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U4IOT IMPACT ON THE LSPs

During the three-year journey (2017-2019) of the [U4IoT project](#), the consortium has invested tremendously in creating sets of tools to support LSPs in their end-user engagement activities, which are all currently available on the U4IoT [Tools & Support](#) page.

The document starts with an overview of metrics summarizing the overall uptake of the U4IoT services, and it breaks down into the use of the tools and services for individual LSP, including contexts & end-user engagement settings, their uptake of the U4IoT tools, support and recommendations; and the impact of the U4IoT services on their work. As a conclusion, short observations and suggestions on how to better interact between the CSA and LSPs are presented.

OVERALL UPTAKE U4IOT SERVICES

Underneath metrics with regard to the overall uptake of the U4IoT services are summarized:

- In total, the online [End-User Engagement Toolkit](#) has gathered 3711 pageviews, of which 1876 unique pageviews. Representatives from all LSP projects have familiarized with the toolkit, according to qualitative interviews they've found it useful especially with the interactive flow-diagram and also the use cases / RZs / DSs have used it. According to the online mini-survey, all received 15 responses show that respondents are satisfied with the End-user engagement toolkit, rating it with either 4 (satisfied) or 5 (very satisfied).
- The [Survey and Crowdsourcing Tools](#) (accessible via [IoT Lab](#)) were developed and used in the different LSPs with good results for the LSPs. The number of visits for the tools reached 9339 visits. The numbers of new users of the mobile applications for the last year of the project are 87 for Android and 12 for iOS. During the 3rd year of the project, 14 questions and 14 mini-surveys for MONICA were done.



- The [Privacy Guideline and Games](#) have been presented to and disseminated through the LSPs, as well as through AG5. The Guidelines have also contributed to set the basis of the collective White Paper on Internet of Things Deployment Compliance with the GDPR – Lessons learned from the LSPs. The Data Protection Game has been presented, tested and validated at several international conferences including three in 2017, seven in 2018 and twelve in 2019. These international conferences gathered from 200 to 2000 participants each including LSP representatives, Privacy and Data Protection Authorities, Data Protection professionals, academia and the general public. The serious game has been tested and validated with partners of the LSPs. It also received a high interest from the public when presented in public events and conferences, such as the IoT Security and Privacy Booth (IoT Week) and data protection specialized conferences. During the conferences dozens of examples of the game were distributed and we received more than 100 requests for the game. A revised version has been developed and the new version of the Data Protection Game with all improvements implemented based on the LSPs' comments has been finalized. The presentation of the serious game had an important impact in triggering the development of an official qualification scheme for the certification of Data Protection Officers in France in collaboration with the SGS and AS. The scheme has been officially endorsed by the French national supervisory authority, the CNIL, and is now used for officially qualifying the competences of DPOs.
- Over the course of the project all LSPs to greater or lesser extent made use of the [Co-Creative Workshop Support](#). A total of 196 participants participated in these workshops. 80 LSP partners and 32 of their direct stakeholders/end-users were amongst the total number of participants. Overall the users of the Co-Creative Workshop support indicated to be satisfied with this support service.
- All LSP projects have received direct [Living Lab Support](#) (LL) in various formats. All have received copies of LL handbooks, and attended workshops/online meetings with LL topics covered. U4IoT workshops during OpenLivingLab Days (OLLD) have been attended by representatives from all LSPs during 2017 and 2018. In general, the LL e-Course has gathered 471 pageviews, of which 336 are unique. In addition, LL intro video has gathered 361 views through Vimeo and YouTube.
