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| Project Acronym: | **VICINITY** |
| Project Full Title: | **Open virtual neighbourhood network to connect intelligent buildings and smart objects** |
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# Deliverable D8.5

## Pilot results of eHealth at Home use-case

| | |
|---|---|
| Work Package: | **WP 8 – Pilot Demonstration and Overall Evaluation** |
| Task(s): | **T8.5 – Realisation and evaluation of eHealth at Home Use Case** |
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## VICINITY Consortium

| No | Beneficiary | | Country |
|---|---|---|---|
| 1. | TU Kaiserslautern (Coordinator) | UNIKL | Germany |
| 2. | ATOS SPAIN SA | ATOS | Spain |
| 3. | Centre for Research and Technology Hellas | CERTH | Greece |
| 4. | Aalborg University | AAU | Denmark |
| 5. | GORENJE GOSPODINJSKI APARATI D.D. | GRN | Slovenia |
| 6. | Hellenic Telecommunications Organization S.A. | OTE | Greece |
| 7. | bAvenir s.r.o. | BVR | Slovakia |
| 8. | Climate Associates Ltd | CAL | United Kingdom |
| 9. | InterSoft A.S. | IS | Slovakia |
| 10. | Universidad Politécnica de Madrid | UPM | Spain |
| 11. | Gnomon Informatics S.A. | GNOMON | Greece |
| 12. | Tiny Mesh AS | TINYM | Norway |
| 13. | HAFENSTROM AS | ITS | Norway |
| 14. | Enercoutim – Associação Empresarial de Energia Solar de Alcoutim | ENERC | Portugal |
| 15. | Municipality of Pylaia-Hortiatis | MPH | Greece |

## Authors List

| Leading Author (Editor) | | | |
|---|---|---|---|
| **Surname** | **First Name** | **Beneficiary** | **Contact email** |
| Kotsanis | Stergios | MPH | s.kotsanis@pilea-hortiatis.gr |

| Co-authors (in alphabetic order) | | | | |
|---|---|---|---|---|
| **No** | **Surname** | **First Name** | **Beneficiary** | **Contact email** |
| 1. | Ananika | Alexandra | MPH | a.ananika@pilea-hortiatis.gr |
| 2. | Apostolidis | Aris | CERTH | arapostol@iti.gr |
| 3. | Belesioti | Maria | OTE | mbelesioti@oteresearch.gr |
| 4. | Isaioglou | Giorgos | CERTH | isaioglou@iti.gr |
| 5. | Kaggelides | Kostis | GNOMON | k.kaggelides@gnomon.com.gr |
| 6. | Karkaletsis | Kostas | GNOMON | k.karkaletsis@gnomon.com.gr |
| 7. | Koutli | Maria | CERTH | mkoutli@iti.gr |
| 8. | Sideridis | Paschalis | CERTH | sideridis@iti.gr |
| 9. | Theologou | Natalia | CERTH | nataliath@iti.gr |
| 10. | Tryferidis | Athanasios | CERTH | thanasic@iti.gr |
| 11. | Zandes | Dimitris | GNOMON | d.zandes@gnomon.com.gr |
| 12. | Zerzelidis | Alexandros | CERTH | alexander_zerzelidis@iti.gr |

## Reviewers List

| List of Reviewers (in alphabetic order) | | | | |
|---|---|---|---|---|
| **No** | **Surname** | **First Name** | **Beneficiary** | **Contact email** |
| 1. | Sundvor | Mariann | TINYM | mariann@tiny-mesh.com |
| 2. | Hovstø | Asbjørn | HITS | hovsto@online.no |
| 3. | Carmen | Perea Escribano | ATOS | carmen.perea@atos.net |

## Revision Control

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## Executive Summary

This deliverable is a report on the outcomes of Task 8.5, which plays an important role towards reaching Milestone 9 “Pilot demonstration and overall system evaluation”. The objective of this deliverable is to present the evaluation of the achieved outcomes of the of Pilea-Hortiatis pilot site, during the realization of the eHealth at Home Use Case.

In this deliverable, the evaluation process followed in order to achieve the task’s results for the pilot site of Pilea-Hortiatis is presented. The four stages of the evaluation process include: (a) the definition of the evaluation parameters, (b) the design of the evaluation methods, (c) the collection of the evaluation evidence and (d) the review of collected data. This report is comprised by a Technical and a Business Evaluation. Technical evaluation, provides an evaluation with regards to the technical KPIs that were defined in D8.1 [1] and concern the e-Health Value-Added Services (VASs) usage, while the Business Evaluation focuses on the stakeholders and participants’ perception on the offered e-Health services and on the VICINITY Unique Selling Points (USPs), mainly in terms of privacy. The technical and business KPIs are measured in this document by developing proper algorithms and questionnaires which were distributed to the end-users of both use cases, the municipality personnel and the health professionals. Finally, the eHealth at Home pilot use case was evaluated towards the Sustainable Development Goals (SDGs) proposed by the United Nations.

Objectives of this task were achieved through an iterative process during the realisation phase of the pilot site by receiving valuable feedback from stakeholders and participants. Therefore, the pilot site representatives managed to adapt to any particular needs and requirements in order to promote the benefits of VICINITY solution in the use cases. Positive feedback was received by the questionnaires regarding the offered e-health services and the privacy/security aspects from both end-users and stakeholders.

## List of Definitions and Abbreviations

| Abbreviation | Definition |
|---|---|
| EC | European Commission |
| EU | European Union |
| GDPR | General Data Protection Regulation |
| IoT | Internet of Things |
| KPI | Key Performance Indicator |
| MPH | Municipality of Pilea-Hortiatis |
| P2P | Peer-to-peer |
| SDG | Sustainable Development Goals |
| VAS | Value-Added Service |
| WP | Work Package |

## Content

## List of Tables



## List of Figures

# 1. Introduction

This deliverable presents the results of the Pilea-Hortiatis pilot site evaluation, in the contexts of the evaluation framework that was defined and analysed in D8.1. The evaluation framework targets in the assessment of the degree of compliance of the VICINITY overall results to the user/business and technical requirements for the Greek Pilot site as they were defined in WP1 and WP5.

The document is structured as follows:

- Chapter 1 – Describes the objectives of T8.5 and provides a brief description of the pilot site and the use cases
- Chapter 2 – Describes the steps of evaluation process that was followed for the Greek pilot site
- Chapter 3 – Presents the results of both the technical and business evaluation.
- Chapter 4 – Presents an evaluation of the pilot site towards the Sustainable Development Goals
- Chapter 5 – Conclusions
- Chapter 6 – References
- Chapter 7 – ANNEX

## 1.1. Context within VICINITY

Work Package 8 concerns the pilot sites demonstration and overall evaluation of VICINITY use cases, with D8.1 to present the business scenarios and the definition of the evaluation framework, while D8.2-D8.5 present the evaluation results of each pilot site. The pilot sites utilize VICINITY platform to demonstrate its benefits to the stakeholders in terms of new functionalities, interoperability and efficiency. The presence of real-life stakeholders greatly enhances the chances of further exploitation both locally and through worldwide dissemination of results.

The KPIs for the Greek Pilot use cases were initially defined in D5.1 and evaluate the degree of overall satisfaction achieved. In D1.4 a set of business requirements per VICINITY domain were identified and are further evaluated in this deliverable. More details on the evaluation methodology and evaluation parameters are described in Chapter 2. Project overview is presented in the following figure.

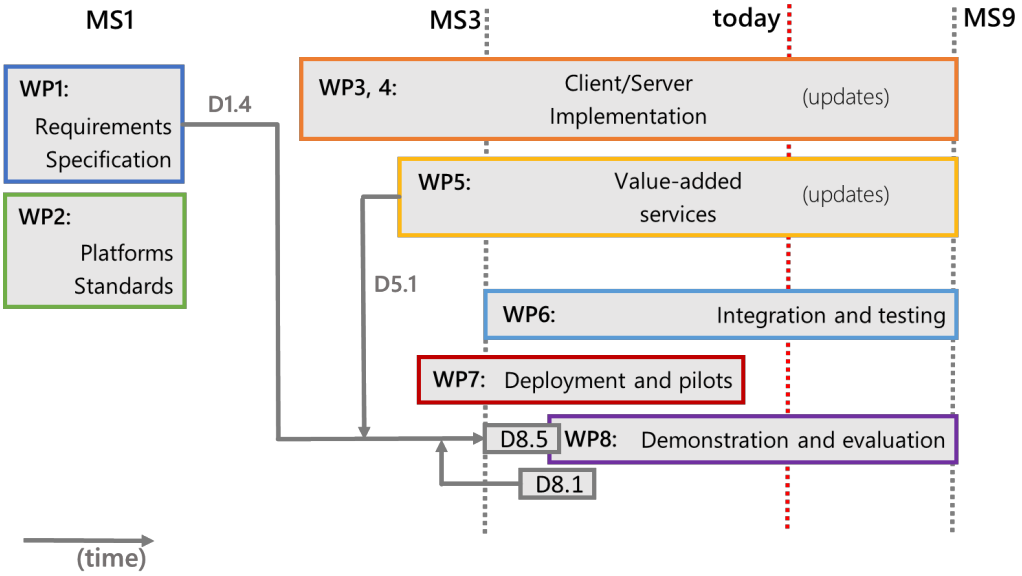


**Figure 1-1 Project Overview**

## 1.2. Objectives in Work Package 8 and Task 8.5

The main objective of T8.5 - **Realisation and evaluation of eHealth at Home Use Case** is the realisation of the e-health business use cases in the pilot site of Pilea-Hortiatis and the evaluation of the implemented solutions and services. The basis for this evaluation was described in D8.1 and is further explained in the next chapter. The goal is to establish whether the Pilot Site has managed to achieve the objectives of this task and provide a useful service to the end users as well as meet the KPI criteria. Different Pilot Sites from the domains of energy, building and transport are evaluated separately in D8.2, D8.3 and D8.4 correspondingly. GNOMON, CERTH, OTE and MPH are the responsible partners for the implementation and monitoring of the pilot site, the respective use cases and the value-added services. User and stakeholders' experience was extracted and during this period and analysed in order to adapt to any particular needs or requirements that arouse during the pilot realization phase. Whenever applicable and possible, especially within the business evaluation framework, the VICINITY solution is assessed against the previously available solution (baseline scenario) in order to identify the advancements achieved and offered by the VICINITY approach.

## 1.3. Description of the Pilot Site

### 1.3.1. Infrastructure

The fourth VICINITY pilot case focuses on eHealth use cases demonstrated in the municipality of Pilea-Hortiatis of Northern Greece, with the participation of several targeted people, who were identified by the municipality health care services. In order to further improve the municipality's existing services offered towards assisted living and preventive medicine, and further motivate more citizens to participate, VICINITY pilot case took advantage of the existing facilities and extended them by adding more monitoring infrastructure and devices, while implementing five new targeted Value-Added Services. The eligible users in the first use case called "eHealth and Assisted Living for elderly people at home" are elderly citizens who preferably live alone, while in the second use case, called "Health improvement for the middle-aged persons", the addresses end-users are middle-aged citizens aiming for a healthier lifestyle.

### 1.3.2. Use Case 3.1 - eHealth and Assisted Living for elderly people at home

A total of 34 elderly citizens' homes have been utilised for the deployment of the VICINITY infrastructure and related Value-Added services and are currently participating in the demonstration of the respective use case. A set of medical connected BT devices (blood-pressure devices, weight scales) and building IoT sensors (pressure mats, motion and door sensors, panic buttons, connected fridge and oven) have been deployed and maintained at the selected homes. The demonstration is monitored by the municipality health services and further supervised by a municipal doctor employed for this work. Data from these IoT devices are gathered in a GDPR-compliant database through the VICINITY cloud infrastructure, shared with the responsible doctors/relatives based on the authorisation access control framework applied. In order to receive feedback and keep up a close relationship and monitoring of the elderly people participating in the demonstration, a psychologist is further employed by MPH, who communicates and further pays visits to the elderly people houses.

### 1.3.3. Use Case 3.2 - Health improvement for the middle-aged persons

A total of 50 middle-aged citizens are participating in the use second use case. The demonstration id supervised by a municipal dietician employed by the municipality, keeping an active communication with the citizens on a bi-weekly basis, by having personal sessions with them at the municipal dietician office. Through this VICINITY demonstration, citizens participate in an "Urban Marathon" context organised by the municipality, being able to gather points by visiting municipal sports centres

participating in the demonstration (through deployed Beacon sensors that communicate with the VICINITY services through a mobile application). Citizens' activity data are further collected by wearable trackers (activity trackers) and a connected weight scale. All data are stored in a GDPR-compliant database for further processing by the respective VICINITY Value-Added Services.

### 1.3.4. Business Orientation

Regarding the evaluation of the business opportunities offered by the respective VICINITY pilot use cases demonstrated in the eHealth domain in the Greek pilot cases, there seems to be a prominent case in improving elderly people's life both in Greece and in Europe in general. In particular, in Greece it is of key importance to seek for new alternative ways in order to provide new solutions in the health domain, given the low access to quality health services to elderly people in Greece. In the last couple of years, it has been made apparent by the Greek Ministry of Health that there is a changing policy in Greece towards promoting e-health services, in order to improve healthy life expectancy while dealing with diseases and tight budgets. On a larger scale, VICINITY use cases regarding eHealth and assisted living services can contribute towards this problem and facilitate with expenditures of hospitals, health institutes and health care providers. Value propositions of such use cases of eHealth & Assisted Living at home lies on the fact that participants can have the ability to remotely monitor their health by specialized medical staff while staying at home, instead of needing to move in caring institutions, therefore leading to reduced primary costs for citizens and municipalities.

The municipality of Pilea-Hortiatis also acts by providing to its citizens a "service" for improving their health life and prevent future health problems. Citizens benefit from this service not only in their future body and health condition but also in the earnings that they will have by needing less medicine or less visits to health care providers or dieticians. This service is valuable not only to the citizens themselves but also to the municipality as it aims to reduce future health service costs. In a larger scale, that breaks the municipality boundaries, similar competitions could be organized in national level, or any kind of larger scale, so that municipalities can fulfill their legal action . Moreover, as it was described in previous deliverables, the need for a use case is big, since obesity is increasing more and more each year, causing numerous side effects and health problems.

