Common European Data Spaces and Robust AI for Transparent Public Governance

CEDAR

Project acronym: CEDAR

Project full title: Common European Data Spaces and Robust AI for Transparent Public Governance

Call identifier: HORIZON-CL4-2023-DATA-01

Type of action: HORIZON-RIA

Start date: 01/01/2024

End date: 31/12/2026

Grant agreement no: 101135577

D6.3 CEDAR Impact Assessment V1

Document description: Outlining the impact assessment framework

Work package: WP6 – IMPACT: Promotion and Exploitation of CEDAR Science and Innovation

Author(s): Peter Graeff (CAU), Sönke Hese (CAU)

Editor(s):

Leading partner: CAU

Participating partners: BIGS, DBC, LC, FVG, ANCE, ARPA, MNZ, SBC, ARU, TI-D, SKS, SU, SBC, MDP, MZ

Version: 1.0

Status: Draft

Deliverable type: R – Document, report

Dissemination level: PU- Public

Official submission date: 31/12/2024

Actual submission date: 24/12/2024

The CEDAR project has received funding from the European Union's Horizon Europe project call HORIZON-CL4-2023-DATA-01 funded project Grant Agreement no. 101135577

Disclaimer

The CEDAR consortium consists of the following partners:

No.	Partner Organisation Name	Partner Organisation Short Name	Country
1	Centre for Research and Technology Hellas	CERTH	Greece
2	Commissariat al Energie Atomique et aux Energies Alternatives	CEA	France
3	CENTAI Institute S.p.A.	CNT	Italy
4	Fundacion Centro de Technologias de Interaccion Visual y Comunicaciones VICOMTECH	VICOM	Spain
5	TREBE Language Technologies S.L.	TRE	Spain
6	Brandenburgisches Institut für Gesellschaft und Sicherheit GmbH	BIGS	Germany
7	Christian-Albrechts University Kiel	KIEL	Germany
8	INSIEL Informatica per il Sistema degli Enti Locali S.p.A.	INS	Italy
9	SNEP d.o.o	SNEP	Slovenia
10	YouControl LTD	YC	Ukraine
11	Artellence	ART	Ukraine
12	Institute for Corporative Security Studies, Ljubljana	ICS	Slovenia
13	Engineering – Ingegneria Informatica S.p.A.	ENG	Italy
14	Universidad Politécnica de Madrid	UPM	Spain
15	Ubitech LTD	UBI	Cyprus
16	Netcompany-Intrasoft S.A.	NCI	Luxembourg
17	Regione Autonoma Friuli Venezia Giulia	FVG	Italy
18	ANCEFVG – Associazione Nazonale Construttori Edili FVG	ANCE	Italy
19	Ministry of Interior of the Republic of Slovenia / Slovenian Police	MNZ	Slovenia
20	Ministry of Health / Office for Control, Quality, and Investments in Healthcare of the Republic of Slovenia	MZ	Slovenia
21	Ministry of Digital Transformation of the Republic of Slovenia	MDP	Slovenia
22	Celje General Hospital	SBC	Slovenia

23	State Agency for Reconstruction and Development of Infrastructure of Ukraine	ARU	Ukraine
24	Transparency International Deutschland e.V.	TI-D	Germany
25	Katholieke Universiteit Leuven	KUL	Belgium
26	Arthur's Legal B.V.	ALBV	Netherlands
27	DBC Diadikasia	DBC	Greece
28	The Lisbon Council for Economic Competitiveness and Social Renewal asbl	LC	Belgium
29	SK Security LLC	SKS	Ukraine
30	Fund for Research of War, Conflicts, Support of Society and Security Development – Safe Ukraine 2030	SU	Ukraine
31	ARPA Agenzia Regionale per la Protezione dell' Ambiente del Friuli Venezia Giulia	ARPA	Italy

Document Revision History

Version	Date	Modifications Introduced	
		Modification Reason	Modified by
0.1	03/11/2024	First draft and creation of ToC	Peter Graeff
0.2	07/11/2024	Revision	Peter Graeff, Sönke Hese
0.3	20/11/2024	Revision, added section about pilots	Peter Graeff
0.4	29/11/2024	Revision, chapter 4 refined	Peter Graeff, Sönke Hese
0.5	03/12/2024	Updated template, rewording of executive summary	Sönke Hese
0.9	06/12/2024	Feedback from internal review	BIGS, MDP
1.0	09/12/2024	Integrated feedback from partners	Sönke Hese
1.0	20/12/2024	Internal review, final check and submission	Thodoris Semertzidis, Mariana Minopoulou

Statement of originality

This deliverable contains original, unpublished work except where clearly indicated otherwise.

Acknowledgement of previously published material and of the work of others has been made through appropriate citation, quotation or both.

