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D4.1 Value-Based Cross-Border Collaborative Public Procurement of Innovation Handbook

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Deliverable Description
This deliverable acts as a comprehensive public practical guide, consolidating the Value-Based Procurement methodology. It is designed to share the knowledge, lessons learned, and good practices generated throughout the initiative to facilitate the replication of the RaDAR-PPI model by other European public procurers. The document emphasizes how PPI can be used as a strategic tool to strengthen health systems and promote results-based reimbursement models.

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ABBREVIATIONS AND ACRONYMS

AMR	Antimicrobial Resistance
ASB	Anti-superbugs
AQuAS	Agència de Qualitat i Avaluació Sanitàries de Catalunya
BG	Biogipuzkoa
CfT	Call for Tender
CMPSB	Consorci Mar Parc Salut Barcelona
CPB	Central Purchasing Body
CSC	Consorci de Salut i Social de Catalunya
DIBI	Biomedical and imaging Diagnostic Network
EC	European Commission
EU	European Union
HIS	Hospital Information System
HMAR	Hospital del Mar
HRI	Health Research Institute
ICO	Institut Català d'Oncologia
INSERM	Institut National de la Santé et de la Recherche Medicale
INSME	International Network for SMEs
IPR	Intellectual Property Rights
KPI	Key Performance Indicator
LIS	Laboratory Information System
LRC	Laboratori de Referència de Catalunya
MDRO	Multi-drug resistant microorganism
MSP	Market Sounding Prospectus
OMC	Open Market Consultation
PCP	Pre-commercial Procurement
PIN	Prior Information Notice
PPI	Public Procurement of Innovation
RaDAR	Rapid detection and control system for Antimicrobial resistance
R&D	Research and Development
ToC	Theory of Change
TRL	Technology Readiness Level
UNINA-DISAP	University of Naples Federico II, Department of Public Health
WP	Work Package

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Table of contents

Co-funded by the COSME programme
of the European Union

List of Figures

Co-funded by the COSME programme of the European Union

1. Executive Summary

The **RaDAR-PPI project** (Rapid Detection and Control System for Antimicrobial Resistance - Public Procurement of Innovation) is a 54-month initiative co-funded by the European Union's COSME programme. Its aim is to address **Antimicrobial Resistance (AMR)**, a global health challenge associated with high healthcare costs and mortality. Through a **value-based, cross-border collaborative procurement** model, five buyer organizations from Spain, France, and Italy jointly identified, procured and implemented innovative solutions for rapid detection and infection control.

This Handbook brings together the main lessons learned from the RaDAR-PPI experience. It is designed as a practical guide for public procurers, economic operators, and policy makers who wish to replicate or adapt this model in other European contexts.

The procurement process in RaDAR-PPI followed the value-based permeability methodology, based on the theory of change, which treats innovation adoption as a system-wide transformation rather than a standalone purchase. To ensure that the contracts are permeable to value and this is maintained throughout the contract lifecycle, the project embedded clinical and organizational outcomes directly into technical requirements and payment mechanisms.

The Handbook summarizes insights from key stakeholders across the different phases of the project:

- **Preparation Phase:** Buyers emphasized the importance of clearly defining the needs to ensure an effective dialogue with the market, as well as the necessity of early engagement with multidisciplinary clinical and IT teams. Economic operators considered the Open Market Consultations (OMC) highly useful to understand buyer expectations, yet expressed concerns regarding a gap between the high innovative ambitions of the project and the current Technology Readiness Level (TRL) of available solutions. Policy makers and payers viewed this phase as essential for sharing risks and sending a clear and coordinated demand signal to the market.
- **Procurement Phase:** Buyers identified administrative and legal complexities as a key factor during procurement slowing down the process. Economic operators reported barriers such as short submission periods and a lack of clarity in some awarding criteria. From a regulatory perspective, the need for more flexible procurement frameworks that support value-based negotiation rather than focusing just on the lowest price was emphasized.
- **Implementation Phase:** Buyers faced significant challenges related to IT integration, which often required more time than initially planned. Economic operators emphasized that for rapid detection technology to be effective, clear clinical pathways, including clear decisions on who to screen and when, must be defined and agreed upon by all stakeholders from the start. Policy makers pointed out that wider adoption of these solutions will depend on strong evidence of clinical impact, economic benefits, and smooth integration into existing healthcare workflows.

2. Introduction

This Handbook constitutes Deliverable D4.1 of the **RaDAR-PPI** project (Rapid Detection and control system for Antimicrobial Resistance-Public Procurement of Innovation). RaDAR-PPI is a 54-month project, coordinated by Agència de Qualitat i Avaluació Sanitàries de Catalunya (AQuAS), which began on January 1st 2022 and is co-funded by the COSME programme of the European Union.

Antimicrobial Resistance (AMR) is a rapidly growing challenge in Europe, and the RaDAR project aims to address the urgent need for rapid detection and effective infection control. Globally, AMR is already the third leading cause of death, and if current trends continue, it could result in up to 10 million deaths per year by 2050. AMR is therefore one of the most pressing issues on the EU's political agenda, with annual costs estimated to exceed 1.5 billion euros in healthcare expenses and lost productivity.

To address this threat, RaDAR-PPI implements a value-based, cross-border collaborative procurement of innovative solutions. The initiative involves a cross-border Buyers Group consisting of five procurement organizations from Spain (ES), France (FR), and Italy (IT). This collective approach promotes innovation by enabling a coordinated response to the AMR problem across the European Union.

2.1 Objectives

The primary purpose of this Handbook is to share the knowledge generated throughout the RaDAR-PPI initiative. It serves as a comprehensive **public practical guide** that consolidates the methodology used at the project and also the lessons learned, good practices, and recommendations derived from the Buyers Group's, the economical operators' and policy makers' experience across the entire procurement process.

The information gathered is organized to describe in detail the definition and explanation of the principles of the Value-Based Cross-Border Collaborative Public Procurement of Innovation model.

By publicly disseminating this practical guide, the project seeks to ensure that other public procurers can utilize Public Procurement of Innovation (PPI) as a tool to foster innovation and effectively address societal challenges, particularly in the health sector.

The objectives embedded within the creation and dissemination of this Handbook are to:

1. **Facilitate Replication:** Provide information for the replicability and improvement of the RaDAR-PPI project, allowing other European public procurers to follow the implemented Value-Based Cross-Border Collaborative PPI model.
2. **Strengthen Health Systems:** Showcase how PPI can contribute to strengthening and increasing the resilience of health systems, improving health outcomes.
3. **Promote Value-Based Models:** Contribute to the development of new reimbursement and financial models with payments based on results.

3. Value based procurement methodology

3.1 Transformation: adoption of innovation

Value chain and Theory of change

The adoption of innovation in health systems is understood as a process of systemic transformation. This implies a transformation of specific elements of the healthcare delivery system. Those elements that are not known yet and depend on the context of the innovation and only fully defined once the innovation and its settings are understood. Adopting a new solution is therefore not just a technology acquisition, it involves the modification of healthcare delivery process to incorporate better practices within a specific context.

Because of this, any successful transformation must be built around a comprehensive value chain that integrates all stakeholders involved. This includes patients and citizens, healthcare professionals, healthcare providers, health system payers, and also the broader socio-economic and environmental dimensions. This transformation is normally a collaborative effort with the technology provider. Thus, the demand side (those defining the needs) works closely with the supply side (those delivering the innovation) to ensure that the final transformation effectively addresses the identified needs.

To structure and guide this transformation, we apply the **Theory of Change (ToC)** methodology[1]. The ToC follows a reverse-engineering logic, starting from the long-term impact we aim to generate in the health system. From there, the mid-term outcomes required to achieve this impact are identified, followed by the short-term outputs that are necessary to sustain the generation of the outcomes and the impact. Then, we also define the inputs (including the actors involved in this transformation, organizational characteristics, existing infrastructure, and professional skills and knowledge) and map the activities necessary to enable the desired final transformation.

In addition, within the PiPPi project methodology[2], a set of challenge-agnostic outcomes were identified. These standardized result categories are applicable across diverse clinical and organizational challenges, allowing transformation projects to be planned by identifying which results are reachable in the short, mid, and long term for each stakeholder across the value chain.

[1] Alessandrello, R., Arrizabalaga Garde, I., Meis Piñeiro, U., Elizondo Cordero, O. A., Sanchis-Amat, M., & Maspons, R. (2021). Theory of change, neutral results with respect to the type of unmet needs and permeability of public procurement of innovation to value in the field of health. Annals De Medicina, 104, 164-167. https://doi.org/10.5281/zenodo.17525136

[2] Arrizabalaga, I., Alessandrello, R., Meis, U., Maspons, R., & project group, P. (2020). PIPPI: D5.4 A core set of outcomes indicators. Zenodo. https://doi.org/10.5281/zenodo.15527571

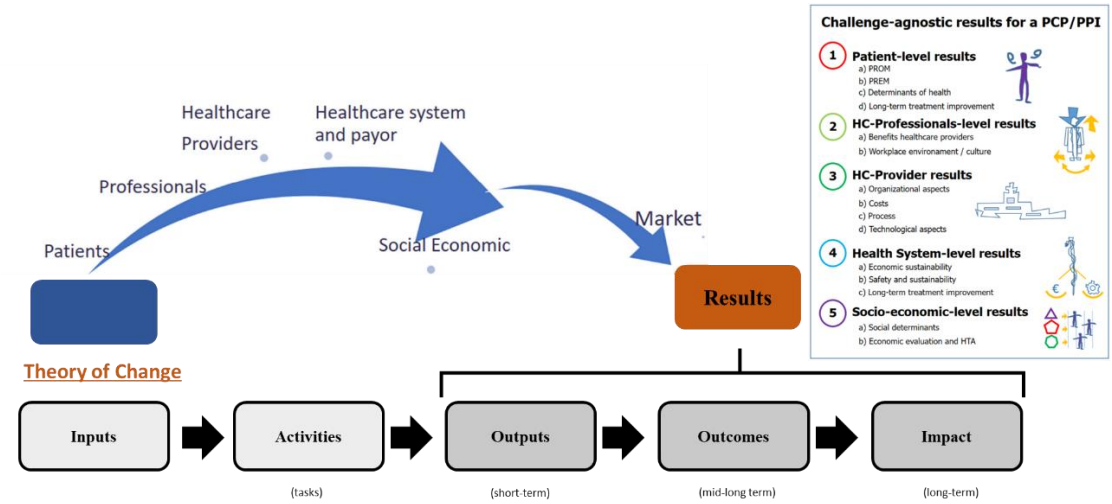

Figure 1. Transformation: adoption of innovation

3.2 Adoption Pathway – Transformation Readiness Assessment

Each time a transformation is defined, its current **maturity level** must be assessed in order to understand the level of risk involved and to determine the most appropriate next steps. This readiness is categorized into three levels:

- **Level 1. From design to Proof of Concept:** The innovation is in the Research and Development (R&D) phase. Activities typically focus on testing the core concept within a single healthcare provider to assess its feasibility.
- **Level 2. From early adoption to multi-health provider or health system adoption:** The idea has moved past the laboratory and is being used by one or more early adopters or within a local health system. At this stage, the focus is on proving that the innovation works in a real healthcare settings.
- **Level 3. From one health system adoption to multi-health system scale up:** The solution has reached sufficient maturity to be adopted across multiple health systems and scaled up for widespread use.

At each level, the organization adopting the innovation must carefully determine its current position and evaluate the transition to the next level. This assessment ensures that the risks taken are justified, the resources are appropriately allocated, and that every action performed is relevant and aligned to the stage of the project.

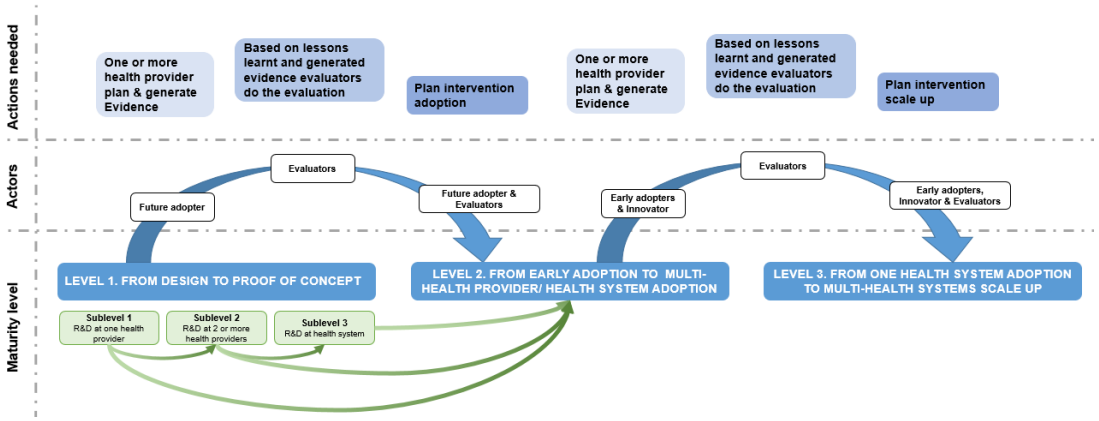

Figure 2. Adoption and scale-up Evaluation Framework for innovative interventions assessment[3]

3.3 Adoption Pathway – Business Case

The Business Case[4] gathers the information to allow the decision makers to judge if a project is desirable, viable and achievable, and therefore worthwhile to invest in. It is a document[5] that provides contextual information to decision makers about the costs and benefits of an intervention, the strategic alignment and/or the business problems that the intervention aims to solve.

Once the transformation objective and maturity level are clearly defined, the most appropriate adoption pathway can be identified by analysing the balance between value, risk, and evidence. This balance is often represented through a three-axis framework (Figure 3).

When a transformation requires taking significant risk because the value to be achieved is clear but the pathways for delivery and adoption are not yet well understood (meaning that the preparedness is low and risk is high), the project is positioned within the Research & Development domain and typically addressed through **Pre-Commercial Procurement (PCP)**. At this stage, the level of preparedness of both the actor adopting the value and the actor delivering the value is low.

On the contrary, when robust evidence has already been generated, uncertainty is well managed, the value wanted to achieve is clearly defined and the preparedness for both delivery and adoption of the innovation is high, the solution is ready for **regular public procurement**. In this case, the level of preparedness of both the value adopter and the value deliverer reaches its highest level.

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[3] Prats Balado, C., Castellano, J. M., Solís Díez, G., Mias, R., Molina-Barceló, A., Romeo Cervera, P., van Schaik, L., Retèl, V., Valls-Comamala, V., Maspons, R., & Alessandrello, R. (2025). D3.4 Evaluation Guide Report (V1.1). Zenodo. https://doi.org/10.5281/zenodo.15349266

[4] Prince2

[5] European Commission: Directorate-General for Digital Services, *PM² Project management methodology –Guide3.1*, Publications Office of the European Union, 2023, https://data.europa.eu/doi/10.2799/970188

Positioned right in the middle from PCP to regular procurement is **innovation procurement**. This intermediate phase allows for the generation of evidence needed to support and validate that the proposed transformation effectively addresses the identified needs and achieves the results defined in the Theory of Change. Throughout this phase, the level of preparedness of both the value adopter and the value deliverer progressively increases in line with the evidence generated.

Thus, preparedness refers to the readiness of both the value adopter and the value deliverer to deliver and adopt the innovation, and increases progressively as evidence is generated along the adoption pathway.

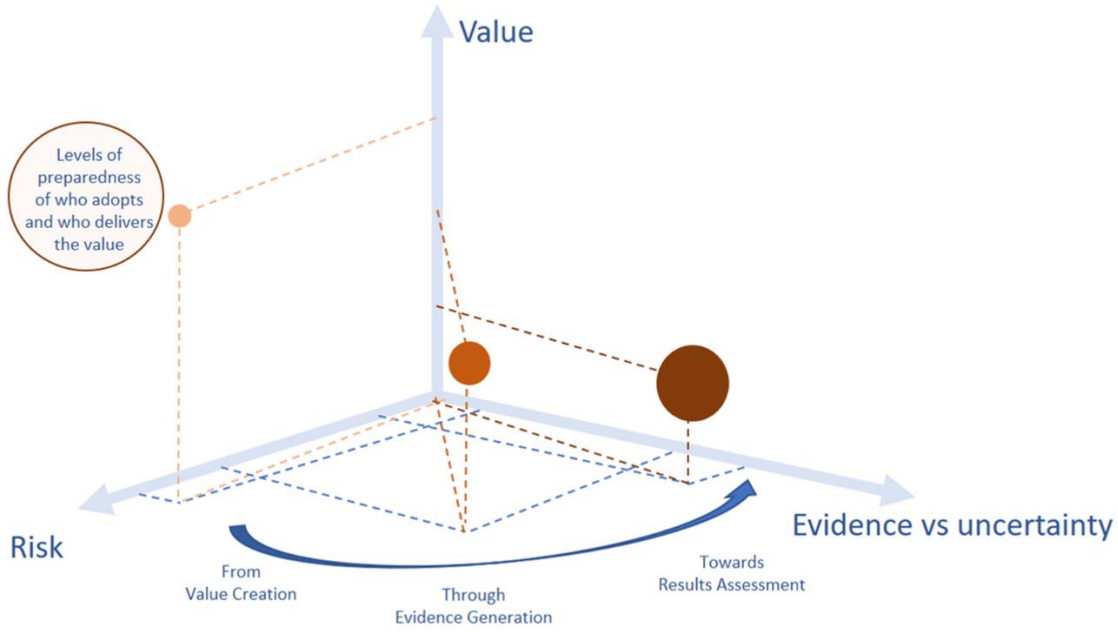

Figure 3. Analysis of Value vs. Risk vs. Evidence and Readiness

3.4 Adoption Pathway – Public Procurement of Innovation

Definition of Value-Based Procurement: from needs to reimbursement

The definition of a value-based procurement process is structured around four horizontal and overlapping blocks:

1. **Future and early adopters' needs desirability assessment:** The process begins with the identification and definition of the problem and unmet needs. This includes validating these needs, prioritizing of the requirements, and building a business case or rationale for investment.
2. **Innovators' readiness and feasibility assessment:** This block focuses on the evaluation of the readiness of innovators and assessment of their feasibility to deliver solutions that address the identified needs. Activities typically include horizon scanning, state-of-the-art analyses, and open market consultations to understand the market maturity and available capabilities.

