Alliance for IoT
and Edge Computing
Innovation

Webinar • 27 June 2023

Presentation of White Paper Replicability and Scalability Assessment Tool

AIOTI

Opening and Welcome

Jara Pascual, AIOTI FG Innovation Ecosystems Chair (Collabwith)

AIOTI

Agenda

Agenda

15.00 **Opening and Welcome (5 min)**

Jara Pascual, AIOTI FG Innovation Ecosystems Chair (Collabwith)

15.05 **Presentation of the paper and recommendations (15 min)**

Pierre-Yves Danet (48d79m Consulting), Paper Editor

15.20 **Presentation of the paper sections (45 min)**

Innovation Ecosystems – Jara Pascual (Collabwith)

Market – Eric Armengaud (Armengaud Innovate)

Sustainability – Alejandro Forned (Universitat Politecnica de Valencia)

16.05 **Questions from the audience (20 min)**

Moderated by Pierre-Yves Danet (48d79m Consulting), Paper Editor

16.25 **Wrap up and end of the Webinar (5 min)**

Jara Pascual, AIOTI FG Innovation Ecosystems Chair (Collabwith)

Presentation of the Paper and Recommendations

Pierre-Yves Danet (48d79m Consulting), Paper Editor

AI TI

Task Force – General Objectives

"The EU aims to create more connected and efficient innovation ecosystems to support the scaling of companies, encourage innovation and stimulate cooperation among national, regional and local innovation actors". European Innovation Ecosystems

Replicability and Scalability are two very important aspects to enable the uptake of R&I project results and bring them to the market

Provide criteria and guidelines to be taken into consideration when we talk about Replicability and Scalability in an EU R&I Project, starting from LSPs (especially in IoT domain and 5GPPP Pilot projects) experiences

Provide a "Replicability and Scalability Assessment Tool" to increase project efficiency and maximise the impact of project results, in line with the EU Commission expectations

Facilitate emerging of **Innovation Ecosystems in EU and their interconnection**

AIOTI

Replicability and Scalability as a process

In line with the work on "**White Paper Supporting Ecosystem Engagement for Sustainable Innovation empowered by IoT and Edge Computing" (led by Eric Armengaud and Jara Pascual)**

Replicability and Scalability of R&I project results, with a particular focus on IoT and Edge Computing solutions, are two enablers of (i) the maximization of R&I project results impact, (ii) the collaboration among several stakeholders operating in Innovation Ecosystems, (iii) the market-uptake.

We can identify three main steps to reach the goals mentioned above, that are part of the Replicability and Scalability Task Force activities:

- **Assessment**. Replicability and Scalability of Assets/Key exploitable results should be assessed during the project life, against several dimensions, that represent key enablers of the replicability and scalability process: i) technical ii) market (market analysis, business model definition, etc), iii) user/stakeholder (user needs analysis, user experience design and usability of solutions, clear instructions on how to use and replicate the solution, etc…) iv) data dimension (GDPR compliance, data security and data quality, etc…), v) IPR, vi) regulatory framework compliance.

- Define **actions/improvements**, aimed to foster replicability and scalability of results. Among other we can mention: i) Early adopters' involvement through experimentation ii) Clustering activities, iii) Open Calls, iv) Local ecosystem involvement v) Scientific publication vi) public presentation vii) networking events
- Use **Platforms** that can support and improve the successful replication of a project results. Platforms, such as IoT Catalogue, Horizon Results Platform, NG IoT, Catalogue NGI.EU, etc…
- **SCoDIHNet** members (DIHs) should become ambassadors of the replicability initiative as they will be very interested to reuse existing use cases and solutions to develop innovations at local level. The assessment tool as defined above will be very helpful as it will facilitate identification of existing use cases/solutions that fit their customer needs and that could be adapt to develop innovations.

REPLICABILITY (definition from Horizon Results Platform)

Replicability refers to the ability of your product, service or business to be replicated and sold and delivered consistently and reliably, to serve (theoretically) infinite customers (multiple markets) the exact same service or product, to the exact same standard every time

KEYWORDS

- Replication
- Consistence
- Reliability
- Multiple markets
- Quality standards of the product

SCALABILITY (definition from Horizon Results Platform)

A result, or rather the business exploiting the result, can be considered scalable if it is able to adapt to the changing needs or patterns of its customers/users and to the increased demand, trends, and needs, even in the face of competition, while remaining profitable and keeping high quality standards. Factors such as the flexibility of technology design, resilience of the supply chain and logistics, the organizational structure of the company and the efficiency of its operations affect scalability.

For investors, scaling is about increasing revenue generated by one unit of resources, or simply put, doing more with less. It is about making the business more efficient and improving its unit economics over time.

Growing, instead, is about acquiring and allocating resources. It is about raising funding and using the funds to recruit sales people or expanding to other geographies. It means adding more fuel to the rocket for it to go farther.

KEYWORDS

- User/stakeholders needs
- Competitors analysis
- Market needs
- Organizational structure of the company (the team)
- Investors
- Financials

AIOTI

Task Force Actions: Design and Develop Replicability and Scalability Assessment Tool

Definition of Replicability and Scalability of R&I project results (literature review, analysis of validation framework in IoT projects)

Define and Validate assessment dimensions and **action**s aimed to foster replicability and scalability of results (with interviews or a second questionnaire, AIOTI+SCOHDINET)*