Table of Contents

List of Tables

List of Figures

List of Terms and Abbreviations

AI	Artificial Intelligence
CBA	Cost-Benefit Analysis
CEDS	Common European Data Spaces
CV	Computer Vision
EU	European Union
FAIR	Findable, Accessible, Interoperable, Reusable
ICT	Information and Communication Technology
KPI	Key Performance Indicator
LEED	Local Economic and Employment Development
MS	Member States
NLP	Natural Language Processing
OECD	Organisation for Economic Co-operation and Development
PESTLE	Political, Economic, Social, Technological, Legal, and Environmental
ROI	Return on Investment
SWOT	Strengths, Weaknesses, Opportunities, and Threats
TED	Tenders Electronic Daily

Executive Summary

This deliverable outlines the Impact Assessment Framework for the CEDAR project. It focuses on evaluating both immediate outcomes and long-term impacts of its digital governance tools across three pilot states—Italy, Slovenia, and Ukraine—and at the broader EU level. The project's overarching aim is the promotion of transparent and accountable public governance. This will be done by demonstrating in the pilot states the process of identifying data sources, integrating these into interoperable data spaces, and developing robust AI technologies to facilitate this data. This document offers a structured framework to assess how these solutions drive meaningful change in the local public sector processes.

Key performance indicators (KPIs) are central to this assessment, providing measurable benchmarks for CEDAR's outcomes and impacts. Two main methods—surveys and formalised partnerships—form the basis of KPI operationalisation, enabling CEDAR to capture stakeholder engagement, satisfaction, and readiness to adopt CEDAR's solutions. Surveys require careful design, including detailed sampling strategies and localised variables tailored to specific country conditions. Formalised partnerships, meanwhile, focus on building long-term adoption pathways for CEDAR's solutions, particularly at the EU level.

The impact assessment framework also includes adaptive assessments for specific KPIs, allowing flexibility in measurement to capture real-time changes and stakeholder feedback as the project progresses. Additionally, PESTLE analysis is applied to bridge pilot outcomes to EU-level impacts, ensuring that insights from each pilot state are contextualised for broader applicability. This approach enables CEDAR to translate local successes into scalable EU-wide recommendations, promoting digital resilience, public trust, and efficiency in governance.

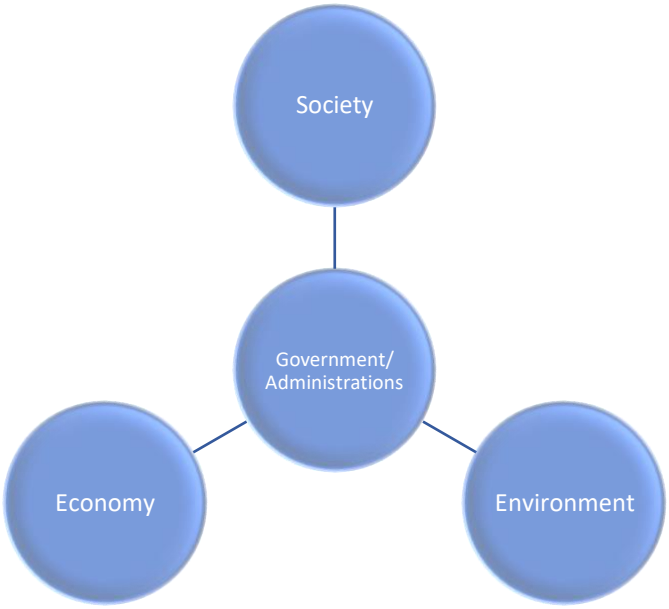
Through this comprehensive framework, CEDAR not only demonstrates immediate benefits within pilot regions but also establishes a foundation for sustainable EU-level impact. The insights generated from this assessment will inform strategic policy recommendations, contributing to a more transparent, accountable, and effective governance model across the European Union.

1 Introduction

1.1 Purpose of the document

Deliverable D6.3 Impact Assessment is an ongoing and final part of Work Package WP6 – IMPACT: Promotion and Exploitation of CEDAR Science and Innovation. This document outlines the framework for deriving CEDAR's impact, supplementing the other WP6 key areas of Knowledge Management and Protection, Strategic Communication, Broad Dissemination and Policy Influence, and Exploitation and Sustainability. While the whole WP6 package warrants that innovative and scientific outcomes are properly disseminated and transferred into benefits for stakeholders and target populations, the Impact Assessment Framework describes how CEDAR sets up operationalised measurements and methodologies in order to evaluate the impact of CEDAR's outcomes over the project's lifetime.