3. **Future and early adopters' feasibility and viability evaluation:** Once the needs, the business case or the rationale behind taking a risk and making an investment, and the readiness of the market are clear, it is the moment to look at the readiness of the adopting organisation. This involves assessing whether the organisation is capable of managing the risks associated with procurement. Key elements include the challenge brief, the value-based procurement strategy, governance structures for decision-making and risk-sharing, and the competition design. Based on this evaluation, one of the following procurement approaches is selected:
    a. Unbundled approach: R&D agreement / PCP followed by PPI
    b. Bundled approach: Innovation Partnership
    c. Public procurement of Innovation
    d. Regular public procurement
4. **Reimbursement Schemas:** In collaboration with the payer, decisions are made regarding how the innovation will be funded. Options may include price and reimbursement, risk-sharing, payment for results, or other innovative payment agreements.

This structure ensures that the total value is taken into account and not only the price. It is important to note that these blocks do not follow a strictly linear sequence but rather overlap and interact. For example, considerations related to reimbursement and the role of the payer must be incorporated from the early stages of needs assessment to ensure alignment across the entire value chain.

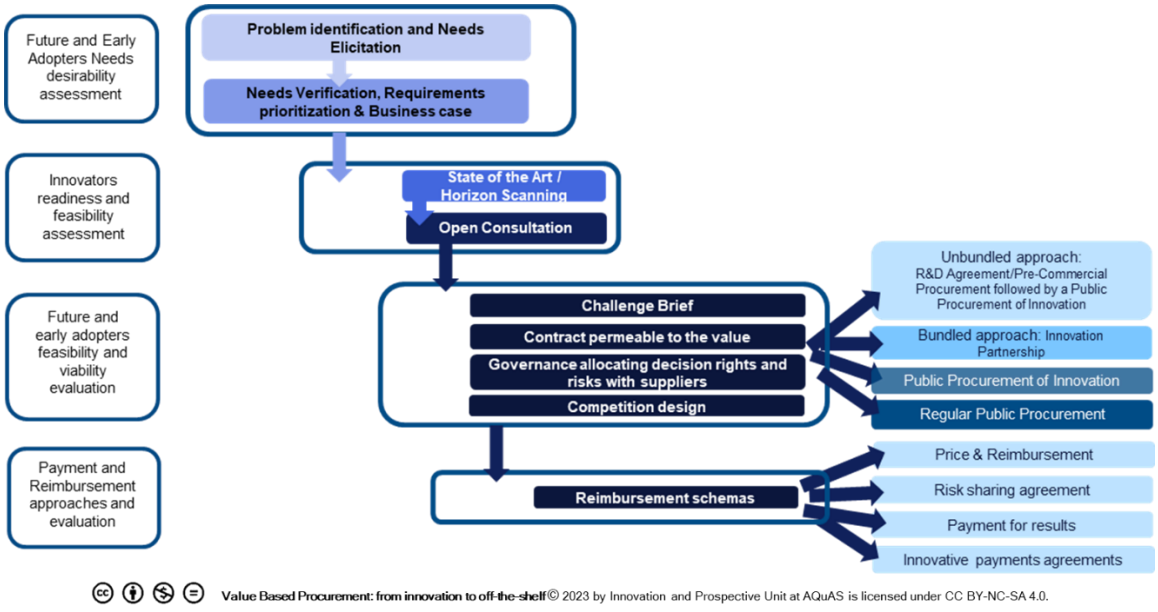

Figure 4. Value Based Procurement: from innovation to off-the-shelf

3.5 Methodological approach: contracts permeable to value

To ensure that value is effectively generated and sustained, contracts must be permeable to value. This means that value has to be explicitly embedded in all the contractual elements, including the definition of object of the contract and requirements, the awarding criteria, contract monitoring and payment schemas, the templates the bidders will need to submit when

presenting and offer to the tender, and in the expertise required to evaluate the bids and the contract monitoring (knowledge needed, competences).

Furthermore, all elements defined in the Theory of Change must be reflected in the contract, involving outcomes across the whole value chain (patients and citizens, healthcare professional, healthcare providers, the health system, and socio-economic and environmental impact). By embedding these dimensions into the contractual framework, the risk of losing intended outcomes and value during contract implementation is minimized, ensuring alignment throughout the contract lifecycle.

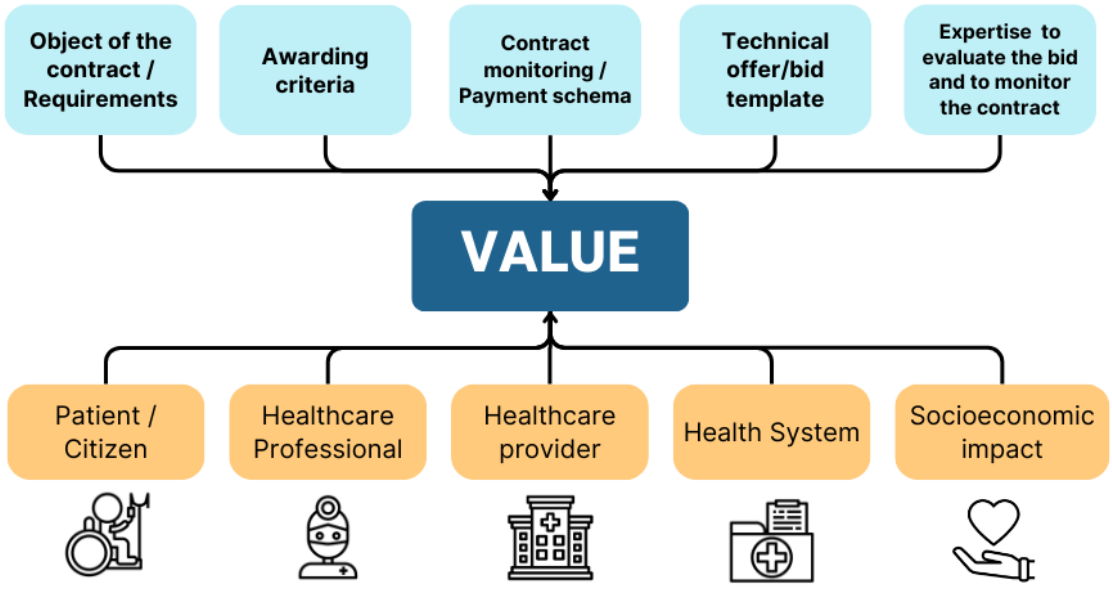

Figure 5. Contracts Permeable to Value[6]

3.6 Evaluation

The final component of the methodology is evaluation, which is a core component and goes beyond verifying contractual compliance. It is designed as a structured process that goes from the identification of needs to market engagement, contracting, and policy learning, ensuring that value generation is assessed across the entire transformation. It includes two key evaluation moments:

- **Initial evaluation**, focused on needs. As value-based procurement is fundamentally needs-driven, this phase assesses if the identified needs were well defined, justified, and prioritized, and if they are aligned with the objectives and stakeholder expectations across

[6] Alessandrello R., Valls-Comamala V Arrizabalaga I., Meis-Piñeiro U., Elizondo-Cordero O., Maspons R., Anna Garcia-Altés. Permeability to value: a methodological framework for designing demand-driven value-based innovation procurements and its application. *Under peer-review*

the value chain. The viability of the project is also assessed at this stage.

- **Final evaluation,** focused on assessing the results achieved through the contract and the broader transformation generated. This includes evaluating if contractual outputs and outcomes have been delivered as expected, as well as assessing the value generated for different stakeholders in the value chain. In addition, interviews with buyers, contractors, and policymakers are conducted to understand the contribution of the project to organizational learning, policy objectives, and long-term sustainability.

In addition to these two key moments, the methodology considers the progressive evaluation of contractual results throughout implementation. This includes the assessment of intermediate and final outputs and outcomes, taking into account the intended impact defined in the Theory of Change and the transformation objectives pursued.

By structuring evaluation from an initial needs and viability assessment to a final evaluation involving the market, contracts, buyers, economical operators and policymakers, the entire process is assessed, ensuring coherence and evidence generation.

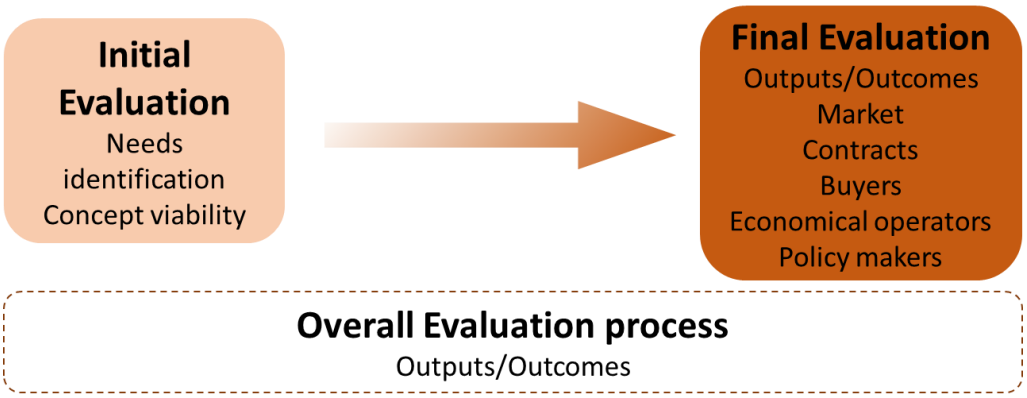

Figure 6. Evaluation

4. RaDAR General Information

4.1 The RaDAR project and consortium

The RaDAR-PPI project aims to address the urgent European need for an improvement in the rapid detection and effective infection control system for antimicrobial resistance (AMR) by implementing a value-based cross-border collaborative procurement of innovative solutions. RaDAR-PPI is a cross-border project with a consortium composed of five Buyers and six supporting entities from four different countries (Spain, France, Italy and United Kingdom).

RaDAR's cross-border Buyers Group is composed of four public organisations and one private entity operating as a public organisation from three European countries (France, Spain and Italy). These five organizations are collaboratively working to act as early adopters and promote innovation, through the identification, evaluation and procurement of innovative solutions that will address their common needs, as well as the particularities of each institution. Complementarily, six diverse and carefully selected supporting entities ensure that the Buyers Group execute a procurement of innovative solutions that meet both consortium and individual needs.

RaDAR Buyers' Group represent various types of organizations with different procurement expertise, including:

1. **Resah**, a central purchasing body based in France that acted as early adopter and procurement dissemination channel. Resah works with over 700 public and private non-profit establishments, ensuring the scalability and high impact of the solution.
2. **Università degli Studio di Napoli Federico II, Department of Public Health (UNINA-DISAP)**, deploying the innovative solution within the general university hospital Federico II (Italy). Experts in Public Health with experience in providing high specialty diagnostic services to local health agencies, hospitals and other public and private organisations in the Campania region.
3. **Institut Català d'Oncologia (ICO)** is a specialized oncology hospital in Catalunya (Spain). ICO also coordinates the VINCat Program, the regional surveillance system for healthcare-associated infections.
4. **Laboratori de Referència de Catalunya (LRC)** is a reference laboratory in Catalunya (Spain) that functions as a public entity buyer. LRC offers to affiliated centres, hospitals (like Hospital del Mar (HMAR), an associated general hospital) and health facilities, access to highly specialized services, technology and rapid response, availability of qualified professionals, as well as a wide catalogue of tests in all areas of Laboratory Medicine. HMAR acts as the supporting pilot entity where the innovative solution is implemented and the results are clinically evaluated and monitored.
5. **Biogipuzkoa Health Research Institute (BG-HRI)**, is an accredited research institute from the Basque Country (Spain) that possesses the structure to manage translational research and innovation in medical technologies. BG-HRI's unique role as a buyer involves procuring a tool specifically designed to evaluate, exploit, and optimize the RaDAR solutions already implemented by the other procurers.

In addition, the supporting entities are crucial partners that provided expertise and strategic continuity across the RaDAR project. **AQuAS** (Agència de Qualitat i Avaluació Sanitàries de Catalunya) served as the project coordinator and evaluation agency, responsible for defining the value-based evaluation framework and monitoring contract execution. **INSERM** (Institut National de la Santé et de la Recherche Medicale) contributed specialized knowledge on Antimicrobial Resistance (AMR) and One Health strategies, leveraging its experience as a coordinator of the EU-JAMRAI and EU-JAMRAI-2 initiatives. **JERA** Consulting LTD provided expertise in innovation procurement and market engagement, coordinating the Market Readiness Assessment and capacity building events. **INSME** (International Network for SMEs) led communication and dissemination efforts, working to ensure European SMEs had access to the public tenders. Finally, the Catalan entities **CSC** (Consorci Salut i d'Atenció Social de Catalunya), a major purchasing and innovation support organization that supported the project through legal and innovation advice, and **HMAR** (Hospital del Mar), the associated general hospital where the LRC pilot implementation takes place, provides critical local support and execution capacity.

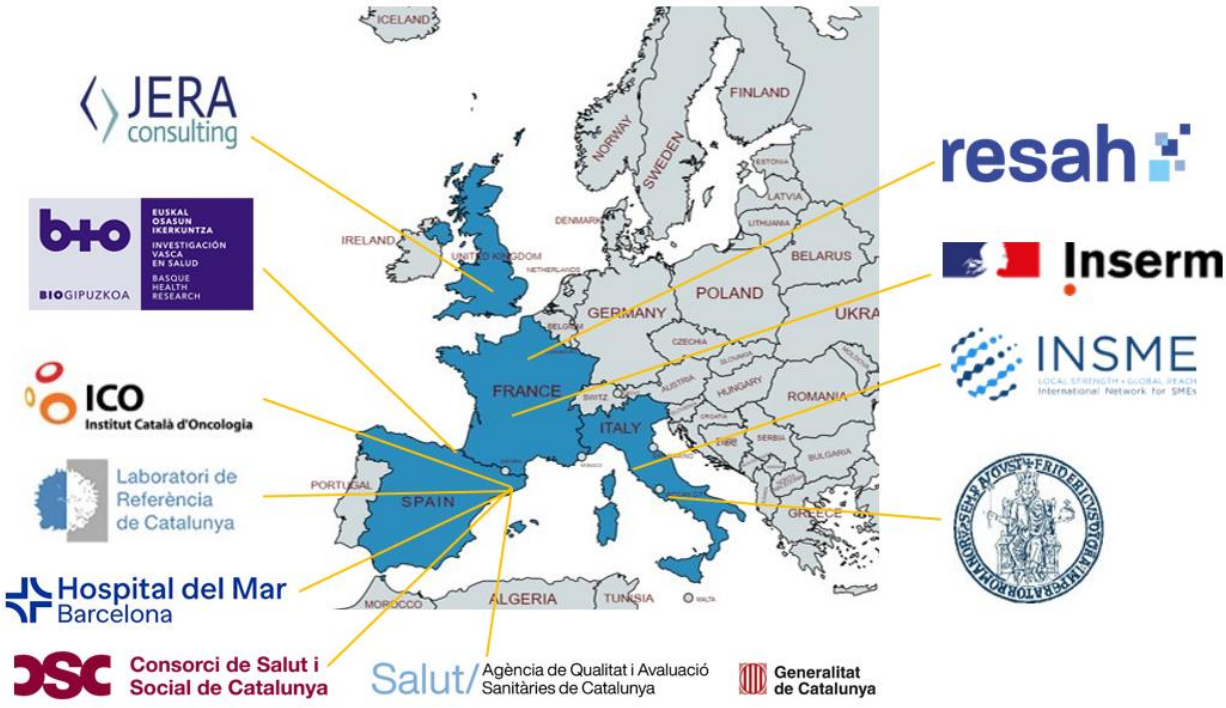

Figure 7. RaDAR Consortium

4.2 Value-Based procurement methodology: application to RaDAR-PPI

4.2.1 Transformation: Adoption of Innovation

Innovation adoption in RaDAR was approached as a **systemic transformation** aimed at enhancing infection prevention and control, antimicrobial resistance (AMR) management, and treatment appropriateness. The transformation integrated all relevant stakeholders (patients, healthcare professionals, providers, the health system, and socio-economic and environmental dimensions) following the Value-Based Permeability methodology and the Theory of Change (ToC) framework.

