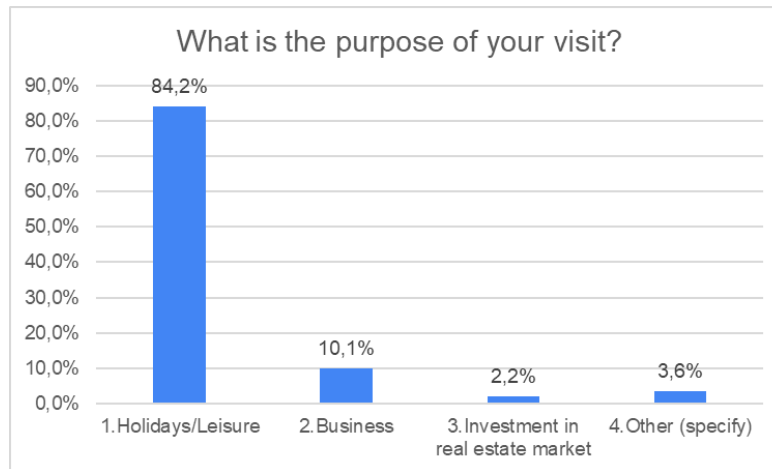
Graph 42: What is the purpose of your visit?

The next question concerns **whether they traveled alone or were accompanied by someone.** It was found that the majority of respondents traveled as a couple (40.3%), followed by those who traveled with their friends (28.8%) or with family (18.7%). Only 2.9% stated that they traveled with colleagues for business purposes (Graph 19).
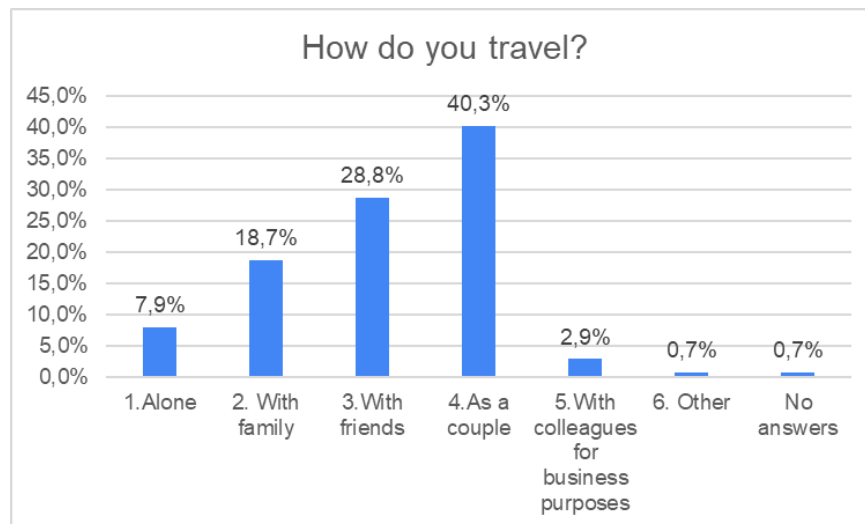
Graph 43: How do you travel?

In the question "How did you get to Athens", the majority stated that they came directly from their country of residence by plane.
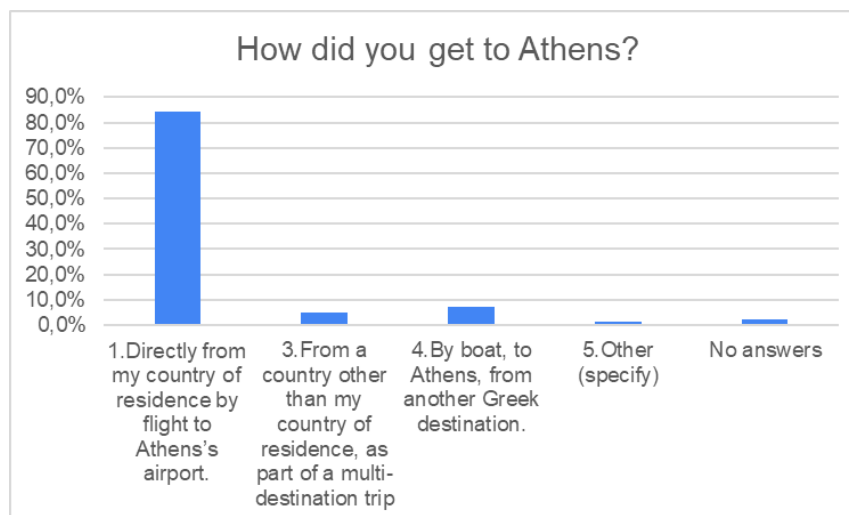
Graph 44: How did you get to Athens?

In the question "**Which of the following places in the area would you like to visit or have you already visited?"** The most popular options in order of ranking were (Graph 19):

- Lake Vouliagmeni
- restaurants and cafes in the Municipality of Vari-Voula-Vouliagmeni
- Beaches
- Astir Marina
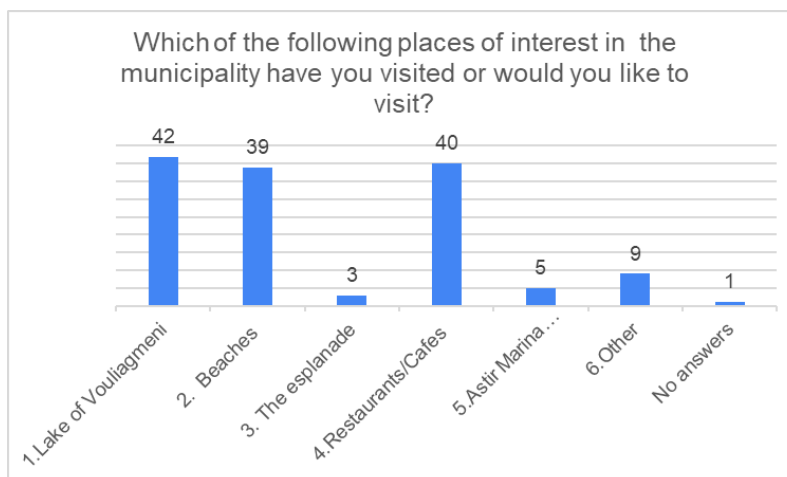
Graph 45: Which of the following places in the area would you like to visit or have you already visited?

A series of questions followed in which respondents were asked to **evaluate the level of their expectations in relation to their actual experience in a series of services and activities**. More specifically (Graph 20 and 21):

- Regarding **accommodation**, the majority of the respondents responded that it was as expected (64.7%).

- Regarding **the variety of activities available**, almost 70% responded that this was as expected and 22.3% that it was much better than expected.

- For **local cuisine and gastronomy**, 56.8% stated that their experience was as expected, while 21.6% described it as much better than expected and 17.3% as better than expected.

- Regarding **shopping,** 67% evaluated their experience as expected and 19.4% as better than expected.
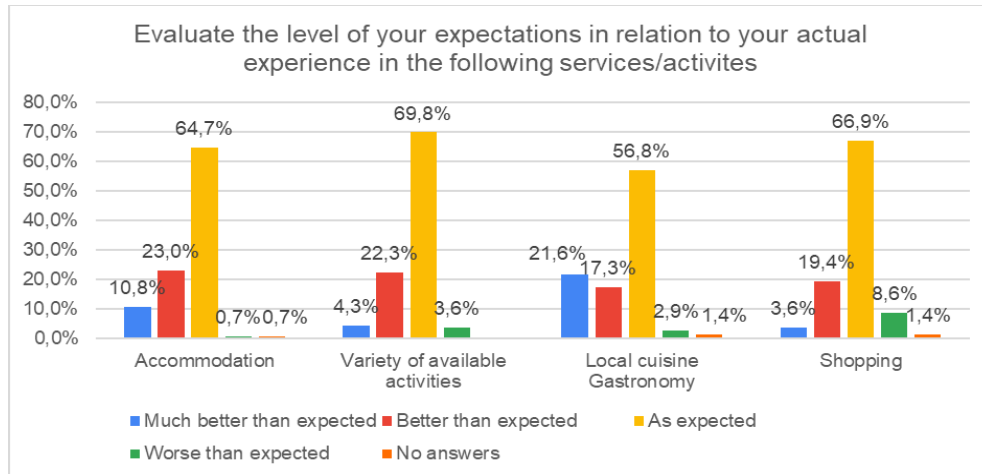
Graph 46: Evaluate your level of expectations in relation to your actual experience with the following services. Part A

- For **nightlife,** 69% said their experience was as expected, 15.8% said it was better than expected and 10.1% said it was better than expected.

- Regarding **nature**, 64.7% half of the respondents said their experience was no different from what was expected, 6.5% said it was much better than expected and 21% said it was better than expected.