Figure 1: CEDAR's Impact Dimensions



The impact assessment framework for the CEDAR project prioritises evaluating the influence of its initiatives on government structures, recognising that governmental impact is crucial for achieving lasting change. At the forefront, the framework will assess how the integration of high-quality datasets and cutting-edge technologies enhances governmental transparency and accountability, especially in areas like public procurement (Fazekas et al. 2018, Graeff and Baur 2020). Furthermore, it will analyse the effectiveness of newly developed interoperable connectors and APIs in facilitating essential data sharing and advancing digital governance across public institutions. This governmental impact also includes evaluating the frameworks set for maintaining compliance with ethical standards and ensuring regulatory integrity in the public sector—elements deemed fundamental to reinforcing accountable governance across Europe (Ahamd et al. 2024).

In addition to governmental impact, the framework will consider the secondary yet significant societal effects of the project. It will examine how ethical standards are strengthened within public institutions and whether these improvements in governance contribute to mitigating corruption. Furthermore, it will assess any shifts in public trust towards government bodies, particularly focusing on whether enhanced transparency leads to improved public perception. The framework will also evaluate how data-driven decision-making tools encourage citizen empowerment and increased civic engagement, supporting broader societal participation in governance.

On an economic level, the framework will analyse the project's contributions to economic resilience, recognising that more effective and transparent governance can lead to reduced corruption and greater economic stability within Europe. It will define methods to quantify potential cost savings from reducing fraud in public spending and assess the competitive edge gained by the public sector and related industries through the adoption of advanced technologies.

Moreover, on the environmental level, corruption in public institutions often enables the unfair allocation of natural resources and promotes ecologically harmful practices (Tacconi and Wiliams 2020). For instance, corrupt officials may grant extraction licenses to companies neglectful of environmental regulations, leading to significant degradation and worsening the climate crisis. Recognizing these risks, CEDAR's methodology is crafted to actively prevent harm to biodiversity and the climate. Aligned with the EU Taxonomy Regulation's environmental objectives, CEDAR's solutions are not only designed to respect these principles by default. They will, moreover, be evaluated regarding their environmental impacts to demonstrate sustainability, particularly regarding climate impact, thereby showcasing our commitment to responsible innovation.

1.2 Intended audience

This is a public document. For the consortium partners, this document serves as an orientation for holding their data, variable definitions and technical solutions being amenable for impact assessment. Moreover, it helps interested stakeholders within and outside of the consortium understand the project's Impact Assessment and the ramifications of CEDAR's outcomes for EU countries and the EU as a whole.

2 CEDAR's Outcomes and Impact

The impact assessment framework for the CEDAR project will focus on evaluating the multifaceted impacts of its initiatives in relation to government in the first place, but also to society, the economy and the environment.

In order to pave possible ways of impact-driven change strategies evocated by CEDAR, we focus on the projects' crucial elements of outcomes and impacts by referring to the last elements of a logic model (McLaughlin & Jordan 2010, 57; OECD/European Union 2024).

Figure 2: Outcomes and Impacts in CEDAR

In CEDAR, outcomes and impact refer to distinct yet interrelated results of the project's efforts. Understanding these terms is essential to evaluating the success and long-term benefits of CEDAR's initiatives.

Outcomes are the immediate, measurable effects of CEDAR's work within the project's lifespan. They represent specific, short- to medium-term changes experienced by the CEDAR stakeholder community—such as data space architects, integrators, developers, policy managers, and citizens—resulting directly from CEDAR's activities and outputs. These outcomes indicate how the CEDAR solutions (outputs) influence stakeholders by improving behaviours, skills, attitudes, and operational conditions within their fields. Outcomes are defined by Key Performance Indicators (KPIs), such as stakeholder engagement metrics or adoption rates of CEDAR tools and practices, reflecting the early uptake of the project's outputs. Outcomes might include, for example, the number of EU member states that adopt CEDAR-recommended data integration protocols or tools within a one- to three-year period, fostering an environment of increased data harmonisation and interoperability.

Impact, in contrast, refers to the long-term, transformative changes that result from sustained adoption and influence of CEDAR's outcomes over time. While outcomes are the immediate benefits seen by direct beneficiaries during the project, impacts are broader, systemic shifts that occur as a ripple effect of these outcomes. The impact of the CEDAR project aligns with its ultimate objectives, such as advancing transparency in data management, promoting efficient data use across Europe, and enhancing citizen engagement in digital governance. This long-term change contributes to lasting improvements in public sector governance, societal trust in digital infrastructure, and alignment with EU policy goals for data interoperability. For example, impact is realised when the adoption of CEDAR's frameworks leads to enduring shifts in how public institutions manage and share data, resulting in a stronger, more interconnected European data space ecosystem.