Identify KPIs for each dimension

Identify a **weighting method**

Tool **Design and Development**

Check with selected projects

Results representation

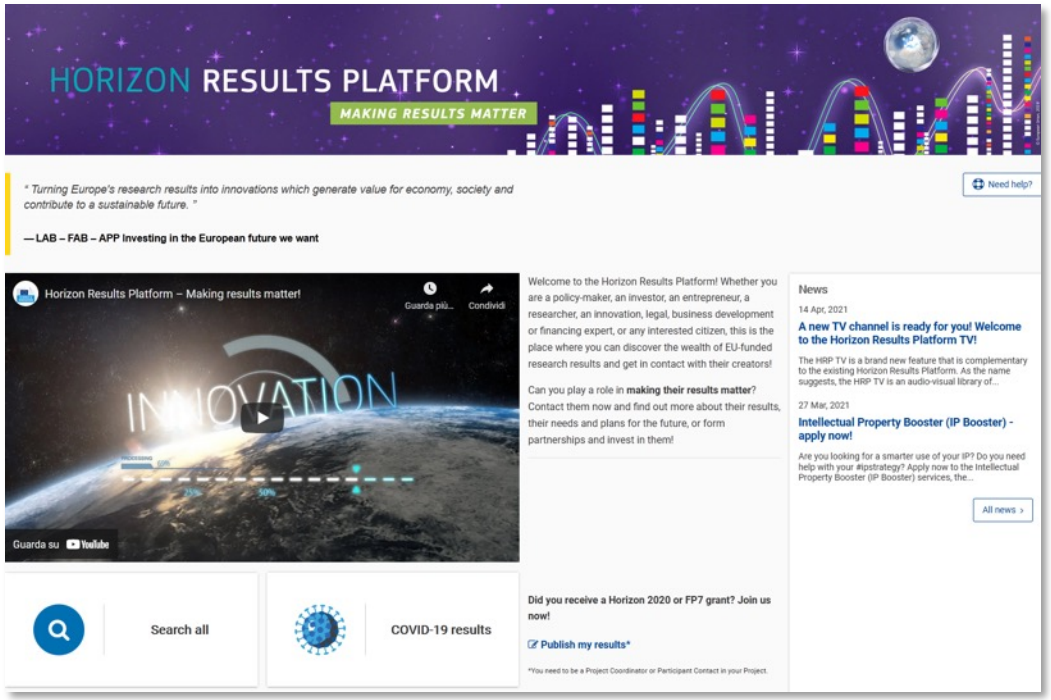
*__Starting point__: results from the questionnaire presented in February during the Bi-Monthly event and during WG Innovation Ecosystems monthly meetings

Expected Results

- REPLICABILITY AND SCALABILITY ASSESSMENT TOOL
- REPORT/WHITE PAPER ABOUT THE INITIATIVE
- PRESENTATION WORKSHOP WITH THE EUROPEAN COMMISSION

ANALISYS OF PLATFORMS THAT COULD BE SIGNIFICANT TO FOSTER REPLICABILITY AND SCALABILITY OF PROJECT RESULTS

The platform was analysed to identify useful elements to foster replicability of project results.



A presentation on the main aspects of the platform was shared during an AIOTI WG Innovation Ecosystems monthly meeting and during a SCoDIHNET periodic meeting

AIOTI

REPLICABILITY AND SCALABILITY ASSESSMENT – THE QUESTIONNAIRE

As part of the on-going Replicability and Scalability initiative, the questionnaire was sent to the AIOTI Community and to 5GPPP pilot projects

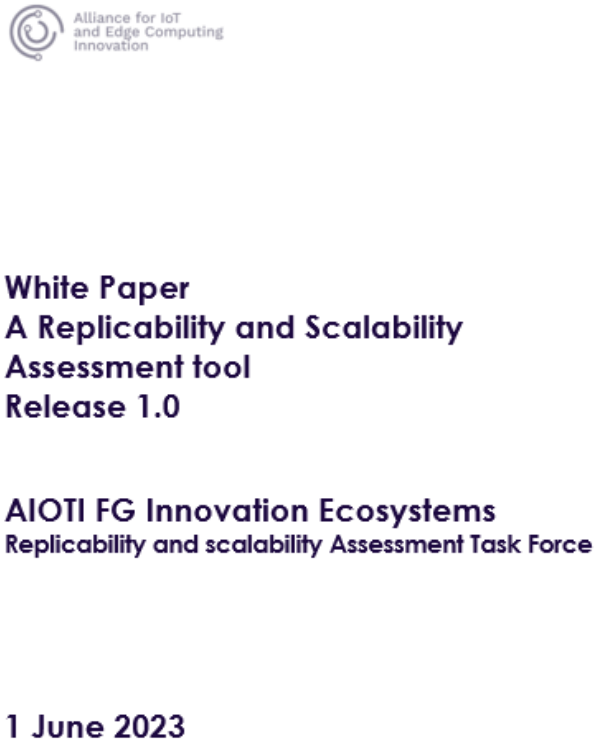
OBJECTIVES

- Collect information about replicability and scalability assessment activities performed (or not performed) in R&I projects
- Identify dimensions for the assessment
- Identify actions to foster replicability and scalability of results
- Understand the awareness and interests of Innovation Ecosystems actors about these topics
- Identify barriers to replicate and scale-up a R&I project result
- Identify tools/platforms that can support and improve the successful replication of a project results

WHITE PAPER ELABORATION

Following the survey and the analysis of the results, the content of the Whitepaper has been designed

- Scope of the AIOTI Replicability and Scalability Task Force
- Definitions of Replicability, Scalability and Sustainability
- The process and the methodology
- Synergies with other Initiatives
- Synergies with other AIOTI Working Groups and initiatives
- Assessment tool dimensions
    - 1/ Technology
    - 2/ Data
    - 3/ Market
    - 4/ Acceptance
    - 5/ Regulation/Policy
- Complementary Replicability topics
    - Ecosystem
    - Sustainability
    - Financial
- The Replicability Assessment tool
- Action Plans



REPLICABILITY & SCALABILITY LEVEL

The 5 dimensions defined in the paper have been used to develop a tool which has the objective to provide a Replicability & Scalability Level

At each question oof the 5 dimensions, we have affected a number of points that will contribute to define the Replicability & Scalability Level. This allocation is today a draft version, it will be review after the test that will be put in place in the next months.