- The online support pages - [Expert Pool](#), [Interactive Flow-Diagram](#) and [e-Courses](#) have gathered a total of 9170 pageviews over the course of the project. Of these pageviews, 2809 views concerned the overall support page, 1402 the Interactive Flow-Diagram page, 4279 the e-Course pages and 680 the Expert Pool page. Most visitors viewing the pages came from European countries, i.e., Spain, Germany and France. Countries that are home to many of the LSP partners. Figures, moreover, showed that the support pages were found as well by a larger public, e.g., in the United States. Visitors, including the LSP end-user engagement representatives, indicated to be satisfied with the online support services, especially the e-Courses were very well received.
- As for the [IoT Adoption Barriers](#), 41 participants (both LSP representatives and experts) attended the three workshops (i.e., Bilbao, Vienna and Aarhus) that organized on the topic, 62 end-user were interviewed, 14 experts were interviewed and 12 LSP representatives were interviewed. In total 102 recommendations have been identified for the 5 LSP domains. The recommendations for tackling IoT adoption barriers are published on special leaflets that are consultable on the project website and will be taken to relevant conferences by the partners. The e-course on adoption barrier is also customized for five LSPs.
- With the [Participatory Sustainability Models](#) U4IoT has created a tool to allow LSP's and other future IoT related projects to self-assess their sustainability status at the start, during and at completion of the project. Diverse support was offered through various events. In January 2018 a workshop with the Monica project was organised and at the Carouge event in 2018 a workshop on mapping stakeholders took place. Input on sustainability was also gathered at a workshop during the IoT Week in Bilbao in June 2018. In 2019 a dedicated session for LSP's representatives was organised at the IoT eXperience for the future in Lisbon in February 2019 and at the IoT Week 2019. In the first activity, input on sustainability was gathered in a session with LSP representatives and various actors working with IoT and in the second activity LSP representatives were presented with an exercise to identify sustainability issues by means of the Innovatrix. Besides these formal activities, e-mail and telephone exchanges were organised throughout the three years in order to validate aspects of the model or gather more information based on LSP experiences. The interaction with LSP's for this task was not for each project very easy to establish or maintain.
- [U4IoT Website, Promotion and Social Media Channels](#): A project website was designed, set up and continuously updated throughout the project duration, with cross links to the LSPs websites, Open call page and deliverable pages of the LSPs and Create-IoT. Printed material was created, in the form of: factsheets, posters, flyers, and project videos. Two social network profiles (Twitter and LinkedIn) were set-up. The total number of website visitors was 4954, with an average session duration of 4:43 minutes and an average number of pages per session of 3.74. Promo materials were created for all LSPs for IoT Week in Aarhus 2019. A U4IoT LinkedIn group has been created with 32 members (LSPs and IoT professionals), and during the project lifetime there were a total of 24 posts published. Total number of Tweets during the project lifetime was 265 with 492 followers.
- [Knowledge Base, Activity Groups \(AGs\) and Open Call support](#): Knowledge base promotion and population were very demanding and we devoted a lot of time and effort to approach and motivate LSPs to participate in the knowledge base population. Total number of Knowledge Base page views was 295 and 20 articles were published. U4IoT actively participated in AGs and in the events co-organized with Create-IoT, also U4IoT was active in Open call support for LSPs. U4IoT was active in the following Activity groups: AG01 (sustainability), AG04 (Accelerators & Open Calls), AG05 (Privacy & End-user Engagement) and AG08 (Communication).