The distinction between outcomes and impact lies in their timeframes and scale: Outcomes are specific, measurable benefits realised by stakeholders during or shortly after project implementation. They are the tangible steps toward impact, as suggested by Figure 2, reflecting changes in stakeholder capabilities or practices driven by CEDAR's interventions. Impact, however, refers to the overarching change that these outcomes aim to drive over a more extended period. Impact signifies the broader societal, political, or environmental transformation that aligns with CEDAR's mission.

CEDAR's data and technology outcomes and impacts will be tested and validated through three pilot programs in distinct European countries. These pilots aim to foster a data-driven public sector and promote more transparent governance, setting the stage for broader EU-wide impacts.

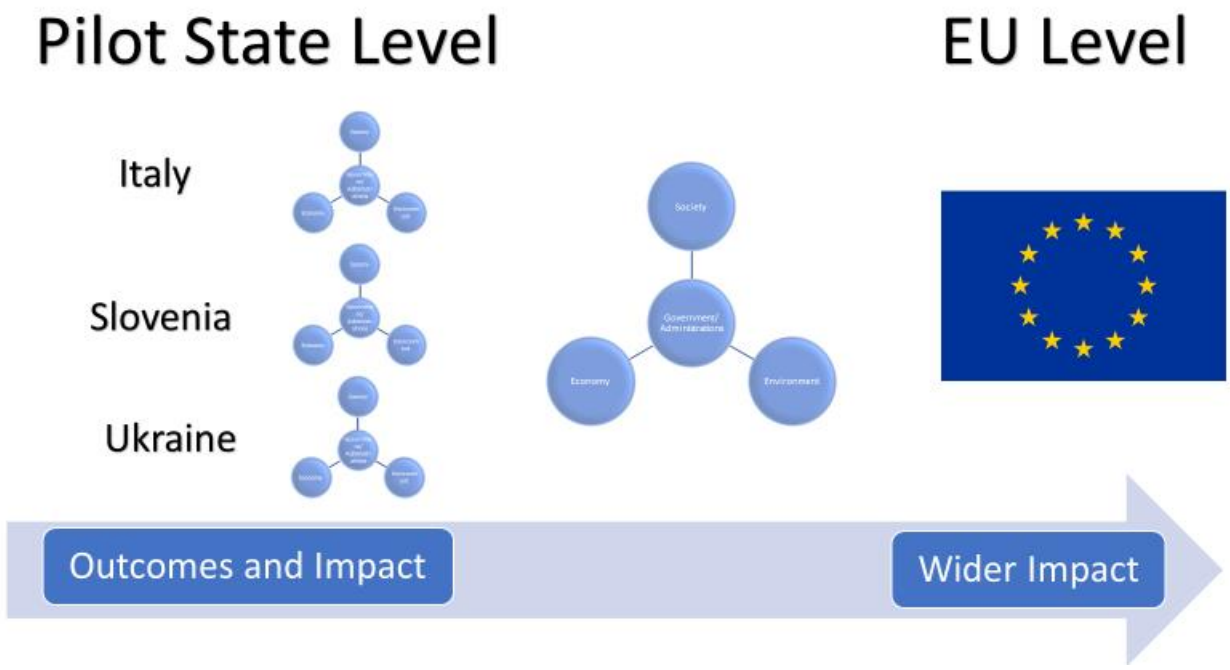
The focus in Italy is to increase the capacity to monitor public procurement, especially in light of its significant increase due to the substantial funds allocated by the National Recovery and Resilience Plan (RRP). For this reason, having tools capable of detecting anomalies in the management of public procurement helps support current control procedures for legality purposes and also for the prevention of infiltration by criminal organisations.

In Slovenia, the emphasis is on the transparent management of healthcare funds, where stakeholders will use data-driven technologies to combat fraud and potential corruption in low-value tenders, thereby strengthening transparency and accountability within the public healthcare sector.

For Ukraine, the pilot supports the transparent management of foreign aid directed at infrastructure and rebuilding efforts. By providing the Ukrainian government and international donors, including the EU, with secure, data-informed tools, CEDAR ensures efficient and accountable use of foreign aid for reconstruction projects.

These pilots are designed not only to validate CEDAR's solutions locally but also to train users and measure the positive impacts on societal, economic, and environmental levels. The insights and effective practices derived from these pilot outcomes will be scaled to generate a wider impact across the EU, promoting transparent governance and resilient data practices throughout Europe, as illustrated in Figure 3.

Figure 3: Outcomes, Impact and Wider Impact



2.1 Outcomes and their Key Performance Indicators (KPIs)

In CEDAR, outcomes are defined by their ability to achieve tangible, short- to medium-term advancements that drive the project towards its overarching goals. Each outcome centres on building a robust and sustainable European data ecosystem, contributing distinct yet interconnected benefits to the broader digital landscape (see Table 1).