High level of replicability : 61 < LR < 80
Good level of replicability: 31 < LR < 60
Low level of replicability: 00 < LR < 30

Technical dimension	Points
T1: Openness of components	0
T2: Interoperability of components	0
T3: Standardized Data Modelling	0
T4: IoT Platform Interoperability	0
T5: Modularity	0
T6: Compatibility with legacy infrastructure and equipment	0
T7: Updates&Maintenance	0
T8: Standards compliance	0
T9: Communication/Cloud infrastructure	0
T10: Exploitation potential	0
T11: Technical Readiness Level	0
Data dimension	**Points**
D1: Compatibility with data privacy rules	0
D2: Data Modelling	0
D3: Data Security	0
D4: Data Quality	0
D5: Data Asset Management	0
D6: Data Relevance	0
Market dimension	**Points**
M1: Market Analysis	0
M2: Demand Analysis	0
M3: Business model	0
M4: Stakeholder needs Analysis	0
M5: IPR Analysis	0
M6: IP strategy for your solution	0
M7: Solution validated in the market	0
M8: Business Readiness Level	0
Acceptance dimension	**Points**
A1: End-user interface design/usability	0
A2: Implementation instructions and documentation	0
A3: Adoption by DIHs	0
A4: User experience	0
A5: Language	0
A6: Societal Readiness Level	0
Regulation/Policy dimension	**Points**
R1: EU Regulation Compliance	0
R2: National Regulation Compliance	0
R3: EU Policy support	0
TOTAL	0

AI TI

SCoDIHNet REPLICABILITY CATALOGUE

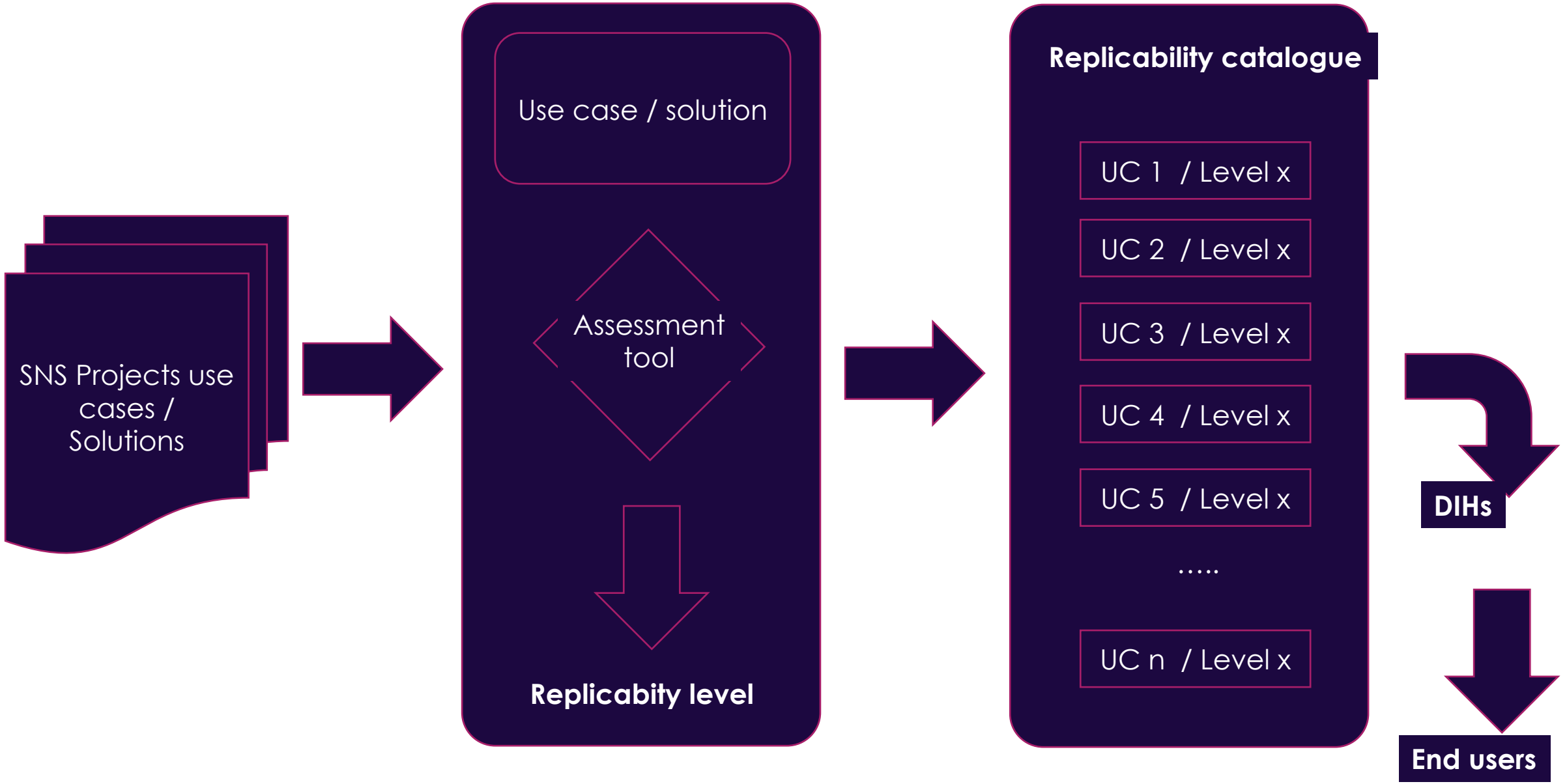
In parallel to the elaboration of the White paper, SCoDIHNet has initiated to populate a catalogue with existing use cases / Solutions which have been developed and experimented by IoT Large Scale Pilot projects and 5G PPP phase 3 experimental projects. It has been completed with the Next Generation Internet enablers that could complement the project solutions.

Today, this catalogue is encompassing around 1200 use cases/Solutions/Enablers covering most of the verticals that are available to DIHs for replication at local level.

The next step is to use the Replicability & Scalability assessment tool to give a Replicability & Scalability Level to each of these inputs. With such information, DIHs will be more comfortable to choose one or the other solution.