- Regarding **transportation,** for 67% the experience was no different from what was expected, for 4.3% it was much better than expected and for 14.4% it was better than expected. It should be noted that for a significant percentage (13.7%) the experience was worse than expected.

- Regarding **the overall quality of services,** 65.5% said it was as expected, 6.5% said it was much better than expected, and 21% said it was better than expected. Only 7.2% said it was worse than expected.
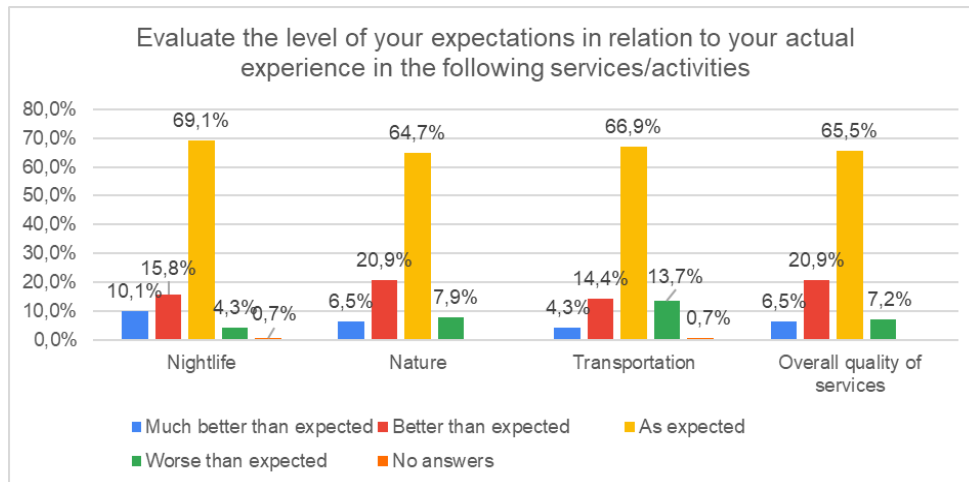
Graph 47: Evaluate your level of expectations in relation to your actual experience with the following services. Part B.

In the question "How likely is it to visit Greece for future vacations", 66.2% answered that that is likely and 23.7% very likely.
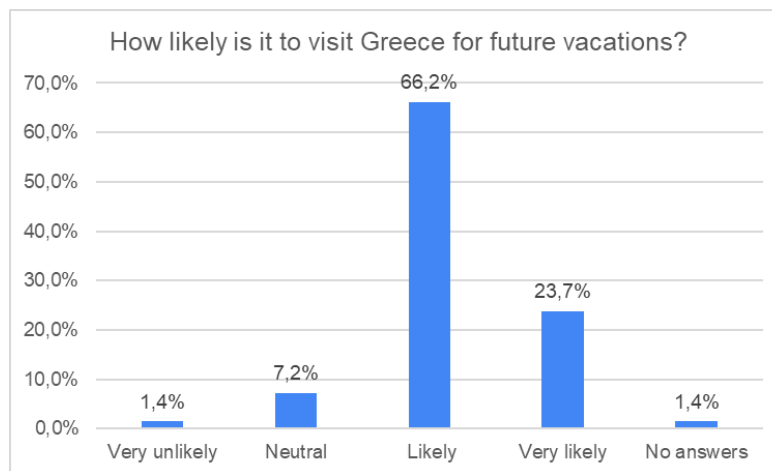
Graph 48: How likely is it to visit Greece for future vacations?

In the question "How likely is it for you to recommend Greece as destination to your friends/acquaintances", 67.6% answered that it is likely and 23.7% very likely.
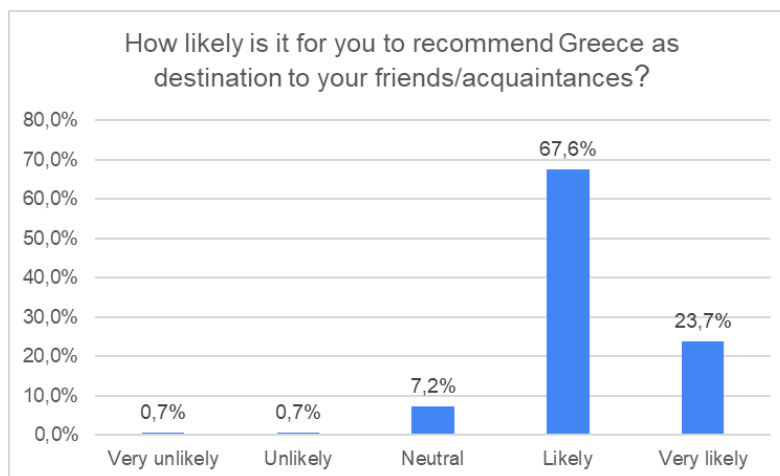
Graph 49: How likely is it for you to recommend Greece as destination to your friends/acquaintances?

A series of questions followed in which respondents were asked to evaluate **the services provided by the Municipality of Vari-Voula-Vouliagmeni in the areas of waste management, traffic management, parking, recycling, beaches, road works (sidewalks, roads) and accessibility.** The main conclusions that emerged are the following:

● In **the area of waste management,** 59% rated municipal services as good and 4.3% as very good. For 29.5%, waste management services are rated as average ("fair"), for 4.3% as poor and for 0,7% as very poor.

● Regarding **traffic management,** 49% of respondents described the municipality's services as good. 34.5% regard the services as average ("fair").It must be noted that 9.4% characterized the municipality's services as poor.

● On **the issue of parking**, it is found that 49% of respondents rate the municipality's services as good. A negative opinion was expressed by 8.6% (poor) and 3.6% (very poor).

● On **the issue of recycling**, 56.1% evaluated municipal services as good and 27.3% as average ("fair"). Only 8% evaluated them negatively ("poor").

● Regarding **beaches,** 59% described the municipal services related to them as good and 12.2% as very good. 23% evaluated them as average while only 0.7% (poor) and 0.7% (very poor) expressed a negative opinion.

● On **the issue of road works** (road surface and sidewalks), 35.3% described the municipality's services as average ("fair"), 48.9% as good and 5% as very good. Only 7.2% described them as poor and 2.2% as very poor.

● Regarding **accessibility,** it is found that 31.7% described the municipality's services as mediocre ("fair"). A positive opinion was expressed by 48.2% (good) and 0.7% (very good), and a negative opinion was expressed by 10.8% (poor) and 3.6% (very poor).
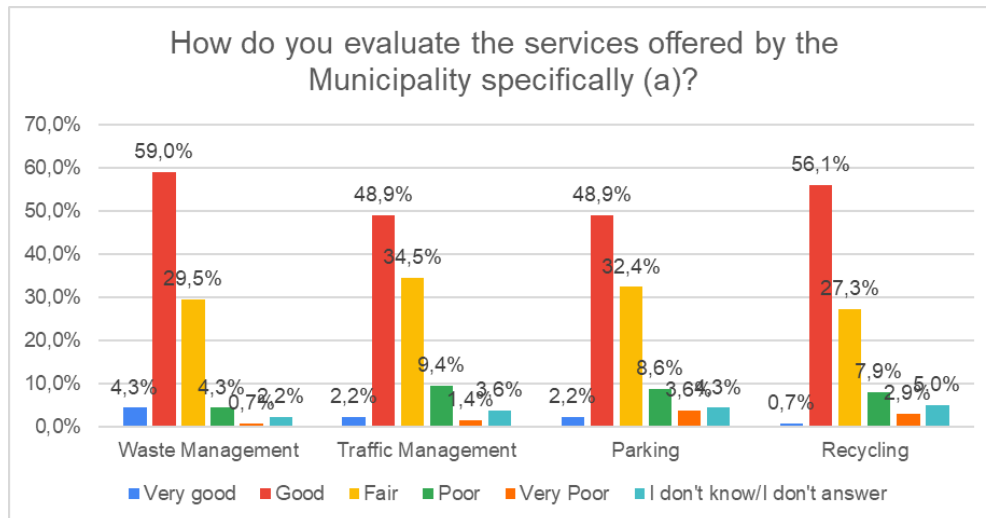
Graph 50: How do you rate the following municipal services? Part A
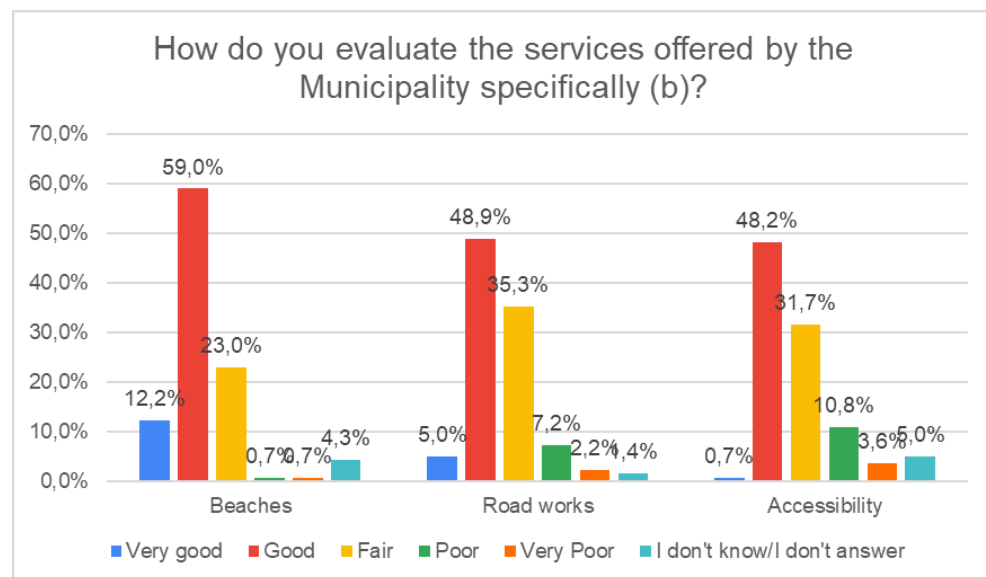
Graph 51: How do you evaluate the following municipal services? Part B.