RaDAR partners developed a common ToC (Figure 8) starting with the desired long-term **impact** that the buyers were aiming to achieve. Followed by the **outcomes** necessary to drive the desired *impact*. Then, the **outputs** were more tangible results, also measurable, necessary to reach the desired *outcomes*. And similarly, the **activities** represented specific set of tasks that needed to be undertaken in the short term in order to build the *outputs* that will lead to the *outcomes* and the *impact* of the intervention. The set of activities required some **inputs** in the process, the feeding elements within the buyers' institutions that allowed economic operators to provide the right set of elements to set up a proposal for an innovative solution to tackle the RaDAR buyers' unmet need.

The need to enhance infection prevention control and stewardship, AMR management, and treatment appropriateness was defined as the final impact. To address this need, the outcome was to advance towards an integrated and intelligent management system that improves the management of patients, pathogens, samples, and prescriptions. Thus, the short-term results (outputs) of RaDAR were the improved and clear data visualization and communication for patient, pathogen, sample and prescription management and the support to healthcare professionals for pathogen and onsite management. To this end, the activities were classified into four different groups considering the areas of intervention and the ability of the economic operators to respond:

1) Detection of multidrug-resistant microorganisms (MDROs): Innovative systems for rapid and precise detection.
2) Training and support: Programs for healthcare professionals.
3) Access to information, visualization, and data aggregation: Development of tools to facilitate analysis and decision-making.
4) Interoperability: System integration to ensure efficient information flow between different platforms.

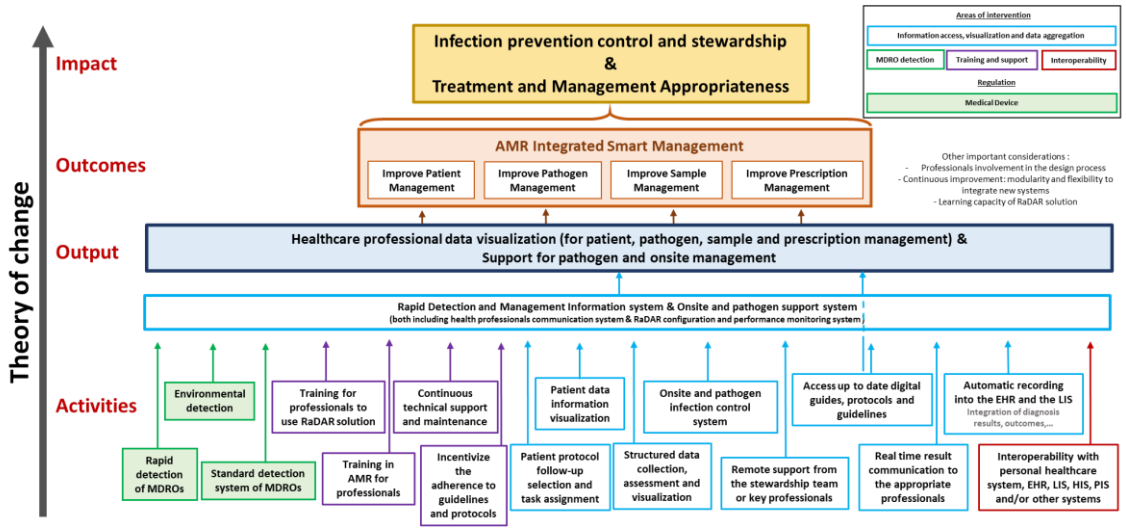

Figure 8. RaDAR common Theory of Change

Each buyer included some of the analysed activities, according to the specific needs detected in each region. Thus, not all activities were included in every procurement process.

As a summary, **Resah** (Figure 9) operates as a central purchasing body and its ToC focuses on MDRO detection, training and support to professionals using the solution, all the activities related to information access, visualization and data aggregation and interoperability.

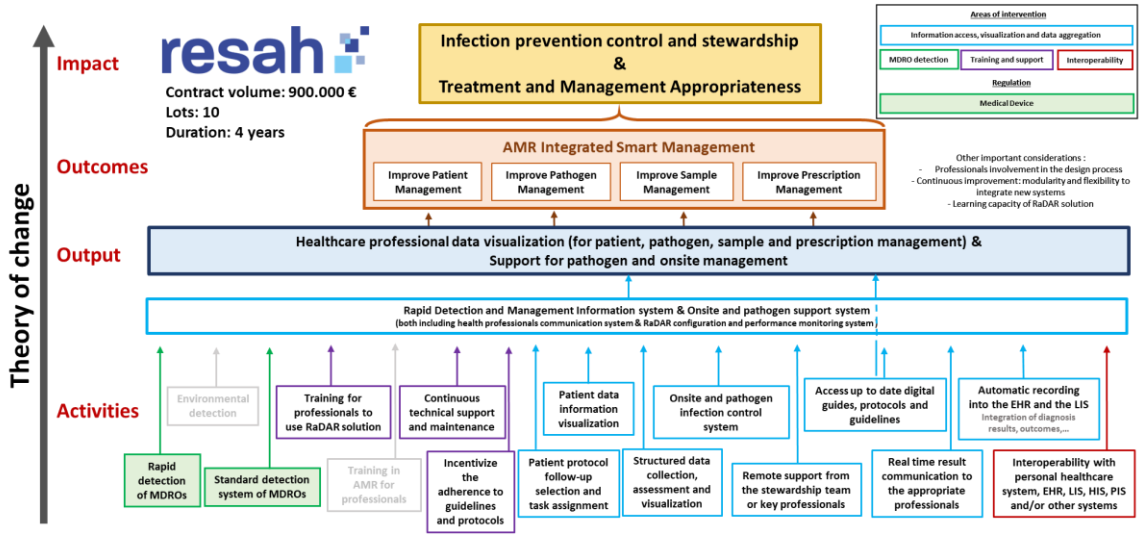

Figure 9. Resah's Theory of Change

UNINA-DISAP (Figure 10) aimed for an integrated solution with rapid MDRO detection, training and support in AMR and for the solution, some activities related to information access, visualization and data aggregation, and interoperability.

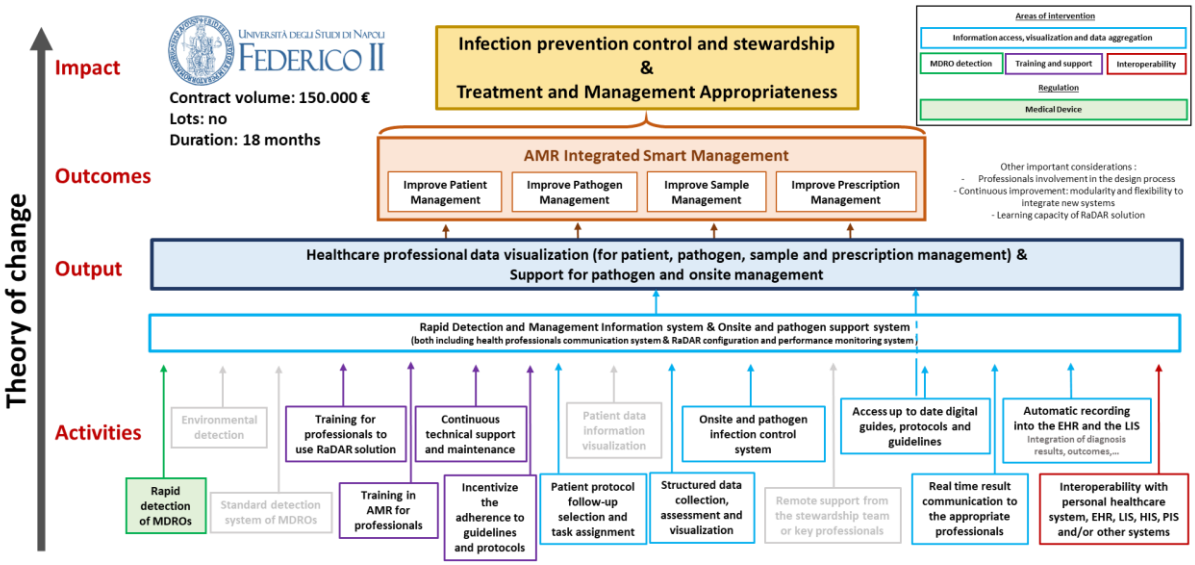

Figure 10. UNINA's Theory of Change

ICO (Figure 11) decided to divide the procurement in 3 lots with the rapid and standard detection of MDROs, training and support for professionals using the solution, interoperability, and information access, visualization and data aggregation without including support for pathogen and onsite management.

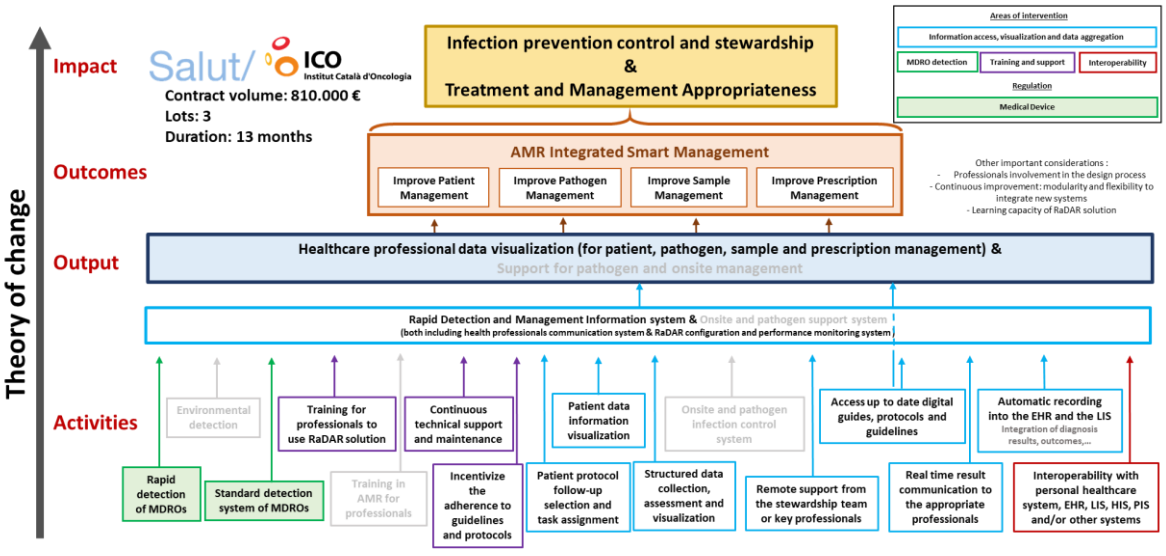

Figure 11. ICO's Theory of Change

LRC (Figure 12) also decided to split the tender in lots, overall containing activities from the four blocks, including: MDRO detection, training and technical support for professionals using the solution, some information access, visualization and data aggregation activities, and interoperability.

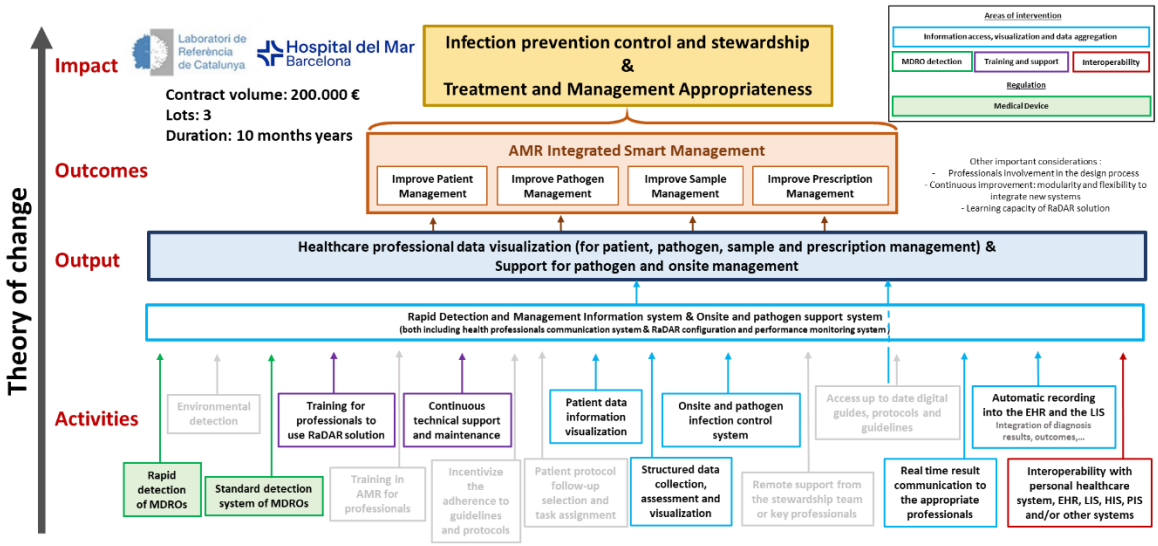

Figure 12. LRC's Theory of Change

BG-HRI (Figure 13) will develop an Evaluation Digital Platform to collect and visualize indicators from all the Buyer's, focusing its activity on information access, visualization and data aggregation, specifically in structured data collection, assessment and visualization.

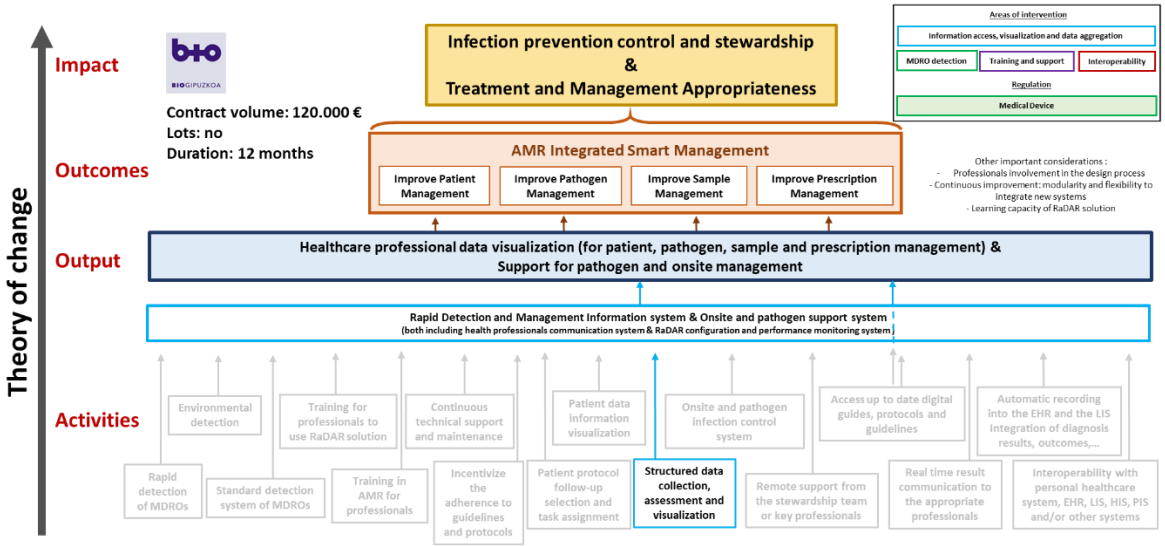

Figure 13. BG-HRI's Theory of Change

4.2.2 Adoption Pathway – Transformation Readiness Assessment

The methodology categorizes readiness into three levels. The transition in RaDAR moves from Level 1 (Design to Proof of Concept), represented by the precursor project ANTI-SUPERBUGS (ASB), to Level 2 (Early Adoption to Multi-Health Provider Adoption) (Figure 14). At Level 2, RaDAR aims to generate robust evidence that the innovation works in real healthcare environments to support validation for future scale-up.

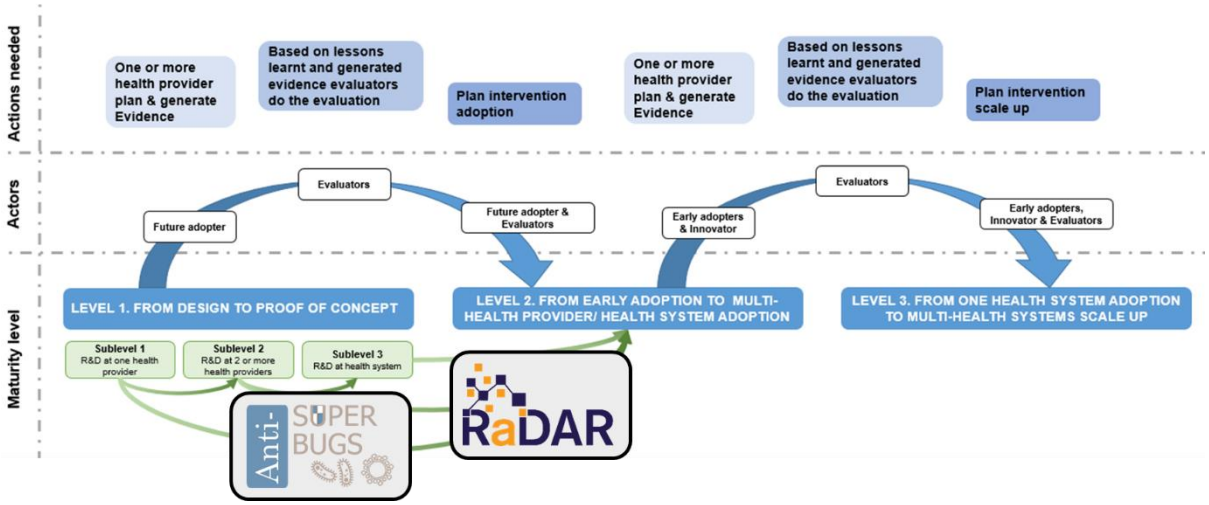

Figure 14. RaDAR's assessment of transformation readiness

In addition, each Buyer has different readiness level depending on their characteristics:

4.2.2.1 Resah

Resah is an experienced public Central Purchasing Body (CPB) built of 130 Regional hospital groups that leverages the purchasing power of hospitals and nursing homes in France, being Resah the leader of this Buyers group. Resah has coordinated the preparation and implementation of Buyers Group tendering procedure as a Lead Procurer.