The first outcome focuses on enhancing the EU's industrial competitiveness by enabling the processing of vast data volumes, a foundational capability that powers other technological developments across various sectors. This capacity establishes a critical infrastructure that supports further innovation and positions the EU as a leader in data-driven solutions. In parallel, the second outcome emphasises the successful deployment of data spaces across multiple economic and social sectors. This

achievement is key in ensuring that data spaces are both functional and accessible, facilitating cross-sector collaboration and aligning with the EU's vision for an integrated data economy.

Another outcome aims to improve data access and governance, focusing on interoperability, protection, and sovereignty in line with FAIR principles (Janssen et al. 2020). This outcome addresses the pressing need for sustainable value chains, ensuring that data usage respects and aligns with the interests of diverse stakeholders. Additionally, CEDAR seeks to enhance the data-related capabilities of companies, particularly SMEs, as well as public sector entities. This outcome expands the capacity of these organisations to act as data providers and active participants within Europe's innovation ecosystem, empowering smaller players and public institutions to contribute to and benefit from the data economy.

Finally, CEDAR aims to support and advocate for data sharing as a means of driving social and economic progress in alignment with the European Strategy for Data. This outcome underscores the project's commitment to using data as a public good, fostering policies and practices that maximise data's value for societal well-being and economic resilience.

In CEDAR, three main methods are used to assess KPI fulfilment. First, surveys are conducted to gather feedback, some of which include retrospective questions to capture changes and improvements. Second, partnerships are formalised through agreements or memoranda to solidify commitments. Third, quantifiable outputs are measured, such as the number of publications or through cost-benefit analyses. Additionally, some KPIs are tracked in a more flexible, open-ended way, allowing for adaptive assessment as the project progresses. Table 1 shows how outcomes are linked with KPIs according to each method.

Table 1: Relating CEDAR's Outcomes and KPIs

Outcomes							
1. Ability to process vast volumes data as one of the key enablers for other technological developments, supporting the competitiveness of the EU's industrial ecosystems.			1				
2. Successful deployment of data spaces involving several sectors of economy or society.				2			
3. Improve data access (in line with FAIR principles), data sovereignty, data interoperability, data protection as an essential factor in the development of sustainable value chains respecting all stakeholder interests.					3		
4. Increasing the capability of companies, particularly SMEs, but also the public sector as data providers and innovation/market ecosystem enablers.						4	
5. To support and promote data sharing and the use of data for social and economic benefits according to the European Strategy for Data.							5
Methods and KPIs							
Methods	KPIs	Outreach					
Measuring quantifiable outputs	>20 scientific peer-reviewed publications related to findings made in WP2-WP5	All areas	1	2	3	4	5
	Evidence collected in the pilots that CEDAR results have Benefit/Cost ratio better than the current practices	Economy, Gov./ Administrations		2	3	4	5
Formalizing partnerships	>7 public administrations will sign an agreement with the consortium to use CEDAR results after the project end	Government/ Administrations	1	2	3	4	5
	>3 investors will sign a memorandum of understanding with the consortium to participate in the exploitation of the CEDAR results	Economy, Gov./ Administrations	1	2	3	4	5
	>10 SMEs and >20 public sector organizations sign an agreement with CEDAR to use its exploitable results	Government/ Administrations				4	5
	>5 public sector organizations from other application domains sign an agreement with CEDAR to exploit results for their data value chain management	Government/ Administrations				4	5
	>5 public sector organizations of different MSs than those of the project's pilots sign an agreement, before the project end, to adopt CEDAR in their public procurement processes	Government/ Administrations				4	5

Surveys	>90% of the Public Authorities and relevant practitioners in the CEDAR stakeholders' community declare they are satisfied with the performances reached by the CEDAR solutions during the pilot phase	Government/ Administrations	1	2	3	4	5
	>80% of the member of the CEDAR stakeholders' community agree with the evidence-based results of the application of CEDAR solution in the three pilots	All areas	1	2	3	4	5
	> 70% of stakeholder community participants report through self-assessment during project validation that adopting the CEDAR solution over current practices would enhance transparency, accountability, and their trust in public governance	All areas	1	2	3	4	5
	High level of adoption of CEDAR results captured during the pilots with >70% of the users willing to use them after the project end	All areas		2	3	4	5
	>80% of the stakeholders' community members agree on the CEDAR business model and exploitation strategy	All areas				4	5
Adaptive assessment	Significant improvements of CEDAR solutions assessed during the pilot activities in relation to specific KPIs agreed with the stakeholders	All areas	1	2	3	4	5
	All target audiences and activities specified in the proposal, section 2.2, will be achieved during the project life cycle	All areas					5

2.2 Wider Impact Aims and their Key Performance Indicators (KPIs)

2.2.1 Aims and KPIs

While CEDAR's outcomes primarily target the pilot states—Italy, Slovenia, and Ukraine—the project's broader impact is designed to benefit the EU as a whole through four strategic aims essential for enhancing Europe's digital and environmental resilience. The first aim focuses on promoting Europe's strategic autonomy, advancing digital and green transitions through human-centred technology, and empowering European stakeholders to develop inclusive policies that address societal challenges.