A **series of questions related to Artificial Intelligence followed**. The first question concerned whether they knew what Artificial Intelligence was and the vast majority of respondents (96.4%) answered positively (Graph 28).
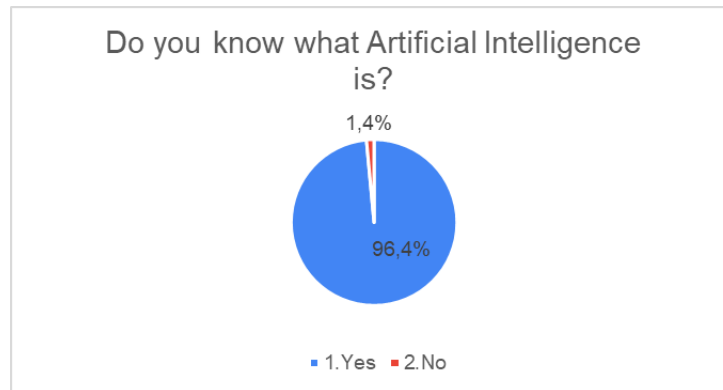
Graph 52: Do you know what Artificial Intelligence is?

Subsequently, those who answered positively to the above question were asked to state whether they trust her. 84.3% of respondents answered positively and 15.7% stated that they do not trust it (Graph 29).
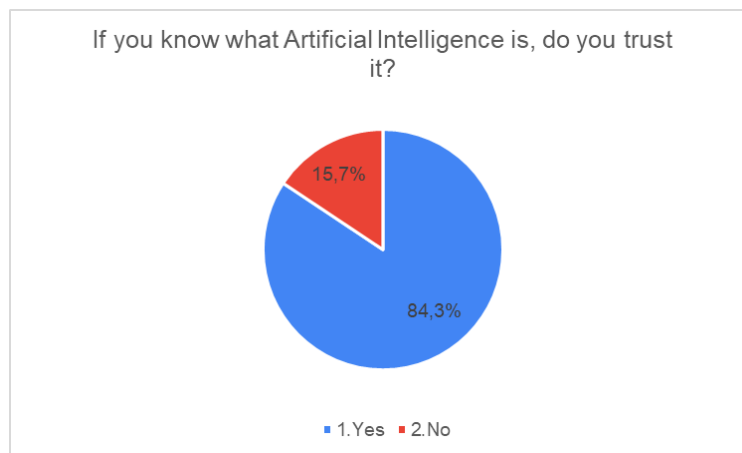
Graph 53: If you know what Artificial Intelligence is, do you trust it?

In addition, respondents were asked to assess whether **the implementation of Artificial Intelligence in the Municipality of Vari-Voula-Vouliagmeni** through the development of smart tools will contribute to improving recycling, traffic management and parking, reducing bureaucracy and delays in public procedures, safety in public spaces and making informed decisions by municipal authorities based on available data. The main conclusions that emerged are the following:

- In all the areas examined, the largest percentage of respondents responded positively ("agree"), with the highest percentages recorded in recycling, and traffic management/parking and bureaucracy.
- Negative responses ("fully disagree" and "disagree") were extremely low in all areas.
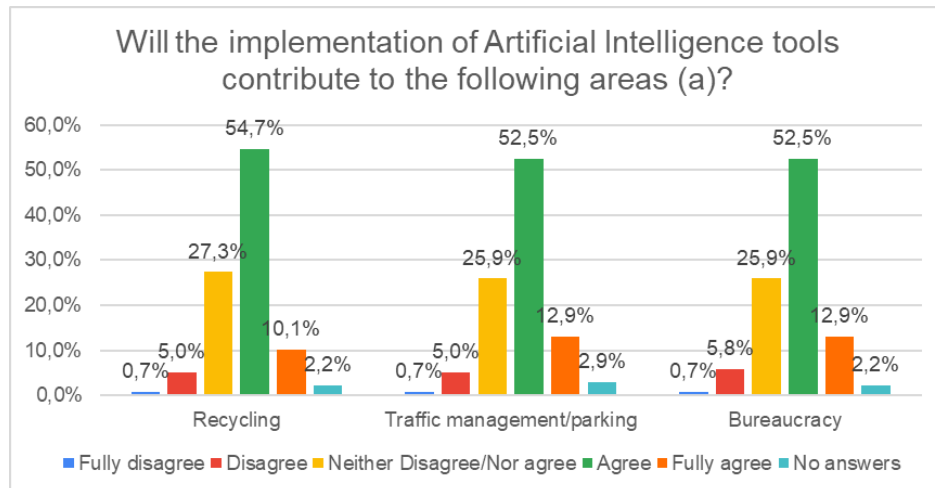
Graph 54: Will the implementation of Artificial Intelligence in the Municipality through the development of smart tools contribute to the improvement of the following areas. Part A.
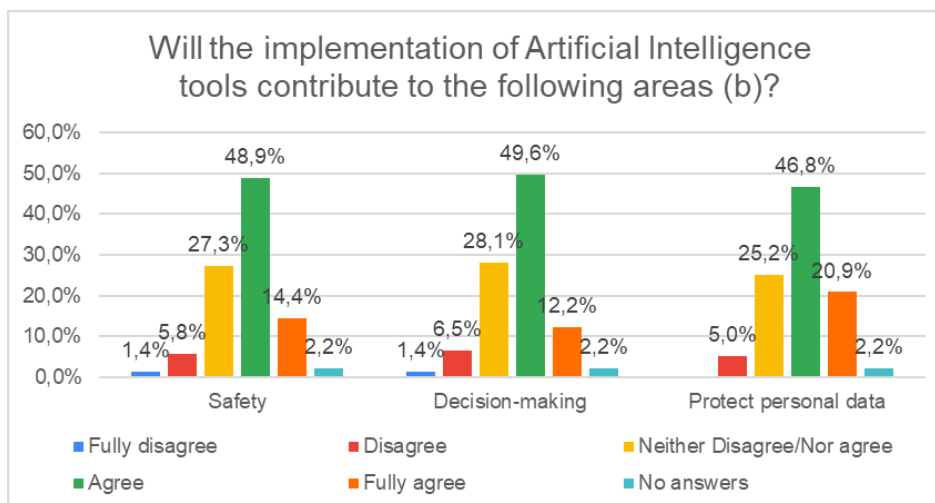
Graph 55: Will the application of Artificial Intelligence in the Municipality of BBB through the development of smart tools contribute to the improvement of the following areas. Part B.

In this cluster of questions, the participants were also asked whether t**he use of Artificial Intelligence in public services should be accompanied by strong measures to protect personal data."** The majority of respondents responded that they full agree or agree (20,9% and 46,8% respectively) with the above statement.