1. ACTIVAGE

1.1. ACTIVAGE'S CONTEXT AND END-USER ENGAGEMENT SETTING

ACTIVAGE (ACTivating InnoVative IoT smart living environments for Aging well) aimed to support and extend the independent living of older adults in their living environments, by responding to real needs of caregivers, service providers and public authorities across 9 Deployment Sites (DS - Galicia, Valencia, Madrid, Region Emilia Romagna, Isère, Greece, Woquaz, Leeds and Finland). By developing and enabling deployment and operation of Active & Healthy Aging IoT based solutions and services.

End-user engagement was embedded from the beginning of the ActivAge project, as the project proposal contained a 9-month co-creation process, with the objective to utilise workshops and focus group sessions to gather end-user requirements. The Deployment Sites (DS) differed in experience levels, but in general all DSs had at least one experienced partner in the field of end-user engagement.

1.2. UPTAKE U4IOT TOOLS, SUPPORT AND RECOMMENDATIONS

The table underneath displays the uptake of the U4IoT services by the LSP project per project year:

	Year 1	Year 2	Year 3
End-User Engagement Toolkit	Coordinating development of the toolkit with LSP rep. Info toolkit shared during workshop M6 (LSP rep & tech partner) and via the newsletter.	LSP rep familiarized with the toolkit. Presented and shared during M18 and M21 workshops, which included a session with feedback collection for the toolkit, LSP rep & DS Leeds present.	DSs aware of the tools, have checked them on the website. They considered them complete & useful, LSP rep stated that they can be used in future projects.
Survey and Crowdsourcing Tools	Survey and tools improved based on feedback from ACTIVAGE partners.	LSP rep familiarized with the Survey and Crowdsourcing Tools via e-course 2 and newsletter, as well as IoTWeek (M18) and ICT Vienna (M24).	Crowdsourcing and survey tools session at LSP workshop IoT Experience for the future (Lisbon) in M26 where LSP rep participated. Further information shared by newsletters and at IoTWeek (M30).
Privacy Guideline and Games	Privacy and Data Protection Guidelines shared with ACTIVAGE to understand challenges and risks the LSP faced. First prototype of the Data Protection Game was developed, tested and improved in collaboration with the project.	First iteration of the game further tested and improved for the smart health community. Game presented at the IoTWeek (M18) Security and Privacy booth, jointly with other LSPs.	Final version of the Game presented at IoT Security and Privacy Booth at the IoTWeek (M30). The Guideline and Games are presented at AG05.
Co-Creative Workshop Support	Coordinating development of the support with LSP rep. Two workshops attended (M6 & M9) by LSP rep & tech partner. Workshop reports disseminated to attendees.	Three workshops attended: ActivAge plenary(M14), 14 DS leads/partners present (7 out of 9 DSs). Workshops (M18 & M21), LSP rep & DS Leeds present.	No workshops attended, stated to have learned more on co-creation & looked into online materials, e.g., Co-Creative Workshop handbook, over the course of the project.
Living Lab Support	Coordinating development of support with LSP rep, info about support shared during workshop M6 (LSP rep & tech partner present) and via the newsletter.	LL session informing about support and collection LSP inputs, LSP rep present. OLLD (M21), DS Leeds present. Received LL support request, LSP rep linked to LL expert.	Direct contact with LSP rep for feedback, continuous LL support through online material.
Expert Pool (EP), Interactive Flow-Diagram (IFD) & e-Courses (e-Cs)	Coordinating development of the support with LSP rep, support announced in workshops M6 (LSP rep & tech partner present) and newsletter.	EP request for direct support (M13) by LSP rep. Support services presented to 7 DSs (M14), especially the IFD, is considered useful. Support enhanced with feedback workshop (M21), DS Leeds present.	DSs aware of support services (EP, IFD & e-Cs), some have further looked into them. Services are considered to be of high quality, LSP rep stated that support services can be used in future projects.
IoT Adoption Barriers	Identifying the societal, ethical and ecological issues in relation to IoT implementation in ACTIVEAGE domain was initiated by conducting the desk research in M6-M12.	Societal, ethical and ecological issues in relation to IoT implementation complemented with expert interviews in the smart healthcare domain. IoTWeek (M18) and ICT18 (M24) workshops utilised to discuss and form adoption barriers for ACTIVAGE.	The final handbook of IoT adoption barriers includes one chapter on the smart health domain. One leaflet was prepared for ACTIVEAGE.
Participatory Sustainability Models	Task only started in M7, focusing on gathering information from the LSP with respect to its sustainability issues and ideas/plans/work. . Identifying and establishing relevant contact points within ActivAge.	Workshop during IoTWeek (M18) in order to grasp dimensions of sustainability from all LSPs, including ACTIVAGE.	The toolkit was presented at the Lisbon during the workshop at the Create Next generation IoT event in Lisbon (M26)) and used by ActivAge participant during the U4IoT workshop at IoTWeek (M30).

1.3. IMPACT

According to the ActivAge LSP end-user engagement representative, the tools and support services are received with a 4/5 satisfaction rate. This is amongst others reflected by the following quote:

"Areas where U4IoT is working are relevant, U4IoT did a very good job in setting up tools. The End-User Engagement Toolkit and the Interactive Flow-Diagram are very useful, especially for the initial phase of a project, when planning the end-user engagement activities." – **ActivAge** –



2. SYNCHRONICITY

2.1. SYNCHRONICITY'S CONTEXT AND END-USER ENGAGEMENT SETTING

SynchroniCity aimed to deliver a digital single market for IoT-enabled urban services in 8 Reference Zones (RZ - Antwerp, Manchester, Santander, Carouge, Milan, Seongnam, Eindhoven, Helsinki, Leon and Porto). The project piloted these foundations in the cities together with a set of citizen-centered services in three high-impact areas, showing the value to cities, businesses and citizens involved.

Within the SynchroniCity proposal a Work Package (WP) dedicated to end-user engagement was defined. This WP, supported by U4IoT, gathered a list of end-user engagement tools and methods. This list was disseminated to the RZs to support them in conducting the end-user engagement activities; however, no resources were allocated to provide the RZ with hands-on support. An open call resulted in spin-off pilots. These pilots, with varying end-user engagement expertise levels were expected to conduct further end-user engagement activities, based on a check-list defined by the WP.

2.2. UPTAKE U4IOT TOOLS, SUPPORT AND RECOMMENDATIONS

The table underneath displays the uptake of the U4IoT services by the LSP project per project year:

	Year 1	Year 2	Year 3
End-User Engagement Toolkit	Coordinating development of the toolkit with LSP rep. LSP rep familiarized with the toolkit (M6), RZ leads/partners Porto, Antwerp & Eindhoven aware of it (M9), info shared also via newsletter.	Toolkit session (M17), attended by RZ Carouge, Antwerp & Porto. Workshops (M18 & M21) with feedback collection for toolkit extension, attended by LSP rep & RZ Porto.	Two sessions referencing the toolkit: M26 SC session for pilots & M30 workshop with RZ Eindhoven. Coordination with 5 pilots for demo/interviews (M30). U4IoT support documented in SC D1.11 and toolkit referenced in SynchroniCity final brochure.
Survey and Crowdsourcing Tools	The survey and tools improved based on feedback from LSP rep.	Survey and Crowdsourcing Tools session (M17), attended by RZ Carouge, Antwerp & Porto. Promotion of tools at IoTWeek (M18) to Porto, Carouge RZ; and ICT18 (M24) to LSP partners.	Survey and Crowdsourcing Tools session at LSP event IoT Experience for the future (M26) and IoTWeek (M30) for LSP rep.
Privacy Guideline and Games	Privacy and Data Protection Guidelines are shared with SynchroniCity to understand challenges and risks faced by smart cities. First prototype of the Data Protection Game was developed, tested and improved for the LSP.	The first iteration of the game further tested and improved for the smart cities community. Game presented at the IoTWeek (M18) Security and Privacy booth, jointly with other LSPs.	Final version of the Game presented at IoT Security and Privacy Booth at the IoTWeek (M30). The Guideline and Games are presented at AG05.
Co-Creative Workshop Support	Coordinating development of the support with LSP rep. Three workshops attended (M6 & M9 ^(2x)), LSP rep & RZ leads/partners Porto, Antwerp & Eindhoven present. Reports disseminated to attendees.	Four workshops: Smart City workshop (M17), RZ leads/partners Carouge, Antwerp & Porto present. Workshops (M18 ^(2x) & M21) attended by LSP rep & RZ Porto. Stated to have used online materials, e.g. Co-Creative Workshop handbook.	Two workshops attended by LSP rep, partners & RZ Eindhoven (M30 ^(2x)). End-user engagement support through a workshop setting was considered to be of added value for supported SC RZs.
Living Lab Support	Coordinating the development of support with LSP rep, info about support has been shared during workshop M6 (LSP rep & RZ leads/partners Porto & Antwerp aware) and via the newsletter.	Specific LL session with RZ Carouge, Antwerp & Porto (M17), Workshop (M18) informing about support and collection LSP inputs (LSP rep & RZ Porto). OLLD (M21) participation by LSP rep & RZ Porto.	Notified especially LSP rep, but also other partners & RFs about updated LL support information. Direct contact with LSP rep for feedback. Continued LL support through online material.
Expert Pool (EP), Interactive Flow-Diagram (IFD) & e-Courses (e-C)	Coordinating development of the support with LSP rep, support announced in workshop M6 (LSP rep & RZ leads/partners Porto & Antwerp aware) & newsletter. EP requests direct support by LSP rep (M9) and RZ Carouge (M11).	IFD session with RZ Carouge, Antwerp & Porto (M17). Support enhanced with feedback workshop (M21), LSP rep & RZ Porto present.	EP request for direct support (M27) by RZ Porto. RZs and some pilots aware of online services, especially additional unique support that was not offered by SC, was considered useful.
IoT Adoption Barriers	Identifying the societal, ethical and ecological issues in relation to IoT implementation in SYNCHRONICITY domain was initiated by conducting the desk research in M6-M12.	Expert interviews were conducted for the societal, ethical and ecological issues for IoT in the smart cities domain. IoTWeek (M18) and ICT18 (M24) workshops utilised to discuss and form adoption barriers for SynchroniCity.	The final handbook of IoT adoption barriers includes one chapter on smart cities. One leaflet was prepared for SynchroniCity.
Participatory Sustainability Models	Tasks started in M7, during the first months material was collected about the LSP with respect to sustainability. Identifying and establishing relevant contact points within SynchroniCity.	Workshop IoTWeek (M18) in order to grasp input about sustainability from LSP and similar broader audience that could be relevant for the SynchroniCity domains.	The toolkit was presented at the Lisbon during the workshop at the Create Next generation IoT event in Lisbon (M26) and applied with 2 participants during the U4IoT workshop at IoTWeek (M30).

2.3. IMPACT

According to the SynchroniCity LSP end-user engagement representative, the tools and support services are received with a 4/5 satisfaction rate. This is amongst others reflected by the following quote:

“Concerning the usage of the tools within SynchroniCity, especially the privacy guidelines and game were really well received.”... “It was also noted that support in a workshop setting is far more important than learning from handbooks. Thus the approach of U4IoT was the right way to tackle the knowledge transfer and was far more valuable than how it was provided in SynchroniCity itself.” – SynchroniCity –



3. MONICA

3.1. MONICA'S CONTEXT AND END-USER ENGAGEMENT SETTING

MONICA (Management Of Networked IoT Wearables – Very Large Scale Demonstration of Cultural Societal Applications) aimed to apply innovative wearables and portable IoT sensors and actuators in the scope of large-scale city events. Solutions were deployed in six major cities in Europe: Tivoli Copenhagen, City of Hamburg, City of Lyon, City of Bonn, City of Torino, City of Leeds. Simultaneously MONICA envisioned a general applicability to dynamically deploy Smart City applications in other fixed locations, e.g., airports, main traffic arterials, and construction sites.