In eHealth, gamification solutions perform as an engagement for following a treatment plan and a motivation to stay committed by earning points with the intention of achieving a behaviour change in citizens' lifestyle. These solutions have gained considerable interest as access to healthcare resources has increased. Moreover, built-in measurement systems in IoT devices makes it easier to access and sync real-time data for further processing and visualisation in corresponding applications. Pointing and rewarding systems boost the intention of people to include exercise in everyday life. As it was already mentioned in *D9.13 VICINITY Exploitation and Business Plan* in Ukraine, a bank rewards customers for exercising by making steps, offering 21% interest rate. The concept was devised by Monobank's three CEOs to aid both personal and national economic wellbeing and address obesity-related health problems [3]. Complementary examples to Monobank initiative are reward programs/applications like *Jolt.ai* by getting real rewards such as amazon gift cards, *HealthyWage* in which you place a wager and gain prizes by following some rules applied to them [4][5]. *DietBet* lets you join games, or starting your own, placing bets and if you lose weight, cash money is paid out to you with promising results [6]. Finally, *Achievement* lets you connect various apps on your mobile phone and earn points for activities like walking, meditating etc. offering you the opportunity to gain cash or donate to charities [7]. These promising applications give great value and business opportunity to the second use case of Greek pilot site.

The VASs derived from the use cases could be distributed as a SaaS distribution model for the main VICINITY platform and offer data analytics service on top of collected data to municipality. These services could solve issues of affordability, accessibility, reliability and technical support. The aim is to

stimulate preventive actions smart phone/ wearables for exercise, fall prevention, pharmaceutical adherence, and management of diabetes. User feedback and experience is valuable for both use cases' application and further reveal their importance and contribution to eHealth domain.

### 1.3.5. Benefits from VICINITY

It is important to evaluate the eHealth use case considering VICINITY USPs together with the services that validate VICINITY platform, enablers and USPs. As described in D9.13 *VICINITY exploitation and business plan revised version*: "The consortium stated that VICINITY's USP is its ability to enable data to be shared between a wide variety of devices by ensuring semantic interoperability among them at the metadata level so that the contents of the data can follow a separate path from the VICINITY platform to ensure privacy"

This USP is broken down into the following features:

- "enable **sharing of data at semantic level**
- **Digital sovereignty by design. Users maintain ultimate control** of their data, no disclosure to 3rd party. Digital sovereignty.
- **GDPR-ready architecture**
- Edge-computing approach / P2P yields **higher scalability, dependability"**

VICINITY Platform benefits both Use Cases by giving the possibility to integrate different sensors from different vendors into the same VAS exploiting the semantic interoperability that it offers. The interoperability that VICINITY offers, enables health care providers to be notified about health profiles of the users handling only one mobile or web/desktop application for every sensor or device inside the house regardless of the device brand, communication protocol or IoT platform that is implemented. Moreover, it offers security and data privacy in all transactions, an aspect which is very important especially in the health domain.

## 2. Pilot Sites Evaluation Process

According to D8.1 pilot site evaluation framework defines two evaluation scopes, the technical and the business. For the evaluation of each of the two scopes the procedure presented in the next figure was followed [8].


**Figure 2-1: MPH pilot site evaluation process**

## 2.1. Define evaluation parameters

The scope of this deliverable is to identify the proper evaluation process for extracting meaningful performance indicators of the VICINITY Greek pilot. In this final stage of the project, the technical and business evaluation of the pilot site reveal the actual value of the VICINITY eHealth applications. This document is also targeted on the evaluation of the degree of compliance of the VICINITY overall results to the use case requirements identified in WP1 such as goals and objectives of the pilot site.

A preliminary work has been already implemented in D8.1 defining the technical and business KPIs and in this phase, the results will be presented. Stakeholders and users evaluated the offered services and the VICINITY platform towards its USPs. As described in D9.13, VICINITY's USP is its ability to enable data to be shared between a wide variety of devices by ensuring semantic interoperability among them at the metadata level so that the contents of the data can follow a separate path from the VICINITY platform to ensure privacy. Therefore, a customer satisfaction survey to the stakeholders and users of the use case IoT applications was conducted, in order to report their perception regarding data privacy, their satisfaction by the interaction with IoT devices and services and their overall experience. It is important to receive feedback on how the users value the developed solution when other alternatives are also available. The quality and quantity of information are two important aspects of evaluation of e-health products.

In market analysis and in order to record and evaluate perception of a "brand", in our case VICINITY, it is important to measure it through targeted questions. Positive brand perception means consumers are more likely to choose a business over a competitor [9]. Brand awareness is a key subject in order to reach positive brand perception which has led into forming the questions that comprise the questionnaires. Evaluation towards these viewpoints was also an iterative process throughout the project lifetime through face to face meetings with the stakeholders, events, social media and online meetings.

Technical evaluation was also conducted, according to the KPIs that were initially defined in D8.1. KPIs demonstrate how effectively the VAS is achieving key business objectives and requirements that were first defined in *D1.3 Report on Pilot sites and Operational Requirements* and further analysed in *D5.1 VICINITY Value-Added Services definition, requirements and architectural design.* All data were gathered autonomously by the IoT devices and gateways and distributed to the interested parties in a secure and private manner through the *Privacy-preserving Data Gathering and Storage ft. GDPR data auditing VAS* (3.1.1). For this technical evaluation the data were anonymously acquired and processed in order to provide the values for the defined KPIs. The GDPR compliant database for storing citizens' personal data from health and building IoT devices and sensors will be thoroughly evaluated in *D6.4 Security and Privacy evaluation report* in the assessment of the Greek Pilot site, which is due to M48.

## 2.2. Design evaluation methods

The basic framework for the evaluation methodology, adopted in all pilot sites, was described in D8.1, including the definition of the evaluation parameters. Business evaluation is mostly focused on VICINITY USPs trying to record the perception of VICINITY at each of the pilot cases, and more specifically the experience of the users regarding the pilot applications demonstrated on the eHealth domain, while technical evaluation is mostly focused on the functionality of the offered Value-Added services.

The evaluation methodology from a technical perspective, is based on the KPIs, defined in D8.1, which mainly focus on results regarding the VASs offered functionality and usability according to the evidence extracted from the processing of the gathered IoT historical data as well as the computed by the VASs data. The methodology for the business evaluation includes the collection of evidence regarding the stakeholders' perception for both the eHealth use cases and the VICINITY platform. The evidence was acquired in the form of questionnaires, which was best preferred due to the large number of

participants and the structured formal that they offer, which allows to easily extract useful outcomes. Separate questionnaires have been implemented for the different stakeholder categories - “Use case 3.1 participants”, “Use case 3.2 participants”, “Municipal employees” and “Health professionals”. “Developers” have been identified as a separate category which will be interviewed for the overall platform evaluation in the scope of D8.6.

The questionnaires were distributed to the different end-users that interact with the implemented services, in order to assess the overall user experience and further identify any usability issues regarding pilot applications and any possible recommendation in an anonymised way. Issues and problems that arose were communicated throughout the pilot lifetime to the pilot partners responsible for the Greek Use Case. The users were requested to evaluate the key value proposition of the platform, by assessing aspects dealing with interoperability, manageability and expendability, as well as their perception regarding privacy and security issues. Business evaluation was also targeted towards achieved changes in their daily life / health that have been accomplished thanks to their involvement in the VICINITY program.

Face to face meetings and online communication with stakeholders was also a key process for the refinement of the KPIs and the pilot progress. Stakeholder engagement, meaning close cooperation between the municipality, the doctors, the users and the responsible of each partner was a key aspect towards achieving the evaluation of the pilot applications and VICINITY USPs. During the meetings the stakeholders had the chance to get insights into the project results and further evaluate in practice noting any improvement/failings. This iterative process set the guidelines to further conduct the steps towards deployment and proper handling of the users by the pilot site representatives.

Mid-term evaluation was not performed in the context of distributing questionnaires, but a continuous agile process was conducted to improve the pilot site. Continuous improvements were made based on feedback from stakeholders when meetings were held with them.

### 2.2.1. Evaluation Checklist

Moreover, the evaluation checklist defined in D8.1 was taken into consideration throughout the evaluation process consisting a guide for assuring the quality of the evaluation. The checklist of D8.1 is further stated below with answers from pilot site responsible.

| Evaluation Step | Y/N | Comments |
|---|---|---|
| Appoint a person to be responsible for evaluation and ‘run’ the Task Gantt chart | Y | Updated Gantt Chart can be found in the Annex I |
| Train a person(s) to manage and run surveys, especially if EUSurvey is chosen | Y | Simple questionnaires were used for business evaluation of users/stakeholders |
| Identify key stakeholders for surveys: users, service provider, infrastructure owners, site managers. | Y | Key stakeholder categories have been identified, namely “Use case 3.1 participants”, “Use case 3.2 participants”, “Municipal employees” and “Health professionals”. “Developers” have been identified as a separate category which will be interviewed for the overall platform evaluation in the scope of D8.6 |

| | | |
|---|---|---|
| Technical evaluation. Results of laboratory testing and 'hackathons' and key standards added to the Evaluation Spreadsheet. | Y | Results from testing (WP6) were taking into consideration throughout the deployment of the pilot as well as feedback collected from the hackathons |
| Review the KPIs. Are they measurable? How will the data be gathered? Are sufficient dimensions identified for the Task, as in the Project Objectives? | Y | KPIs were reviewed through the period of the deployment and finalized after the required data were gathered as described in this document |
| Technical evaluation- by service provider. Are the IoT devices and gateways working correctly? How well? To what extent has 'interoperability as a service' achieved cross domain? Are the standards adequate for wide-scale deployment? | Y | Validating the proper function of the IoT devices and gateways is a continuous process from the beginning of the pilot realization and every functionality of VICINITY is continuously validated and evaluated |
| Technical evaluation. Are events being logged and anomalies being logged and sent to the evaluation dashboard? How many per day/week? | Y | A set of common KPIs has been defined and will be monitored in the evaluation dashboard which will be presented in D8.6 |
| Technical evaluation. Is the battery management/replacement process working? | Y | Pilot site responsible is in charge of checking this process |
| Technical Evaluation. Does the Evaluation Dashboard give benefit for consolidation of results or showcasing? Have you a better local Evaluation Dashboard? | N/A | An evaluation dashboard will be presented in D8.6 |
| Technical evaluation. How well are security and privacy requirements being met? | Y | Users and stakeholders are satisfied regarding VICINITY privacy and security features as it is presented in the business evaluation |
| Technical evaluation. Are any fixes required resulting from the mid-trial evaluation? | Y | Though no mid-trial evaluation was implemented, evaluation is an iterative process and through the pilot site realisation, feedback from stakeholders, responsible and users was taken into consideration for further enhancements and corrections |
| Technical and business evaluation. How scalable is the solution? | Y | The solution is scalable in terms of business aspects as described in 1.3.4 & 1.3.5 chapter of this document. By integrating more VASs to the current use cases the health solution offered could be further extended |
| Carry out user/stakeholder satisfaction surveys. Are the users' unmet needs being satisfied and are they satisfied with the performance of VICINITY? | Y | More information on Chapter 3.3 |
| Business assessment. Does VICINITY add value (when comparing the 'with' and 'without' scenarios?). Did any unexpected benefits/demerits come from the trial? | Y | More information on Chapter 3.3 |

| | | |
|---|---|---|
| Business assessment. Does the solution justify further investment? | Y | More information on Chapter 1.3.4 and deliverables D9.12, D9.13 and D9.14 (Exploitation and business plan) |
| Consolidate the results of the technical and business assessments, add them to the evaluation spreadsheet and prepare graphical visualisations | Y | Chapter 3 includes the technical and business evaluation and visualization of the results |
| Strategic benefit. How well does the VICINITY solution match the neighbourhood, citywide, regional and/or EU requirements? | Y | See Chapter 4, regarding Sustainable Development Goals (SDGs) |
| Prepare Reports to stakeholders including VICINITY Deliverables | Y | Relevant deliverables distributed to stakeholders are D5.1, D5.2, D7.5 and D8.1 as well as the internal reports prepared for face to face meetings |

**Table 1 Evaluation Checklist**

## 2.3. Collect evaluation evidence

A critical stage for the evaluation process is the establishment of a process (automated or manual) for acquiring the necessary data. This mechanism is differentiated depending on the type of the data and can be grouped, as already described, into two main categories: technical and business (both of which are stakeholder / user oriented). In this deliverable proper algorithms and questionnaires have been implemented for covering the needs of the necessary data acquisition.
The questions that needed to be answered are the following:

- *Who will collect the data?*
- *What data needs to be collected?*
- *Where will the data be found?*
- *How will the data be obtained?*

The municipal doctors and psychologists distributed the questionnaires to all the elderly people participating in the first use case during face-to-face appointments in the elder's homes, while the dietician organised similar appointments at the municipality premises, in order to distribute the questionnaires to all the middle-aged participants. We have received 34, 50 answered questionnaires for the participants/users of the first and the second use case respectively. The answers on the questionnaires were gathered and further processed and visualised.

For the technical assessment, a RESTful service was implemented in order to gather anonymised historical data from the MPH database for both use cases and the respective processing algorithms were implemented for the calculation of the KPIs values.

## 2.4. Review collected information and take decisions

In this phase, data are processed, analysed and visualized in order to extract useful conclusions for the technical and business KPIs. The technical KPIs are presented in the form of bar charts or plain numbers. Business evaluation results are Likert scale data, which are presented in the form of stacked bar charts to compare parts across different answer categories. The evaluation results are presented in the next section.