Project	Usecases	All Verticals	Industry 4.0	Automotive	Agriculture	Media	Public Safety	Energy	Smart Cities	Transport & Logistics	Healthy Ag
5G PPP projects											
MonB5G	2	2									
TERAWAY	1	1									
5GZORRO	4		1	1	1	1					
5G-EPICENTRE	8						8				
5G-SOLUTIONS	18		5	2		5		2	4		
HEXA-X	5	5									
5G-SMART	3		3								
5G GROWTH	9		5					2		2	
5G-HEART	16				2					6	8
INSPIRE-5GPLUS	2			1					1		
5G-EVE	16		2			1	1	2	4	4	2
5GENESIS	2	1					1				
5G-VINNI	3		1				1				1
5G-CARMEN	4			4							
5G-CroCo	2			2							
5G-MOBIX	1			1							
5G!Drones	2									2	
5G-TOURS	1									1	
5G-VICTORI	1									1	
5G CLARITY	3		2						1		
5G COMPLETE	3						1	1	1		
ADRIADNE	4			1					2	1	
LOCUS	2								2		
5GASP	2						2				
5G-ERA	1		1								
5GMETA	3			2					1		
5G-Blueprint	4			1						3	
5GMED	4			2						2	
5G-LOGINNOV	10			4						6	
5G-IANA	7			7							
B5G-OPEN	1					1					
Smart5Grid	2							2			
DEDICAT 6G	4		1	1		1	1				
MARSAL	4	1	1			2					
5GMediaHUB	3					3					
FUDGE-5G	5	1	1			1	1				1
IoT Large Scale Projects											
MONICA	6								6		
IOF2020	33				33						
THOMAS	2		2								
BENTELER	1		1								
PROPHESY	4		4								
VICINITY	7								5		2
BOOST	8		8								
ICP4LIFE	3		3								
ODINS	1				1						
FAREDGE	2		2								
WAZIUP	3				3						
NGI projects											
DAPSI	992 enablers	26									
ESSIF-LAB	44	44									
NGI ASSURE	114	114									
NGI ATLANTIC	10	10									
NGI LEDGER	66	66									
NGI POINTER	36	36									
NGI TRUST	57	57									
NGI ZERO DISCOVERY	293	293									
NGI ZERO PET	304	304									
ONTOCHAIN	42	42									
TOTAL	1198	11	43	29	40	15	16	9	27	28	14

AIOTI


SNS Projects use cases / Solutions
Use case / solution
Assessment tool
Replicabity level
Replicability catalogue
UC 1 / Level x
UC 2 / Level x
UC 3 / Level x
UC 4 / Level x
UC 5 / Level x
.....
UC n / Level x
DIHs
End users

SMART NETWORK AND SERVICES CALL 1 PROJECTS SURVEY

The 35 projects funded under the Smart Network and Services call 1 have started in January 2023 and a survey has been conducted in order to better understand their respective objectives. One of the question was related to replicability and it appears that 31 among them are ready to develop and provide replicable solutions.

These projects have usually 2-3 years duration, their solutions will be available later on but the proposal is to use the Replicability & Scalability Assessment tool time to time in order to see the evolution of the Replicability Level.

Specifically, all the Stream D (Large-Scale SNS Trials and Pilots) projects have the ambition to deliver replicable solutions

NEXT STEPS

- A Release 2 of the paper will be developed after the first pilots
- Identification of AIOTI members interested to experiment the assessment tool with their solutions
- Organisation of a real pilot with one SCoDIHNet DIH
- Feedback analysis and follow-up strategy (i.e. AIOTI label,)

Presentation of the examples

Jara Pascual (Collabwith)
Eric Armengaud (Armengaud Innovate)
Alejandro Fornes (Universitat Politecnica de Valencia)

Innovation Ecosystems

For a high performing ecosystem is important to know the technology available to be able to adopt it and to collaborate and to co-create and to do business.

ECOSYSTEM & COMMUNITY CANVAS

DATE

Energy flows where your attention goes.