Resah is the only central purchasing body specialized in both healthcare and medical-social sectors in France. It offers more than 5000 public contracts in all the procurement segments, covering all hospital needs: medical (pharmaceuticals, medical devices, biomedical equipment, PPE...) and non-medical (ICT solutions, catering, energy...). Today, the public organization has more than 3900 affiliated hospitals, healthcare and social welfare facilities as well as regional authorities. The procurement volume through Resah's contracts was 3.2 billion € in 2024 supported by a team of 250 professionals.

4.2.2.2 University of Naples Federico II, Department of Public Health (UNINA - DISAP)

The Department of Public Health at the University of Naples Federico II (UNINA-DISAP) promotes a vision of medicine focused on disease prevention in living and working environments, the study of bio-morphological and molecular mechanisms of disease, and the management of healthcare services through an interdisciplinary and social conception of Public Health. The Department fosters multidisciplinary research with the aim of developing innovative models and solutions for the effective management and governance of healthcare services and systems.

UNINA-DISAP coordinates its institutional activities in close collaboration with other departments within the Medical School, as well as with regional, national, European and international research and training organizations, both public and private. It also works in partnership with Local Health Agencies, hospitals, and industry to integrate research, education, and service provision, thereby promoting excellence in scientific research at both the national

and international level. The Department plays a key role in supporting the Campania Region, providing high specialty services for local health agencies, hospitals, and other public and private organizations.

4.2.2.3 Institut Català d'Oncologia (ICO)

The Catalan Institute of Oncology (ICO) is a public non-profit centre working almost exclusively in the field of cancer. Its approach to the disease is comprehensive, combining, all in one organisation: Prevention, Patient Care, Training and Research. ICO is currently the cancer centre for almost 45% of the adult population of Catalonia. Structured as a network, it comprises four centres (ICO L'Hospitalet, ICO Girona, ICO Badalona and ICO Tarragona i Terres de l'Ebre) that work in cooperation with university hospitals (Bellvitge, Dr. Josep Trueta, Germans Trias i Pujol and Joan XXIII), local hospitals, non-profit health research institutes and universities, having direct influence in 23 hospitals across Catalonia. ICO therefore provides a rich, stimulating, multidisciplinary environment and fertile soil for biomedical research ensuring the highest quality provision of health care.

ICO is part of the VINCat program: healthcare-associated infections surveillance program. A program of the Catalan Health Service that established a unified surveillance system for infections related to health care (IRAS) in health centres in Catalonia. Its mission is to contribute to reducing the rates of these infections through active and continuous epidemiological surveillance. The program is based on the work carried out by the professionals of the multidisciplinary infection control teams of the Catalan health centres.

4.2.2.4 Laboratori de Referència de Catalunya (LRC) (associated with HMAR)

The Laboratori de Referència de Catalunya, SA (LRC) is a trading company that belongs to the public sector and whose purpose is to carry out diagnostic support tests by means of clinical analysis and, in general, the activity of clinical diagnosis and environmental and food health control by any means; the management of laboratories and diagnostic support services; and consultancy in the different fields related to clinical diagnosis and environmental and food health.

LRC has the status of own means personified with respect to its direct shareholders, such as Consorci Mar Parc Salut de Barcelona (CMPSB) or Consorci de Salut i d'Atenció Social de Catalunya, SA (CSC). LRC manages the diagnostic services of the centres managed by the CMPSB, including the Hospital del Mar.
The Hospital del Mar (HMAR) is part of the CMPSB. HMAR is a comprehensive service organisation covering all levels of healthcare, with important provisions for research and documentation. Hospital del Mar provides healthcare services to a population of 315,000 inhabitants in the maritime districts of Barcelona (Ciutat Vella and Sant Martí). It has 461 acute beds and in 2023 it discharged 32,901 patients from acute care.

On the other hand, LRC together with Imagen Médica Intercentres, SL (IMI), have promoted the creation of the Dibi Network, which is a public network of integrated biomedical diagnostic services, which includes the areas of Anatomical Pathology, Clinical Analysis and Diagnostic Imaging, and which is run in hospitals and health centres.

4.2.2.5 BG-HRI

Biogipuzkoa Health Research Institute (BG-HRI) is an Accredited Research Institute by the Ministry of Science, Innovation and Universities of the Government of Spain together with the Carlos III Health Institute (ISCIII), which possess the capabilities and structure to manage an efficient translational research and innovation in medical and health technologies in the Basque Country. Biogipuzkoa has an Innovation Support Unit with profiles working on technological innovation, open innovation and digitalisation-data science.

4.2.3 Adoption Pathway – Business Case

The knowledge gained during the ASB project was applied at the RaDAR project. And the reference RaDAR business case was built (*D1.2 Reference RaDAR Business cases*) studying the burden that AMR imposes on the patients and society in each Buyer Group member. As well as the potential benefits of the incorporation of rapid diagnostic test to innovate the care delivery and management of patients at their facilities (e.g. ICUs and/or hospital rooms).

The Call for tenders from each buyer were designed taking into account the perspective of all the stakeholders. All the information related to the adoption pathway was included in the tender documents and a summary can be found in the following table:

RaDAR Buyer	Object of the contract	Expected Value (Outcomes/results)	Evidence to be generated	Risks and mitigation		Readiness (who brings value)	
				Technological, organisational, policy/regulatory	Financial	Open Market consultation	Applicable regulations and solvency
Resah 	To promote adoption of innovative solutions and accelerate scalability to combat AMR. The solutions (10 lots) cover global **microbiology systems** (rapid AST/molecular biology), **diverse rapid tests** (e.g., Colistin, RSV, C. difficile), and three specific **software systems** (surveillance/alert, antibiotic therapy monitoring, consumption monitoring). Specifically **Lot 8** is the procurement of a **surveillance and alert software for multi-resistant bacteria (MRB) and emerging highly resistant bacteria (EHB)**. The Contractor will provide a software solution enabling test results to be	As part of its activity as a central purchasing body, Resah wishes to implement actions with the following objectives in particular: • Improve the quality and relevance of diagnoses; • reduce costs; • to be able to offer Beneficiaries the most appropriate solutions possible, as close as possible to the technical, technological or budgetary constraints they face; • optimise logistics; • taking greater account of the principles of social and environmental responsibility in purchasing; • access to the best technical and technological standards. For **lot 8**: • Improve communication of laboratory microbiological results to healthcare professionals and facilitate access to patients'	To assess the impact of the contract, the implemented solution will be monitored and evaluated. Project managers are responsible for monitoring the installation once it has been deployed. The Contractor undertakes to provide information tools and media to enable data to be pooled and shared between project team members. Project managers then ensure that the installation runs smoothly, and coordinate the various resources involved. In order to improve the performance of the contract, and in line with the innovation and value-based procurement objectives during the performance of this framework agreement, a progress plan will be set up between the supplier and one or more Beneficiaries of the framework agreement.	Technological: separation of the tender in lots. Contract governance includes clear definition of the: - Meetings scheduled - Monitoring calendar divided in 2 phases (1. Initialization, 2. Deployment) with defined monitoring reports at the end of each phase, - Monitoring elements, results and KPIs	Framework agreement with no minimum value. Estimated total purchase volume across all 10 lots is approximately **€90M** over 4 years (Lot 1 estimated at €15M, Lot 8 estimated at €8M). The maximum contractual value for all lots is approximately €252M.	A four-stage open market consultation (OMC) process was adopted: • Early notification: Publication of the Prior Information Notice (PIN) • Market sounding • OMC Workshops • Bi-lateral meetings 67 good quality responses were received during the market sounding, the majority of which were SMEs. 164 supply-chain representatives attended the market consultation events. 48 companies were represented in the bi-lateral meetings Specifically in the OMC in Paris the number of Market participants was 12	The equipment and services provided under the framework agreement must comply with the **legislation and regulations** in force on the date of their execution, particularly with regard to product safety, shelf life, packaging and the various indications to be displayed on the packaging. In particular, the equipment is supplied by the Licensee(s) of the lots concerned, taking into account the provisions of the following texts: • Current regulations governing medical biology equipment; • Regulations concerning in vitro diagnostic medical devices (CE marking). The equipment bears the CE-IVDR mark, which symbolizes compliance with the conformity procedures and the provisions relating to Regulation (EU) 2017/746, or is covered by a certificate or declaration of conformity issued/established in accordance with Directive 98/79/EC, enabling it to benefit from transitional provisions.

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RaDAR Buyer	Object of the contract	Expected Value (Outcomes/results)	Evidence to be generated	Risks and mitigation		Readiness (who brings value)	
				Technological, organisational, policy/regulatory	Financial	Open Market consultation	Applicable regulations and solvency
	integrated into the healthcare facility's existing information systems.	microbiological information; • Act as a rapid, real-time alert system; • Automatically triggered, and linked to devices used by the healthcare professionals; • Integrate alerts into the patient's history					The equipment complies with the following or equivalent standards and recommendations: • ISO 13485: Quality management system or equivalent, • Applicable legislative and regulatory provisions of the French Public Health Code, in particular for in vitro diagnostic medical devices.
UNINA-DISAP Università degli Studi di Napoli Federico II	Supply of **integrated IT services for the rapid detection of multidrug-resistant microorganisms and for the intelligent management and control of antibiotic resistance**, at the Department of Public Health of the University of Naples 'Federico II', in patients admitted to certain wards of the AOU Federico II.	Impact: infection prevention and control, treatment appropriateness and management Outcome: timely, intelligent and integrated antimicrobial resistance management for patient, sample and prescription management. **Expected overall results:** • **Improvements for patients:** earlier and better diagnostic and therapeutic decisions, better follow-up, better results, reduction of isolations and antibiotic/anti-fungal treatments, better patient and caregiver experience. • **Improvements for health professionals:**	To assess the impact of the contract, the implemented solution will be monitored and evaluated. The monitoring of the contract consists of the fulfilment of activities, timely achievement of milestones and deliverables. During the contract and at the end of the contract, the deliverables specified in the contract or in the test generation plan to be provided by the supplier will be collected and evaluated. The impact will be assessed against the requirements outlined by the contracting authority taking into account the expected impact on health	Contract governance includes clear definition of the: - Meetings scheduled - Monitoring calendar divided in 3 phases (1. Change management, on-site adaptation and acceptance testing, 2. Execution, 3. Project Execution and Termination) with defined monitoring deliverables and milestones, - Payment scheme - Monitoring elements, results and KPIs The supplier must submit a Technology	Total fixed price is **€150,000.00 (including VAT)** (Taxable amount: €122,950.82) for the **18-month** duration. The contract requires consumables/kits sufficient for an estimated population of 2,000 patients/year.	A four-stage open market consultation (OMC) process was adopted: • Early notification: Publication of the Prior Information Notice (PIN) • Market sounding • OMC Workshops • Bi-lateral meetings 67 good quality responses were received during the market sounding, the majority of which were SMEs. 164 supply-chain representatives attended the market consultation events.	The technologies used by the RaDAR solution MUST comply with the following EU **directives**: - REGULATION (EU) 2017/745 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 5 April 2017 on medical devices, amending Directive 2001/83/EC, Regulation (EC) No 178/2002 and Regulation (EC) No 1223/2009 and repealing Council Directives 90/385/EEC and 93/42/EEC - REGULATION (EU) 2017/746 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 5 April 2017 on in vitro diagnostic medical devices and repealing Directive 98/79/EC and Commission Decision 2010/227/EU

RaDAR Buyer	Object of the contract	Expected Value (Outcomes/results)	Evidence to be generated	Risks and mitigation		Readiness (who brings value)	
				Technological, organisational, policy/regulatory	Financial	Open Market consultation	Applicable regulations and solvency
		improved patient follow-up and decision-making, better working environment, access to evidence-based medical information. • **Improvements for the healthcare professional**: improved workflow, reduced patient isolation and length of stay, reduced antibiotic/antifungal consumption and less variability between professionals. • **Improvement for the healthcare system**: better results, reduced costs and possibility to assess the impact of AMR in the long term • **Improving the social system:** reducing the impact of AMR on temporary and permanent sick leave of patients and their caregivers.	(technology and innovation, operability and implementation, quality, impact and evidence generation) and the benefits of the contract based on the value to the stakeholders. In each monitoring phase, the contractor will provide a report including the Impact Generation Plan, which will include: • Report on the results of the implementation of the RaDAR solution • Impact and Evidence Report • Description of the questionnaires used to assess user satisfaction • Evaluation of local results • Achievements during each phase • Changes to the plan: description of changes, risks identified and actions to mitigate them	and Innovative Excellence Plan, and describe the Operational Implementation Plan and Impact Generation Plan.		48 companies were represented in the bi-lateral meetings. Specifically in the OMC in Naples the number of Market participants was 15.	**ELIGIBILITY REQUIREMENTS:** Registration with the Register of Companies at the Chamber of Commerce for activity identical/analogous to the one in question **TECHNICAL AND PROFESSIONAL CAPACITY REQUIREMENTS** It must have performed in the last three years (i.e. three years preceding the month preceding the publication of this notice) A similar supply of a minimum amount of €80,000.00, plus VAT. Similar provision means health and health care IT services.
ICO ICO Institut Català d'Oncologia	Contract a system to implement, deploy and maintain a functional solution, made up of three lots that together allow for a	The RaDAR model also aims to align the interests of patients, healthcare system officials, hospitals and providers in a model aimed at creating shared value among all stakeholders through hospital-provider	To assess the impact of the contract, the implemented solution will be monitored and evaluated. The monitoring of the contract consists of the fulfilment of activities, timely achievement of milestones	Technological: separation of the tender in lots. Contract governance includes clear definition of the: - Meetings scheduled	The Estimated Contract Value is **€681,818.18** (excluding VAT) for the three lots. Activity volume specified for each lot:	A four-stage open market consultation (OMC) process was adopted: • Early notification: Publication of the Prior Information Notice (PIN)	**Technical solvency:** List of main services with similar characteristics (microbiological detection tests (lots 1 and 2) and similar IT solutions (lot 3) for a minimum amount of 70% of the average annual payment

RaDAR Buyer	Object of the contract	Expected Value (Outcomes/results)	Evidence to be generated	Risks and mitigation		Readiness (who brings value)	
				Technological, organisational, policy/regulatory	Financial	Open Market consultation	Applicable regulations and solvency
	comprehensive approach to antimicrobial resistance in the hospital **Lot 1.** Rapid detection system for bacteraemia or sepsis **Lot 2**. Rapid detection in screening for colonization or infection by microorganisms resistant to Antimicrobials **Lot 3.** IT solution for the management and administration of antimicrobial resistance (or RaDAR ICT solution)	contracts. These rapid tests would lead to a better prognosis for patients and better control of microorganisms in the hospital. Giving the appropriate treatment earlier could also reduce the prescription and consumption of broad-spectrum antimicrobials or restricted-use antimicrobials or "AWaRe" (Access, Watch and Reserve), which would mean greater safety for the patient, a reduction in expenses for the institution and a reduction in the selection and spread of strains resistant to antimicrobials, which is essential in the long term.	and deliverables. During the contract and at the end of the contract, the deliverables specified in the contract or in the test generation plan to be provided by the supplier will be collected and evaluated. The impact will be assessed against the requirements outlined by the contracting authority taking into account the expected impact on health (technology and innovation, operability and implementation, quality, impact and evidence generation) and the benefits of the contract based on the value to the stakeholders. In each monitoring phase, the contractor will provide a report on the Generation of Impact and Evidence.	- Monitoring calendar divided in 2 phases (1. Change management, on-site adaptation and acceptance testing, 2. Full deployment) with defined monitoring deliverables and milestones, - Payment scheme - Monitoring elements, results and KPIs The tenderer will assume increases in the patient management activity estimated at a maximum of 15%. On the other hand, ICO will assume decreases in the estimated activity of up to 15% due to the compensation rate for lower activity. Payment will be made as a fixed monthly payment during the period of execution of the contract (98% of the offered price) and a 2% **result-based payment** linked to	• **Lot 1:** 488 patients, €351,360.00 • **Lot 2:** 800 patients €74,350.00 • **Lot 3:** €242,471.92	• Market sounding • OMC Workshops • Bi-lateral meetings 67 good quality responses were received during the market sounding, the majority of which were SMEs. 164 supply-chain representatives attended the market consultation events. 48 companies were represented in the bi-lateral meetings. Specifically in the OMC in Barcelona the number of Market participants was 62.	of the corresponding lot, in the best of the last three years, accredited by certificates issued by the competent body, when the holder is a public sector entity, or by declaration of the bidding company, when it concerns private companies.