# 3. Evaluation at Pilot Site of Pilea-Hortiatis

## 3.1. WP1 requirements refinement

In WP1 health domain requirements were defined for the Greek Use Case paying attention to the challenges of this domain, including the right handling of medical data. In the following table the requirements defined in D1.4 are presented.

| VICINITY-BR-HLT010 Healthcare personnel need to be involved |
|---|
| The municipality employed the necessary healthcare personnel in the beginning of the pilot realization to interact with the citizens. Doctors, psychologist and a dietician were employed for monitoring the participants, while a lawyer was employed in order to prepare all the GDPR-related documents that needed to be signed by the use case participants. |

| VICINITY-BR-HLT020 Cost-benefit, effective devices need to be selected |
|---|
| The devices involved to the two use cases are low cost, effective and easy to use for the users (elderly people and middle-aged citizens) as presented in the interaction with IoT devices and services in 3.3.1 and 3.3.2. |

| VICINITY-BR-HLT030 Audit management must be adopted and adhered |
|---|
| An effective audit management mechanism is implemented in the GDPR compliant database developed for the needs of this pilot case. Users are fully aware, giving consent of who has access to their personal health data. |

| VICINITY-BR-HLT040 Contracts need to be prepared for authorised third parties |
|---|
| Users' personal health data are handled through contracts defining ownership of data, usage of data and privacy. |

| VICINITY-BR-HLT050 Standards for health data need to be adopted and adhered |
|---|
| The medical IoT devices that are integrated in this use case communicate via Bluetooth, while the panic button communicates via the telecommunication network. |

| VICINITY-BR-HLT060 A standard process for emergency cases need to be adopted and adhered |
|---|
| A standard process is followed in cases that the panic button is triggered. The first action is a call to the 24-hour responsible call centre, in order to have a talk with the elder and be informed about his/her condition. If the elder doesn't respond, the elder's guardian is called by the call centre in order to assist the process and possibly physically contact the elder in his/her apartment. If this is not possible the local health centre is informed for the incident. |

| VICINITY-BR-HLT070 Health and Home Monitoring devices |
|---|
| Access to health status and in-house conditions are provided to caretakers for identifying abnormal behaviour with the supervised person. |

| VICINITY-BR-HLT080 Blood pressure and walking monitoring |
|---|
| Affordable devices used for condition assessment are made available to elderly citizens and caretakers. |

| VICINITY-BR-HLT090 | Smart drug dispenser |
|---|---|
| Pilot site representatives considered that the existing medical devices were sufficient to cover the needs of the first use case and did not deployed smart drug dispensers to the elder citizens. | |

| VICINITY-BR-HLT100 | Wearables |
|---|---|
| Wearable activity trackers were distributed to the elder citizens of the municipality in order to track their daily activity and promote a healthy lifestyle through the usage of the respective mobile app. | |

| VICINITY-BR-HLT110 | Oven and Fridge usage monitoring |
|---|---|
| Household appliances usage data deployed to a citizen's house in order to identify abnormal behaviour. | |

| VICINITY-BR-HLT120 | Weather Conditions for citizens |
|---|---|
| This requirement was covered by the UV index service of Martim-Longo pilot site, as part of the smart cities services that it offers, while Greek pilot site mainly targeted the eHealth at home and fitness improvement. | |

| VICINITY-BR-HLT130 | Wind Speed and Air Humidity Monitoring |
|---|---|
| The requirement was updated during the course of the project so that indoor conditions are measured. Moreover, the need for behavioural monitoring arose, which led to the use of motion and door sensors that capture the elders' movement as well as the indoor temperature and luminance. | |

## 3.2. Technical Evaluation

To evaluate and validate the KPIs for the technical assessment, algorithms are developed to measure the values needed for the definition of the KPIs. Key Performance Indicators for technical assessment first defined in WP1, WP5 and D8.1 for the Value-Added Services of the Pilot Site are presented in the following paragraphs.

### 3.2.1. Use Case 1: eHealth and Assisted Living for elderly people at home

Results of each KPI for this use case are presented in the following table:

### VAS 3.1.1 Privacy-preserving Data Gathering and Storage ft. GDPR data auditing

- *Percentage of correct auditing of data transaction*: **88%**
- *Number of data requests*: **115376**

During the last nine months of the pilot realization, there have been recorded 115376 data requests from all the IoT devices and sensors deployed for both use cases.

### VAS 3.1.2 Analysis and clustering of elderly's people medical data to detect unusual behavioural events

- *Average frequency of measurements per week/month*: **36,6**

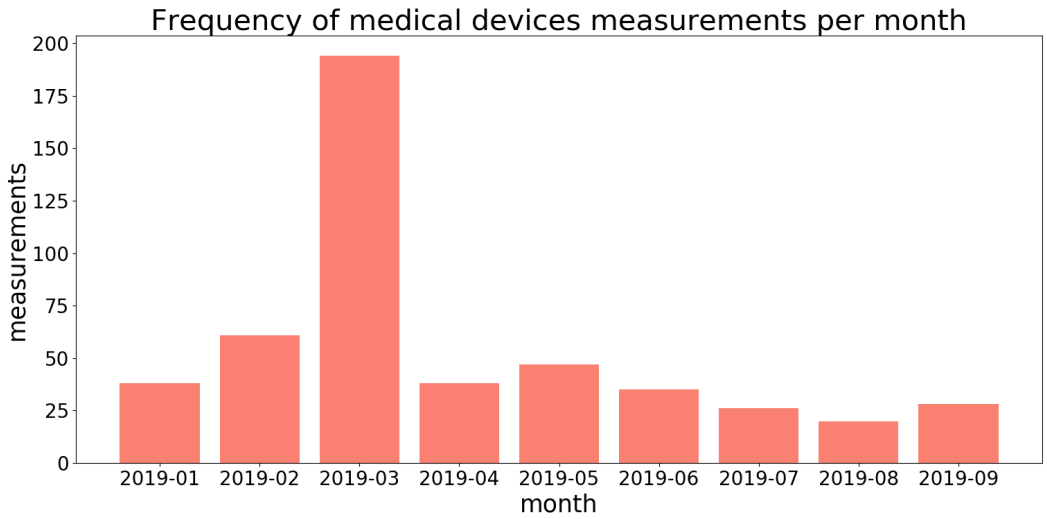


**Figure 3-1 Frequency of medical devices' measurements per month**

The above diagram presents the monthly frequency of measurements from medical devices (blood-pressure monitor and weight-scale). A high frequency (194) is observed during March, which is justified, since many installations took place during this month and included many test measurements from the elders, thus the measurements of this month were not considered when computing this KPI. The rest of the months range from 20 to 61, with a lower number of measurements observed during summer.

- *Number of warning incidents*: **158**

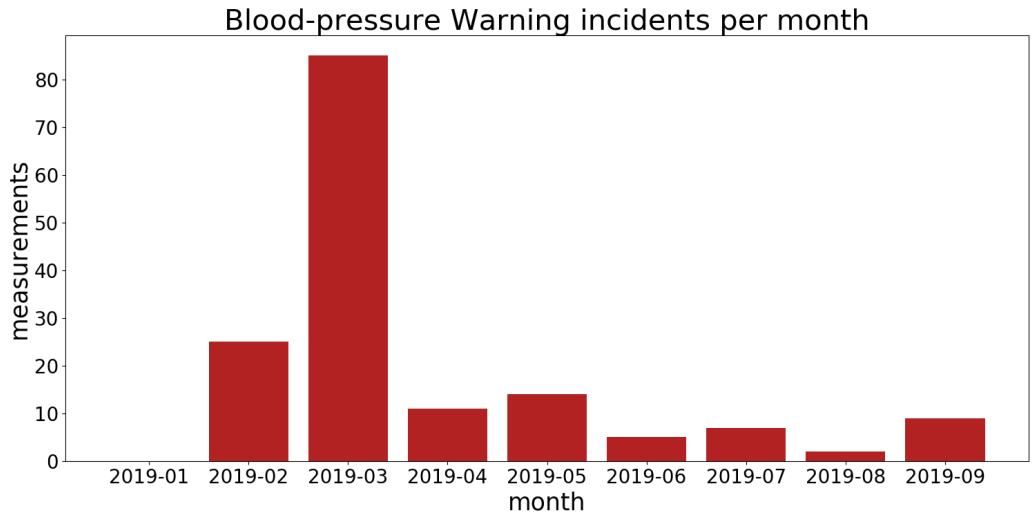


**Figure 3-2 Blood-pressure warning incidents per month**

We have received blood-pressure measurements from eight different elders, which were checked according to predefined threshold values. A warning is triggered in cases that a low (systolic blood pressure<90 mmHg or diastolic blood pressure<70 mmHg) or a high (systolic blood pressure≥140 mmHg) blood-pressure is

observed. As we can see the warning incidents are analogous to the frequency of measurements. An extra graph is presented below, to show the range of blood pressure measurements. As it can be seen around 33% of the total measurements (hypotension, hypertension-stage 2), produces a warning. Nevertheless, as we can observe in Figure 3-4, the average blood-pressure of each participant is inside the normal area, thus we consider these warnings as abnormal events and not a chronic disease.

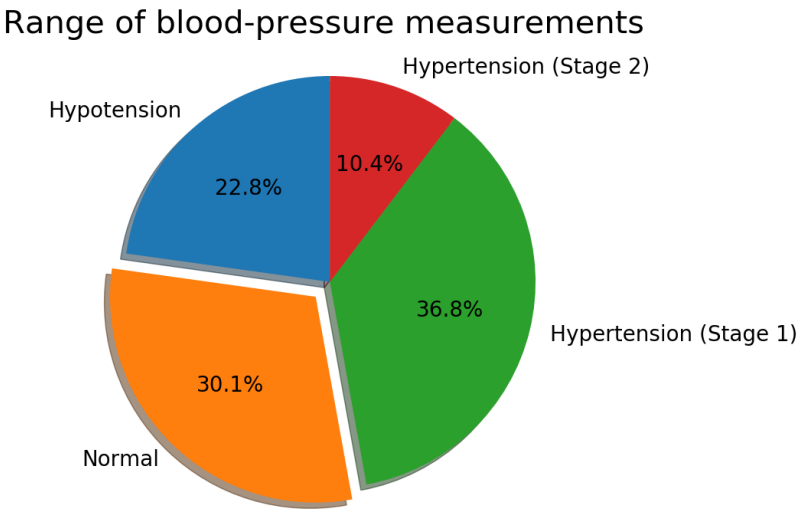


**Figure 3-3 Range of blood pressure measurements**

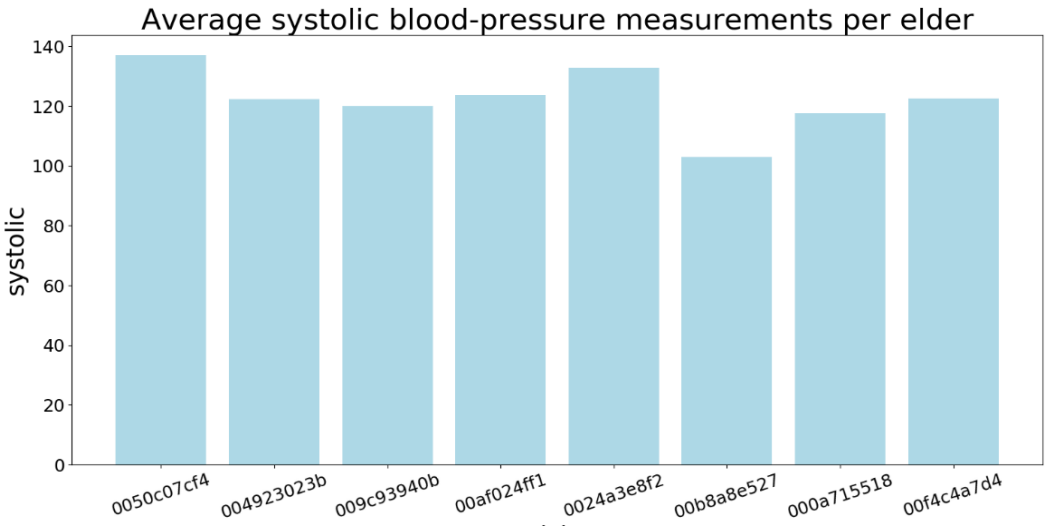


**Figure 3-4 Average systolic blood-pressure measurements per elder**

- *Number of false measurements automatically detected and rejected*: **10**

We check the range of measurements in terms of (a) value e.g. a zero-blood pressure, is a false measurement, (b) timestamp e.g. a future timestamp. We have detected 0 false measurements in terms of value and 10 false measurements in terms of timestamp. This event occurred due to wrong setting of date and time on the blood-pressure monitor device, which resulted to measurements from the future!

- *Average usage of panic button per month*: **1,9**

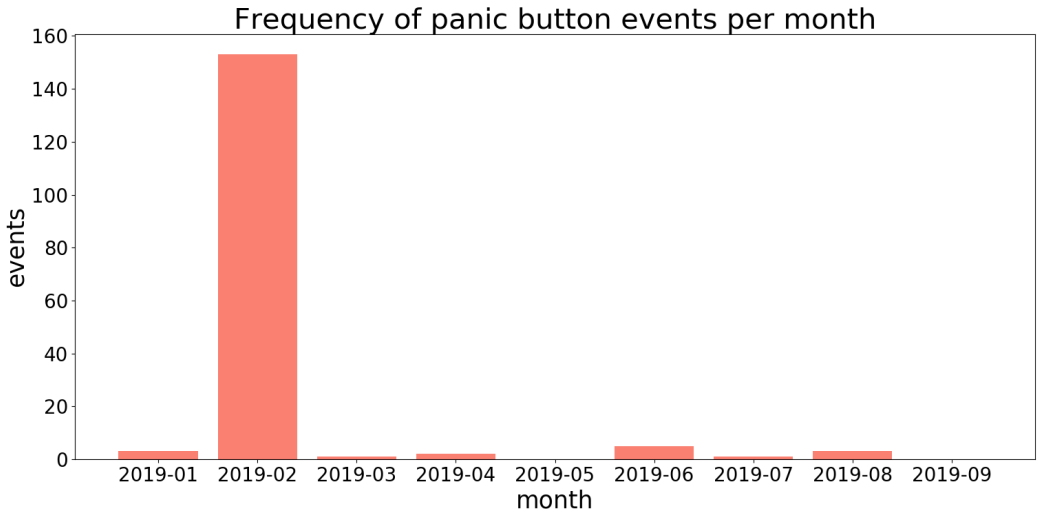


**Figure 3-5 Frequency of panic button events per month**

Similar to the frequency of medical measurements diagram, the usage of panic button is excessive during February when the installations in the houses took place with many trial presses of the button, thus the average usage of the panic button per month was calculated excluding the usage in this month.

### VAS 3.1.3 Triggering abnormal detection in homes

- *Average percentage of false alarms (false positive rate)*: **0.049**
- *Average percentage of successful identifications of abnormal situations (true positive rate)*: **0.57**
- *Overall accuracy score*: **0.88**

The above performance indicators were extracted by performing the following testing methodology. Ninety days of data, constitute the training set, while the next thirty consecutive days constitute the test set. To compensate the lack of ground truth, we have collected manual annotations of abnormalities from the health professionals, who monitor the elders. The results are that the VAS can quite accurately detect changes in the elders' behaviour at home.