Additionally, CEDAR supports the Common European Data Spaces (CEDS) initiative, reinforcing Europe's leadership in the global data economy. By establishing standards for data lifecycle management and enhancing data access and interoperability, CEDAR strengthens Europe's competitive edge in data-driven innovation. The project also seeks to maximise the social and economic benefits of widespread and effective data use, enabling various sectors to leverage insights for public benefit and economic growth.

Lastly, CEDAR enhances Europe's capacity to address urgent societal challenges (Thomann et al. 2023), such as crisis management and sustainable digital practices, by fostering data-driven solutions to tackle critical issues. This commitment reflects Europe's dedication to building a resilient and adaptive data ecosystem. Table 2 connects these four aims with specific KPIs and lists the methods used to assess KPI fulfilment. Compared to outcomes, the broader impact KPIs focus on formalising partnerships, except for a particular KPI related to significant benefits observed during the pilot phase on societal challenges, which falls under adaptive assessment.

Table 2: Wider Impact Aims and their KPIs

Wider Impact Aims				
1. Promoting an open strategic autonomy of Europe to accelerate and steer the digital and green transitions through human-centred technologies and innovations.	1			
2. Contribution to the CEDS and improved European leadership in the global data economy.		2		

3. Maximised social and economic benefits from the wider and more effective use of data.					3	
4. Reinforced Europe's ability to manage urgent societal challenges (e.g., data for crisis management, digital for clean).						4
Methods and KPIs						
Methods	KPIs	Outreach				
Formalizing partnerships	> 20 government organizations from more than six EU member states will agree to adopt CEDAR to enhance their digital capabilities for developing inclusive, action-oriented policies to address societal challenges	Government/ Administrations	1	2	3	4
	>15 policy makers from more than 8 EU MSs include in their agenda CEDAR's policy recommendations	Government/ Administration	1	2	3	4
	>3 impact investing organizations willing to economically support the industrialization and the scale up of CEDAR	All areas	1	2	3	4
	> 15 companies from at least six EU member states will agree with the consortium to use the proposed solution to enhance their public procurement processes.	Economy	1	2	3	4
	>3 standardization authorities agree that the CEDAR recommendations are useful to improve their standards on data life cycle	Government/ Administrations		2	3	4
	≥3 of the CEDS responsible organizations agree to use CEDAR to improve access to their data spaces and accelerate their interoperability	All areas		2	3	4
Adaptive assessment	Significant benefits registered during the pilot's phase for KPIs related to societal challenges (e.g., open EU data space for all; reduction of skill and digital literacy shortage; etc.)	All areas		2	3	4

2.2.2 Reconciling the pilots' outcomes and impacts with the EU level impact

To bridge the outcomes and impacts observed in the CEDAR pilot states to a broader EU-level impact, it is essential to reconcile local results with a larger, generalised framework that can benefit similar contexts across the Union. Procurement data, specifically, requires an alignment between micro-level insights from individual pilot countries and macro-level implications for the entire EU. To achieve this, CEDAR will employ a PESTLE analysis (outlined in Deliverable 6.2 Impact Generation Activities V1), which examines Political, Economic, Social, Technological, Legal, and Environmental factors. This analysis will contextualise each pilot's findings, providing a basis for extending local insights to comparable EU countries and integrating them into a cohesive European framework.

The PESTLE analysis will help adapt the assessment of data and technology use within each pilot to account for national-specific conditions while also allowing for generalisation across borders. For instance, results from Ukraine's procurement data monitoring can be quantitatively measured due to the established system already in operation. The analysis here would involve identifying any increase in flagged instances, which could indicate enhanced oversight, as well as estimating the financial savings from prevented misappropriations. This quantitative approach provides a replicable model for other EU countries with established procurement systems, where similar analyses can offer insights into potential financial gains from implementing CEDAR technologies.

In Slovenia, where procurement staffing may be limited, qualitative insights are valuable alongside quantitative measures. Here, the analysis could include assessing time saved per tender through project interventions, tracking changes in staff trust toward the procurement system, and identifying perceived shifts in corruption risks. Feedback on workflow challenges and potential system improvements gathered from personnel could further refine CEDAR's impact. Insights derived from this approach can help identify both cost-benefit advantages and cultural or operational challenges, which will inform the adaptation of similar tools for other EU nations with comparable healthcare procurement structures.