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RaDAR Buyer	Object of the contract	Expected Value (Outcomes/results)	Evidence to be generated	Risks and mitigation		Readiness (who brings value)	
				Technological, organisational, policy/regulatory	Financial	Open Market consultation	Applicable regulations and solvency
				achieving key performance indicators (KPIs).			
LRC (associated with HMAR)	Provide the diagnostic service of the Hospital del Mar, managed by the Laboratori de Referència de Catalunya (LRC), with a **system for rapid screening of multi-resistant microorganisms (MMR) and rapid detection of antibiotic resistance and a system for the prevention of nosocomial infection caused by multi-resistant microorganisms**. Achieved via 3 lots: **Lot 1** - Supply of a rapid screening method for the detection of gram-negative bacilli in patients under surveillance for colonisation with these micro-organisms **Lot 2** - Supply of a	The aim of this project is to prevent the transmission of MMR in the hospital in order to avoid cases of MMR infections. Therefore we will use a combined strategy in different fields of action. The application of a rapid screening test for MMR in rectal swabs followed by the use of rapid tests to identify the resistance mechanisms of these MMR. Together with the use of molecular tests based on whole genome sequencing (WGS) for molecular typing of MMR in a prospective manner. The implementation of rapid detection technologies for MMR and whole genome analysis is transformative for hospital care: • Improving patient care: reducing unnecessary isolation days, Optimised antimicrobial therapy • Infection control and outbreak management: rapid genomic analysis	To assess the impact of the contract, the implemented solution will be monitored and evaluated. The monitoring of the contract consists of the fulfilment of activities, timely achievement of milestones and deliverables. During the contract and at the end of the contract, the deliverables specified in the contract or in the test generation plan to be provided by the supplier will be collected and evaluated. The impact will be assessed against the requirements outlined by the contracting authority taking into account the expected impact on health (technology and innovation, operability and implementation, quality, impact and evidence generation) and the benefits of the contract based on the value to the stakeholders. In each monitoring phase,	Technological: separation of the tender in lots. Contract governance includes clear definition of the: - Meetings scheduled - Monitoring calendar divided in 3 phases (1. Implementation, 2. Development, 3. Evaluation) with defined monitoring deliverables and milestones, - Payment scheme - Monitoring elements, results and KPIs Payment is structured as 98% monthly variable payments (based on delivered reagents) plus 2% **result-based payment** linked to achieving key performance indicators (KPIs).	The Estimated Contract Value is **201.874,05 €** for the three lots and the **10-month** duration. Activity volume specified for each lot: • **Lot 1:** 11.962 samples, **59.777,70€** • **Lot 2:** 1.794 samples, **32.288,85€** • **Lot 3:** 605 genomic analysis isolations, **109.807,50€**		**Applicable regulations:** The products offered must comply with current Spanish and EU regulations on quality, labelling and packaging. In the case of medical devices, the bidding company must resent documentation accrediting compliance with current legislation and that all products and equipment offered in lots 1 and 2 have the CE-IVDD / CE-IVDR conformity marking, complying with the in vitro diagnostic directives. The company shall submit a declaration that all the devices of lot 1 and 2 are labelled and provide documentation complying with the content foreseen as necessary requirements in these specifications and in Regulation (EU) 2017/745 and Regulation (EU) 2017/746 of the European Parliament and of the Council of 5 April 2017 on in vitro diagnostic medical devices, as applicable. **Technical solvency:** Tenderers must prove that the cumulative annual amount of supplies of the

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RaDAR Buyer	Object of the contract	Expected Value (Outcomes/results)	Evidence to be generated	Risks and mitigation		Readiness (who brings value)	
				Technological, organisational, policy/regulatory	Financial	Open Market consultation	Applicable regulations and solvency
	method for rapid detection of antimicrobial resistance **Lot 3** - Supply of the platform to carry out the complete genomic analysis of the multi-resistant micro-organisms of application in prospective epidemiology	helps to identify sources, Prevention of transmission. • Resource optimisation and cost savings: Shorter hospital stays, Lower isolation costs. • Supporting Public Health Objectives: Reducing antibiotic resistance and Strengthening surveillance systems	the contractor will provide a report on the Generation of Impact and Evidence.				same type or nature as those corresponding to the subject of the contract in the most recent three years is at least 70% of the average annual amount of the lots of the contract for which they are bidding.
BG-HRI BIOGIPUZKOA	Development and **deployment of a Digital Tool**, the RaDAR Evaluation Digital Platform, for collecting, structuring, analysing, and visualizing indicators. The tool's primary function is to evaluate the solutions and their impact across all four purchasing partners (Resah, UNINA, ICO, and LRC/HMAR).	Expected value is to provide decision-making support, reports, predictions, and recommendations for improving AMR management to the RaDAR partners. The outcomes defined: Improving RAM Management in the framework of RaDAR PPI buying partners: • Access to information of RaDAR buyers • Access to public information • Decision-making support for purchasing RaDAR partners. Data and AI Quality and Reliability • AI-Based access to public information	Evaluation of the coordinated contracts of the RaDAR Project.	Contract governance includes clear definition of the: - Meetings scheduled - Monitoring calendar divided in 2 phases (1. Development, 2. Deployment and use phase), - Payment scheme - Monitoring elements, results and KPIs	The Estimated Contract Value is **€99,000.00** (excluding VAT). The total contract duration is 12 months (5 months development, 7 months deployment/use).	A Market information event took place in San Sebastian with the participation of 7 companies	**Technical or Professional solvency** – In accordance with Article 89 of the Spanish Public Sector Contracts Law (LCSP): List of the main digital tool development services carried out by the bidder during the last three years, of the same or similar nature to those that constitute the subject of the contract, indicating the amount, date, and the recipient (public or private). The bidder must have developed, in the last three years and in the healthcare sector, at least three tools with similar functionalities, and whose development cost is at least 70% of the estimated value of this tender.

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RaDAR Buyer	Object of the contract	Expected Value (Outcomes/results)	Evidence to be generated	Risks and mitigation		Readiness (who brings value)	
				Technological, organisational, policy/regulatory	Financial	Open Market consultation	Applicable regulations and solvency
		• Provide quick responses and efficient to internal users • Ensure the integrity and accuracy of the information processed by the platform • Explainability of models • Ensure that the platform's AI modules process requests quickly and reliably, contributing to an optimal user experience					

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4.2.4 Adoption Pathway – Public Procurement of Innovation

The PPI process is defined from needs to reimbursement:

1. **Needs desirability assessment**: This phase involved identifying the core problems, verifying requirements, and building the business case for investment. Conducted between January 2022 and May 2023, this stage established the clinical foundation for the procurement, resulting in the D1.2: Reference RaDAR Business cases and D1.4: Clinical demand definition report.
2. **Innovators readiness and feasibility assessment**: This block evaluated the market's capacity to deliver solutions addressing the defined needs through horizon scanning and direct engagement. The market consultation was a rigorous four-stage process (Early Notification, Market Sounding, Open Market Consultation, and Bilateral Meetings) performed between November 2022 and April 2023. All the information can be found at D2.3: Market Readiness Report, and a summary was published at the RaDAR-PPI website: Market Report Summary.
3. **Future and early adopters' feasibility and viability evaluation:** This phase defined the competition design, risk-sharing governance, and the actual launch of the tenders.
    a. **Definition of the evaluation framework** involved drafting the procurement strategy and the technical/functional requirements for the contracts. Conducted between November 2022 and August 2023 and summarized in D3.1 Consolidated Procurement Strategy Report and D3.2 RaDAR Evaluation Framework.
    b. **Public procurement of innovation Call for Tenders publication:** This stage covered the preparation and publication of individual tender documents across the buyer regions. Tender preparation was from August 2023 till tender publication which was done in two phases, the first one in January 2024 and the second one in January 2025 (https://radar-ppi.com/procurement/).
4. **Payment and reimbursement approaches and evaluation**: RaDAR adopted innovative payment models where the evidence is generated by the reimbursement process. These models often utilized risk-sharing mechanisms where a portion of the payment was conditional on the satisfactory completion of milestones and the achievement of KPIs.
    - **Reimbursement Structure:** Buyers like ICO and LRC/HMAR implemented a 2% retention of the total contract price, which is only paid during the final month of the contract upon validation of result-based evidence.
    - **Evidence Generation:** This phase is currently being evaluated through Deliverable D4.2 RaDAR-PPI Interim Evaluation Report (submitted in October 2024) and will conclude with D4.3 RaDAR-PPI Evaluation Report at the project's end (June 2026).

4.2.5 Methodological approach: contracts permeable to value

Contracts are considered "permeable to value" when the elements of the Theory of Change are embedded throughout the contractual framework, including the object of the contract, technical requirements, KPIs, monitoring, evaluation mechanisms, and payment schemes. This approach ensures that the value intended for patients, healthcare professionals, and healthcare organisations is preserved and not diluted during contract implementation.

Building on this principle, each buyer selected context-specific RaDAR activities defined in the ToC and reflecting their local needs, and translated them into technical specifications and functional requirements capable of driving the desired outcomes. As a result, contractual requirements supported rapid diagnostics, antimicrobial stewardship, and improved clinical decision-making, while remaining aligned with the overall RaDAR objectives and determining value permeability within each procurement process.

Value generation is monitored through KPIs related to patient, pathogen, sample, and prescription management, applying shared principles across buyers while allowing for local adaptation. The expected epidemiological impact includes reduced transmission of target microorganisms, a decrease in healthcare-associated infections, and shorter AMR-related lengths of stay (Figure 15).

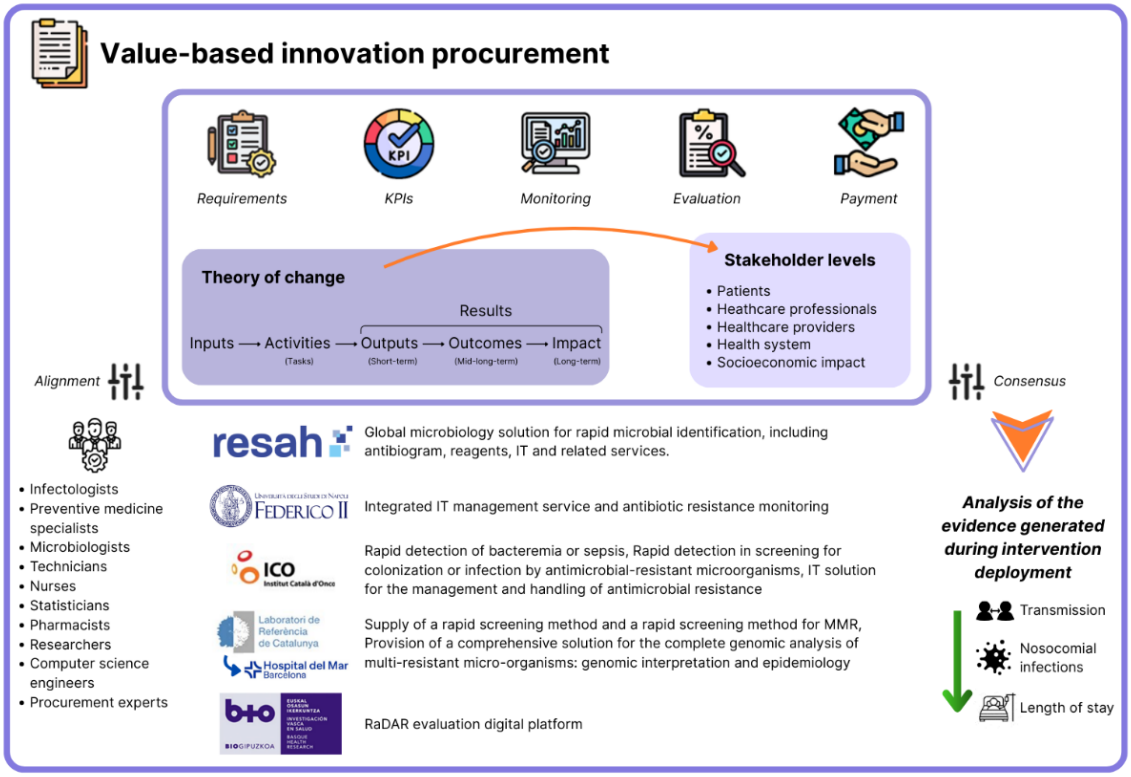

Figure 15. Value-based innovation procurement followed at RaDAR-PPI

4.2.6 Evaluation

Evaluation in RaDAR is a key part of the value-based procurement approach and goes beyond contractual compliance. It is used to assess whether the project is delivering the expected value throughout the full process, from the definition of needs to implementation and impact.

- **Initial Evaluation (needs and feasibility):** This phase focused on confirming that the identified clinical and organisational needs were well defined, relevant, and justified. It also supported the decision to invest by building the business case.
- **Interim Evaluation (contract monitoring):** This phase takes place during contract

implementation and is currently ongoing. It focuses on monitoring progress against agreed milestones and KPIs. Monthly monitoring meetings are used to review performance, identify potential issues, and introduce corrective actions when needed.

- **Final Evaluation (results and impact):** This phase will be carried out at the end of the contracts. It will assess whether the expected results have been achieved and evaluate the broader impact on healthcare organisations and the health system. Feedback from both buyers and contractors will be collected to capture lessons learned and to support future scale-up and wider adoption of the solutions.

5. Lessons learnt, good practices, and recommendations from the Buyers Group

This section consolidates the experiences of the Buyers Group (Resah, UNINA-DISAP, ICO, HMAR-LRC, and BG-HRI) across the life cycle of the RaDAR value-based cross-border collaborative PPI project.

5.1 Preparation phase

The preparatory phase on the RaDAR-PPI project included the definition of the clinical demand, the market assessment and the coordinated tender preparation for the publication. The buyer's group detected several important aspects during this phase to be taken into account for future PPI initiatives.

5.1.1 Needs definition and market engagement

- **Lesson Learnt:** The definition of the need must be sufficiently framed and precise; this will ensure a better dialogue with the market, which is necessary to refine requirements and avoid unsuccessful tendering processes. The scope of the innovative solution has to be carefully managed, as defining very complex solutions in a single lot can reduce the amount of available solutions, closing the contract and complicating the submission of tenders from potential suppliers.
- **Good Practice:** Market dialogue before publication of the Call for Tenders (CfT) ensures that the requirements framed are achievable by economical operators.
- **Recommendation:** Frame the needs precisely and maintain continuous dialogue with the market during the preparation phase to refine requirements and ensure that the tendering process will be successful.

5.1.2 Multidisciplinary involvement

- **Lesson Learnt:** It was observed across institutions the importance of early and continuous involvement of clinical teams (multidisciplinary professionals) in the tender definition phase to ensure the usability and clinical relevance of the requirements.
- **Good Practice:** Integrating feedback from a wide range of multidisciplinary professionals (clinical, laboratory, IT) ensures that the requirements are clinically relevant and reflect the needs across the entire institution.
- **Recommendation:** Ensure early multidisciplinary engagement of all stakeholders during preparation to guarantee that the solutions procured are usable and clinically relevant.

5.1.3 Internal planning

- **Lesson Learnt:** Each public institution has unique bureaucratic specificities that can slow down the preparation process. Additionally, national public procurement laws are dynamic and require strict adherence, some flexibility is needed on the planning to secure time for

last minute bureaucratic changes.

- **Good Practice:** Careful planning with strong clinical involvement, and following the evaluation framework, can lead to high-quality procurement outcomes prioritizing clinical and technical quality and maintaining cost-effectiveness.
- **Recommendation:** Plan with flexibility and take into account potential administrative delays that can slow down the process.

5.1.4 Knowledge transfer and Partnership

- **Lesson Learnt:** The RaDAR consortium experienced some changes while the project was already running as new partners joint the project. For organizations newly integrated into the process, prior knowledge and a defined institutional vision of their AMR management model significantly smooth their tendering process. These new partners aligned quickly with the RaDAR methodology and adopted the know-how easily.
- **Good Practice:** RaDAR could benefit for the previous experience in PPI projects of some partners, thus, accelerating the procurement process. Continuous collaboration between partners and associated entities facilitates operational alignment and accelerates planning during the preparation phase. Continuous coordination between legal, procurement, and clinical actors also strengthens alignment and improves the capacity to solve problems.
- **Recommendations:** Make use of the existing knowledge for a smoother preparation of specifications.

5.2 Procurement period

The procurement period includes the finalization of tender documents, the publication of the call for tenders (CfT), the period given for bid submission, and evaluation. Those activities showed some administrative, legal, operational complexities and points of improvement inherent in cross-border innovation procurements.

5.2.1 Tender Complexity and Budget

- **Lessons Learnt:**
  - Procurement efforts highlighted recurring issues in aligning the complexity of the solution with the market's capacity and the procurer's internal budget. Buyers recognized that the allocated budget might be insufficient for the specific type of innovative services being procured. Meaning that initial planning is essential to purchase the solution needed, and there is a necessity for greater flexibility regarding mandatory requirements to secure viable offer from the market.
  - Reluctance has been observed from large competing companies to form a joint venture or consortium. For this reason, the willingness of the companies to collaborate should be studied before publishing tenders which requirements cannot be fulfilled by a single company.

- Procurement teams also experienced difficulty quantifying the cost of the services associated with the innovative solution during the bid drafting process, which delayed publication.

- **Good Practice:** When complexity is high, splitting the tender into individual, complementary lots (e.g., separating hardware, screening kits, and common software solutions) can be a good practice for reducing complexity and ensuring successful contracts.
- **Recommendations:**
  - Procurers should simplify the overall solution and ensure flexibility in mandatory requirements to maximize the number of offers received. Review the association strategy to enhance competition.
  - When dealing with innovative services, ensure sufficient budget for the type of service procured and estimate the consumption before the tendering process begins.
  - When tenders require suppliers to form joint ventures or consortia, confirm the willingness of potential partners to collaborate before publishing the tender, due to reluctance observed among large competing companies.