The questionnaire was completed with four questions on the demographic data of the respondents (gender, level of education, age, country of residence, profession). Regarding gender, it is found that 46% of the respondents were men, 43.2% were women and 1.4% chose the response "other" (Graph 30).
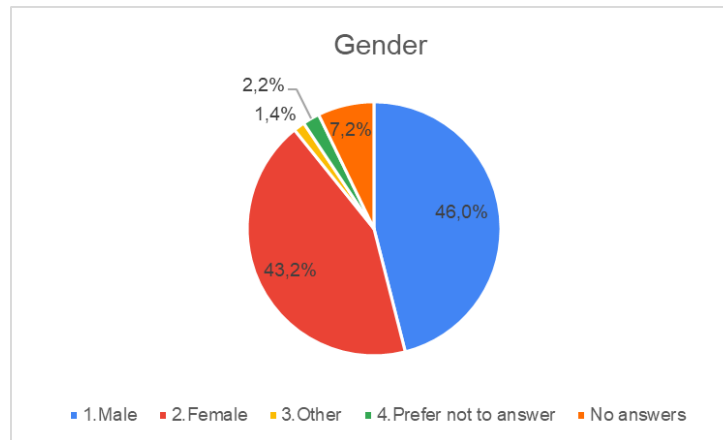
Graph 56: Gender

The next question concerned their **level of education.** It was found that the educational level of the respondents is particularly high, with 33.8% having a master's degree and 8.6% a doctoral degree. 40.3% have completed higher education and the percentage of those who had only received secondary education was low (1.4%).
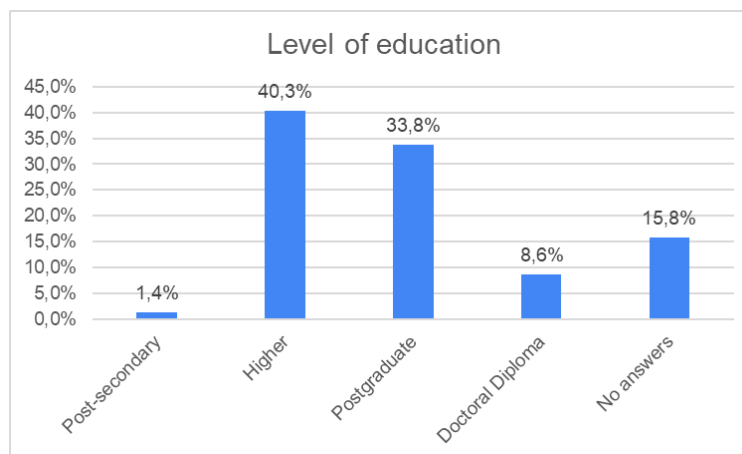
Graph 57: Education level

Regarding **the age profile** of the respondents, it was found that 40.3% belonged to the age group 26-45 and 33.1% to the age group 45-55. The percentages of respondents belonging to the categories 18-25 (8.9%), 56-65 (11.5%) and over 66 (3.6%) were low (Graph 32).
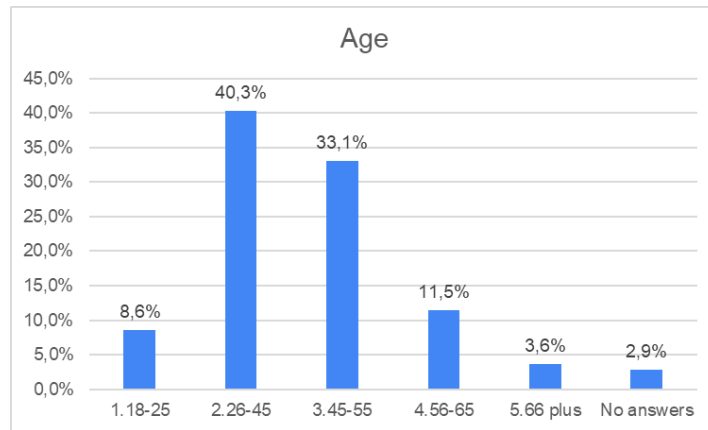
Graph 58: Age.

The last question concerned the **country of residence**. It was found that the largest number of   of respondents stated that their country of residence was Germany (40), the United Kingdom (19), France (17) and Italy (14). 23 Participants did not answer this question (Graph 36).
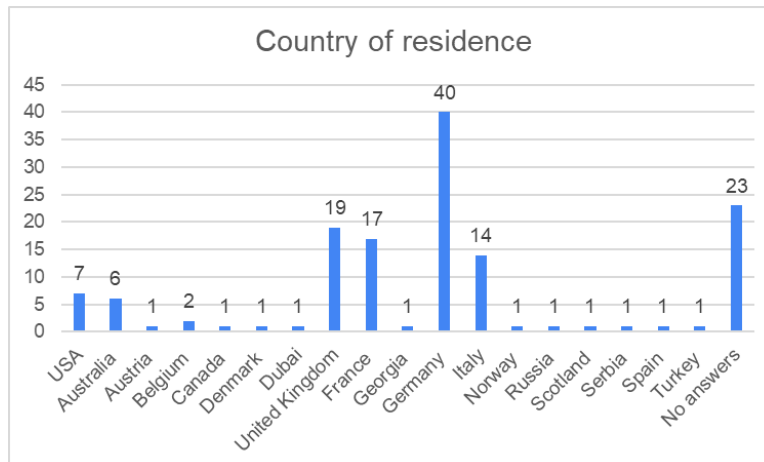
Graph 59: Country of residence

The majority of the respondents are freelancers (28.1%) or work in the field of education (16.5%). 12.9% work in the medical field or in the private sector in general.
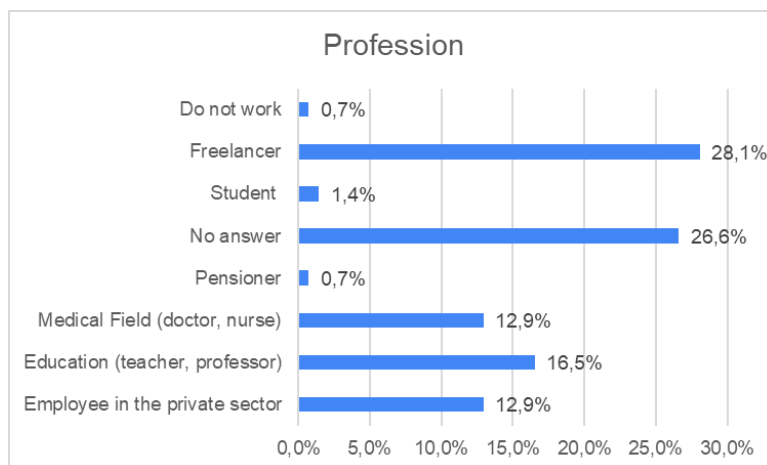
Graph 60: Profession

7.10.2 Questionnaire results for the Municipality's employees

A total of 71 questionnaires were completed by municipal employees. In the first question ("How long have you been working at the Municipality?"), the majority of employees have been working for the municipality for 1-10 years.
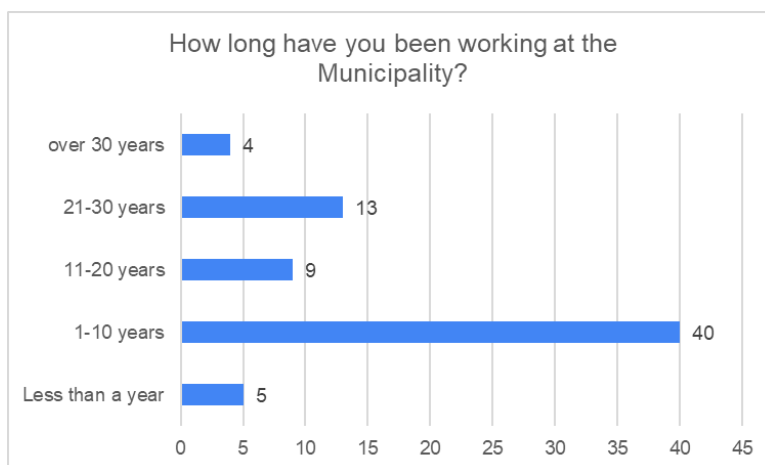
Graph 61: How long have you been working at the Municipality?

In the question ("Which department of the Municipality do you work at?"), it is noted that the majority of the employees who answered the questionnaire work in waste management and recycling.
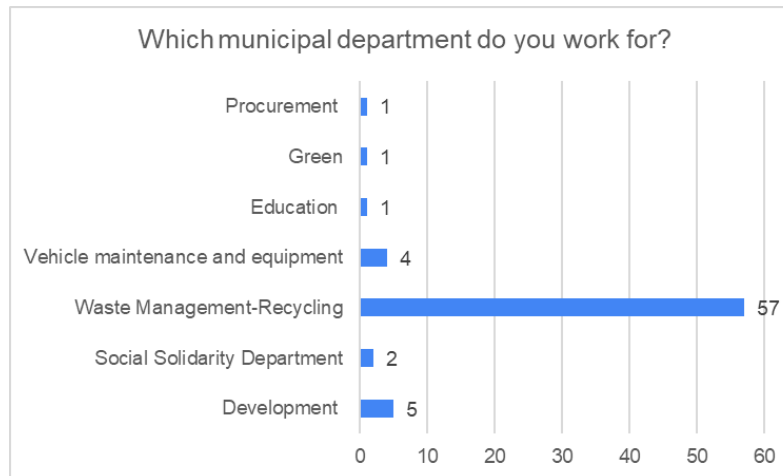
Graph 62: Which municipal department do you work for?