- *Average percentage of abnormal notifications per month*:

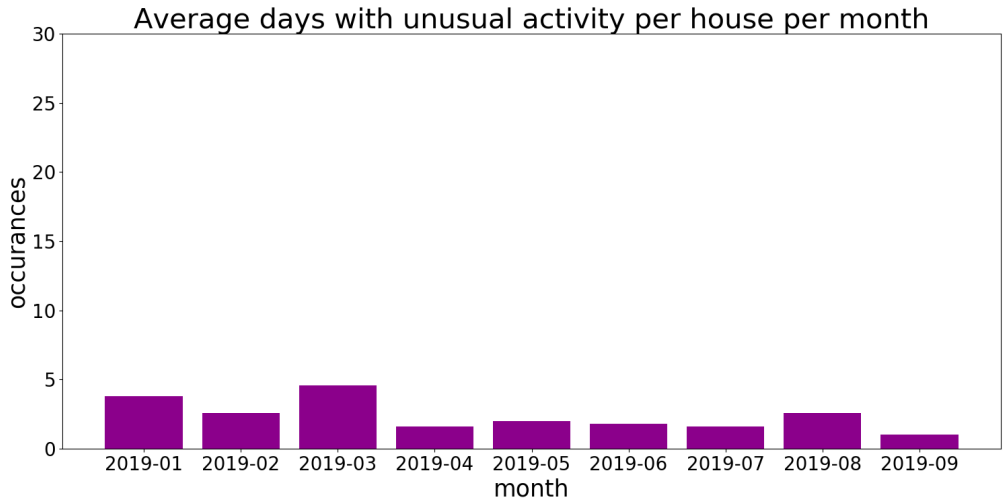


**Figure 3-6 Average days with unusual activity per house per month**

The above diagram shows the distribution of the detected as abnormal days per house per month. The values range from 1 to 4.6 days, which accounts for 3.3% to 15.3% of days per month. The percentage is considered expected, since there could be some days of the month that the elders' behaviour is different due to casual visits or sickness, but all events were temporary.

### 3.2.2. Use Case 2: Health improvement for the middle-aged persons

Results of each KPI for this use case are presented in the following table:

**VAS 3.2.1 Privacy-preserving Data Gathering and Storage ft. GDPR data auditing**

- *Percentage of correct auditing of data transaction*: **as in section 3.2.1**
- *Number of data requests*: **as in section 3.2.1**

**VAS 3.2.2 Individual Statistical Analysis of data from wearables, medical devices, beacons**

- *Number of initial participations to the urban marathon*: **50**
- *Percentage of citizens finishing the urban marathon/citizens initially signing up*: **90.7%**

During the pilot realisation some of the participants of the second use case moved out in another municipality and could not continue being enrolled in the Urban Marathon organised by Municipality of Pilea-Hortiatis. Moreover, due to heavy schedule and daily obligations some of the initially enrolled citizens couldn't follow the meetings with the dietician and the athletic centers.

**VAS 3.2.3 Aggregated Statistical Analysis of data from wearables, medical devices, beacons**

- *Weight loss percentage for women and men in the Municipality*: **2.76%**
- *Average BMI of men and women in the beginning and in the end of the VICINITY program*: **30.3** and **29.1 BMI**

The above KPIs proves that middle-aged citizens managed to lose weight effectively by visiting the dietician and the athletic centres.

- *Number of citizens visiting specific gyms of the Municipality through the pilot realisation*:

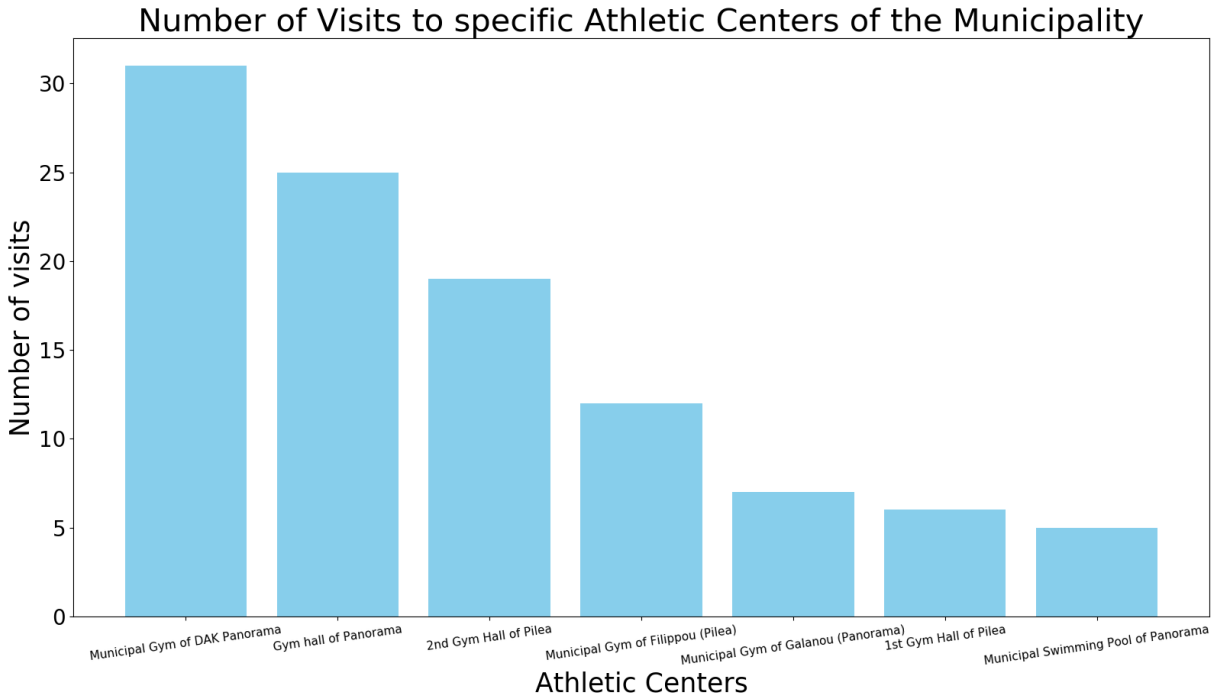


**Figure 3-7: Number of Visits to athletic centres of the municipality**

More visits are detected in athletic centres of Panorama because most of the participants live in this area. The rest of the visits are to athletic centres of Pilea, however participants from Asvestochori and Horiatis chose to exercise in private gyms instead of the municipal athletic centres.

- *Percentage of overweight men and women (BMI>25) in the beginning of the deployment and in the last month*: **78.57%** and **71.42%**.

The result concludes that the program motivated citizens to lose weight. In the beginning of the project 78.57% of the participants had BMI over 25 whereas in the last month this percentage dropped to 71.42%.

- *Average number of daily steps per month achieved by participants and its variation during the urban marathon*:

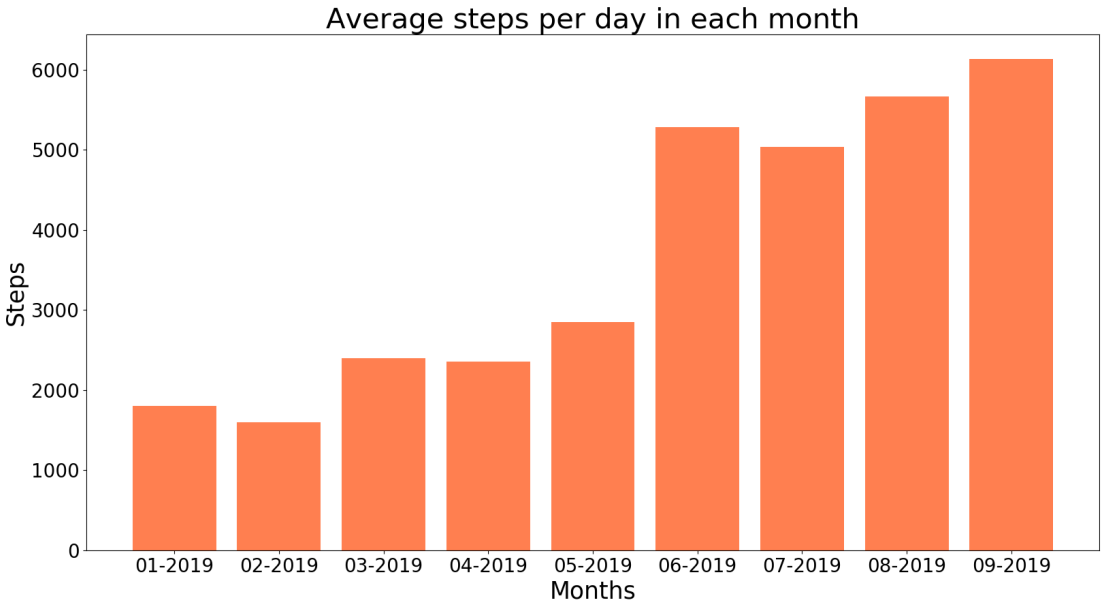


**Figure 3-8: Average steps per day in each month**

As it is presented in the diagram, average steps per day for the middle-aged citizens are in an ascending line since the first months of the pilot realization. On the one hand this occurs because of the motivation of the middle-aged people to walk more and on the other hand because since March 2019 more citizens were enrolling to the program.

## 3.3. Business Evaluation

The developed questionnaires were distributed to the users of the two use cases, the employees of the municipality and the health professionals. Moreover, Developers of the Greek pilot site have further been asked to fill the respective questionnaires, but these results will be evaluated in deliverable D8.6 together with the answers from the rest of the pilot sites' developers.

Elderly and middle – aged people answered the questionnaires in order to describe their experience with the IoT devices and sensors deployed to their houses / or given to them, their perception regarding privacy and security of the solution and their overall experience for their participation to VICINITY program. The MPH employees and health professionals have also answered the related questionnaires. The results are displayed in the following diverging stacked bar charts, which are ideal for showing the spread of negative and positive values, such as Strongly Disagree to Strongly Agree. In cases where the elderly people were unable to answer the questions, their relatives / guardian supported them.

### 3.3.1. Use Case 1 Users

### 1. Interaction with IoT devices / sensors

The interaction of the elderly people with the IoT devices and sensors was generally positive with a small portion of them to report that they have faced difficulties. Over 85% of the users found the IoT devices useful in their everyday life enabling them to accomplish daily tasks with safety. Important outcome is that over 70% of the elderly users feel more confident living alone than before the offered services, in the context of VICINITY and over 60% feels that their doctor is able to monitor better his/her health progress.

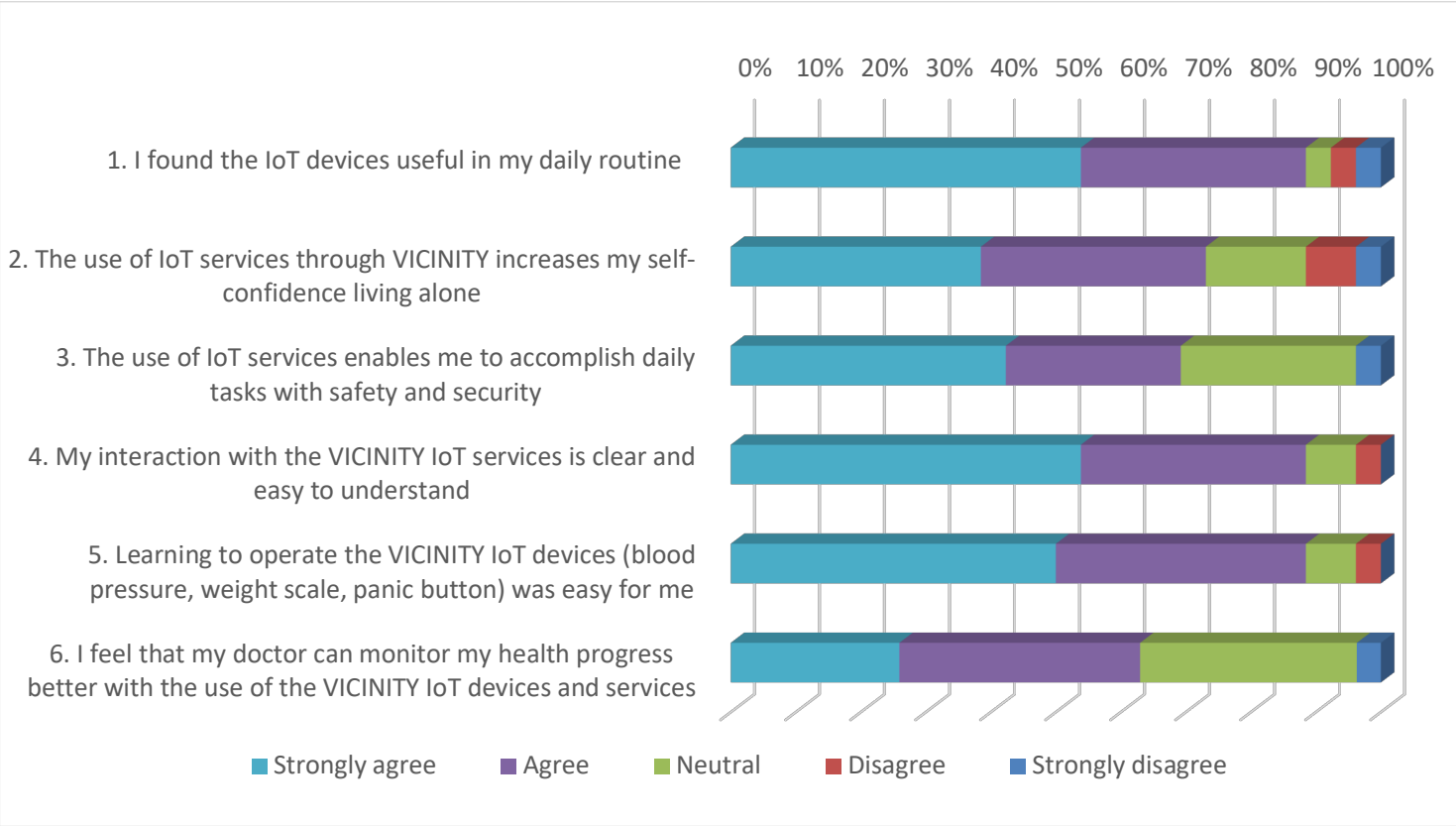


**Figure 3-9 Interaction with IoT devices/sensors – Use Case 1**

### 2. Privacy / Personal Data usage

As described in the previous chapters, it is important to evaluate the users' perspective of the USPs in the context of privacy as this pilot is dealing with health data. For this reason, a GDPR compliant database was developed in order to store citizens' medical and building data that will be further evaluated in *D6.4 Security and Privacy evaluation report*. Over 60% of the elderly people are confident that their personal data gathered from VICINITY IoT devices won't be shared with anyone not eligible to have them. A smaller portion believes that their data are safe when interacting with IoT devices but a small portion less than 4% disagrees.