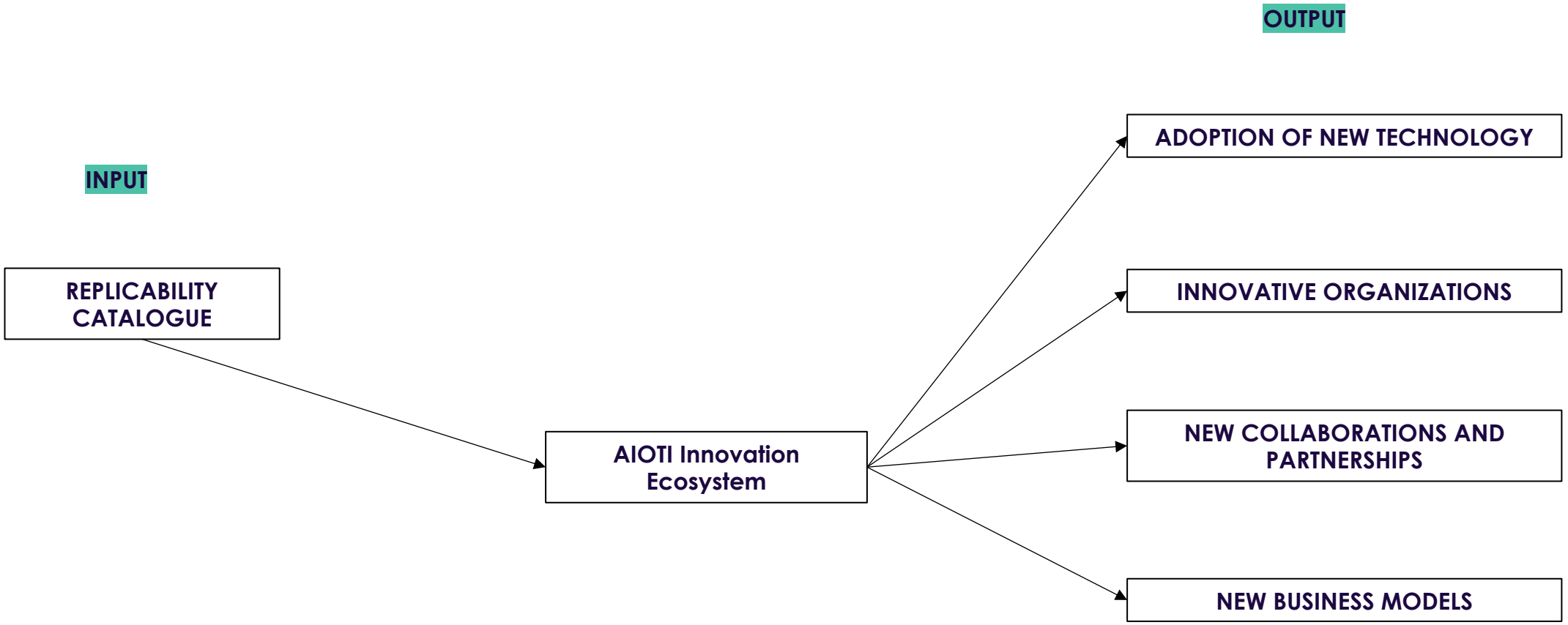
STARTING	PREPARATION	DEFINITION	BONDING
KNOWLEDGE: (which kind of knowledge do you bring to the community and ecosystem?)	ACTIVITIES: (you need to schedule activities to bring people together. The objective is to share information and knowledge and bring value to them)	NEEDS: (define needs and issues your ecosystem and community are facing)	VALUES: (identidy and define values for your ecosystem and community, such as transparency, innovation, collaboration, respect, diversity, etc)
SUPPORT: (how can you help your community and ecosystem?)	PURPOSE: (what is your ecosystem and community theme and purpose? What is the value creation you are creating with your ecosystem and community? Which problems are you solving?)	SOLUTIONS: (what kind of solutions do you need to bring to the ecosystem and community?)	MANIFESTO: (create your own manifesto for the ecosystem and community. Including mission and vision. Choose your SDG (sustainable development gaols) and communicate it!)
ACTORS: (make a list of actors you want to add into your community and ecosystem: corporates, academics, investors, consultants, st tups, universities, policy makers, customers, etc.)	INFORMATION FLO (list the information and e format you want to share: news, events, showcase ex ertise, curated collaborations, etc)	TOOLS: (create groups in social media channels or collabwith channels. aka. Where does your ecosystem and community meet and connect?)	EDUCATION: (what do you have to educate your ecosystem and community with? Innovation, collaboration, open mindedness, your topic, etc.)

COLLABWITH

https://collabwith.co

AIOTI

AIOTI FG Innovation Ecosystems



The rationale

Replicability

KEYWORDS
- Replication
- Consistence
- Reliability
- Multiple markets
- Quality standards of the product

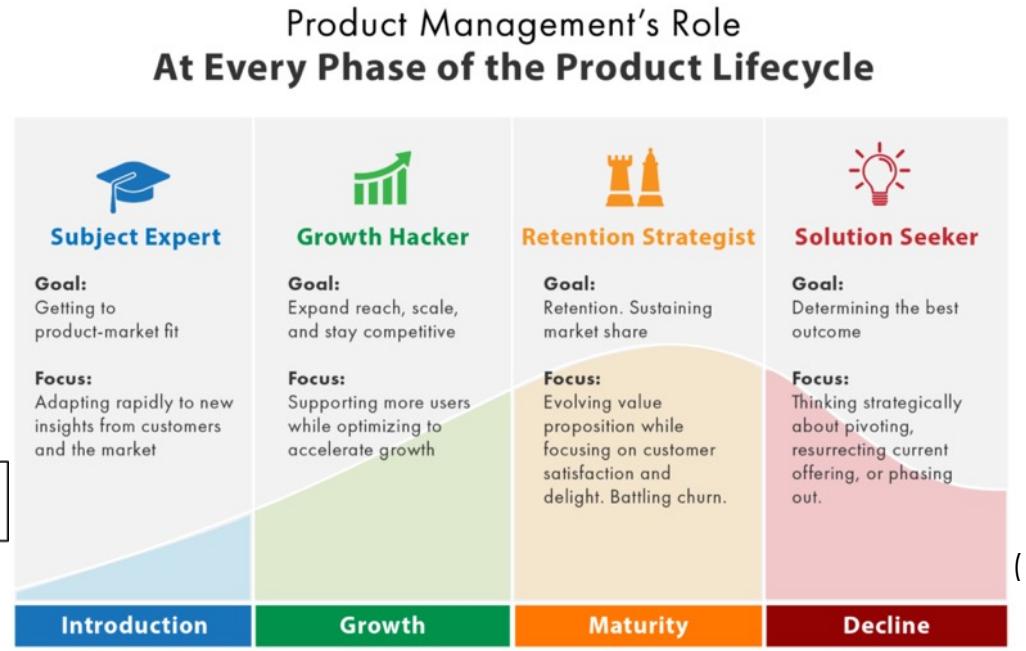
Scalability

KEYWORDS
- User/stakeholders needs
- Competitors analysis
- Market needs
- Organizational structure of the company (the team)
- Investors
- Financials

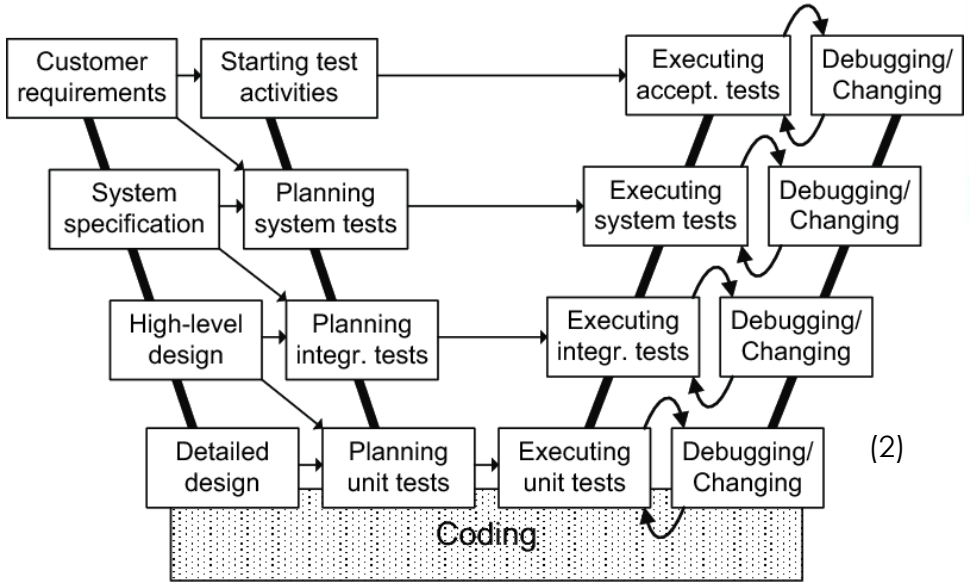
Market maturity – and capability to address the market – is playing a key aspect