In the question ("Do you agree that the arrival of tourists/visitors negatively affects the following sectors?"), the majority of employees consider that it affects all sectors to a significant extent.
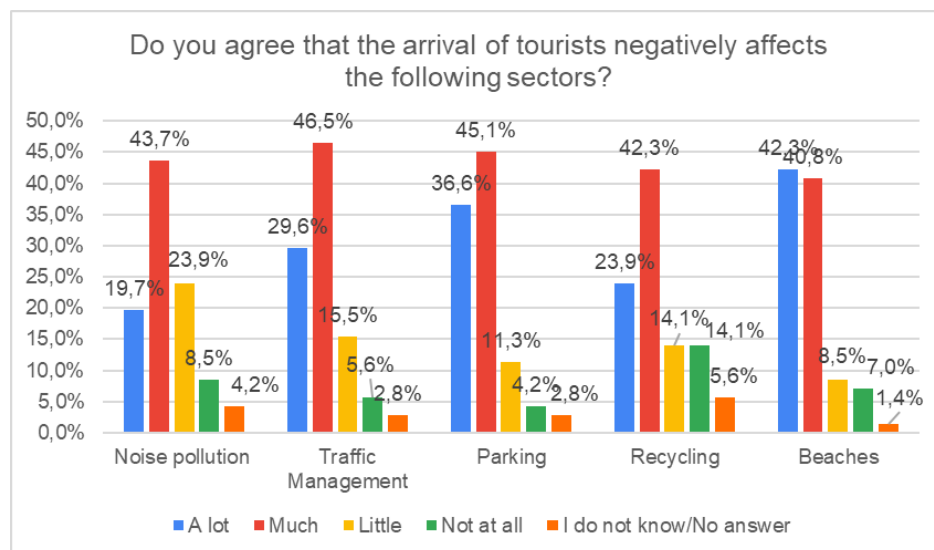
Graph 63: Do you agree that the arrival of tourists/visitors negatively affects the following sectors?

A **series of questions related to Artificial Intelligence followed**. The first question concerned whether they are aware of what Artificial Intelligence is. The vast majority of respondents (79%) answered positively (Graph 33).
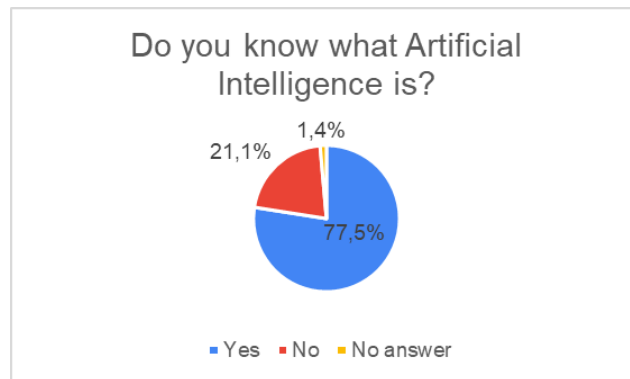
Graph 64: Do you know what Artificial Intelligence is?

Subsequently, those who answered positively to the above question were asked to state whether they trust her. 45% of respondents answered positively and 55% negatively (Graph 34).
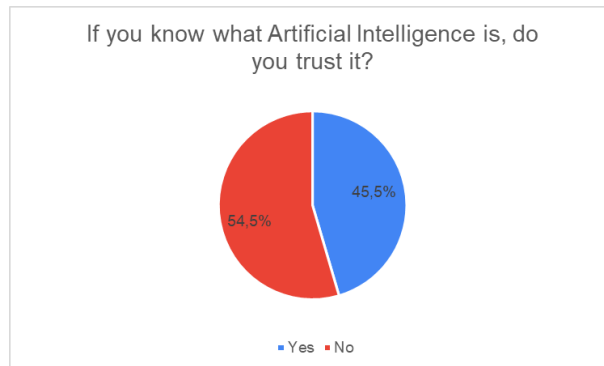
Graph 65: If you know what Artificial Intelligence is, do you trust it?

In addition, respondents were asked to assess whether **the implementation of Artificial Intelligence in the Municipality of Vari-Voula-Vouliagmeni** through the development of smart tools will contribute to improving waste management, the recycling system, traffic and parking management, reducing bureaucracy and delays in public procedures, safety in public spaces and making informed decisions by municipal authorities based on available data. The main conclusions that emerged are the following:

- In all the areas examined, the largest percentage of respondents responded positively ("agree" and "fully agree"), with the highest percentages recorded in safety, traffic and parking management and the reduction of bureaucracy.
- Negative responses ("strongly disagree" and "disagree") were low in all areas. The largest negative percentages are recorded in the areas of improving safety in public spaces and recycling.
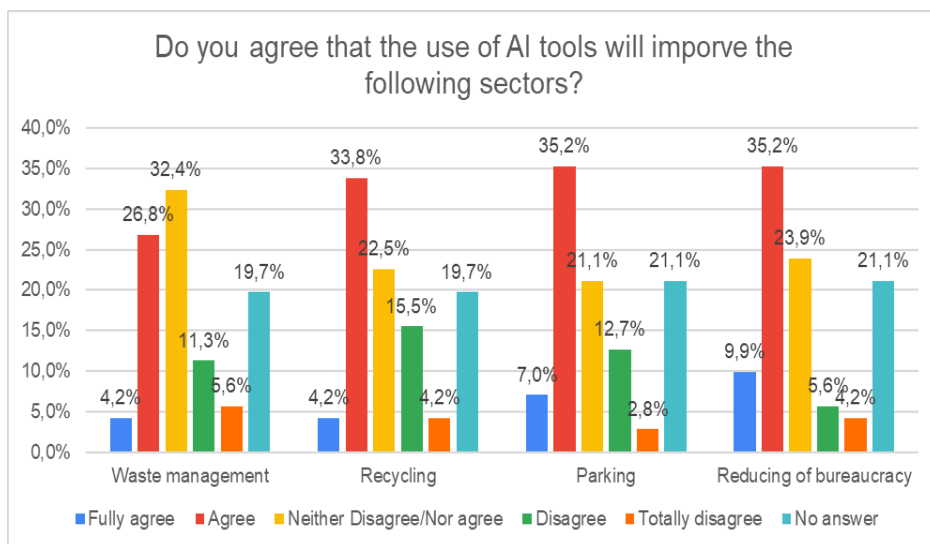
Graph 66: The implementation of Artificial Intelligence in the Municipality of BBB through the development of smart tools will contribute to the improvement of the following areas.
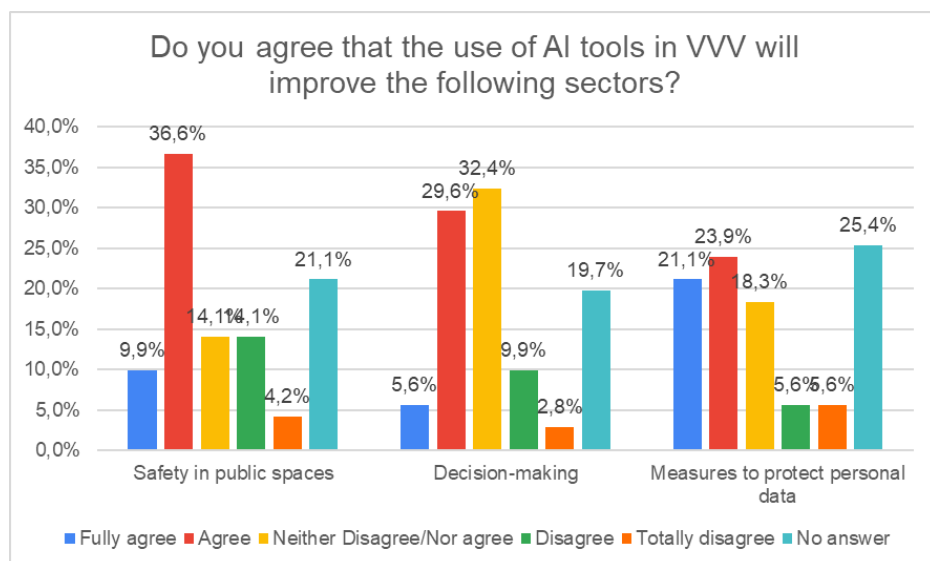

Graph 67: The implementation of Artificial Intelligence in the Municipality of BBB through the development of smart tools will contribute to the improvement of the following areas.