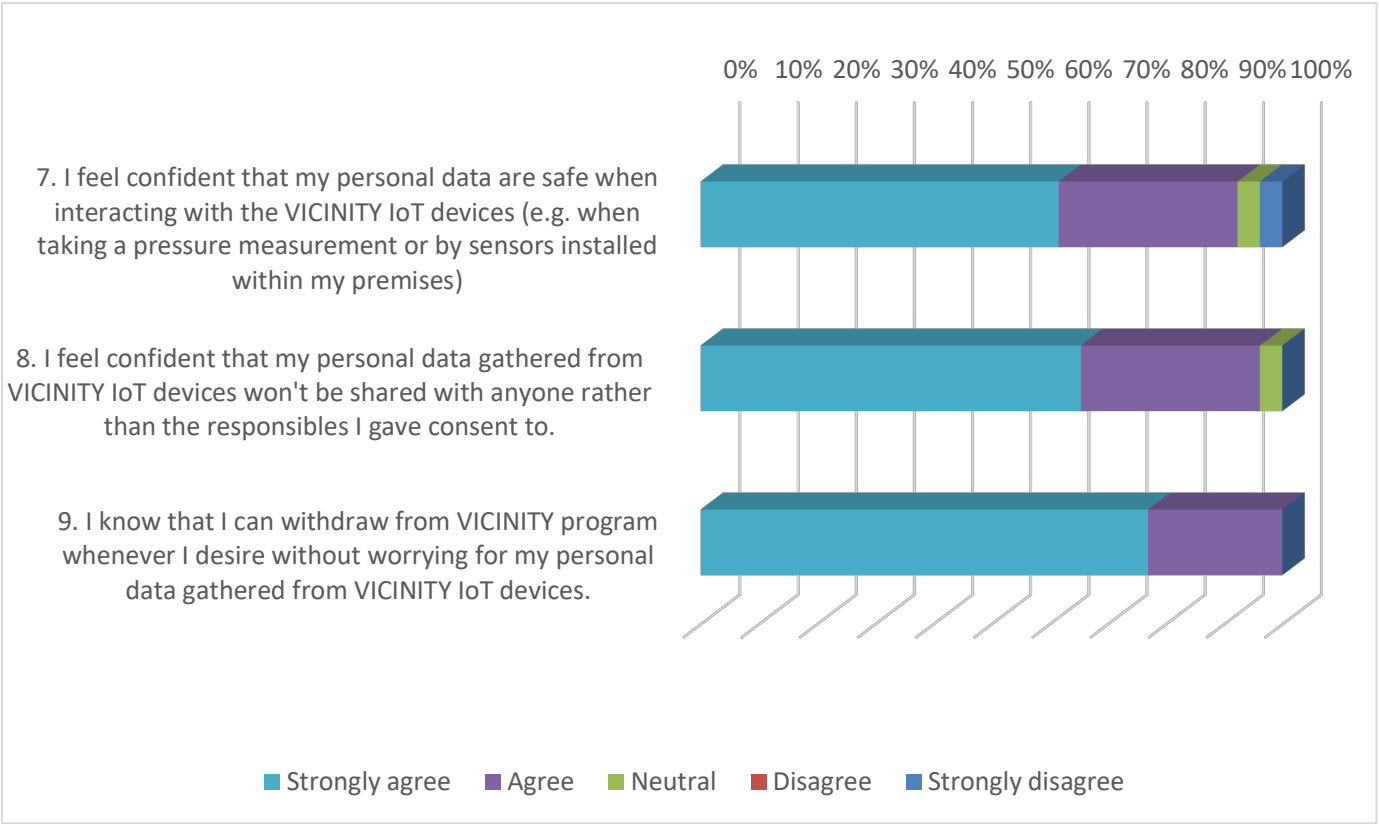


**Figure 3-10 Privacy / Personal Data usage – Use Case 1**

### 3. Overall experience from VICINITY program

Overall experience from VICINITY program was also evaluated resulting in positive responses. One of the most crucial conclusions regarding the pilot application is that over 60% of the users think that through VICINITY program elderly people could have the chance to live alone more independently than before. Moreover, VICINITY performance is measured by its users and their feedback offering a look at how they react to the platform in brand perception manner. Over 90% of the users of the first use case would recommend VICINITY platform and the eHealth use case application to other people or organizations.

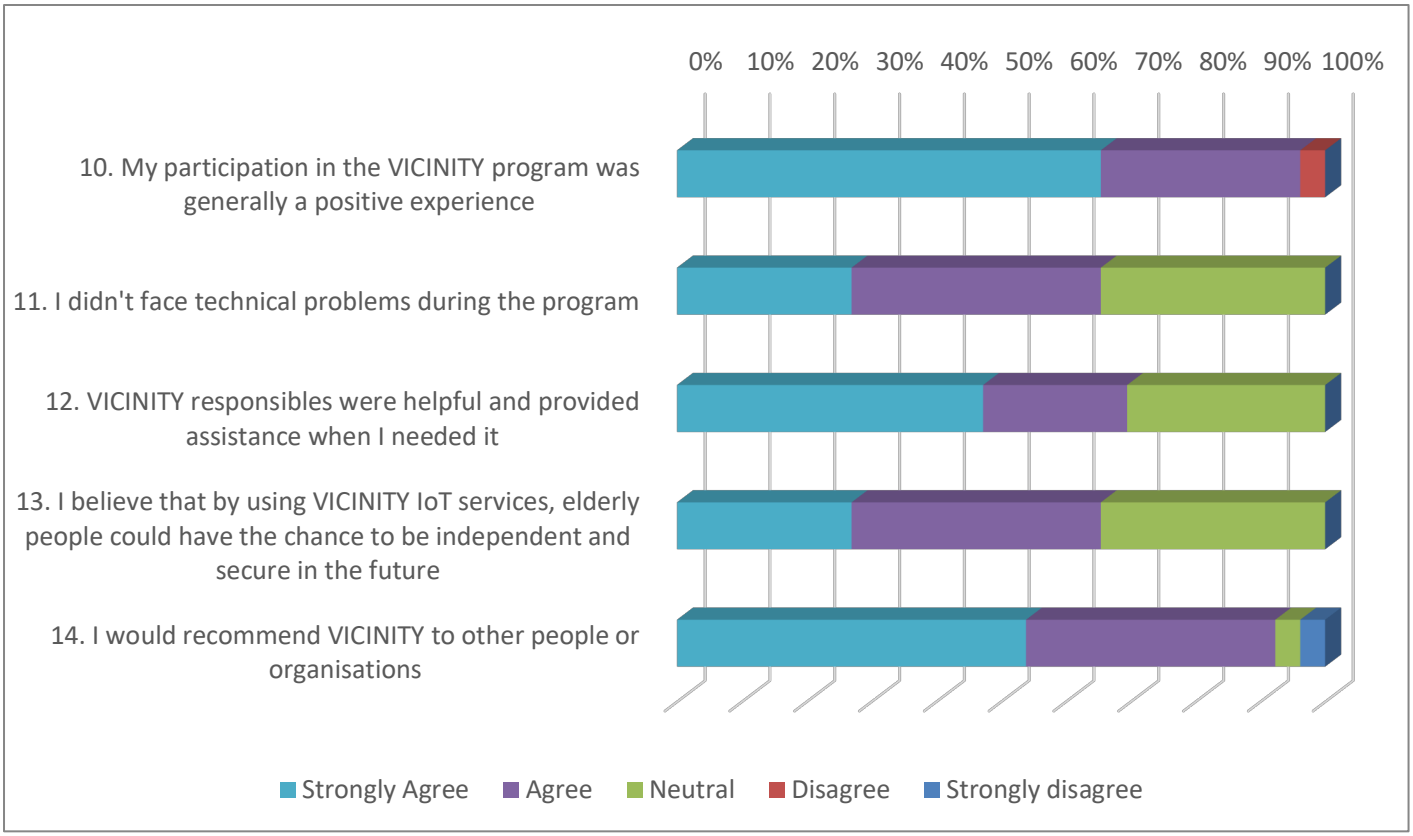


**Figure 3-11 Overall experience from VICINITY program – Use Case 1**

### 3.3.2. Use Case 2 Users

#### 1. Interaction with IoT devices / sensors

Interaction with IoT devices and sensors was generally a positive experience for the middle-aged people of the second use case. Operating the devices and using the mobile application was easy for them and found the IoT devices useful in their everyday life.

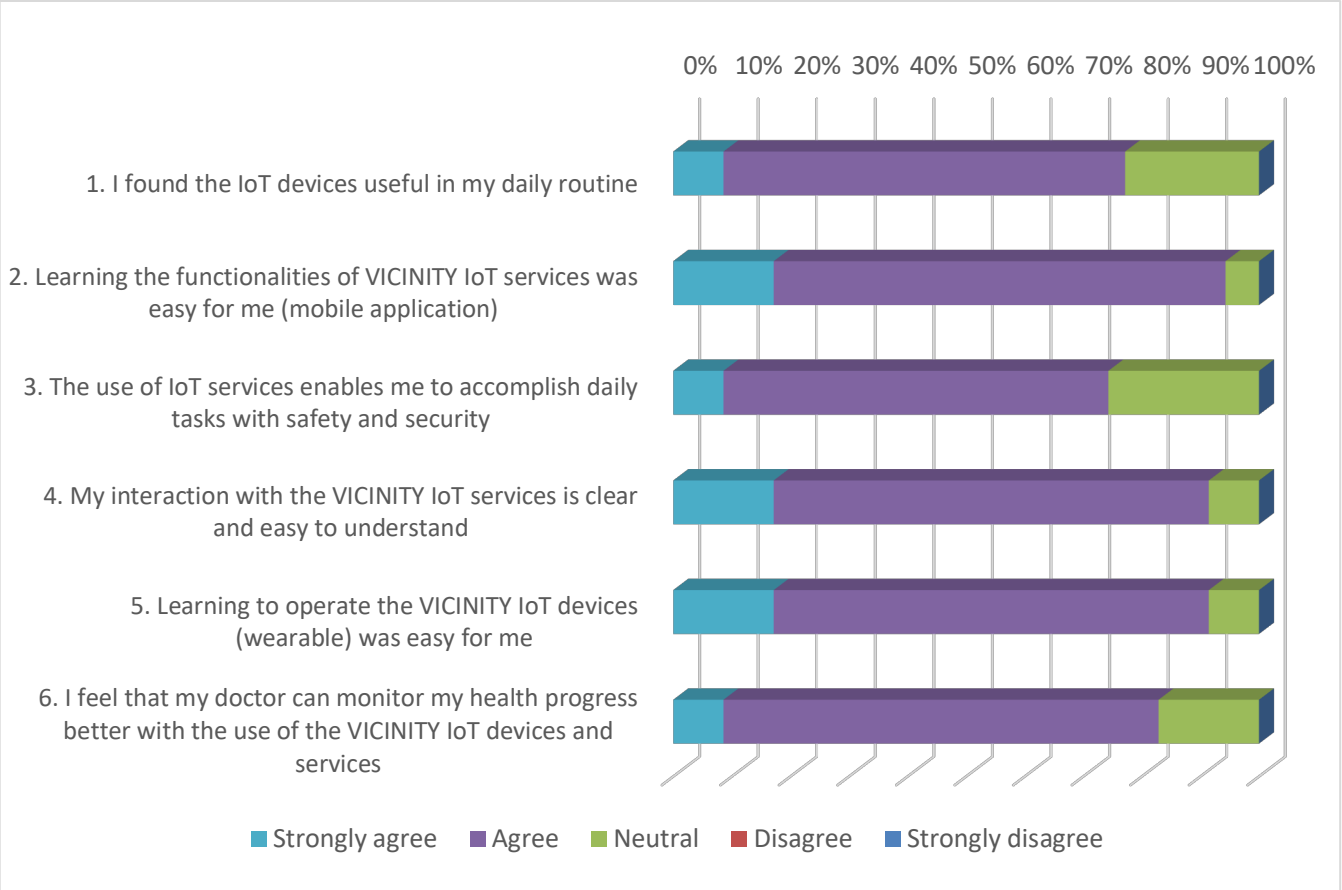


**Figure 3-12 Interaction with IoT devices / sensors – Use Case 2**

### 2. Privacy / Personal Data usage

100% of the middle-aged people feel confident that their personal data are safe when interacting with VICINITY IoT devices and that the data won't be shared with third parties. Middle-aged people were gathered and informed about the process of the use case solving any doubts they had regarding their data. After explaining VICINITY architecture as simple as possible, they wanted to further participate into VICINITY program and felt confident about privacy and security issues.