For Italy, the pilot aims to mitigate organised crime infiltration in managing Recovery and Resilience Plan (RRP) funds. Assessing this pilot's impact includes tracking changes in red-flagged transactions and estimating the cost associated with these alerts to demonstrate a return on investment (ROI) in corruption prevention (Fazekas et al. 2021). These insights will support broader EU efforts by demonstrating how data-driven monitoring systems can protect public resources from organised crime, offering a valuable model for other countries managing large-scale public funds.

Each pilot's findings analysed through PESTLE, will collectively contribute to a broader picture of CEDAR's efficacy, helping identify shared patterns and unique challenges across different national contexts. Through this approach, CEDAR will bridge local outcomes to EU-wide impacts by providing a roadmap for scaling successful practices, refining technology integration based on pilot experiences, and reinforcing transparent governance across the European Union.

2.2.3 Adaptive assessments

While many KPIs in the CEDAR project are either prepared for measurement or can be operationalised with straightforward methods, those associated with adaptive assessments require more precise methodological definitions. Specifically, two outcomes and one wider impact demand detailed clarification of methods and indicators suited to adaptive assessments.

The first outcome KPI requiring clarification involves the significant improvements in CEDAR solutions observed during pilot activities. Drawing on literature and past project experiences, recommended methods include periodic performance reviews with stakeholders, as well as user surveys and focus groups conducted during and after implementation. These methods will assess usability and effectiveness, with key indicators such as user satisfaction scores, percentage improvement in efficiency (e.g., time saved on tasks like data entry or monitoring), and stakeholder-reported reliability and responsiveness of CEDAR solutions. Additional metrics might cover the frequency and quality of generated red flags (for procurement contexts) and the accuracy of predictive analytics in risk prevention (Ferwerda et al. 2017).

The second outcome KPI needing clarification pertains to engagement and reach across specified target audiences and activities as outlined in the proposal. Methodologically, it is advisable to track engagement through digital analytics (e.g., attendance at webinars, workshops, or trainings), monitor follow-up actions by stakeholders, and evaluate engagement levels through feedback forms and participation rates. Primary indicators may include the number of planned activities completed, audience reach metrics, and participant satisfaction and retention rates. Additional indicators might involve the percentage of target audience members implementing CEDAR recommendations or tools, as well as measurable improvements in their knowledge and skills over the project period.

The sole wider impact requiring further definition relates to significant benefits recorded during pilot phases for KPIs tied to societal challenges. For this, methods such as PESTLE analysis, quantitative data monitoring, and cost-benefit analysis within each pilot region are recommended. Data collection should focus on societal indicators related to transparency, digital literacy, and trust in governance. Indicators may include reductions in time and resources devoted to administrative tasks, the number of detected fraud attempts (where relevant), cost savings from improved efficiency, and stakeholder-reported improvements in transparency and accountability. For addressing digital literacy and skill shortages, indicators might track the number of training sessions held and changes in digital competency levels among participants before and after engagement with CEDAR solutions.

3 Methods

This section outlines the methods applied within CEDAR, noting that some require greater coordination among project partners than others. For instance, surveys necessitate careful consideration of country-specific conditions and language, making close collaboration essential for effective implementation. Conversely, methods primarily at the EU level, such as formalising partnerships, are generally easier to initiate, though they may still benefit from partner support. The following descriptions summarise each method, highlighting the particular project needs they address.

3.1 Surveys

The use of surveys in CEDAR for assessing specific KPIs requires careful design, sampling, and coordination to effectively capture stakeholder perspectives on project outcomes. Literature highlights the importance of using structured surveys for assessing satisfaction, agreement, and adoption intentions, especially when capturing perceptions of innovation and technology solutions in public administration contexts (Dickel and Graeff 2018).

3.1.1 Satisfaction with CEDAR Solutions Performance (>90% satisfaction among public authorities and practitioners)

Sample Selection: Given the goal of reaching over 90% satisfaction, sampling should ensure a broad representation across the CEDAR stakeholders' community, particularly focusing on public authorities and practitioners who are directly engaged in the pilot activities. This could involve stratified sampling based on country, sector, or involvement level to ensure diverse insights.

Coordination: Partner support is crucial for identifying suitable respondents, especially for navigating national variations in public sector structure and roles. Partners in each country can assist with survey distribution and local engagement.

Retrospective Questions: Retrospective questions should capture perceptions of improvement or changes in satisfaction over time, such as comparing baseline satisfaction with satisfaction during or after the pilots. Within limitations, this approach can help identify specific solution features that contribute to overall satisfaction (Hipp et al. 2020).