Which market maturity do I need

- Uptake and reuse implies different maturities in component development
- Target is to map the system's market expectation with the component's market readiness



(1)



(2)

Source: (1) https://www.productplan.com/learn/product-management-role-product-lifecycle
(2) Damm, Lars-Ola. (2007). Early and Cost-Effective Software Fault Detection - Measurement and Implementation in an Industrial Setting.

Topics addressed

- **M1: Market analysis**
- **M2: Demand analysis**

→ *Confidence that there is a market demand for my solution*

- **M3: Business model**
- **M4: Stakeholder needs analysis**

→ *Confidence that there is the possibility to create / operate the solution in a (financial) sustainable way*

- **M5: IPR analysis**
- **M6: IP strategy for your solution**

→ *Confidence about (a) the freedom to operate, and (b) that my solution won't be copied by a competitor*

- **M7: Solution validated in the market**

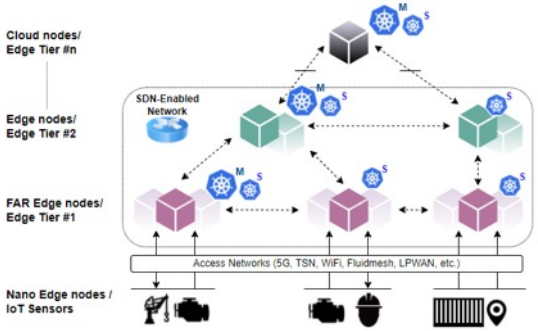
→ *Validation of the solution through the market*

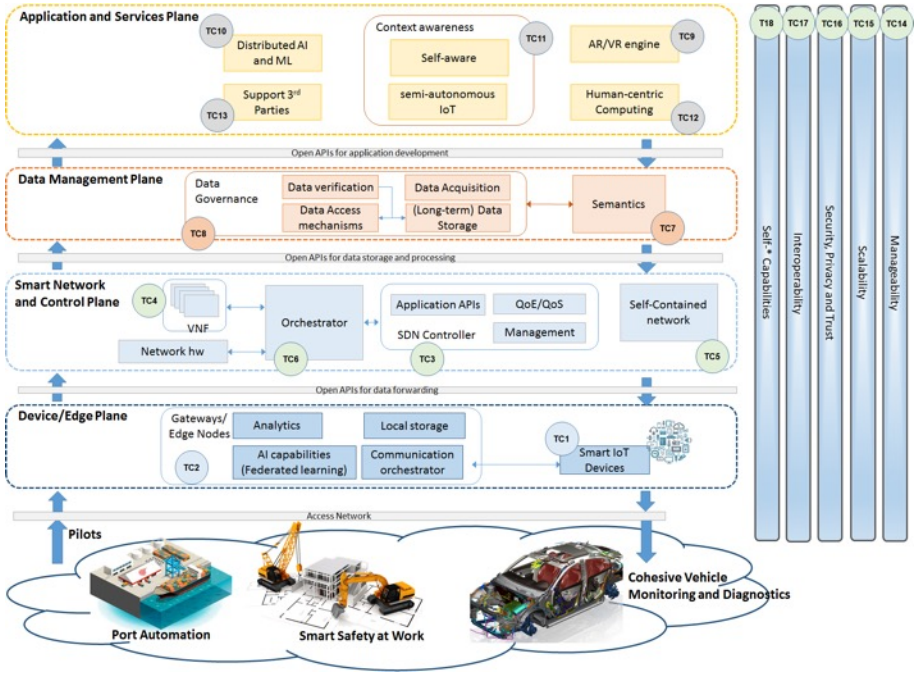
ASSIST-IoT – The Project

assist-iot

"Architecture for Scalable, Self-*, human-centric, Intelligent, Secure, and Tactile next generation IoT"

Call: H2020-ICT-2020-1 // **Topic:** ICT-56-2020
Type of action: RIA // **Duration:** 36 months
Start date: 1 November 2020
Partners: 15 // **Countries:** 7





- Delivering a blueprint NGIoT **multi-plane-oriented architecture**
- Supported by **key enablers** atop a smart network infrastructure, with low latency capabilities
- Transferring **intelligence closer to the edge**

AIOTI

ASSIST-IoT – The Transferability / Adoption potential USE CASES

Tested in highly **heterogeneous environments** to ensure minimization of the risk.

ASSIST-IoT works with **leading industries**.

Different vertical with **diverse market needs**.