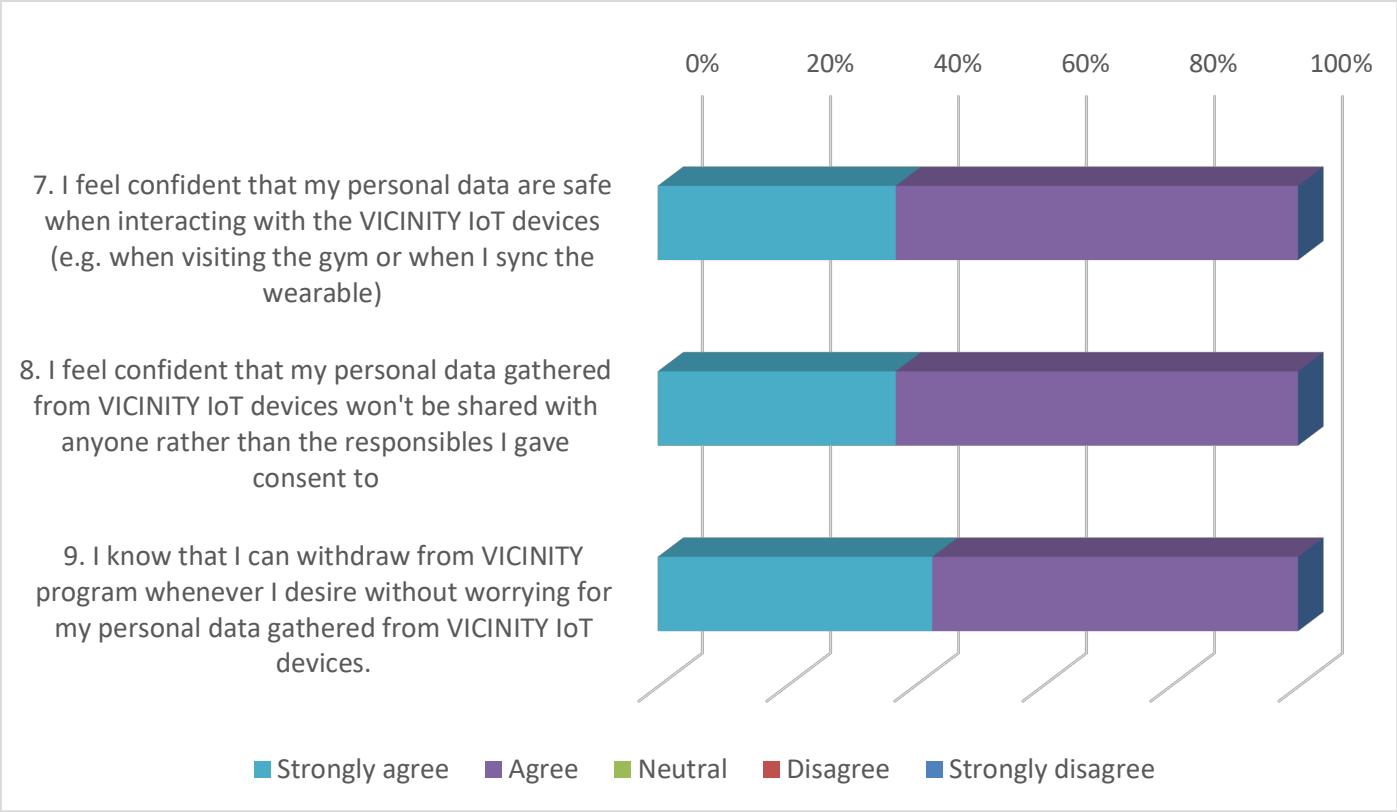


**Figure 3-13 Privacy / Personal Data usage– Use Case 2**

### 3. Overall experience from VICINITY program

As described before, VICINITY performance is measured by its users and in this use case 100% of the users would recommend VICINITY platform and the eHealth use case application to other people or organizations so the overall experience to them was a positive experience. A small portion of the users faced technical problems but almost 70% agreed that VICINITY responsible were helpful and provided assistance when needed. Gamification system was efficient as due to the pointing system and the wearable provided, over 75% of the users increased their daily walking distance than before VICINITY and together with the biweekly visits to the dietician, 50% of them claim to have lost weight more efficiently and almost 60% increased their visits to gym. Generally, over 80% of the participants believe that by VICINITY program can lead to a healthier lifestyle.

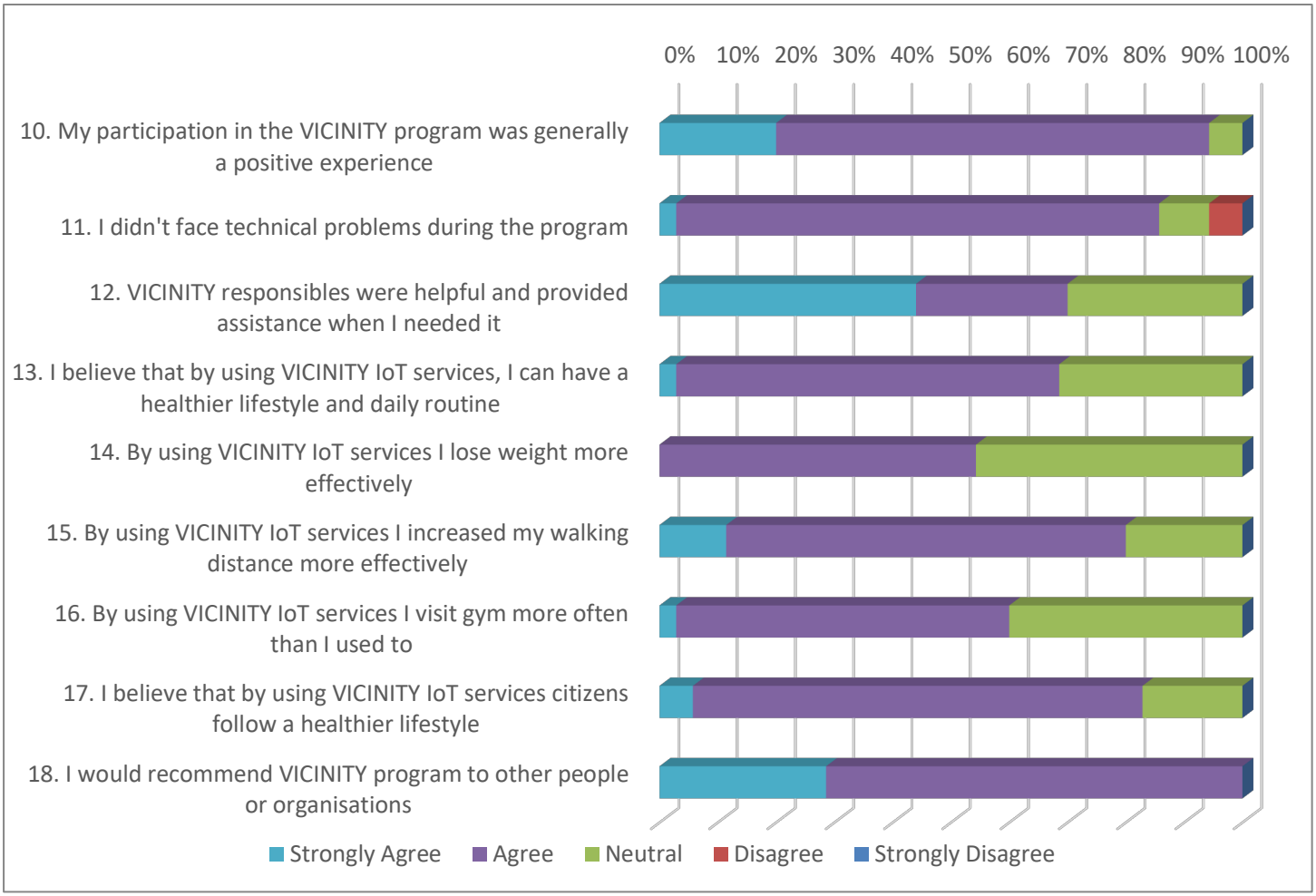


**Figure 3-14 Overall experience from VICINITY program – Use Case 2**

### 3.3.3. MPH – Municipality employees

#### 1. Interaction with IoT devices / sensors

Municipality as a stakeholder plays a valuable role in the business evaluation. Several meetings were held during the deployment phase between MPH, CERTH and GNOMON in order to guarantee a smooth pilot operation keeping into consideration the recommendations from all partners. MPH is more aware of its citizens' needs and believes that the interaction with the IoT devices and services is easy and understandable. However, they have doubts whether to install more sensors/devices to its citizens to provide more services. Especially in the use case 1, installing devices and sensors to private home is a challenging procedure and requires elegant handling from the technical representatives and the doctors. So it is sensible for the employees of the municipality to have doubts regarding the addition of more devices and sensors to the houses.

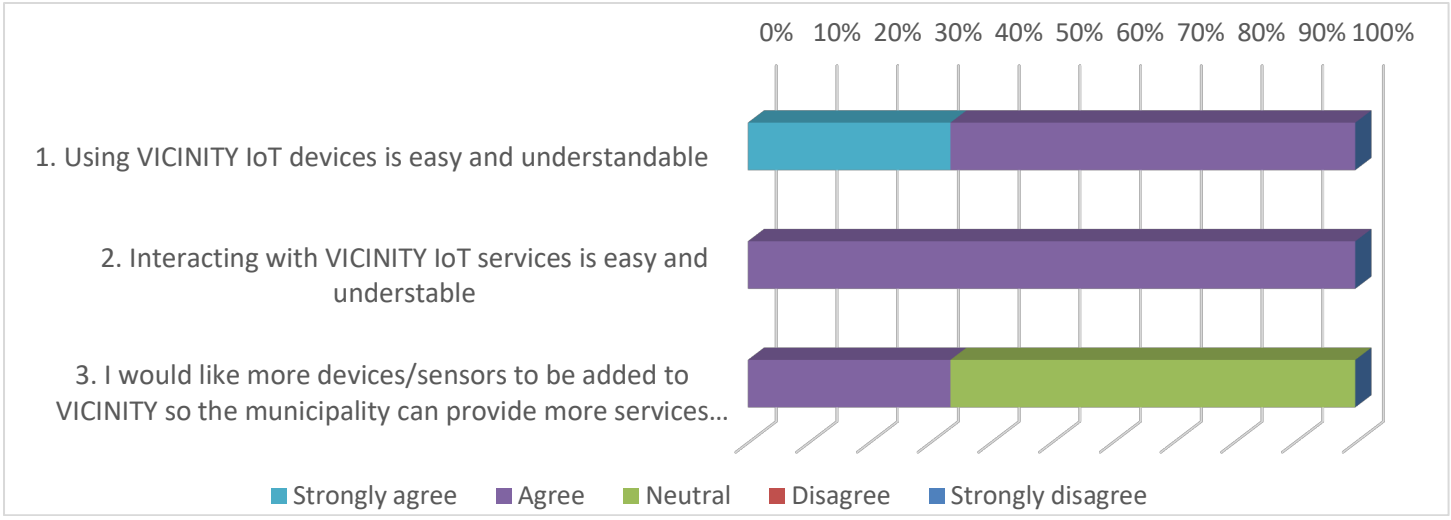


**Figure 3-15 Interaction with IoT devices / sensors - MPH**

### 2. Privacy / Personal Data usage

Municipality's employees are 100% sure that GDPR regulations are followed during the processing and storing of citizens' personal data. Moreover, they are sure that data are not shared to third parties having a GDPR-ready architecture.

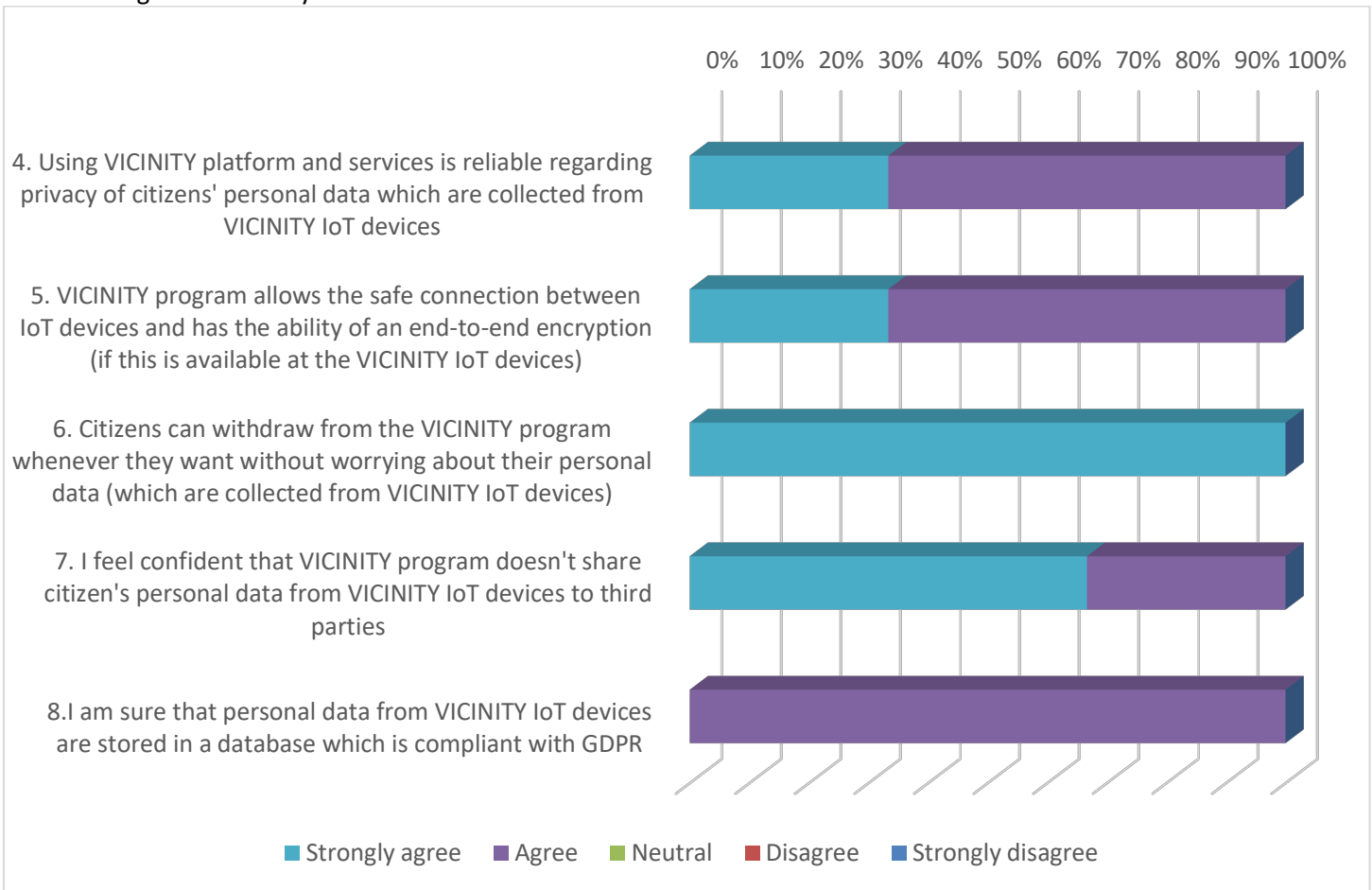


**Figure 3-16 Privacy / Personal Data usage - MPH**

### 3. Overall experience from VICINITY program

Overall experience from VICINITY program was also evaluated resulting in positive responses. One of the most crucial conclusions regarding the pilot application is that over municipality's employers think that through VICINITY program elderly people could have the chance to live alone more independently than before and middle-aged people to have a healthier life and routine. Moreover, VICINITY performance is measured by its users and their feedback offering a look at how they react to the platform in brand perception manner. Over 60% of the municipality employers would recommend the program to other stakeholders (municipalities) whereas a 30% is still undecided.