In MONICA focus was more on developing underlying technologies than on end-user engagement. During the focus collaboration took place with stakeholders i.e., event organisers, security organisations and municipalities. Only in the final stages of the project there have been end-user engagement activities conducted with end-users (citizens), in the form of user evaluation studies, to amongst others persuade them to make use of the technology developed.

3.2. UPTAKE U4IOT TOOLS, SUPPORT AND RECOMMENDATIONS

The table underneath displays the uptake of the U4IoT services by the LSP project per project year:

	Year 1	Year 2	Year 3
End-User Engagement Toolkit	Coordinating development of the toolkit with LSP rep. Info toolkit shared during workshops M6 & M9 (LSP rep & partner present) and via the newsletter.	LSP rep familiarized with the toolkit. MONICA Plenary (M17), toolkit tutorial provided to city leads/partners (12 participants from WP11). Workshops (M18 & M21) feedback collection for extension toolkit, attended by City of Leeds.	Toolkit shared within the Leeds city council. LSP rep stated to also have further needs for online support in final project phases and future projects.
Survey and Crowdsourcing Tools	The survey and tools improved based on feedback from LSP rep.	LSP rep familiarized with the Survey and Crowdsourcing Tools. Info shared via e-course 2 and newsletter. IoTWeek (M18) and ICT18 (M24) participation by LSP rep.	Crowdsourcing and survey tool session at LSP workshop (M26). Preparation of the crowdsourcing and survey tool demo in cooperation with LSP rep at IoTWeek (M30). 14 questions and 14 mini-surveys were conducted. Positive feedback gathered from LSP rep to use the results of the demo.
Privacy Guideline and Games	Privacy and Data Protection Guidelines are shared with MONICA to understand challenges and risks. First prototype of the Data Protection Game developed, tested and improved in collaboration with the project.	The first iteration of the game further tested and improved for the use at smart events and of IoT wearables. Game presented at the IoTWeek (M18) Security and Privacy booth, jointly with other LSPs.	Final version of the Game presented at IoT Security and Privacy Booth at the IoTWeek (M30). The Guideline and Games are presented at AG05.
Co-Creative Workshop Support	Coordinating development of the support with LSP rep. Two workshops attended (M6 & M9), LSP rep & partner present. Reports disseminated to attendees.	Three workshops attended: MONICA plenary (M17), City leads/partners present (12 participants from WP11). M18 _(2x) & M21 workshops attended by City of Leeds.	No workshops attended, stated to have looked into online materials, e.g., Co-Creative Workshop handbook, over the course of the project.
Living Lab Support	Coordinating the development of support with LSP rep, info about support has been shared during workshops M6 & M9 (LSP rep & partner present) and via the newsletter.	LL info provided during MONICA plenary (M17) with City leads/partners. M18 workshop informing about support and collection LSP inputs (LSP rep). OLLD (M21) participation by LSP rep.	Support shared within the Leeds city council. Direct contact with LSP rep for feedback, continuous LL support through online material. LSP rep expressed further need for online support in final project phases and future projects.
Expert Pool (EP), Interactive Flow-Diagram (IFD) and e-Courses (e-Cs)	Coordinating development of the support with LSP rep, support announced in workshop M6 (City of Leeds present) and via the newsletter.	EP request for direct support (M14) by City of Leeds. Support services presented and IFD used by city leads/partners (12 participants from WP11) in M17. Support enhanced with feedback workshops (M18 & M21), City of Leeds attended.	Support services shared within the Leeds city council. LSP rep stated to have further needs for online support in final project phases and future projects, e-Cs are especially considered useful for this.
IoT Adoption Barriers	Identifying the societal, ethical and ecological issues in relation to IoT implementation in MONICA domain was initiated by conducting the desk research in M6-M12.	The societal, ethical and ecological issues in relation to IoT implementation was complemented with expert interviews in the IoT wearables domain. IoTWeek (M18) and ICT18 (M24) workshops utilised to discuss and form adoption barriers for MONICA.	Final handbook of IoT adoption barriers includes one chapter on the IoT wearables domain. One leaflet was prepared for MONICA.
Participatory Sustainability Models	Workshop MONICA Plenary Bonn (M13); Tool used to make first sustainability assessment of LSP. Gathering information about sustainability issues in MONICA Identifying and establishing relevant contact points within MONICA	IoTWeek (M18) workshop, assembling inputs from LSPs and similar users on sustainability that could be relevant for the Monica domain	Workshop IoTWeek (M30), usage of the tool to collect feedback from MONICA.