The questionnaire was completed with four questions on the demographic data of the respondents (gender, level of education, age, country of residence). Regarding gender, it is found that 32% of the respondents were women and 59% were men (Graph 35).
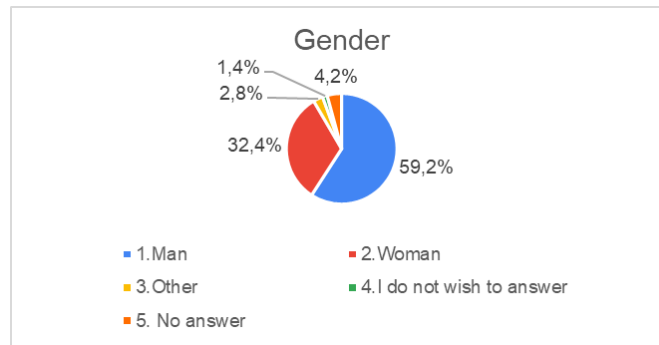
Graph 68: Gender

The next question concerned their **level of education.** It was found that the educational level of the respondents is particularly high, with 66% having a secondary education and 10% have completed higher education. Only 10% stated that they had received other types of post-secondary education (Graph 36).
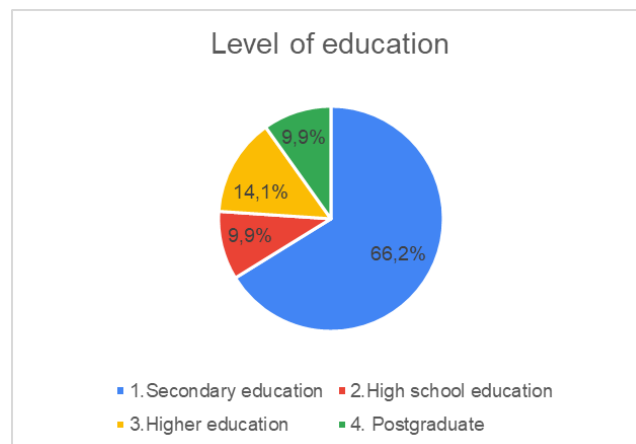
Graph 69: Education level

Regarding **the age profile** of the respondents, it was found that 32% belonged to the age group 26-45 and 40% to the age group 45-55. The percentages of respondents belonging to the categories 56-65 (24%) and 18-25 (3%), were low (Graph 37).
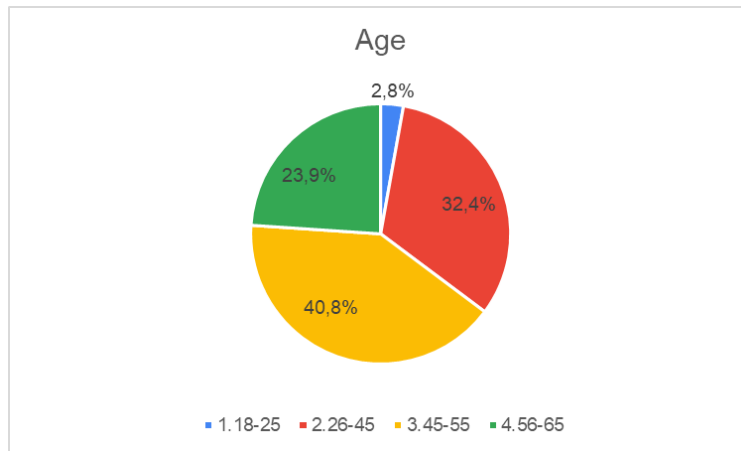
Graph 70: Age

7.10.3 Questionnaire results for Businesses

A total of 34 questionnaires were completed for businesses. To the first question ("Are you a permanent resident of the Municipality of Vari-Voula-Vouliagmeni"), 16 respondents answered positively and 18 negatively.

To the open-ended question "If you are a permanent resident, since which year have you been residing in the municipality", the answers are reflected in the graph below (Graph 38):
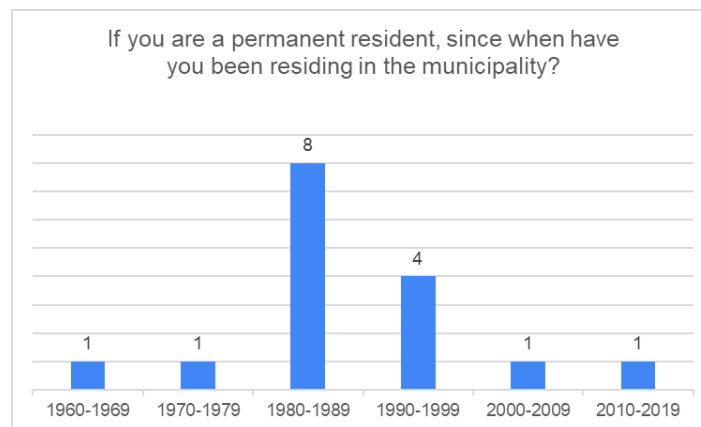

Graph 71: If you are a permanent resident, since when have you been residing in the municipality?

In the question "**Which of the following places in the Municipality do you like to visit?**" in the case of combined answers (Graph 39), Vouliagmeni Lake is in first place, followed by the option "Vouliagmeni Marina" and in fifth and last place is the option "Municipal Beach".
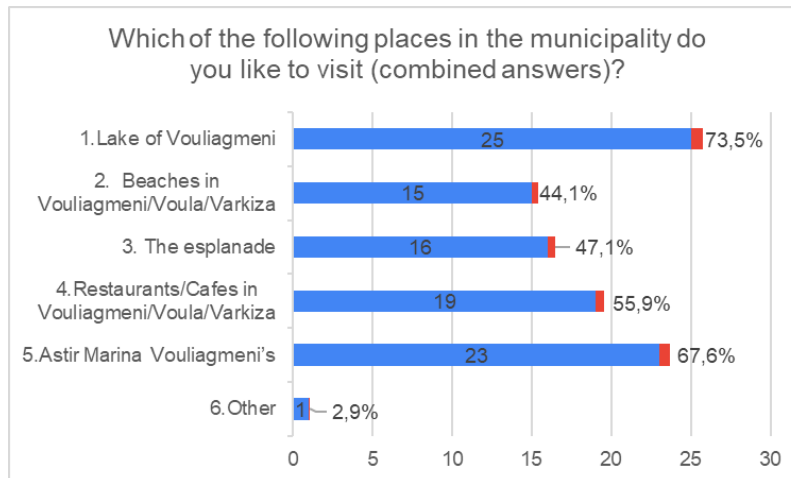
Graph 72: Which of the following places in the Municipality in the municipality do you like to visit (combined answers)

In the question ("Do you agree that the arrival of tourists/visitors negatively affects the following sectors?"), the majority of employees consider that it affects all of the following sectors to a significant extent (a lot and very much).
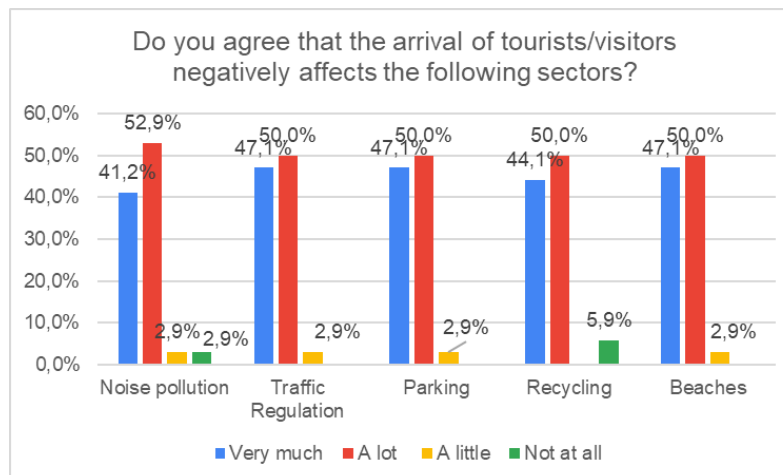

Graph 73: Do you agree that the arrival of tourists/visitors negatively affects the following sectors?

A series of questions followed in which respondents were asked to evaluate **the services provided by the Municipality of Vari-Voula-Vouliagmeni in the areas of waste managemtn, traffic management, parking, recycling, the Novoville application, beaches, road works (sidewalks, roads) and accessibility.** The main conclusions are the following:

- In **terms of waste management,** 73.5% rated municipal services as good and 5.9% as very good. For 17.65%, cleaning services are rated as average ("fair") and only 2.9% as very poor.

- In **terms of traffic management,** a positive opinion was expressed by 64.7% (good) and 2.9% (very good), and a negative opinion by only 5.9% (very poor).

- On **the issue of parking**, it is found that the majority of respondents rate the municipality's services as good (67.6%). A negative opinion was expressed by only 2.9% (poor) and 2.9% (very poor).