5.2.2 Timing of publication and Administrative Process

- **Lesson Learnt:**
  - The timing of publishing the CfT is important; launching the publication just before holiday periods should be avoided to maximize public visibility as well as closing the bid submission period during holidays.
  - Also during the tendering process, institutions found that the bureaucratic specificities of each institution, which depend on different administrative departments, can slow down the tendering process. In addition, technical problems can occur on the bid submission platform, which can also delay the publication. Altogether shows that it is essential to plan with flexibility to account for potential administrative delays until contracts are finalized. Furthermore, it is important to double check for failures during the process to avoid further delays.
- **Good practices and recommendations:**
  - Plan tenders with flexibility allowing extra time for unforeseen delays for bureaucracy and/or technical problems
  - Plan the timing for the CfT publication carefully and strategically.

5.2.3 Institutional Alignment and Collaboration

- **Lesson Learnt:** The process is facilitated when all stakeholders involved in AMR management at the institution are aligned since the beginning.
- **Good practices:**

- Quick alignment of the internal institutional AMR management model with the RaDAR methodology helped accelerate the procurement process.
- The close collaboration between new and previous partners was fruitful, facilitating the exchange of information, which was useful for speeding up the development of new tenders.

- **Recommendations:** The alignment of the different stakeholders together with a good definition of the methodology and workflow to be achieved with the transformation are essential to speed up new processes.

5.3 Implementation phase

The implementation phase or contract execution was split in two phases: change management and deployment phase. Those phases were different in each institution depending on the solution procured and the length of the implementation. This section summarizes the knowledge gained, organizational practices and strategic advice derived from the Buyer's group experience.

5.3.1 Stakeholder Engagement and Leadership

- **Lesson Learnt:** Engaging hospital management and the leadership of clinical, nursing, IT, and laboratory areas early helps align institutional priorities and secure necessary support. Even though, achieving **active engagement** from all hospital departments and frontline professionals is challenging due to their high workload, requiring significant effort to secure their commitment.
- **Good practices:** Involving a multidisciplinary working group (physicians, nurses, biologists, IT, prevention professionals) helped promoting awareness of the AMR problem, leading to better knowledge of management processes and internal pressure to adopt effective surveillance measures.
- **Recommendations: Include leadership teams** (general management, clinical, IT) from the beginning to ensure strategic alignment, prioritization, and institutional support.

5.3.2 IT Integration and Data Management

- **Lessons Learnt:**
  - Direct, real-time integration with existing Hospital Information Systems (HIS) and Laboratory Information Systems (LIS) requires substantial time, long internal administrative procedures, and dedicated resources due to strict data security requirements. This time needs to be taken into account during the change management phase and it might be longer than expected.
  - The expectations regarding the functionalities of digital platforms can only be tested and refined if the required data is provided. It is important to emphasize the importance of delivering the necessary data or, at least, reporting information about the data

structure (type, format, scale) as early as possible.

- **Good practices:** Creating mock-ups of digital platforms at an early stage allows earlier review and optimization of the platform's User Interface/User Experience.
- **Recommendations:**
  - Early collaboration with hospital IT management and planning for integration are necessary to prevent delays caused by extensive administrative procedures and data security requirements.
  - Establish the expected data type, format, scale, and the KPIs to be built before receiving the actual data to significantly speed the monitoring platform's development process.

5.3.3 Monitoring and Coordination

- **Lesson Learnt:** Not all local teams had the capacity, existing tools or resources for complex monitoring and evaluation, often necessitating the development of dedicated databases or dashboards, which requires **additional, unplanned personnel effort**.
- **Good practices:**
  - Internal governance structures, including coordination between various internal departments facilitates communication and alignment. This goes together with the implementation of a precise and organized follow-up system with regular monitoring points, identified contacts, and formalized processes (e.g., weekly coordination meetings and shared documents) to maintain alignment between all teams and resolve problems smoothly.
  - Using dedicated tools for KPI collection, such as REDCap, improves transparency and monitoring efficiency. Similarly, implementing business intelligence tools like Power BI can monitor contracts and visualize total orders effectively.
- **Recommendations:**
  - Complex projects require dedicated tools (e.g., REDCap, Power BI) and personnel for monitoring and evaluation, which should be **planned and budgeted** from the proposal stage.
  - For coordinated monitoring, it would be beneficial to establish and be able to follow a **common calendar** defining the same implementation period, monitoring months, and KPIs across all buyers.

5.3.4 Workflow Design, Training, and Clinical Pathways

- **Lesson Learnt:** With variable weekly sample volumes, relying on standard reagent formats can lead to **waste and suboptimal stock management**. Adapting references or formats (e.g., tailored number of reactions) is necessary to optimize consumption.

- **Good practices:**
  - **Hands-on training** with professionals and the complete simulation of the expected workflow helped to confirm that the system functions correctly, its user-friendliness, and its alignment with operational needs. And thus, it also helped improving the commitment of professionals. Together with the **validation and testing** the implementation with clinical staff, which ensures the usability and applicability of the solutions.
  - Workflows should be co-designed together with the end-users (e.g., the laboratory team), rather than relying on a purely "vendor-driven" model. This approach increases commitment and compliance with the protocol, facilitating smoother implementation.
  - Implementing the system gradually, starting with a limited set of clinical indications, allows for early detection and correction of issues without compromising the entire workflow.
  - For rapid diagnostics, agree and document the **clinical pathways** (who to screen, when, and how to act on results) earlier, involving microbiology, infection control, and prescribing clinicians to maximize the clinical impact of faster results from the first weeks of implementation
- **Recommendations:**
  - Combine initial training sessions with dedicated, **hands-on support** staff during the first weeks of use of the solution to resolve incidents quickly, consolidate routines, and increase user confidence.

5.3.5 Legal and Regulatory Management

- **Lesson Learnt:** Legal and regulatory processes, such as securing Ethical Committee approval and defining a research protocol, can cause major delays. Those processes need to be anticipated and addressed proactively during the Change Management phase. In addition, clarifying legal aspects, particularly those related to data protection and sharing protocols, before the deployment starts, is necessary to avoid implementation delays.
- **Good practices:** When not all procurement lots are part of the same financial mechanism it is necessary to establish internal processes for applying those complex mechanisms (for instance, price reductions due to EU subsidies). This will ensure accurate application, systematic monitoring, and increases the transparency and traceability of allocated funds.
- **Recommendations:** Prepare the **research protocol and Ethical Committee documentation** during the Change Management phase to secure approval *before* the deployment phase starts, avoiding significant delays.

6. Lessons learnt, good practices, and recommendations from the economical operators

This section reflects the perspective of the private sector, focusing on how the market perceived the collaboration, the clarity of the tendering documents, and the viability of the Value-Based Public Procurement of Innovation (PPI) approach.

To gather this information, the RaDAR consortium prepared a survey to be answered by the economical operators that participated in the different activities that took place during the preparatory phase. In the survey, which you can find at the Annex 1 of this document (page 55), there were two common sections regarding the engagement during the RaDAR-PPI pre-procurement stage and tender stage. Furthermore, there were few specific questions depending on the level of participation:

- Participating in the RaDAR-PPI Open Market Consultation(s) (OMC)/Information event but **not** presenting an offer during the Call for Tenders
- Participating in the RaDAR-PPI OMC/Information event and presenting an **offer** to one or more of the Tender procedures that was **not awarded**
- Participating in the RaDAR-PPI OMC/Information event and presenting an **offer** to one or more of the Tender procedures that was **awarded → RaDAR contractors**

In total, 11 companies with different levels of participation in the tendering phase answered the questionnaire. The survey answers received were analysed and general conclusions were extracted for this section.

6.1 Preparation phase

This phase covers the different actions proposed by the RaDAR-PPI consortium that took place before launching the Call for Tenders, such as the Prior Information Notices (PINs), Market Sounding Prospectus (MSP), Open Market Consultations (OMCs), and information events.

6.1.1 Market engagement and outreach

- **Lesson Learnt:**
  - The engagement from the market with the activities proposed by the RaDAR-PPI consortium was high. 70% of the respondents participated in two or more of the activities proposed and only a 10% almost did not have interactions with the Buyers Group during the pre-procurement stage.

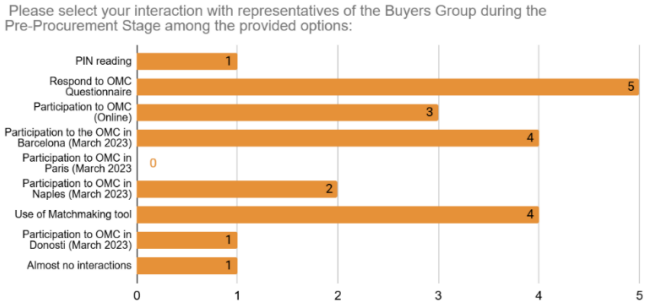

Figure 16. Interaction with Buyers Group during pre-procurement phase

- Even though the engagement was high, the effectiveness of this engagement varies. Most operators found the interaction with the Buyers Group and the participation in the events organized to be "very interesting" or "considerably good". However, some participants found the actions taken to be "not really useful" indicating variability in the effectiveness of the initial outreach strategy. Nobody considered that the activities were not helpful at all.

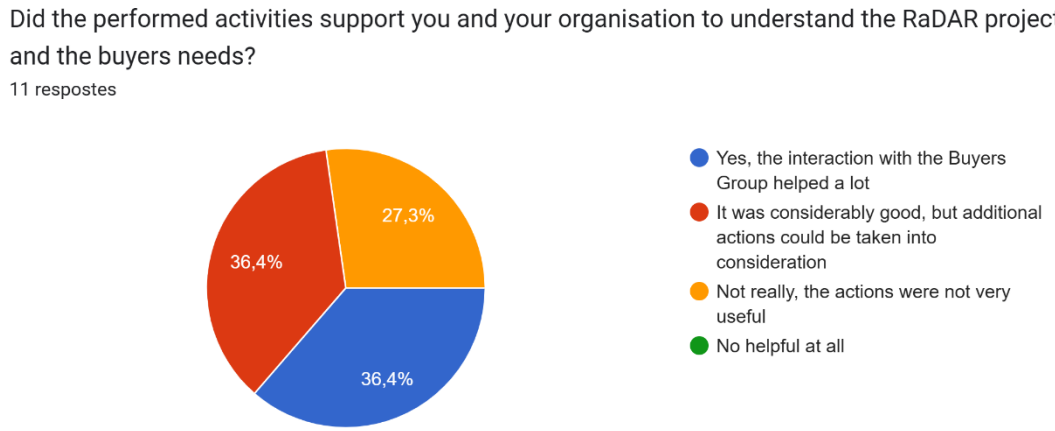

Figure 17. Support from the performed activities to understand RaDAR project and buyers needs

- Although many suppliers acknowledged that participating in the market engagement activities improved their perception of PPI, some organizations remained **"still unclear about this risk-sharing instrument"** and how to integrate PPI into their current operations. In addition, 27% showed interest but it is still not clear for them how to participate or found the proposals not close to what is available in the market.

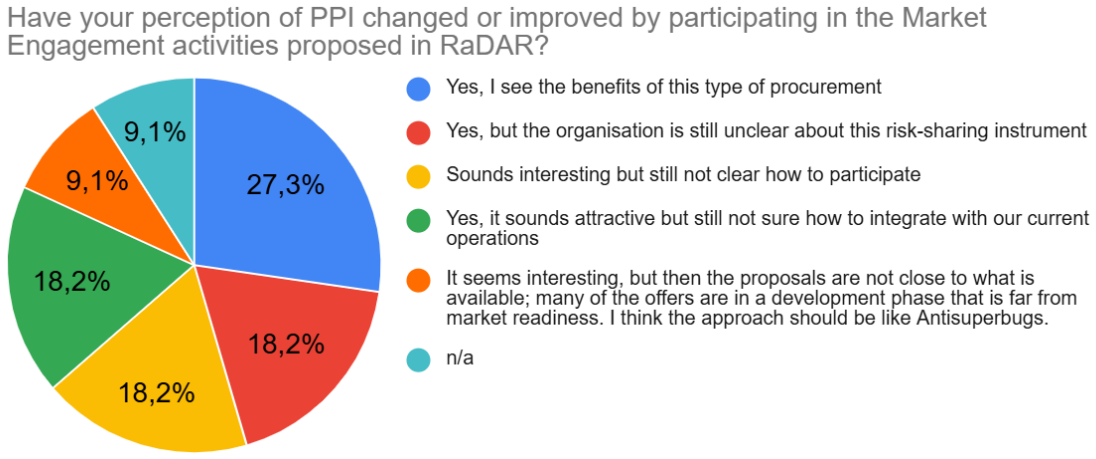

Figure 18. Perception of PPI

- A key challenge noted was that some procurement requirements felt "not close to what is available" on the market, as many proposals deemed relevant by the buyers were still in a development phase far from market readiness. Suggesting a gap between the innovative ambitions of PPI and the Technological Readiness Level (TRL) of available solutions.

- **Good Practices:**
  - Participation in physical and online OMCs was highlighted as successful.
  - The ability of the Buyers Group to consider market feedback and the product pitching opportunity during InfoDay were also valued.
  - The interaction with the Buyers Group generally helped the economical operators to understand the project and the needs of the buyers.
- **Recommendations:**
  - Increase the number and frequency of marketing activities related to the project to improve visibility, reach, and communication consistency.
  - Clearly define tender specifications with requirements that are feasible for the market to achieve.

6.2 Procurement period

This phase refers to the actions that took place since the publication of RaDAR-PPI Call for Tenders until the contracts awarding and formalization.

6.2.1 Information Dissemination and Timing

- **Lessons learnt:**
  - From the companies that participated in the preparation phase and market engagement, more than 70% read the tender documents and more than 60% internally consider to present an offer. In addition, less than 20% decided to not perform any action at this stage, meaning that they did not find the RaDAR-PPI project interesting for their activities.
  - It is also interesting to note that nobody used the Theory of Change described in the Tender documents. Thus the RaDAR-PPI consortium should rethink how to make this a useful resource.

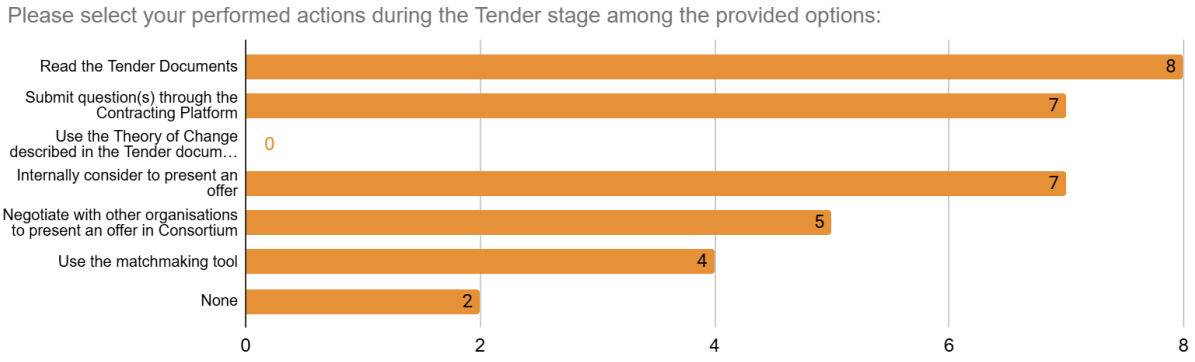

Figure 19. Performed actions during tender stage

- Overall, most of the respondents to the questionnaire agreed that the information provided by the Buyers Group during the tender procedure was helpful. However, from

those that considered it helpful, 70% said that additional actions could have been taken into consideration. A minority said that the actions were not helpful and one respondent was not aware of the tendering process, highlighting a need for increased dissemination.

- It was highlighted that more reminders and more proactive public information/updates on the tendering stages and deadlines could have been helpful.

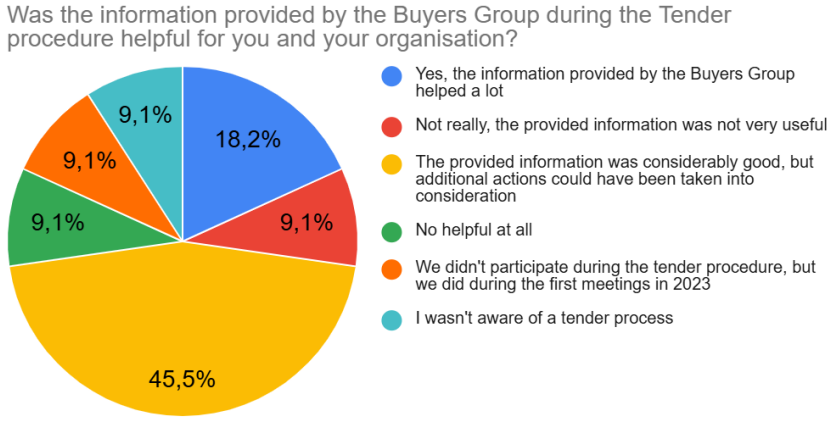

Figure 20. Helpfulness of the information provided by the Buyers Group

- **Recommendation:** Increase information and dissemination during preparatory and tendering phases, including reminders on stages and deadlines.