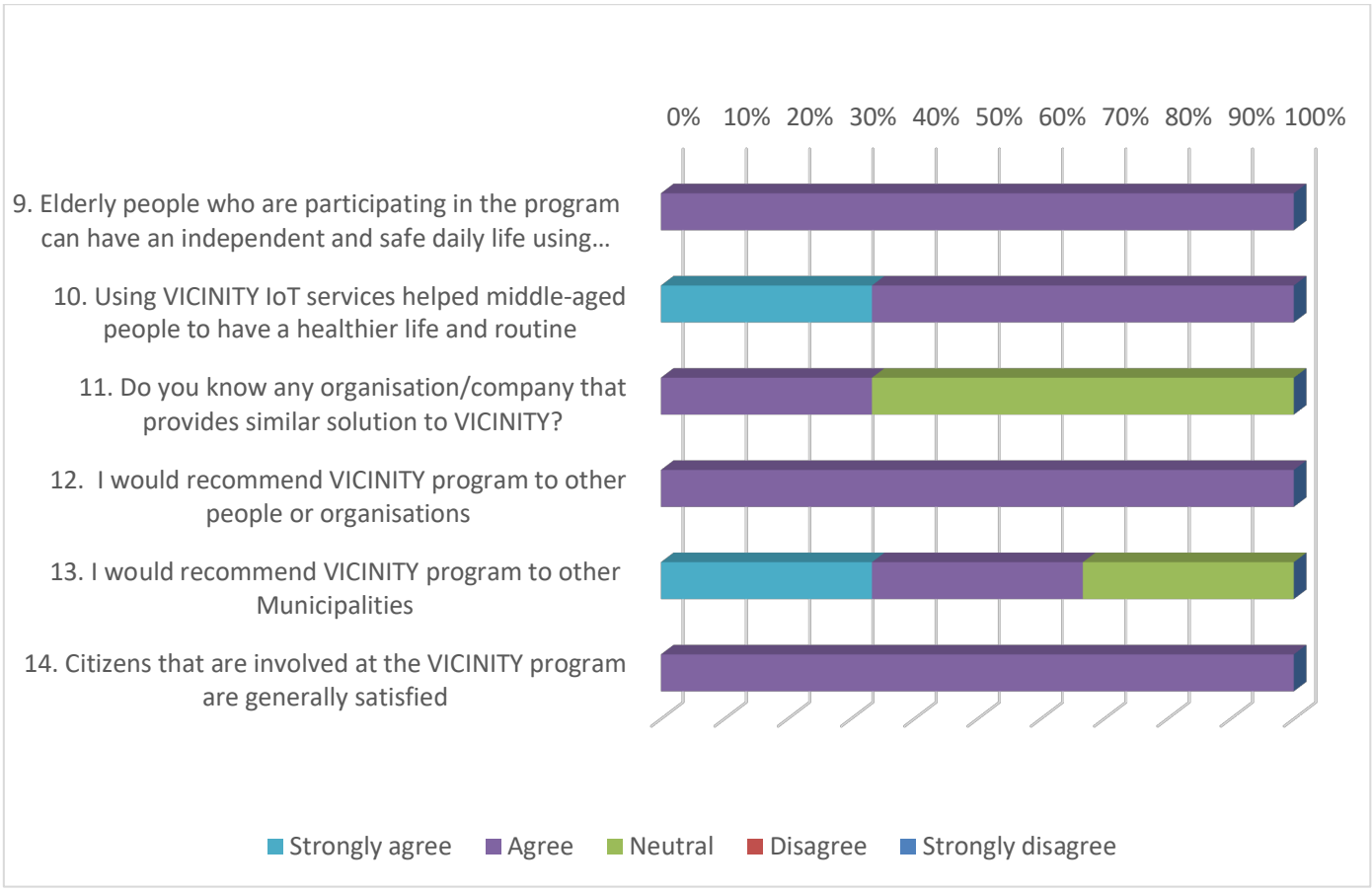


**Figure 3-17 Overall experience from VICINITY program - MPH**

## 3.3.4. Health Professionals of Use Case 1 and Use Case 2

### 1. Interaction with IoT devices / sensors

Doctors participating in the VICINITY program evaluated their experience regarding the use of IoT devices and sensors. 100% of the doctors find the interaction with the IoT devices, sensors and services easy and understandable and would choose to enhance their conventional way of attendance with the VICINITY pilot applications and control better the medical condition of their patients. Half of the doctors are undecided whether they would recommend the VICINITY IoT services to other doctors.

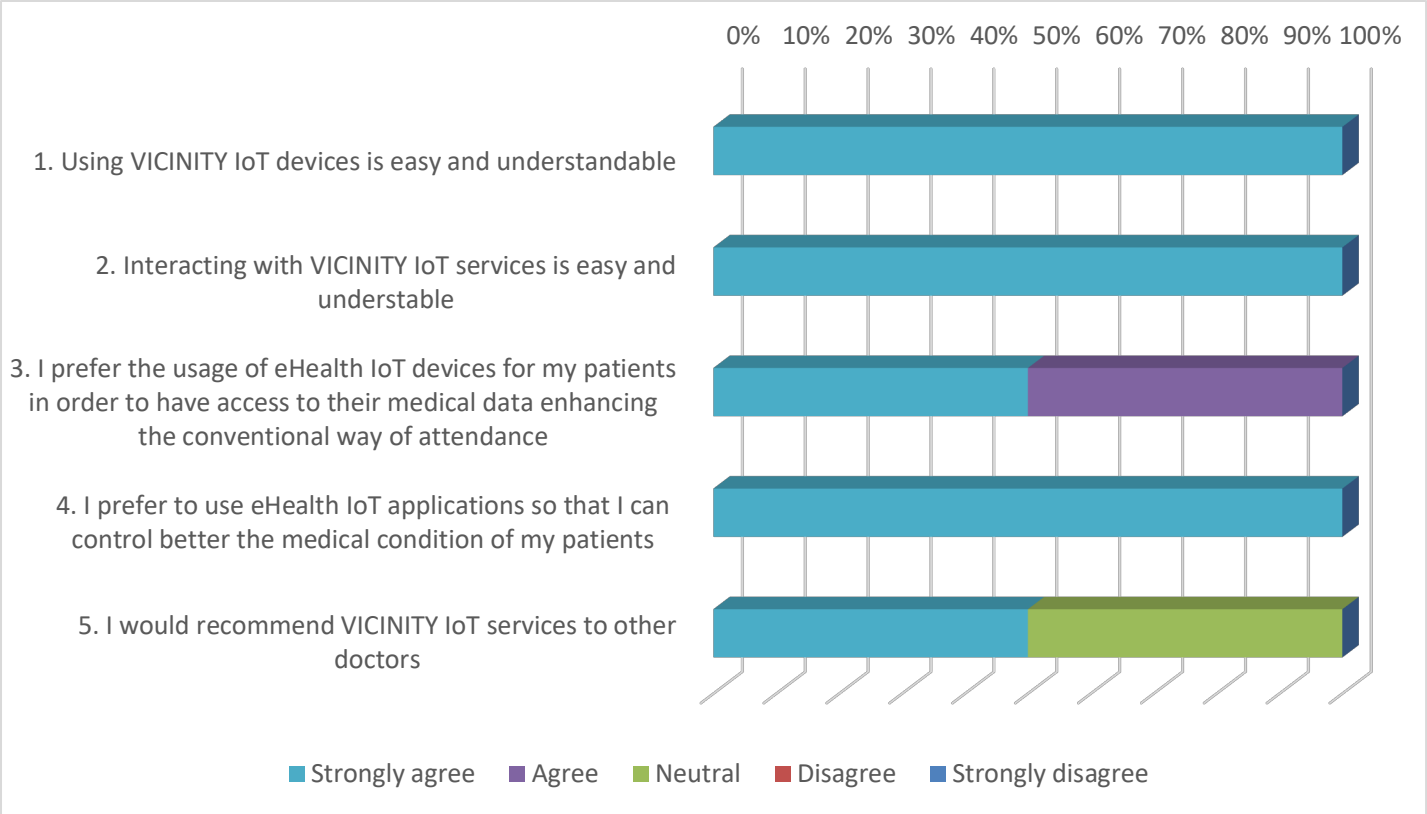


**Figure 3-18 Interaction with IoT devices / sensors - Doctors**

### 2. Privacy / Personal Data usage

It is important that 100% of the doctors employed by MPH who participated in the VICINITY MPH use cases are satisfied regarding privacy and security issues and data usage, processing and storage.

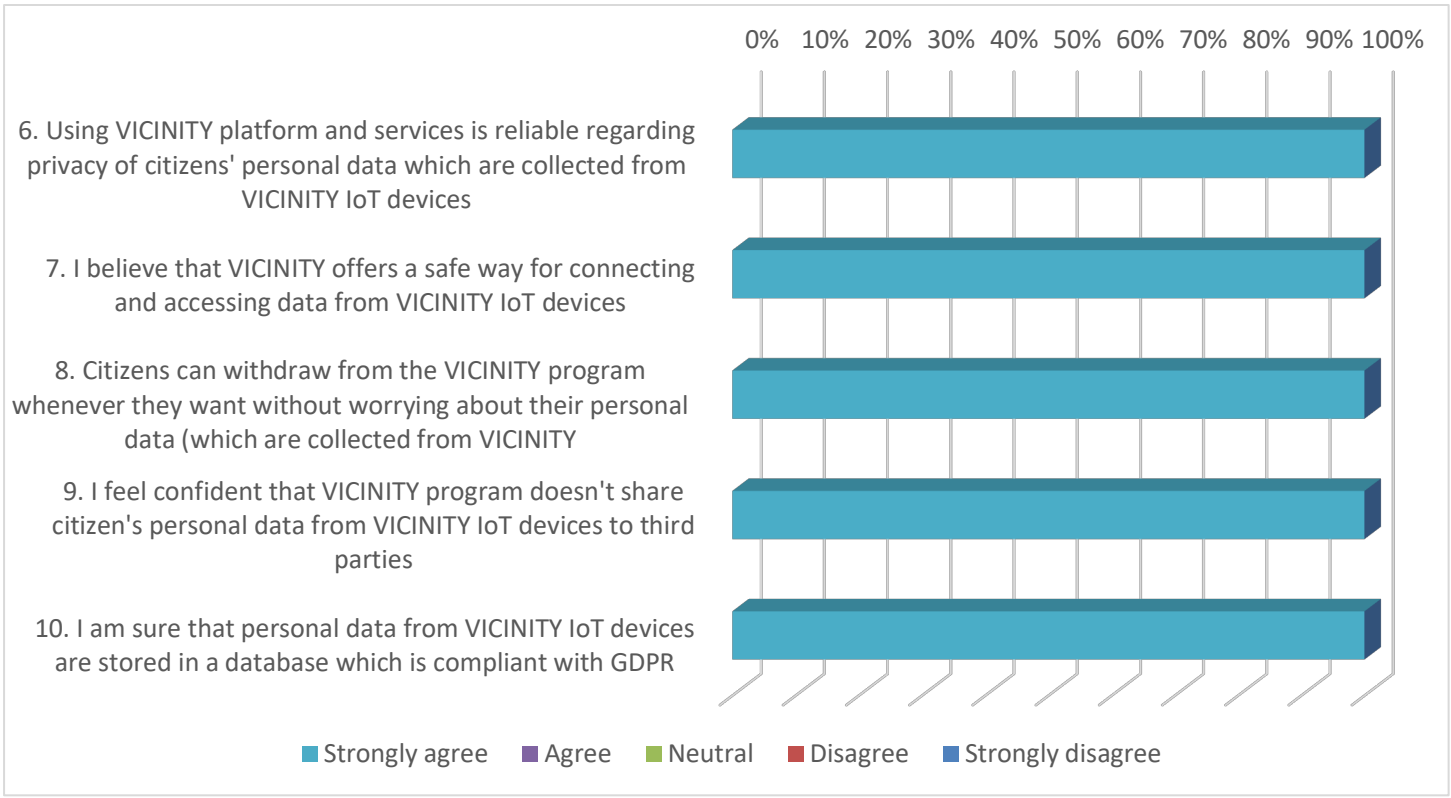


**Figure 3-19 Privacy / Personal Data usage/ sensors - Doctors**

### 3. Overall experience from VICINITY program

Overall experience is generally good but 50% of the doctors believe that citizens that are involved with the VICINITY program are not satisfied. This is possibly due to the deployment of sensors and devices to elderly people private homes.

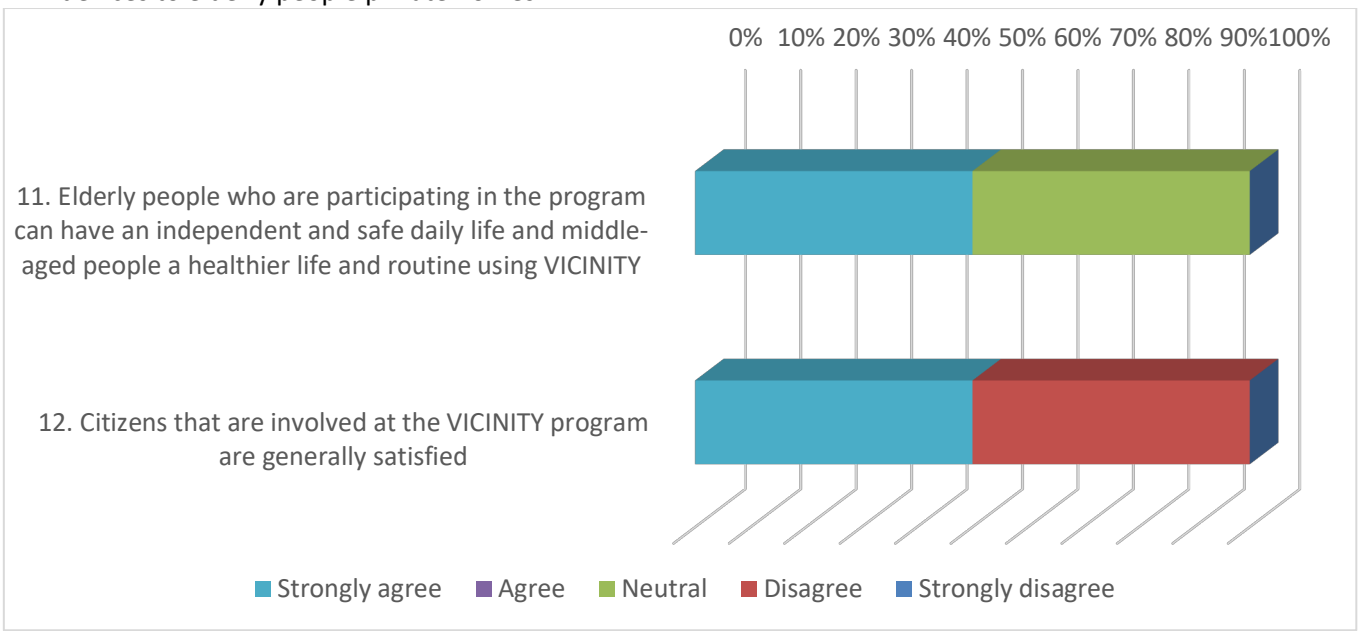


**Figure 3-20 Overall experience from VICINITY program - Doctors**

# 4. Evaluation regarding Sustainable Development Goals


**Figure 4-1 Sustainability Goals [10]**

Member States decided to launch a process to develop a set of Sustainable Development Goals (SDGs) [10]. These goals are a call for action by all countries to accelerate progress on sustainable development aimed at securing healthy, peaceful and prosperous life to all. Small changes from VICINITY pilot site in the eHealth domain could make a significant difference for the Goals 3 and 13, proposed by the United Nations.