3.3. IMPACT

According to the MONICA LSP end-user engagement representative, the tools and support services are received with a 5/5 satisfaction rate. This is amongst others reflected by the following quote:

"The tools and support are of really high quality, everything is available online, so this is really convenient. The tools are relevant as stand-alone support, yet, especially with the guidance of experts, they are useful."... *"MONICA has disseminated the U4IoT tools and support within the Leeds City Council, as there was interest for them."* – **MONICA** –



4. AUTOPILOT

4.1. AUTOPILOT'S CONTEXT AND END-USER ENGAGEMENT SETTING

AUTOPILOT (AUTOMated driving Progressed by Internet Of Things) aimed to increase safety, boost comfort and create new business opportunities for mobility services. The project developed services including autonomous driving vehicles, autonomous car sharing, automated valet parking, and enhanced digital dynamic maps allowing fully autonomous driving. The IoT enabled autonomous driving solutions were tested, under real conditions, at four permanent large scale pilot sites (PS - Finland, France, Netherlands, Italy, South Korea and Spain).

End-user engagement was embedded in the AUTOPILOT proposal, in the form of user evaluation studies. In the early stages of the project, feedback was gathered through workshops with stakeholders, i.e., business and local authorities. Remote user evaluation studies were conducted in the final stages of the project, test results included multiple aspects, i.e., technology, user, business and legal aspects. In practise, it was however difficult to engage end-users, amongst others because of safety reasons. Participants could not drive the car themselves, as it is not allowed by law. The studies that were held, therefore had to be conducted seating participants on the back seat of the car, consequently hindering a 'real' driving experience.

4.2. UPTAKE U4IOT TOOLS, SUPPORT AND RECOMMENDATIONS

The table underneath displays the uptake of the U4IoT services by the LSP project per project year:

	Year 1	Year 2	Year 3
End-User Engagement Toolkit	Coordinating development of the toolkit with LSP rep & PS Eindhoven. Sharing info about toolkit during workshop in M9 (LSP partner present) and via the newsletter.	M18 workshop with feedback collection for toolkit attended by LSP rep.	Limited user engagement, and therefore the opportunity to use the toolkit was limited (according to the LSP rep). Awareness about the tools has raised amongst partners.
Survey and Crowdsourcing Tools	The survey and tools improved based on feedback from LSP partners.	LSP rep familiarized with the Survey and Crowdsourcing Tools. Info shared via e-course 2, newsletter, IoTWeek (M18) LPS rep present.	Crowdsourcing and survey tools session at LSP workshop IoT Experience for the future in M26. Awareness about the tools raised via newsletters.
Privacy Guideline and Games	Privacy and Data Protection Guidelines are shared with AUTOPILOT to understand challenges and risks faced. First prototype of the Data Protection Game was developed, tested and improved in collaboration with the project.	The first iteration of the game further tested and improved for the use of connected vehicles. Game presented at the IoTWeek (M18) Security and Privacy booth, jointly with other LSPs.	Final version of the Game presented at IoT Security and Privacy Booth at the IoTWeek (M30). The Guideline and Games are presented at AG05.
Co-Creative Workshop Support	Coordinating development of the support with LSP rep & PS Netherlands (Eindhoven). One workshop (M9) attended, LSP partner present. Report disseminated to attendees.	Two workshops attended by LSP rep. (M18;20).	Presentation provided during LSP User Evaluation call (M30). Workshop study (M30) conducted on behalf of LSP rep & PS Versailles. 29 design guidelines shared with LSP rep.
Living Lab Support	Coordinating the development of support with LSP rep and PS Eindhoven, info about support has been shared during the workshop in M9 (LSP partner present) and via the newsletter.	LL support enhanced during the M18 workshop, informing about support and collection LSP inputs (LSP rep).	Direct contact with LSP rep for feedback, continuous LL support through online material.
Expert Pool (EP), Interactive Flow-Diagram (IFD) and e-Courses (e-C)	Coordinating development of the support with LSP rep & PS Eindhoven, support announced in the newsletter.	Support enhanced with feedback workshops (M18), attended by LSP rep.	EP request to participate in User Evaluation Call & provide direct support (M30). LSP rep stated support services are relevant to raise end-user engagement awareness in this highly technical domain.
IoT Adoption Barriers	Identifying the societal, ethical and ecological issues in relation to IoT implementation in the AUTOPILOT domain was initiated by conducting desk research in M6-M12.	The societal, ethical and ecological issues in relation to IoT implementation was complemented with expert interviews in the automated cars domain. IoTWeek (M18) and ICT18 (M30) workshops utilised to discuss and form adoption barriers for AUTOPILOT.	The final handbook of IoT adoption barriers includes one chapter on the autonomous driving domain. One leaflet was prepared for AUTOPILOT.
Participatory Sustainability Models	Task started in M7 with gathering information about the Autopilot project in relation to sustainability Identifying and establishing relevant contact points within Autopilot	IoTWeek (M18) workshop, assembling inputs from LSPs and similar users on sustainability that could be relevant for the Monica domain	No successful interaction with Autopilot project could be established despite U4IoT's attempt to connect.