6.2.2 Collaboration interest

- **Lessons learnt:**
  - Regarding the interest from economical operators to collaborate with other organisations to give an integrated response to the buyers' needs, it was observed that more than 75% of economical operators would be interested. Some are always interested and some others only if needed and if there was enough time.
  - It is also interesting to highlight that almost 50% of the economical operators negotiated with other organizations to present an offer in consortium. This willingness is important, because there were other reasons that made that at the end any of the RaDAR tenders received an offer made in consortium.

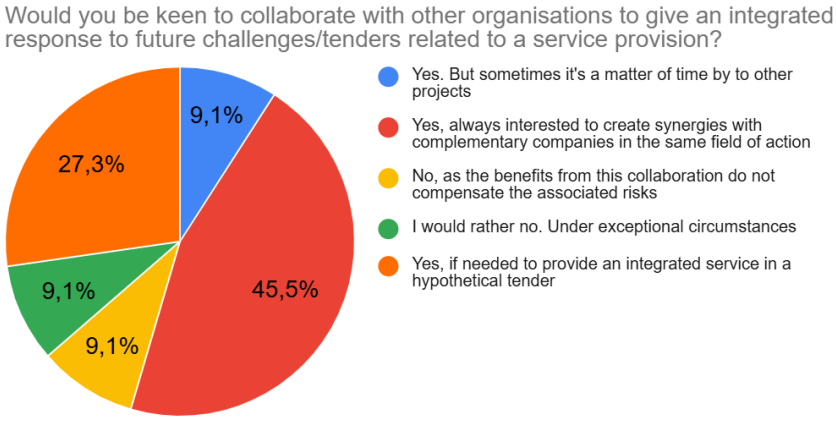

Figure 21. Collaboration with other organisations

- **Good practice:** The creation of the Matchmaking tool and the InfoDay event to facilitate interaction between economical operators to form a consortium. Given that some suppliers could not respond to the challenge alone, the Buyers Group should continue to find ways to facilitate collaboration between complementary companies.
- **Recommendation:** Facilitate the formation of consortiums by finding ways to help complementary companies collaborate.

6.2.3 Outcome-based payment

Economical operators were also asked about the attractiveness and sustainability of the proposed outcome-based payment system in the long term.

- **Lesson learnt:** Few of the economical operators considered the proposed outcome-based payment an attractive system but it was also frequently cited and considered "not sustainable", "not interesting from an organisational business point of view," and "very difficult to apply in real life".
- **Recommendation:** Ensure the outcome-based payment system creates a “win-win scenario” between buyers and suppliers to make the system attractive and sustainable in the long term.

6.2.4 Depending on the level of participation

From the economical operators that participated in the survey, were then split based on their level of participation:

1. Participating in the RaDAR-PPI Open Market Consultation(s) (OMC)/Information event but not presenting an offer during the Call for Tenders
2. Participating in the RaDAR-PPI OMC/Information event and presenting an offer to one or more of the Tender procedures that was NOT awarded
3. Participating in the RaDAR-PPI OMC/Information event and presenting an offer to one or more of the Tender procedures that was awarded

Organizations from the 3 levels participated:

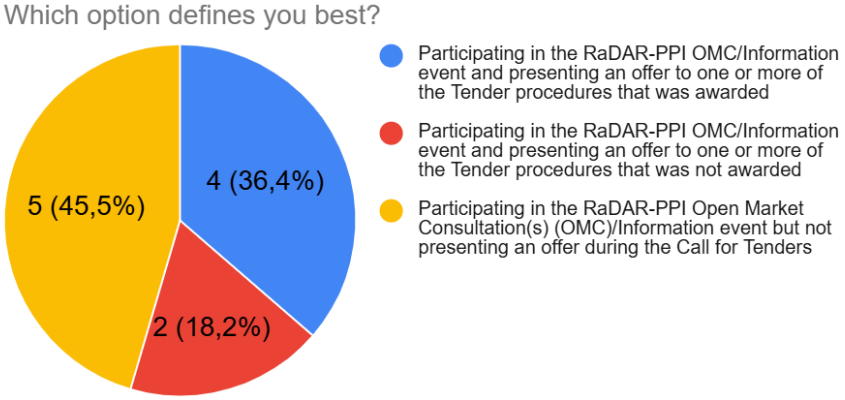

Figure 22. Level of participation in RaDAR-PPI

From **Level 1. Participating in RaDAR-PPI Open market Consultations (OMC) but not presenting an offer during the Call for Tender**, the aspects that influenced to not present and offer were asked, and a variety of reasons were observed (Figure 23).

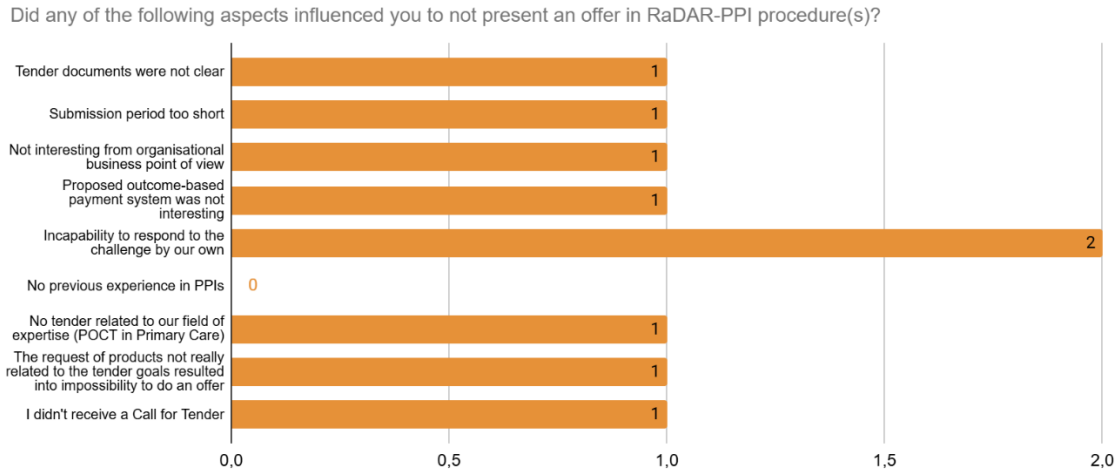

Figure 23. Aspects that influenced to not present an offer

The reasons to not submit an offer were very diverse. Some economic operators did not submit an offer because it was not interesting form an organisational business point of view or that the proposed outcome-based payment system was not interesting. Furthermore, there was also the case that the tenders were not related to the field of expertise of the economical operator or that they were not aware of the publication of the CfT.

Looking now at the companies of **Level 2. OMC participating companies that presented a non-awarded offer**, the reasons that influenced that the offer they made was not awarded area also variable but related to the answers from the companies at Level 1 that decided to not present an offer.

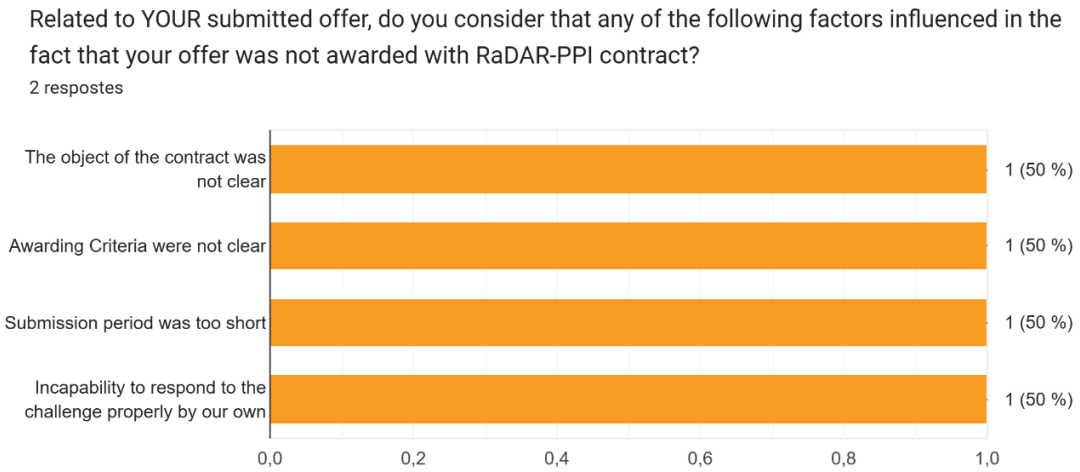

Figure 24. Factors influencing that an offer was not awarded

- Looking at the common elements between level 1 and level 2, there are several common **lessons learnt**:
  - A barrier encountered was the lack of clarity in procurement documents. Operators reported that the tender documents, the object of the contract and the awarding criteria were not clear.
  - Furthermore, several companies cited the "submission period too short" as a reason for not submitting or struggling to submit an offer.
  - And another problem shared was the incapability to respond to the challenge properly by their own, 3 companies were identified with this problem.
- **Recommendations**:
  - Take time to write the documents clearly explaining well the different sections together with allowing enough time between tender publication and offer submission deadline.
  - **Clearly define the tender specifications**. Include requirements that are feasible for the market to achieve in order to respond to the challenge properly.

At the **RaDAR-PPI contractors that answered the survey (Level 3),** the success factors for being awarded were asked.

Success factors for awarded contracts included understanding the project well, preparing a good technical report and having the technology available and aligned to the requirements together with a competitive pricing. It was also highlighted that the proposals were innovative because it will enable healthcare systems to pilot a new approach of AMR tackling strategy and test a new standard of care.

6.3 Implementation phase

The implementation phase focuses on the execution of the signed contracts, including the service provision adjustment, validation, system integration, and deployment in buyers' facilities.

During the implementation phase, the economical operators awarded that are deploying the solutions at the buyers' facilities also encountered some barriers and thus learnt how to improve in future PPIs.

6.3.1 Workflow, Clinical Pathways, and Logistics

- **Lessons Learnt:**
  - Variable sample volumes require logistical flexibility and tailored reagent formats to optimize consumption and costs, as standard reagent formats can lead to waste and suboptimal stock management. Adapting references or formats (custom number of reactions) is necessary to optimize consumption and costs.
  - Maximum impact of rapid detection technology is achieved only when clinical pathways

(who to screen, when, and how to act on results) are clearly defined and agreed upon by all relevant clinical and infection control stakeholders from the beginning.

- **Good practices:**
  - **Connecting the solution's capabilities** (rapid detection, shorter time to result) specifically with the RaDAR-PPI objectives (AMR control, infection reduction) helped motivate stakeholders and justify the organizational effort.
  - **Co-designing workflows** with professionals, such as the laboratory team, instead of imposing a model coming from the vendor. This increased ownership and facilitated smoother implementation and compliance.
  - **Progressive implementation** helps to detect and correct issues early without compromising the entire workflow.
- **Recommendations**:
  - Having a **clinical pathway** agreed by microbiologists, infection control, and prescribing clinicians before the full system go-live maximizes the impact of faster results from the first weeks of implementation.
  - Future collaborative deployments would benefit from a **common calendar** between buyers, establishing the same implementation period, monitoring months, and KPIs for synchronized evaluation.

6.3.2 Validation and training

- **Lessons learnt: Protocols require validation.** A protocol or solution may not perform as expected under real-world conditions, emphasizing the need for early validation and readily available alternative options to correct deviations without disrupting routine activity
- **Good practices: Hands-on training and support is important.** Training should be comprehensive and continuous, combining theoretical sessions with practical, hands-on demonstrations, and dedicated on-site support staff during the first weeks of use to resolve incidents quickly and consolidate routines.
- **Recommendation:** Plan a hands-on training for all professionals that will use or take part of the workflow of the solution.

6.3.3 IT integration and Data management

- **Lesson Learnt:**
  - Integration with hospital IT systems is often difficult and delayed due to internal factors at the contractors facilities like system transitions or lack of internal data expertise.
  - The development and refinement of digital platforms and monitoring dashboards are entirely dependent on the availability of data. The functionalities of the platform can only be tested and refined if the requisite data is collected and provided in time.

- **Good practices:** Creating **mock-ups of digital platforms** at an early stage allows the revision and optimization of the User Interface/User Experience before full development.
- **Recommendations:**
  - Try to establish early **alignment with the IT department** regarding system readiness and available interfaces. When integration is complex, implement flexible, interim interoperability solutions (e.g., structured data export/import workflows) to ensure operational continuity. Ensure communication with the Laboratory Information System (LIS) experts is established before starting the project.
  - **Establish the expected data type, format, scale, and the KPIs** during the change management phase and before data collection from the solutions to facilitate results collection and platform development process.

6.3.4 Communication and Support

- **Lessons learnt:** Communication between contractor and buyer helps to have alignment and facilitates the implementation of the solution correctly
- **Good practices:** Maintaining **weekly meetings and constant communication** between the contractor and the buyer facilitates internal alignment and problem-solving. For deployment, having named contact persons and regular meetings helps solve problems quickly.
- **Recommendations:**
  - Maintain constant communication during the whole implementation: change management and deployment phases
  - Define a **governance structure** from the start, with meetings scheduled to review progress, KPIs, and resolve issues.

7. Lessons from the payers and policy makers

Insights from interviews with Marie-Cécile Ploy (INSERM) and Enric Limón (ICO, VINCat)

To capture lessons learnt from policy- and payer-relevant stakeholders involved in antimicrobial resistance (AMR) initiatives, two interviews were conducted with experts actively engaged in initiatives at European and regional levels. Their profiles reflect complementary perspectives relevant to value-based and cross-border innovation procurement in the AMR field.

Enric Limon, RN (University of Barcelona), MSc (University of Montreal, Canada), PhD (University of Barcelona), is the Director of the VINCat Program Coordinating Center (Surveillance of Healthcare-Associated Infections in Catalonia) and the current Coordinator of the VINCat Program. He is also the Director of the Master's Program in Infection Control at the University of Barcelona–IL3. He has more than 20 years of experience in infection control and antimicrobial stewardship within the Catalan public healthcare system, having worked at Bellvitge University Hospital and the Catalan Institute of Oncology (ICO) (CatSalut – Department of Health). His work spans surveillance systems, clinical implementation, and health system-level strategies to prevent healthcare-associated infections. He received a Fellowship from the Spanish Network for Research in Infectious Diseases (REIPI) in 2000 and has authored more than 40 peer-reviewed publications in indexed scientific journals. His research focuses on the etiology and prevention of healthcare-associated infections, with particular emphasis on infections caused by multi-drug resistant organisms, including *methicillin-resistant Staphylococcus aureus* (MRSA) and *Clostridioides difficile*.

Marie-Cécile Ploy, MD, PhD, is a senior clinical microbiologist and researcher at INSERM (Institut National de la Santé et de la Recherche Médicale, France) and Head of the RESINFIT research unit in Limoges. She has more than 30 years of experience in antimicrobial resistance, having worked on antibiotic resistance since her doctoral research. Her scientific work focuses on the transmission of resistance genes between bacteria across human and environmental ecosystems, contributing to a One Health understanding of AMR emergence and spread. She is the Coordinator of the European Joint Action on Antimicrobial Resistance and Healthcare-Associated Infections (EU-JAMRAI and EU-JAMRAI 2), an initiative involving around 30 countries and aimed at supporting the implementation of national public health action plans against AMR. Through this role, she works closely with national public health authorities, ministries of health, and European institutions on the governance and coordination of AMR strategies. In addition, she co-leads the PROMISE network at INSERM, which aims to foster ambitious collaborative research projects through strengthened cooperation.

1. **Are you familiar with the RaDAR-PPI project? What has been your role and your level of involvement (if any)?**

Marie-Cécile Ploy confirmed that she is familiar with the RaDAR-PPI project, as she is a partner in the consortium. Her role mainly focused on discussions related to clinical demand, particularly the needs of clinicians and microbiologists regarding rapid diagnostics for AMR. At INSERM, her team conducted interviews with clinicians and produced a summary of these findings. In

addition, she is involved in Work Package 6 together with a colleague, contributing to the One Health dissemination activities and the One Health perspective of the RaDAR project.

Enric Limón indicated that he is familiar with the RaDAR-PPI project as an innovative initiative in the field of AMR. He described his involvement from the beginning as primarily scientific advisory, including drafting the proposal, providing strategic oversight, supporting dissemination, and managing local operations. His role has encompassed monitoring the project's progress, understanding its implications for the sustainability of the healthcare system, and evaluating the potential for scaling the solution to other centres with similar characteristics. He also participated in regular briefings and reviewed interim reports to assess alignment with health priorities and the public procurement regulations of his region.

2. **From your perspective as policy maker, what are the main motivations or expected benefits for participating in a value-based cross-border Innovation Procurement (PPI) project such as RaDAR?**

Enric Limón identified three main motivations for participating in a cross-border PPI project such as RaDAR. First, collaboration enables the distribution of risks and costs. Given that AMR is a systemic, cross-border threat, working together allows partners to share significant financial and operational risks inherent in procuring and validating novel solutions. Pooling resources makes the initial investment more feasible for each participating healthcare system.

Second, such an approach serves as a powerful tool for market shaping and sending a consolidated demand signal. A joint, cross-border public procurement demonstrates a clear and committed demand from multiple health systems for innovative AMR solutions. This signal incentivizes suppliers to invest in development and can potentially reduce long-term costs through economies of scale.