**Goal 3 – Good Health and Well-being**

Both use cases of the Greek pilot case "eHealth & Assisted Living for elderly people at home" and "Health improvement for the middle-aged persons" are assisting in addressing many different persistent and emerging health issues. Related target of this goal that could be covered with VICINITY eHealth use cases is:

**3.4** By 2030, reduce by one third premature mortality from non-communicable diseases through prevention and treatment and promote mental health and well-being (according to [1]).

By promoting a healthier lifestyle among middle-aged citizens and creating incentives to make exercising and well-being part of their daily life disease prevention could be succeeded.

**Goal 13 – Climate Action**

As climate change is affecting more people in the world United Nations have included the goal of climate action as a high priority. The second Use Case of the Greek pilot, "Health improvement for the middle-aged persons", is promoting a healthier lifestyle and more exercising for the citizens. This could lead to a change in the ways of commuting, as using a bicycle or walk instead of using private vehicles for short distances, which is a small step for climate change-related planning and management.

[1] https://www.un.org/sustainabledevelopment/health/

# 5. Conclusions

This report presents the evaluation results of the VICINITY eHealth use case of Pilea-Hortiatis Pilot Site. The conducted evaluation is primarily based on the evaluation framework that was defined in D8.1, bearing in mind aspects such as, the usage and benefits of the implemented services, the overall user experience and perception on the VICINITY platform USPs, and the global impact of the use case.

Technical assessment included an evaluation of the implemented VASs, defined in D5.1, according to the KPIs defined in D8.1. Respective algorithms were implemented for data acquisition and processing, in order to extract the indicators values. The results reveal the scale of both use cases, presenting a high traffic of 115.376 data requests during the realization of the pilot. In use case 3.1 “eHealth and Assisted Living for elderly people at home”, we observe a frequent usage of the medical devices, which is followed by warning incidents, validating the need for the implemented solution. Moreover, the KPIs reveal a small number of detected behavioural changes per participant, with a high expected accuracy, which constitutes a very informative mean for the psychologists who monitor the elders. In use case 3.2 “Health improvement for the middle-aged persons”, we observe a positive change in the lifestyle of middle-aged citizens in terms of walking greater distances and visiting the municipality’s sport centres, while in average they have effectively lost weight.

The stakeholders’ satisfaction was measured in the form of questionnaires for the business evaluation. Four categories of stakeholders have been defined, namely, “Use case 3.1 participants”, “Use case 3.2 participants”, “Municipality employees” and “Health professionals”. For each category, a separate questionnaire has been prepared in order to receive the most relevant feedback, according to the role of each one in the use case. The positive results show that over 80% of the users found their IoT devices useful in their everyday life for both use cases, while over 90% of the users feel confident sharing their data with health professionals through the VICINITY platform. This last fact reveals the acceptance and trust of non-technical, end-users to the offered e-health VICINITY solution. Regarding the USPs, it is also important to mention that over 65% of the municipality employers would recommend the program to other municipalities, while all health professionals argued that they prefer such a solution to enhance their conventional way of attendance.

Throughout the realization of this pilot, development and deployment as an iterative process was facilitated by the stakeholders and participants feedback and recommendations during face-to-face and online meetings. Business proposition for VICINITY eHealth Use Case seems viable and our aim is to continue its operation after the completion of the project. The use case’s impact is also remarkable, as its contribution surpasses the pilot site goals by reporting progress towards the global sustainable development goals in terms of good health and well-being, as well as climate action.

As a whole, VICINITY platform gives the opportunity to stakeholders to integrate devices from different vendors ensuring privacy and giving the opportunity to build partnerships by integrating more VASs and infrastructure expanding the business possibilities.

## 6. References

[1] D8.1 Pilot Evaluation Framework Definition, online: https://vicinity2020.eu/vicinity/content/d81-pilot-evaluation-framework-definition

[2] http://www.vicinity-h2020.eu

[3] https://www.theguardian.com/world/2018/nov/23/sweating-your-assets-the-bank-that-links-interest-to-exercise-monobank-ukraine

[4] https://www.healthywage.com/?sscid=91k3_dgxsd

[5] http://www.jolt.ai/

[6] https://waybetter.com/dietbet

[7] https://www.myachievement.com/

[8] https://www.webpages.uidaho.edu/ele/Scholars/Practices/Evaluating_Projects/Resources/Evaluation%20Methodology.pdf

[9] https://www.getfeedback.com/blog/brand-perception/

[10] https://www.un.org/sustainabledevelopment/

# 7. ANNEX

## 7.1. Gantt Chart

| VICINITY Pilot Evaluation Task Plan | M34 | M35 | M36 | M37 | M38 | M39 | M40 | M41 | M42 | M43 | M44 | M45 | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kick-Off and input to GA meeting | | | | | | | | | | | | | |
| Identify the KPIs for value added services and UIs, each one seprately and clearly | | | | | | | | | | | | | KPIs defined in detail in D8.1 |
| Implement function of KPIs for Pilot level | | | | | | | | | | | | | KPIs mplemented in D8.5 |
| Inform users about the usage of the applications | | | | | | | | | | | | | All relevant end-users are informed through Stakeholders meetings |
| Draft Table of Contents of D8.5 | | | | | | | | | | | | | |
| Identify impact of open call if any | | | | | | | | | | | | | |
| Report on lessons learned from lab trials (WP6 ends M48) (AAU) | | | | | | | | | | | | | WP6 Input Integration Test and Validation |
| Start mid-trial evaluation-issue questionnaires) | | | | | | | | | | | | | Questionnaires completed and distributed to end-users |
| Make improvements resulting from inputs from stakeholders | | | | | | | | | | | | | Through f2f and online meetings |
| Start final evaluation | | | | | | | | | | | | | |
| Add detailed text to Deliverable T8.5 | | | | | | | | | | | | | |
| Complete final evaluation | | | | | | | | | | | | | |
| Complete D8.5 Draft Deliverable | | | | | | | | | | | | | **Task Completed** |
| Review Deliverable | | | | | | | | | | | | | **In progress** |
| Amend Deliverable and issue it | | | | | | | | | | | | | |
| T8.5 on overall evaluation begins | | | | | | | | | | | | | |

**Figure 7-1 Gantt Chart for T8.5**

## 7.2. Questionnaires

### 7.2.1. Use Case 1 – Users

| |
|---|
| VICINITY Program – Greek Pilot Case Questionnaire |
| Use Case 1: eHealth and Assisted Living for elderly people at home |
| **Memo:** 1. Strongly disagree, 2. Disagree 3. Neutral 4. Agree 5. Strongly agree |
| **User ID / Date** |
| **Interaction with IoT devices / sensors** |
| 1. I found the IoT devices useful in my daily routine |
| 2. The use of IoT services through VICINITY increases my self-confidence living alone |
| 3. The use of IoT services enables me to accomplish daily tasks with safety and security |
| 4. My interaction with the VICINITY IoT services is clear and easy to understand |
| 5. Learning to operate the VICINITY IoT devices (blood pressure, weight scale, panic button) was easy for me |
| 6. I feel that my doctor can monitor my health progress better with the use of the VICINITY IoT devices and services |
| **Privacy / Personal Data usage** |
| 7. I feel confident that my personal data are safe when interacting with the VICINITY IoT devices (e.g. when taking a pressure measurement or by sensors installed within my premises) |
| 8. I feel confident that my personal data gathered from VICINITY IoT devices won't be shared with anyone rather than the responsible I gave consent to. |

| |
|---|
| 9. I know that I can withdraw from VICINITY program whenever I desire without worrying for my personal data gathered from VICINITY IoT devices. |
| **Overall experience from VICINITY program** |
| 10. My participation in the VICINITY program was generally a positive experience |
| 11. I didn't face technical problems during the program |
| 12. VICINITY responsible were helpful and provided assistance when I needed it |
| 13. I believe that by using VICINITY IoT services, elderly people could have the chance to be independent and secure in the future |
| 14. I would recommend VICINITY to other people or organisations |

**Table 2 Questionnaire for Use Case 1 users**

### 7.2.2. Use Case 2 – Users

| |
|---|
| VICINITY Program – Greek Pilot Case Questionnaire |
| Use Case 2: Health improvement for the middle-aged persons |
| **Memo:** 1. Strongly disagree, 2. Disagree 3. Neutral 4. Agree 5. Strongly agree |
| **User ID / Date** |
| **Interaction with IoT devices / sensors** |
| 1. I found the IoT devices useful in my daily routine |
| 2. Learning the functionalities of VICINITY IoT services was easy for me (mobile application) |
| 3. The use of IoT services enables me to accomplish daily tasks with safety and security |
| 4. My interaction with the VICINITY IoT services is clear and easy to understand |
| 5. Learning to operate the VICINITY IoT devices (wearable) was easy for me |
| 6. I feel that my doctor can monitor my health progress better with the use of the VICINITY IoT devices and services |
| **Privacy / Personal Data usage** |
| 7. I feel confident that my personal data are safe when interacting with the VICINITY IoT devices (e.g. when visiting the gym or when I sync the wearable) |
| 8. I feel confident that my personal data gathered from VICINITY IoT devices won't be shared with anyone rather than the responsible I gave consent to |
| 9. I know that I can withdraw from VICINITY program whenever I desire without worrying for my personal data gathered from VICINITY IoT devices. |
| **Overall experience from VICINITY program** |
| 10. My participation in the VICINITY program was generally a positive experience |
| 11. I didn't face technical problems during the program |
| 12. VICINITY responsible were helpful and provided assistance when I needed it |
| 13. I believe that by using VICINITY IoT services, I can have a healthier lifestyle and daily routine |
| 14. By using VICINITY IoT services I lose weight more effectively |
| 15. By using VICINITY IoT services I increased my walking distance more effectively |
| 16. By using VICINITY IoT services I visit gym more often than I used to |
| 17. I believe that by using VICINITY IoT services citizens follow a healthier lifestyle |
| 18. I would recommend VICINITY program to other people or organisations |

**Table 3 Questionnaire for Use Case 2 users**

### 7.2.3. MPH – Municipality

| |
|---|
| VICINITY Program – Greek Pilot Case Questionnaire |
| Use Case 1+2 |

| |
|---|
| **Memo:** 1. Strongly disagree, 2. Disagree 3. Neutral 4. Agree 5. Strongly agree |
| **MPH employer / Date** |
| **Interaction with IoT devices / sensors** |
| 1. Using VICINITY IoT devices is easy and understandable |
| 2. Interacting with VICINITY IoT services is easy and understandable |
| 3. I would like more devices/sensors to be added to VICINITY so the municipality can provide more services to its citizens |
| **Privacy / Personal Data usage** |
| 4. Using VICINITY platform and services is reliable regarding privacy of citizens' personal data which are collected from VICINITY IoT devices |
| 5. VICINITY program allows the safe connection between IoT devices and has the ability of an end-to-end encryption (if this is available at the VICINITY IoT devices) |
| 6. Citizens can withdraw from the VICINITY program whenever they want without worrying about their personal data (which are collected from VICINITY IoT devices) |
| 7. I feel confident that VICINITY program doesn't share citizen's personal data from VICINITY IoT devices to third parties |
| 8.I am sure that personal data from VICINITY IoT devices are stored in a database which is compliant with GDPR |
| **Overall experience from VICINITY program** |
| 9. Elderly people who are participating in the program can have an independent and safe daily life using VICINITY |
| 10. Using VICINITY IoT services helped middle-aged people to have a healthier life and routine |
| 11. Do you know any organisation/company that provides similar solution to VICINITY? |
| 12. I would recommend VICINITY program to other people or organisations |
| 13. I would recommend VICINITY program to other Municipalities |
| 14. Citizens that are involved at the VICINITY program are generally satisfied |

**Table 4 Questionnaire for Municipality's employees**

### 7.2.4. Health Professionals

| |
|---|
| VICINITY Program – Greek Pilot Case Questionnaire |
| Use Case 1+2 |
| **Memo:** 1. Strongly disagree, 2. Disagree 3. Neutral 4. Agree 5. Strongly agree |
| **Doctor / Date** |
| **Interaction with IoT devices / sensors** |
| 1. Using VICINITY IoT devices is easy and understandable |
| 2. Interacting with VICINITY IoT services is easy and understandable |
| 3. I prefer the usage of eHealth IoT devices for my patients in order to have access to their medical data enhancing the conventional way of attendance |
| 4. I prefer to use eHealth IoT applications so that I can control better the medical condition of my patients |
| 5. I would recommend VICINITY IoT services to other doctors |
| **Privacy / Personal Data usage** |
| 6. Using VICINITY platform and services is reliable regarding privacy of citizens' personal data which are collected from VICINITY IoT devices |
| 7. I believe that VICINITY offers a safe way for connecting and accessing data from VICINITY IoT devices |
| 8. Citizens can withdraw from the VICINITY program whenever they want without worrying about their personal data (which are collected from VICINITY |

| |
|---|
| 9. I feel confident that VICINITY program doesn't share citizen's personal data from VICINITY IoT devices to third parties |
| 10. I am sure that personal data from VICINITY IoT devices are stored in a database which is compliant with GDPR |
| **Overall experience from VICINITY program** |
| 11. Elderly people who are participating in the program can have an independent and safe daily life and middle-aged people a healthier life and routine using VICINITY |
| 12. Citizens that are involved at the VICINITY program are generally satisfied |

**Table 5 Questionnaire for Health professionals**