4.3. IMPACT

According to the AUTOPILOT LSP end-user engagement representative, the tools and support services are important to raise awareness with regard to end-user engagement in a very technical field. U4IoT results were disseminated in the project, this is reflected in the following quote:

"In the world of connectivity, data is extremely important, data protection is a big issue. The Privacy Game could be integrated into the project workshops to bring some variation and make people aware of data protection."... "U4IoT did a great job with the Co-Creative workshop study conducted during the IoTWeek19 in Aarhus. Results of the study were sent to AUTOPILOT partners." – AUTOPILOT –



5. IOF2020

5.1. IOF2020'S CONTEXT AND END-USER ENGAGEMENT SETTING

IoF2020 (Internet of Food and Farm 2020) aimed to accelerate adoption of IoT for securing sufficient, safe and healthy food and to strengthen competitiveness of farming and food chains in Europe. The heart of the project is formed by 19 use cases (UCs - grouped in 5 trials with end-users from Arable, Dairy, Fruits, Vegetables and Meat verticals) that demonstrate the business case of innovative IoT solutions for a large number of application areas. A lean multi-actor approach focusing on user acceptability, stakeholder engagement and sustainable business models boost technology and market readiness levels. Development is enhanced by an open IoT architecture and infrastructure of reusable components based on existing standards and a security and privacy framework.

The approach of IoF2020 to end-user engagement focussed more on the end of the innovation process. Therefore limited early-stage support was needed from U4IoT. Stakeholders were rather involved in a Business-to-Business interaction, including a complex value-chain with a lot of legal, field-specific aspects to be considered. There is a lot of expertise embedded in IoF2020 concerning these topics; and if a necessary expertise was lacking, knowledge has been created, e.g., by forming new WPs. End-users are envisioned to be engaged towards the end of the project (2020), there will be User Experience support with regard to product development for selected products.

5.2. UPTAKE U4IOT TOOLS, SUPPORT AND RECOMMENDATIONS

The table underneath displays the uptake of the U4IoT services by the LSP project per project year:

	Year 1	Year 2	Year 3
End-User Engagement Toolkit	Coordinating development of the toolkit with LSP rep, testing the early version in M9 with WP leader. Sharing info about toolkit during workshops M6 & M9 (LSP rep and WP leader present) and newsletter.	LSP rep familiarized with the toolkit. Shared during the M18 workshop, feedback collected for extension of the toolkit, attended by LSP rep.	LSP rep stated that toolkit has been used by UCs. Will use the tools, as adapted, within structures that will be set-up in future actions.
Survey and Crowdsourcing Tools	The survey and tools improved based on feedback from LSP partners.	LSP rep familiarized with the Survey and Crowdsourcing Tools. Info shared via e-course 2 and newsletter. IoTWeek (M18) and ICT18 (M24) participation by LSP rep.	Crowdsourcing and survey tools session at LSP workshop IoT Experience for the future in M26. Awareness about the tools raised via newsletters and IoTWeek (M30).
Privacy Guideline and Games	Privacy and Data Protection Guidelines are shared with IoF2020 to understand challenges and risks. First prototype of the Data Protection Game was developed, tested and improved in collaboration with the project.	The first iteration of the game further tested and improved for the farming community. Game presented at the IoTWeek (M18) Security and Privacy booth, jointly with other LSPs.	Final version of the Game presented at IoT Security and Privacy Booth at the IoTWeek (M30). The Guideline and Games are presented at AG05.
Co-Creative Workshop Support	Coordinating development of the support with LSP rep. Three workshops attended (M6 _(2x) & M9), by LSP rep & WP leader. Reports disseminated to attendees.	One workshop attended by LSP rep (M18). Input provided for M21 workshop, results of this workshop were shared with LSP rep.	Stated that project partners (WP4) are aware and found the online materials, e.g., Co-Creative Workshop handbook & templates.
Living Lab Support	Coordinating the development of support with LSP rep, info about support has been shared during workshops M6 & M9 (LSP rep & WP leader present) and via the newsletter.	LSP rep familiarized with LL support. Support enhanced during M18 workshop, informing about support and collection of LSP inputs (LSP rep).	Direct contact with LSP rep for feedback, continuous LL support through online material.
Expert Pool (EP), Interactive Flow-Diagram (IFD) and e-Courses (e-C)	Coordinating development of the support with LSP rep, support announced in workshop M6 (LSP rep & UC rep) and via the newsletter.	LSP rep familiarized with the support services. Support enhanced with feedback workshop (M18), attended by LSP rep.	Project partners (WP4) have followed webinars and e-Cs, customised the information for project needs.
IoT Adoption Barriers	Identifying the societal, ethical and ecological issues in relation to IoT implementation in the IOF2020 domain was initiated by conducting the desk research in M6-M12.	The societal, ethical and ecological issues in relation to IoT implementation was complemented with expert interviews in the smart farming domain. IoTWeek (M18) and ICT18 (M24) workshops utilised to discuss and form adoption barriers for IoF2020.	The final handbook of IoT adoption barriers includes one chapter on the smart farming domain. One leaflet was prepared for IoF2020.
Participatory Sustainability Models	Task started online in M7. Focussing on collecting necessary information about the project. Identifying and establishing relevant contact points within IOF.	Workshop IoTWeek (M18) to collect viewpoint LSP's and similar audiences on sustainability that could also be relevant for smart farming	Usage during workshop IoTWeek and follow-up interview with one representatives (M30).