Port automation

TERMINAL LINK

Improve efficiency, safety and profitability of new port processes

Smart Safety of workers

Mostostal

Make provisions for predicting potentially dangerous situations in construction

Cohesive vehicle monitoring and diagnostics

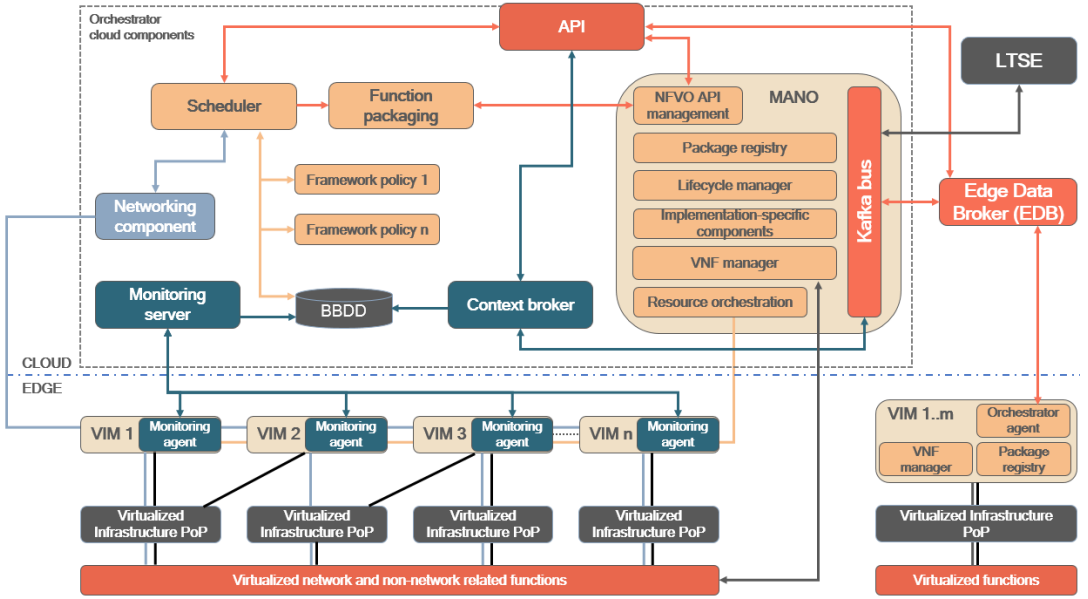
Ford

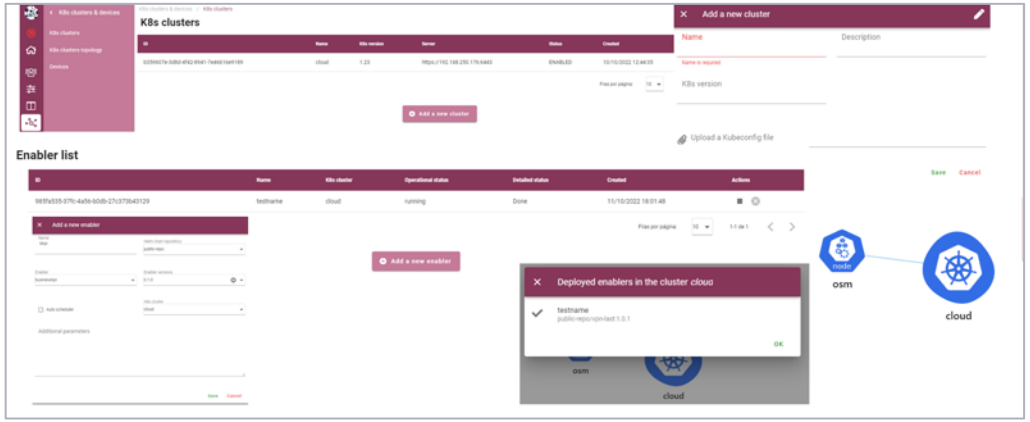
Increase monitoring capabilities in individual cars and at a fleet scale

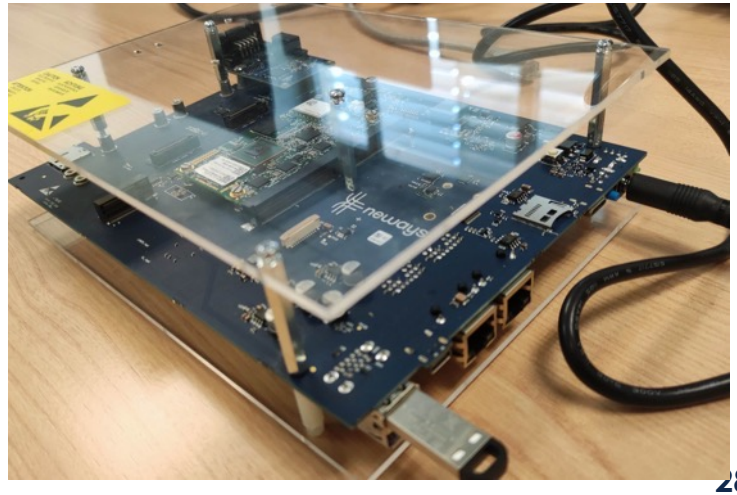
AIOTI

ASSIST-IoT – The Transferability / Adoption potential INNOVATION ELEMENTS

IE id	IE description	IE type	
IE-01	TruckGUI app	SW Platform	WP7
IE-02	UWB Geofencing	HW / SW Platform	WP7
IE-03	Multiwireless ROS	HW / SW Platform	WP4-5
IE-04	eGuided ROS	SW Platform	WP7
IE-05	Workers safety system	SW Platform	WP7
IE-06	MR-based inspection support system	SW source code	WP4-5
IE-07	In-Service emission diagnostic	HW / SW Platform	WP7
IE-08	Enhanced scanner	SW Platform	WP7
IE-09	GWEN	HW	WP4-5
IE-10	ASSIST-IoT service deployment orchestration (ASDO)	SW source code	WP4-5
IE-11	FL System	SW Platform	WP4-5
IE-12	Enhanced Security Center	SW Platform	WP4-5
IE-13	ASSIST-IoT Horizontal Autoscaling (ASHA)	SW Platform	WP4-5
IE-14	Edge data broker	SW source code	WP4-5
IE-15	Enhanced Blockchain as a Service	SW source code	WP4-5







The ASSIST-IoT Replicability Methodology

- **Transferability document** indicating:
  - ASSIST-IoT installation and design for other use-cases/ verticals