- On **the issue of recycling**, 70.6% evaluated municipal services as good and 8.8% as very good. Only 5.9% evaluated them negatively (poor).

- Regarding the Novoville application, the majority evaluate it as good (67.6%) and 17.6% as average ("fair").

- Regarding **beaches,** 73.5% described the municipal services related to them as good and 5.9% as very good. 17.6% evaluated them as average while only 2.9% as poor.

- On **the issue of road works** (road surface and sidewalks), 67.6% described the municipality's services as good and 2.9% as very good. Only 2.9% described them as a poor and 5.9% as very poor.

- Regarding **accessibility,** it is found that 67.6% described the municipality's services as good and 20.6% as average.

Overall the evaluation of the municipality's services by the business owners who participated in the research is positive.
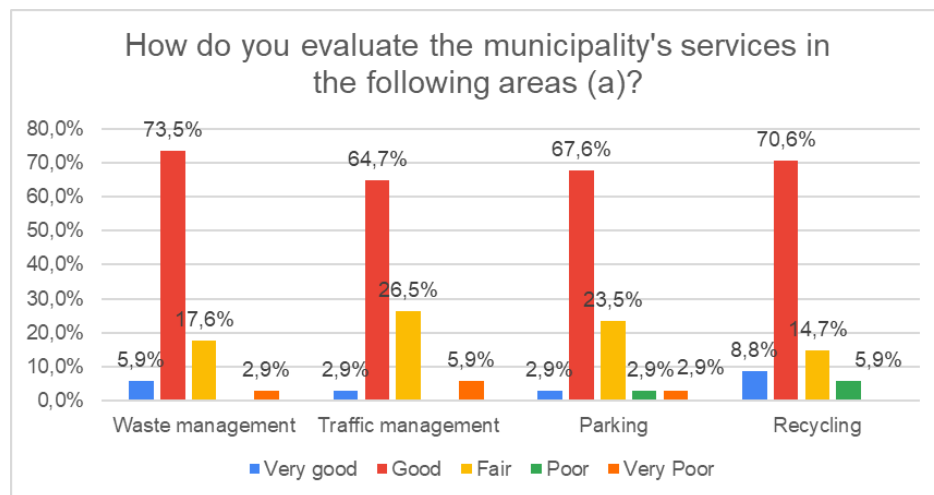

Graph 74: How do you rate the following municipal services?
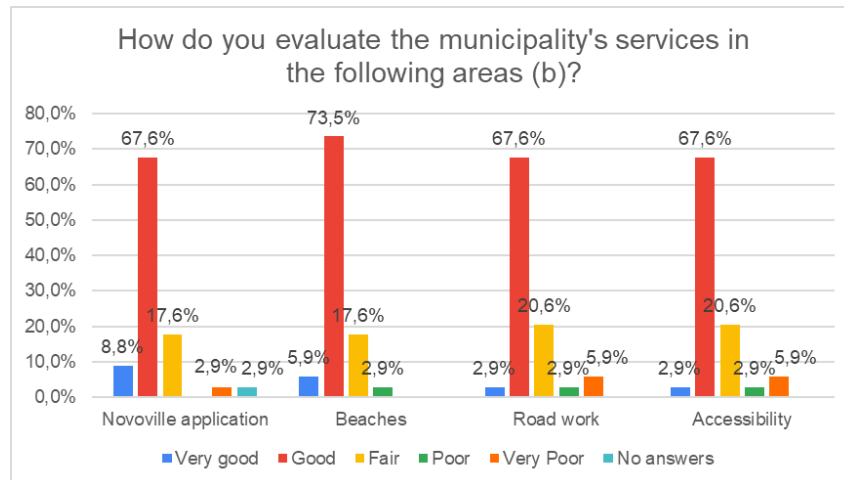
Graph 75: How do you rate the following municipal services?

A **series of questions related to Artificial Intelligence followed**. The first question concerned whether they are aware of what Artificial Intelligence is and all of the respondents (100%) answered positive.

Additionally, they were asked to state whether they trust her. 88.2% of respondents answered positively and only 8.8% negatively (Graph 41).
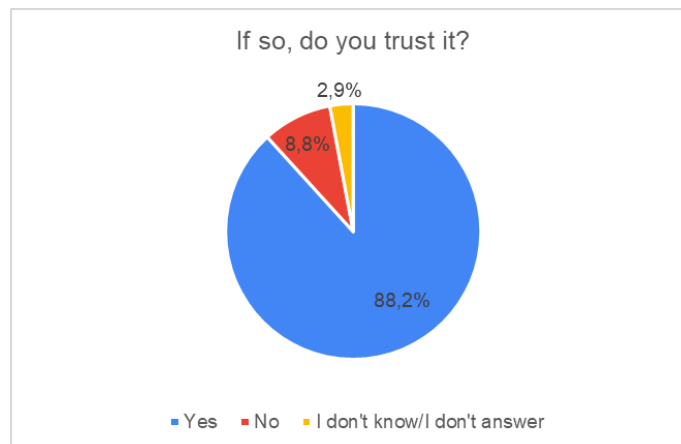

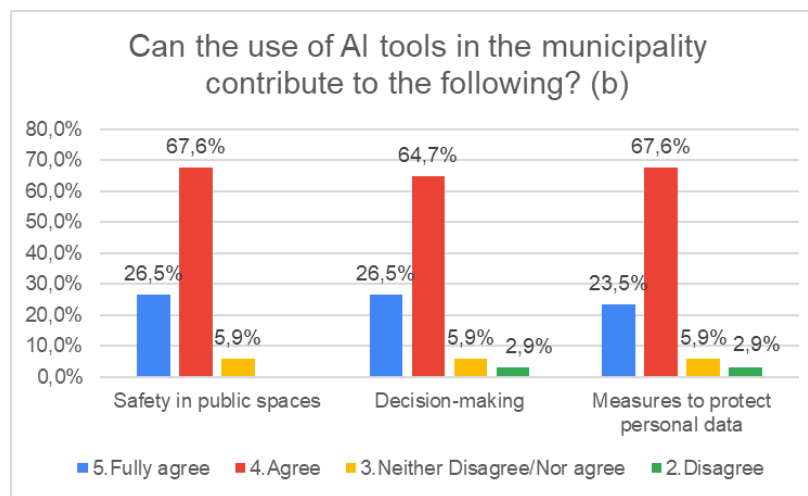*Graph 76: If you know what Artificial Intelligence is, do you trust it?*

In addition, respondents were asked to assess whether **the implementation of Artificial Intelligence in the Municipality of Vari-Voula-Vouliagmeni** through the development of smart tools will contribute to improving cleanliness, the recycling system, traffic and parking regulation, reducing bureaucracy and delays in public procedures, safety in public spaces and making informed decisions by municipal authorities based on available data. The main conclusions that emerged are the following:

- In all the areas examined, the largest percentage of respondents responded positively ("agree"), with the highest percentages recorded in waste management, parking and safety in public spaces.
- Negative responses ("disagree") were extremely low in all areas.

- Very high is the percentage of the responders who call for the strong protection of personal data in the use of AI tools.
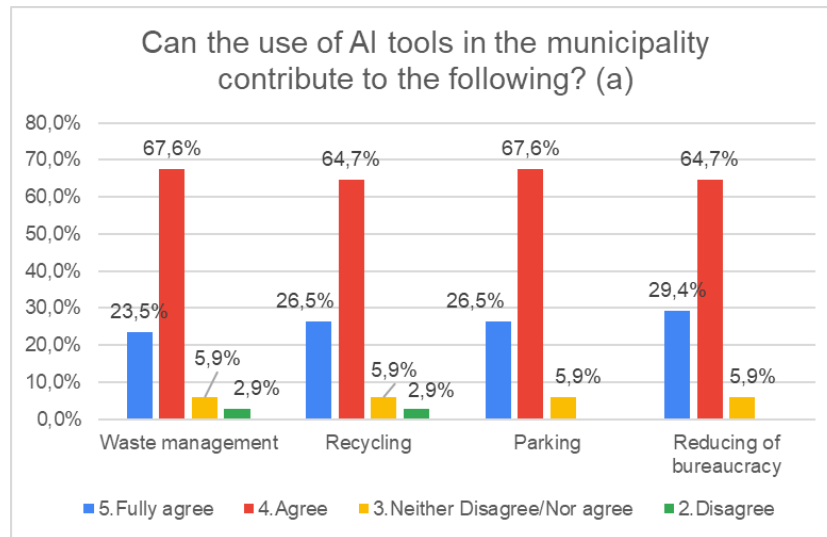

Graph 77: The implementation of Artificial Intelligence in the Municipality of BBB through the development of smart tools will contribute to the improvement of the following areas (a).