Finally, collaboration accelerates collective learning and evidence generation. Working across countries and settings enables partners to gather robust, comparative data on clinical and economic value more rapidly than any single nation could alone. This shared learning curve facilitates safer and better-informed decisions regarding national adoption and scaling.

Marie-Cécile Ploy clarified that she does not consider herself a policymaker, but rather a microbiologist. From her perspective, one of the main interests in participating in an innovation procurement project such as RaDAR was gaining a better understanding of how innovation procurement works and being able to observe the entire process. She highlighted that this was particularly valuable from a clinical microbiologist's point of view, as it provided insight into the role that European-level coordination can play in fostering innovation procurement across different countries.

She also emphasised the importance of discussions between clinicians from different countries, noting that it was striking to observe that, regardless of whether they were from Spain, Italy, or France, the clinical demands were ultimately very similar.

3. **What type of validation, evidence, or consensus do policy makers and payers require to consider the RaDAR solution (or other transformations) ready for broader adoption or investment? In your opinion, are innovative reimbursement models (like outcome-based payments) feasible and sustainable in the long term for both buyers and suppliers in projects like RaDAR?**

Enric Limón explained that multiple levels of evidence are required to decide on broader adoption.

- **Clinical validation and economic impact:** Evidence must demonstrate improved patient outcomes, a reduction in inappropriate antibiotic use, and cost-effectiveness or institutional budget impact analysis that is convincing for managers.
- **Operational feasibility:** The solution must integrate seamlessly into existing clinical workflows without imposing unsustainable burdens on staff.
- **Data interoperability and security:** The solution must comply with national laws, data security standards, and the European framework, while being compatible with existing health information systems.

Regarding innovative reimbursement models, he noted that **results-based payments** are attractive in theory to align incentives and guarantee value, but long-term viability requires clear, measurable, and attributable outcome indicators. In complex care processes, isolating the impact of a single solution is challenging, and continuous monitoring and auditing are necessary.

He also highlighted the importance of **flexibility in contracts based on trust**, explaining that new procurement models require a shift from transactional relationships to long-term collaborative partnerships between buyers and suppliers. Projects like RaDAR serve as essential 'testing grounds' for these new contract frameworks.

Marie-Cécile Ploy acknowledged that economic incentives are clearly needed, including new economic models, and that innovative reimbursement models are likely part of the solution. However, she stated that she does not feel sufficiently competent in economics to provide a definitive opinion. Regarding feasibility, she expressed uncertainty, noting that such models would require approval from all European countries and highlighting the existing difficulties in implementing economic incentives for new antibiotics. In terms of sustainability, she stated that she hopes these models can be sustainable in the long term, while considering feasibility to be the most challenging aspect.

4. **Which enabling factors (policy, regulatory, organisational, and financial) do you consider necessary to facilitate the participation of institutions in Innovative procurement projects in AMR? In the case of RaDAR, were these elements already in place, or did the project help create new conditions or insights that could support future initiatives?**

Enric Limón identified three key enabling factors:

- **Policy/Regulatory:** Flexible public procurement frameworks, such as the European CPI and CPP Directives, that allow pre-commercial procurement and value-based negotiation, not solely based on lowest price.
- **Organizational:** Specialized procurement units with competence and mandate to manage complex, multi-year innovation projects, along with clinical leaders who act as advocates ('champions') to secure acceptance.
- **Financial:** Access to dedicated funding lines for innovation procurement, separate from routine operational budgets.

He noted that the RaDAR project has been instrumental in highlighting where these enabling factors are strong or lacking. It has provided concrete insights into the legal complexities of cross-border contracts and the need for aligned evaluation methodologies, creating a practical handbook for future initiatives.

Marie-Cécile Ploy explained that these aspects were discussed within the JAMRAI framework, where initial discussions had taken place around innovative economic incentives, including procurement for new antibiotics. She noted that these topics now fall within the scope of DG-HERA, and she is not aware of the current state of progress. She referred to recent announcements at the European level, including the introduction of a new incentive system for antibiotics within pharmaceutical legislation. In addition, the European Commission, through DG HERA and the EU4Health Programme, has earmarked €8.85 million to support the development of rapid diagnostics for antimicrobial resistance, aimed at reducing inappropriate antibiotic use.

She stated that she does not know to what extent RaDAR has built all the necessary elements to continue innovative procurement initiatives. Nevertheless, she highlighted that value-based approaches, although more difficult to implement, could help convince policymakers of the need for innovation in financial and regulatory frameworks.

5. **What added value do you identify from the cross-border collaboration? Does it create opportunities or challenges from a policy perspective in the field of AMR?**

Enric Limón emphasized that the cross-border dimension is the core strength of the project. It facilitates alignment of clinical and economic evaluation protocols and creates standardized benchmarks for AMR interventions. It also builds a strong community of practice among policymakers, which is invaluable for tackling transnational threats.

The project offers opportunities by positioning Europe as a coordinated and sophisticated buyer, fostering a more innovative European health tech ecosystem for AMR.

Challenges include harmonizing different national procurement laws, reimbursement pathways, and ethical review processes, as well as navigating sensitive issues related to data sovereignty and sharing across jurisdictions. While these divergences can slow execution, they provide critical lessons for EU health policy integration.

Marie-Cécile Ploy stressed that cross-border collaboration is always highly valuable, as it creates opportunities for discussion and exchange between health systems that differ across countries. She underlined that addressing AMR effectively requires such collaboration, as well as thinking at the European level and potentially at a global level.

She acknowledged that cross-border collaboration can also create challenges from a policy perspective. However, she suggested that the experience and expertise gained through projects such as RaDAR could be used constructively, for example by producing a policy brief targeted at policymakers and European decision-makers to explain the added value of innovative procurement based on the RaDAR experience.

She concluded by reiterating that this collaboration was particularly insightful, as it confirmed that clinical demands were largely the same across countries.

6. ***W*hat key lessons learnt, good practices, and recommendations would you highlight for other regions or countries considering to engage in a value-based cross-border PPI addressing AMR?**

Based on his experience with RaDAR-PPI, ANTISUPERBUGS-PCP, and similar initiatives, **Enric Limón** highlighted several recommendations:

- Start with a clear and shared value proposition: Align all regions from the outset on the specific healthcare system and economic problems being addressed. The value-based procurement framework proposed by AQUAS is crucial.
- Invest in legal and contractual foundations early on: Allocate significant time and expert resources upfront to design flexible cross-border consortium agreements and results-based contract models.
- Engage buyers and procurement authorities from day one: Their operational and financial concerns must shape the project design. They should be included in the consortium's governance.
- Involve clinical and care managers in decision-making: This ensures ownership of the initiative from the outset.
- Build scalability and sustainability into the pilot design: Define and map out potential pathways for procurement and reimbursement in each participating region from the beginning.
- Engage in interactive communication with the market: Conduct open market consultations not just once, but as ongoing dialogue to ensure feasibility and maintain supplier engagement.
- Document the process, not just the outcomes**:** Lessons on governance, conflict resolution, and data sharing agreements are as valuable as clinical results for replicating the model elsewhere.

Marie-Cécile Ploy emphasised that, to engage other regions or countries in a PPI process, it is essential to start from the ground level, focusing on feedback from clinicians and clearly articulated clinical demand, rather than beginning with the concept of PPI itself. She explained

that the approach may differ depending on the stakeholders involved. For economic departments within hospitals or institutions, the focus might be more on processes, economic aspects, and simplicity. However, to convince microbiologists and clinicians, it is crucial to start with clinical needs and to demonstrate the full process, including the structured pathways used at the beginning of the project.

She acknowledged that defining key performance indicators remains very challenging, but maintained that anchoring the process in clinical demand is fundamental. She also highlighted the importance of IT systems, noting that she did not initially expect the strong emphasis clinicians placed on the need for innovative IT solutions. She suggested that this aspect should be highlighted to other regions, as such systems can significantly change clinical practices and improve daily work.

Finally, she concluded by stating her strong conviction that working at the European level is always highly productive and beneficial for all stakeholders involved.

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8. Conclusions

The RaDAR-PPI project has demonstrated that value-based, cross-border collaborative procurement, when implemented through PPI, is not just a theoretical framework but an effective and practical way to improve and transform healthcare. By moving away from traditional procurement, which is mainly price-based, and adopting a model that focuses instead on clinical results, the project has provided an effective approach to address complex health challenges like AMR. Its success comes from the project's ability to align the needs of clinicians, patients, and technology providers through a structured and evidence-based approach.

The methodology used, together with the application of the theory of change, played a key role in the project. By starting with the desired long-term impact (improving patient safety and treatment appropriateness), the Buyers Group then worked backward to define the mid- and short-term outcomes, outputs, and define the specific activities needed to achieve this goal. This approach ensured that every technical requirement had a clear clinical purpose.

Furthermore, the methodology introduced the concept of "contracts permeable to value". Clinical and organizational outcomes, as well as KPIs, were directly embedded into technical requirements and payment mechanisms. This ensured that the expected value and benefits for the healthcare system were maintained during implementation and throughout the entire contract lifecycle.

An important finding of from the preparation and procurement phases is that hospitals in different European countries face very similar challenges when addressing AMR. This confirmed the importance of clearly defining clinical needs at the start of the process and highlighted the value of early involvement of different professional groups. Bringing together IT staff, laboratory teams, microbiologists and clinicians from the beginning helped ensure that the selected solutions were suitable for everyday hospital practice.

In addition, the project showed that early market engagement is essential for successful PPI. The Open Market Consultations (OMCs) allowed buyers to adjust their requirements based on what was technically feasible. During the procurement phase, the consortium also learned that flexibility is essential. Differences between national legal and administrative systems led to delays that required adaptable timelines.

The implementation phase provided the most significant operational insights. The project highlighted that IT integration (connecting new tools to HIS/LIS systems) was frequently a bottleneck, often requiring more time and specialized resources than initially planned. To address this, the Buyers Group recommended to co-designing workflows with end-users rather than following a vendor-driven model. This approach improves acceptance and commitment among professionals and ensures that the technology fits smoothly into the clinical pathway.

The project also showed that hands-on training is essential for effective change management. Having technical support available on-site during the first weeks of deployment helped resolve problems quickly and increased user confidence. This early support is key to ensure that new solutions are used consistently over time.

Overall, this Handbook confirms that value-based, cross-border collaboration projects offer clear benefits. Shared risks, stronger influence on the market, and collective learning make this approach worthwhile. The lessons from the RaDAR-PPI project provide a solid base for other initiatives aiming to implement innovation and strengthen the resilience of health systems.

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9. Annex I

RaDAR-PPI. Lessons Learnt from Market Engagement

The objective of this questionnaire is to gather supply chain representatives' perspectives to assess the replicability and scalability of RaDAR-PPI model in future procurement procedures.

In the same manner, it is aimed to comprehend the barriers identified by the supply chain to:

1. Give response to the challenge launched by RaDAR Buyers Group in the Rapid Detection and control systems for AMR
2. Participate in an innovative procurement procedure

To this end, RaDAR Consortium is approaching representatives of targeted supply chain organisations that participated either in the different stages of the RaDAR procurement procedure, from the open market consultation towards the contracts execution.

About RaDAR-PPI

RaDAR is an European project co-funded by the COSME programme of the EU (Grant Agreement N° 101036228) aiming to address the European urgent need of a **ra**pid **d**etection and effective infection control system for **a**ntimicrobial **r**esistance (AMR) through the implementation of a value-based cross-border collaborative procurement of innovative solutions. The common identification of the clinical needs by a cross-border group of 5 procurement organisations (Spain, France and Italy) will promote an increased impact of the adopted innovation and will collaboratively give response to the current AMR problem affecting the EU.

For more detailed information on RaDAR-PPI, you can visit the website here.

Confidentiality

All responses will remain confidential. Questionnaire responses will be linked using a unique identifier and will only be available to the data administrator, who will analyse provided information for reporting purposes to European Commission. Your name and email are collected in case further information is needed, but in any case will be included in any project communication.

All personal data will be strictly anonymized in the resulting publication, deliverables, RADAR-PPI reports and in any other communication and dissemination materials.

Your personal data will remain in the database until the results have been completely analysed and exploited for RADAR-PPI. The project RADAR-PPI ends in June 2026.

By responding this survey you agree to participate voluntarily and understand that your responses will be used anonymously. You can withdraw from the questionnaire at any time at no consequence to you. You are free to refuse to answer any question in the questionnaire. When you submit this questionnaire, you consent that RADAR-PPI will process your personal data provided in the questionnaire as explained.

If you have any questions or concerns, please contact us at contact@radar-ppi.com.

Section 1

1. Your Name
2. Email address
3. Name of your Organisation
4. Position/Role in your Organisation

Section 2: Engagement during RaDAR-PPI Pre-Procurement Stage

The Pre-Procurement stage would refer to the actions that took place BEFORE the launching of RaDAR-PPI Call for Tenders

5. Please select your interaction with representatives of the Buyers Group during the Pre-Procurement Stage among the provided options:
    - PIN reading
    - Respond to OMC Questionnaire
    - Participation to OMC (Online)
    - Participation to the OMC in Barcelona (March 2023)
    - Participation to OMC in Paris (March 2023)
    - Participation to OMC in Naples (March 2023)
    - Participation to RaDAR-PPI Info Day (November 2023)
    - Participation to Market Information Event in Donosti (Feb 2025)
    - Use of Matchmaking tool
6. Which of the identified activities are/were considered fruitful from your point of view? And why?
7. Did the performed activities support you and your organisation to understand the RaDAR project and the buyers' needs?
    - Yes, the interaction with the Buyers Group helped a lot
    - It was considerably good, but additional actions could be taken into consideration
    - Not really, the actions were not very useful
    - No helpful at all
8. Question 11: Have your perception of PPI changed or improved by participating in the Market Engagement activities proposed in RaDAR?
    - Yes, I see the benefits of this type of procurement
    - Yes, it sounds attractive but still not sure how to integrate with our current operations
    - Yes, but the organisation is still unclear about this risk-sharing instrument
    - Sounds interesting but still not clear how to participate
    - No, I still do not see the benefits
9. Would you suggest any additional action that the Buyers Group could take in future procurement procedures during the Pre-Tender phase?

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Section 3: Engagement during RaDAR-PPI Tender Stage

The Tender stage would refer to the actions that took place SINCE the publication of RaDAR-PPI Call for Tenders until the contracts awarding and formalization

10. Please select your performed actions during the Tender stage among the provided options:
- Read the Tender Documents
- Submit question(s) through the Contracting Platform
- Use the Theory of Change described in the Tender documents to reconsider your own R&D target goals in order to meet the desired long-term results established by RaDAR
- Internally consider to present an offer
- Negotiate with other organisations to present an offer in Consortium
- Use the matchmaking tool
- None

11. Was the information provided by the Buyers Group during the Tender procedure helpful for you and your organisation?
- Yes, the information provided by the Buyers Group helped a lot
- The provided information was considerably good, but additional actions could have been taken into consideration
- Not really, the provided information was not very useful
- No helpful at all

12. Related to this topic, would you suggest any additional action(s) the Buyers Group could take in future procurement procedures during the Tender stage?

13. Would you be keen to collaborate with other organisations to give an integrated response to future challenges/tenders related to a service provision?
- Yes, always interested to create synergies with complementary companies in the same field of action
- Yes, if needed to provide an integrated service in a hypothetical tender
- No, as the benefits from this collaboration do not compensate the associated risks
- I would rather no. Under exceptional circumstances
- No, never

14. RaDAR-PPI proposed an outcome-based payment system. Do you consider this proposed payment system attractive and sustainable in the long term for both the buyers and the suppliers? Please justify your answer.

Section 4: Participation in the RaDAR-PPI pre-procurement stage and...

15. Which option defines you best?
- Participating in the RaDAR-PPI Open Market Consultation(s) (OMC)/Information event but not presenting an offer during the Call for Tenders
- Participating in the RaDAR-PPI OMC/Information event and presenting an offer to one or more of the Tender procedures that was not awarded

- Participating in the RaDAR-PPI OMC/Information event and presenting an offer to one or more of the Tender procedures that was awarded

(Following sections depending on the answer to question 15)

Section 5: Level 1. Participating in RaDAR-PPI Open market Consultations (OMC) but not presenting an offer during the Call for Tender

16. Did any of the following aspects influenced you to not present an offer in RaDAR-PPI procedure(s)?
- Tender documents were not clear
- Submission period too short
- Not interesting from organisational business point of view
- Proposed outcome-based payment system was not interesting
- Incapability to respond to the challenge by our own
- No previous experience in PPIs

17. Please justify your answer and add anything you consider worth sharing:

Section 6: Level 2. OMC participating companies that presented a non-awarded offer

18. Did you submit offers to one or more tenders/lots?
- One
- More than one

19. Related to YOUR submitted offer, do you consider that any of the following factors influenced in the fact that your offer was not awarded with RaDAR-PPI contract?
- The object of the contract was not clear
- Awarding Criteria were not clear
- Submission period was too short
- Incapability to respond to the challenge properly by our own

20. Please justify your answer:

21. Is there any action (e.g., internal at your organisation and/or from the Buyers Group) that would have been fruitful to present a winning offer?

22. Please, share any considerations or internal debates that came out in your internal decision making process that could leverage the uncertainties:

Section 7: Level 3. RaDAR-PPI Contractors

23. Question 31: What would you consider were the success factors of being awarded?

24. Question 32: Did you submitted offers to more tenders/lots?
- Yes
- No