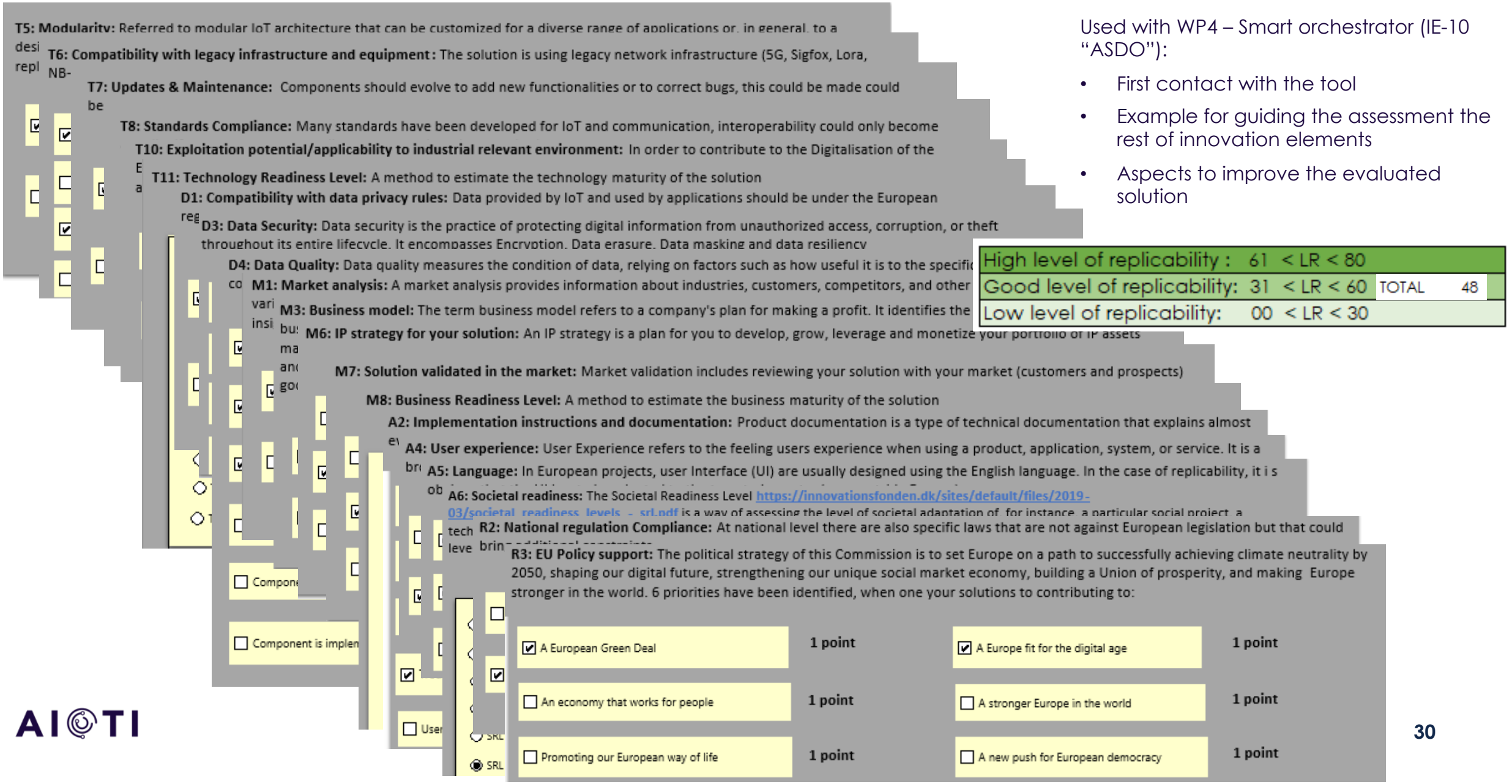
  - Barriers for implementation
  - Application of diverse transferability analysis techniques

1. Collect information about replicability and scalability assessment activities performed (or not performed) in R&I projects
2. Identify dimensions for the assessment
3. Identify actions to foster replicability and scalability of results
4. Understand the awareness and interests of Innovation Ecosystems actors about these topics
5. Identify barriers to replicate and scale-up a R&I project result
6. Identify tools/platforms that can support and improve the successful replication of a project results
7. Active participation in the Replicability initiative of AIOTI

Understand the barriers of each of our selected Innovative Elements
-
Apply a series of tools to those Innovation Elements to weigh their transferability potential

AIOTI

How we have used AIOTI Assessment and Replicability tool so far



Used with WP4 – Smart orchestrator (IE-10 "ASDO"):

- First contact with the tool
- Example for guiding the assessment the rest of innovation elements
- Aspects to improve the evaluated solution

How we have used AIOTI Assessment and Replicability tool so far

- Areas of improvement of the assessed solution (ASDO):
  - Any use of data modelling tool, to formalize the model created
  - Lack of dedicated features related to data consistency and uniqueness
  - Although a market analysis has been performed, business model and stakeholder needs analysis come too late
  - Improvements in the (installation, usage) instructions and FAQ could be made
  - User experience testing of the GUI, checked with design experts BUT not with potential users
  - A thorough analysis of regulation compliance has not been made
- Other aspects, although didn't received highest marks, are not that relevant either (i) for the solution itself, or (ii) for its current development phase.
- Feedback related the replicability tool itself:
  - In general, very intuitive and easy to use by the development team in a short period of time
  - Data, market, acceptation and regulation dimensions seem applicable to almost any IE
  - Some aspects of the technical dimension are a bit particular (T2, T9) to specific platforms or solutions

Next Steps

Step / Month	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
Participation WG Innovation Ecosystems - TF Replicability and Scalability									
Survey #2 to stakeholders feeding barriers for implementation									
Use of AIOTI assessment and replicability tool in rest of IEs									
Evolution of T9.4 impact task									
Feedback to the white paper									
Second assessment with the tool to all the IEs									
Release of ASSIST-IoT transferability document, part of D8.4									

Questions from the Audience

Moderated by:
Pierre-Yves Danet (48d79m Consulting), Paper Editor

AI TI

Wrap up and end of the Webinar

Jara Pascual, FG Innovation Ecosystems Chair

AI TI

Thank you for listening

Any questions?

You can find us at @AIOTI_EU or email sg@aioti.eu

AIOTI