Graph 78: The implementation of Artificial Intelligence in the Municipality of BBB through the development of smart tools will contribute to the improvement of the following areas (b).

The questionnaire was completed with four questions on the demographic data of the respondents (gender, level of education, age, country of residence). Regarding gender, it is found that 47% of the respondents were women and 53% were men(Graph 42).
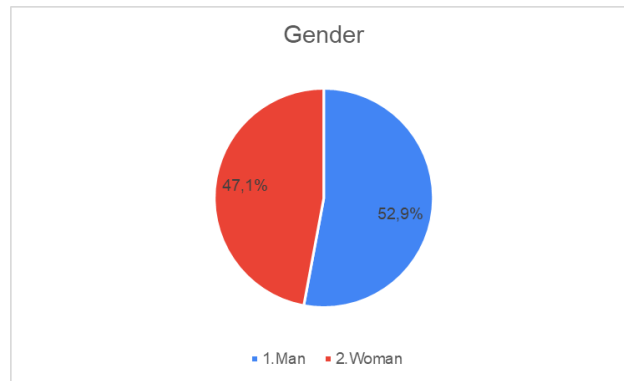
Graph 79: Gender

The next question concerned their level of education. It was found that the educational level of the respondents is particularly high, with 82% having a secondary education and 15% have completed higher education. Only 3% stated that they had received other types of post-secondary education (Graph 43).
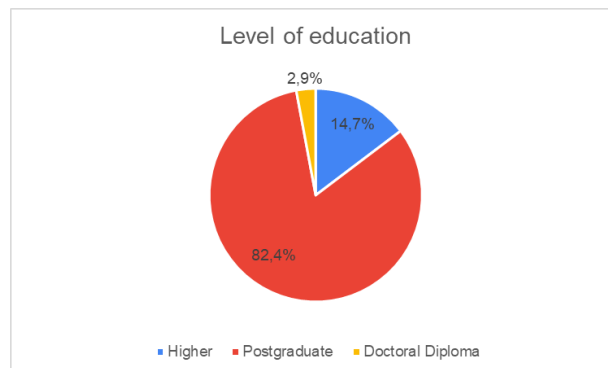
Graph 80: Education level

Regarding the age profile of the respondents, it was found that 56% belonged to the age group 26-45 and 32% to the age group 45-55. The percentages of respondents belonging to the categories 56-65 (12%) was low (Graph 44).
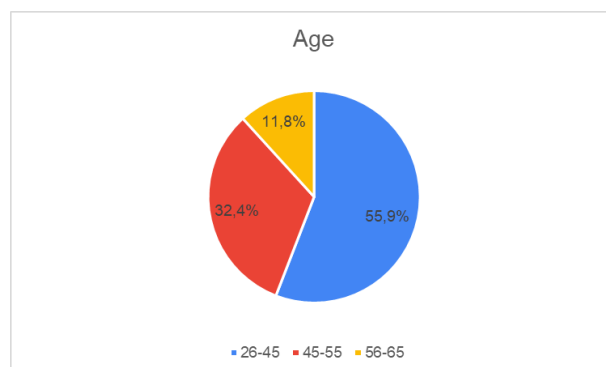
Graph 81: Age

7.11 References

7.11.1 Press

Municipality of Vari Voula Vouliagmeni (2023), «IRONMAN® 70.3® Vouliagmeni, Greece: The top triathlon event returns on October 22, in the Municipality of Vari, Voula, Vouliagmeni». Available in https://www.vvv.gov.gr/index.php/enimerosi-tou-politi/delt-typou-graf-dimarxou/item/12938-ironman-2023

Koutlianis Konstantinos (18/09/2021). «Vouliagmeni: Hiking on the hill of Faskomilia ». In the webpage NouPou. Available in: https://www.noupou.gr/stories/vouliagmeni-pezoporia-ston-lofo-tis-faskomilias/

Iefimerida (31/05/2024). «A new cosmopolitan corner in Attica - Astir Marina Vouliagmeni opened, luxurious yachts and super luxury brands in the shopping area». Available in: https://www.iefimerida.gr/oikonomia/marina-boyliagmenis-ti-perilambanei

NouPou (06/09/2024). "Chic Dining with a sea view: The upscale restaurants of the Athens Riviera". Available in: https://www.noupou.gr/en/food-drink/chic-dining-with-a-sea-view-the-upscale-restaurants-of-the-athens-riviera/

Runner Magazine (6/10/2024). "Night Run Vouliagmeni 2023. The most idyllic golden hour race on the Athenian Riviera". Available in: https://runnermagazine.gr/proigoumenoi-agones/124575/night-run-vouliagmeni-2023/

VIMAONLINE (20-10-2022). «The Municipality of Vari-Voula-Vouliagmeni is an international sports destination». Available in: https://www.vimaonline.gr/20/article/48942/diethnis-athlitikos-proorismos-o-dimos-varis-voulas-vouliagmenis

Perimeni Georgia (26/4/2024). The new tourist infrastructure in the Southern Suburbs. In NouPou Real Estate. Available in: https://www.noupou.gr/real-estate/tourismos/oi-nees-touristikes-ipodomes-sta-notia-proastia/

Webpages

Website for Wetlands of Greece (2017). Available in: http://greekwetlands.biodiversity-info.gr/Sites/Details/1078#

Official tourism portal of the Municipality of Vari-Voula-Vouliagmeni (2016). Available in: https://visitvarivoulavouliagmeni.gr/index.php/el/

Official Website of the Hellenic Society for the Protection of Nature (2024). Available in: https://eepf.gr/

Official Webpage of Vouliagmeni Lake (2025) : https://lakevouliagmeni.gr/

7.11.2 Studies

INSETE (2021). Greek Tourism Action Plans 2030. Destination "Athenian Riviera". Available in: https://insete.gr/wp-content/uploads/pdf/proorismoi/proorismos-athinaiki-ribiera.pdf

7.11.3 Academic literature

Diran D., van Veenstra A.F., Timan T., Testa P. and Kirova M. (2021). "Artificial Intelligence in smart cities and urban mobility. How can Artificial Intelligence applications be used in urban mobility and smart cities and how can their deployment be facilitated. Briefing requested by the AIDA committee." Για το Policy Department for Economic, Scientific and Quality of Life Policies, Directorate General for Internal Policies, European Parliament.

Economou A., Mitoula R. (2018). "Measures to protect the urban environment and its natural features, the case of Vouliagmeni (Greece)". Στο International Journal of Current Innovation Research, Vol. 4, Issue a (A), pp. 1145-1151. DOI: 10.24327/IJCIR

Fang B., Yu J., Chen Z., Osman A.I, Farghali M., Ihara I., Hamza E.H., Rooney D., Yap P.S. (2023). "Artificial Intelligence for waste management in smart cities: a review". Στο Environmental Chemistry Letters (2023) 21:1959-1989.

Gugurullo F. and Xu Y. (2024). "When Ais become oracles: generative artificial intelligence, anticipatory urban governance and the future of cities" Policy and Society. 2024, 1-18, DOI: https://doi.org/10.1093/polsoc/puae025

Karadimitriou N., Guleton S., Pagonis A., Sousa S. (2022). "Public Value Capture, Climate Change and the Infrastructure Gap in Coastal Development: Examining Evidence from France and Greece". Στο Sustainability 2022, 14, 7019. Διαθέσιμο στο https://doi.org/10.3390/su14127019

Kuziemski M., Misuraca G. (2020). "AI governance in the public sector: Three tales from the frontiers of automated decision-making in democratic setting". Στο Telecommunications Policy 44 (2020) 44 (2020). Διαθέσιμο στο: https://doi.org/10.1016/j.telpol.2020.101976

Kalliontzi V., Voulgarakis V., Delinavelli G. (2024). "Data-driven policy development of Municipalities. Preparation steps for Integrating AI tools in the policymaking process". The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences, Volume XLVIII-4/w10-2024

Mikalef P., Fjortoft S.O. and Torvatn H.Y. (2019). Artificial Intelligence in the public sector: a study of challenges and opportunities for Norwegian municipalities. Στο Lecture Notes in Computer Science. DOI: 10.1007/978-3-030-29374-1_22

Yigitcanlar T., Desouza K.C., Bulter L., Roozkhosh F. (2020). "Contributions and Risks of Artificial Intellligence (AI) in Building Smarter Cities: Insights from a Systematic Review of the Literature".

Yigitcanlar T., David A., Li W., Fookes C., Bibri S.E, Ye X. (2024)"Unlocking Artificial Intelligence Adoption in Local Governments: Best Practice Lessons from Real-World Implementations". Στο Smart Cities 2024, 7, 1576-1625

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[i] PRO – patient reported outcomes, CRO – caregiver reported outcomes