5.3. IMPACT

According to the IoF2020 LSP end-user engagement representative, the tools and support services are received with a 3,5/5 satisfaction rate. This is amongst others reflected by the following quote:

"The input of the CSA, i.e. the results from U4IoT are excellent. The U4IoT toolkit has already been used by IoF2020 in some of the project workshops, sometimes the tools were adapted according to internal needs." "... the project partners know about it, have the information and have access to all materials. They also have followed the webinars and e-courses provided by U4IoT." - IoF2020-

6. SUMMARY AND SUGGESTIONS

U4IoT's tools and support services receive overall good feedback from LSP representatives follow U4IoT activities: apart from AUTOPILOT which unfortunately could only fit limited end-user engagement activities in their work plan, the rest of the four LSPs rated 82.5% satisfaction on average, on the uptake of the tools and services.

However, the general uptake of the tools and services lay below expectations from both the U4IoT and LSPs and frustration exist on both ends:

- LSPs mainly regarding being frequently contacted and "do extra work", unsynchronised timing and efforts;
- U4IoT mainly regarding lack of feedback received from LSPs, limited resources, and the imbalance between efforts spent on developing all tools and services vs. relatively low uptake of results from LSPs.

SUGGESTIONS FOR BETTER INTERACTION WITH THE LSPS

- One alternative to the current U4IoT – LSP – End-users set up, is to allow the U4IoT team to conduct end-user engagement activities for all the LSPs directly. This option allows the skilled to do what they are skilled in and therefore optimise the use of time and resources, i.e. U4IoT focuses on end-user engagement (not just developing tools and training) and LSPs focus on developing proper IoT solutions. The tools and services can remain public to raise awareness and build capacity for end-user engagement at a general level.
- It is more efficient when LSP projects include end-user engagement to start with. It is U4IoT's experience that LSPs with an end-user engagement WP or aspect included in their own work plan tend to be better in sync with U4IoT, compared to the LSPs without such planning. This has several implications for future reference:
 - The LSPs with end-user engagement planning considered it being important and therefore more onboard with the ideas and requests when U4IoT team contacted them (although still suffering from mismatching timing)
 - Resource wise, projects with end-user engagement planning reserved effort and time for that and therefore saw it less as "surprise" or "extra" work when U4IoT team contacted them for activities
 - The LSPs and U4IoT planning during the Call phase shall be more synchronised, for example: 1) highlighting the fact that end-user engagement is an important aspect to be included in the LSPs 2) the Work Plan of LSPs and U4IoT need to be in sync - timing and resources, among others. However, this might need a different approach from the normal proposal preparation process. Currently, different consortia do not "cooperate" with each other at the proposal stage, leaving gaps for collaboration during actual implementation.
- The importance of end-user engagement shall be further advocated at POs and reviewers levels, to support the U4IoT to conduct their activities. U4IoT alone is far too small in size (team and resources) and weak in power/hierarchy compared to LSPs to efficiently convince the latter to collaborate. When LSPs only consider such a topic being additional to their own plan, or need extra effort to coordinate due to different timing/lack of resources, both sides would be frustrated during the communication (as it was the case).
- U4IoT and the PO can work more actively together to address some of the difficulties