3.1.2 Agreement with Evidence-Based Results (>80% agreement within the CEDAR stakeholders' community)

Sample Selection: To capture reliable feedback on the evidence-based results of CEDAR solutions, the sample should cover a range of stakeholders, particularly those involved in assessing or validating pilot results. Random sampling within these groups can ensure a balanced perspective.

Coordination: Partners play a critical role in facilitating the survey's dissemination to ensure high response rates and in interpreting findings within each national context, given differences in policy expectations or operational standards.

3.1.3 Enhancement of Transparency, Accountability, and Trust (>70% report improvement)

Sample Selection: This outcome requires engaging participants who directly experience or implement the CEDAR solutions in their governance roles. Selecting samples based on experience level or direct engagement with transparency-focused tools will provide relevant insights.

Coordination: Partners are needed to help localise survey questions, as perceptions of transparency and accountability may vary by cultural and political context. Coordination can also help reach participants who might be less familiar with data-driven governance models.

3.1.4 Willingness to Use CEDAR Solutions Post-Project (>70% adoption intention)

Sample Selection: To assess long-term adoption intentions, the sample should focus on stakeholders involved in piloting and using CEDAR solutions, as well as those in decision-making roles concerning solution adoption.

Coordination: Partner support is essential to emphasise the importance of adoption-related questions, particularly in making respondents aware of potential future uses and benefits. Partners can help clarify how CEDAR solutions align with ongoing national or organisational strategies.

3.1.5 Agreement on the Business Model and Exploitation Strategy (>80% agreement)

Sample Selection: Since the focus is on agreement with the business model, samples should include both end-users and decision-makers who evaluate the sustainability aspects of the solution. Sampling should represent both practitioners and administrators to gauge broad support.

Coordination: Effective communication about the business model's value proposition is essential, with partners helping contextualise the strategy to align with regional economic conditions and governance structures.

According to survey theory, achieving high response quality in satisfaction and adoption surveys benefits from carefully designed questions that consider social desirability bias, particularly in sensitive areas like public governance (Groves et al., 2009). In addition, retrospective questions are grounded in the theory of change, where they help capture shifts in perception over time, providing insights into how users' experiences with CEDAR solutions evolve. This approach can improve validity and provide more actionable insights for future project phases.

3.2 Cost-Benefit-Analysis (CBA)

Cost-benefit analysis (CBA) is a method used to evaluate the economic viability of a project by comparing the anticipated costs of implementation with the expected benefits. In essence, CBA quantifies both costs and benefits in monetary terms to assess whether the projected advantages outweigh the expenditures. By providing a clear metric for decision-making, CBA helps stakeholders understand the financial value and sustainability of proposed solutions and identify areas where cost reductions or benefit enhancements are feasible.

In the CEDAR project, CBA is applied across three pilot states—Italy, Slovenia, and Ukraine—to assess the efficiency and economic impact of CEDAR's solutions within each unique context. Each country pilot addresses a distinct area of public governance, from preventing organised crime in Italy's Recovery and Resilience Plan (RRP) funds to improving transparency in Slovenia's healthcare procurement to managing foreign aid transparency in Ukraine's reconstruction. CBA in these pilots involves assessing the costs of implementing CEDAR's data-driven solutions, such as technology acquisition, training, and operational adjustments, against the benefits realised through enhanced transparency, accountability, and cost savings from improved data governance.

Key considerations in CEDAR's application of CBA include:

1. Country-Specific Adaptations: Each pilot operates within different economic and governance frameworks, which affects cost structures and benefit calculations. For instance, the Italian pilot's focus on detecting patterns and anomalies in the management and execution of public procurement, to safeguard the principle of transparency, and to support control activities aimed at preventing the infiltration of criminal organisations into public procurement may entail high initial costs for advanced monitoring tools, while benefits are measured in terms of funds safeguarded from criminal misuse. In Slovenia, CBA must account for the relatively small procurement workforce in healthcare, where time savings and fraud reduction directly translate to efficiency gains. For Ukraine, CBA emphasises transparency in foreign aid management, focusing on how incremental improvements in flagging risk indicators can prevent resource misallocation.

2. Quantifiable Benefits: CBA requires that benefits, such as time savings, reduced risk of fraud, and increased public trust, are expressed in monetary terms. In CEDAR, this is particularly important for demonstrating tangible returns. For example, calculating the cost of each red flag detected versus the potential loss prevented by acting on that flag provides a direct measure of financial impact. In Ukraine, quantitative analysis could involve estimating the percentage of foreign aid safeguarded, thereby translating trust and transparency into monetary gains.

3. Stakeholder-Specific Metrics: In each pilot, CBA considers the particular roles of stakeholders, such as government agencies, healthcare providers, and foreign donors, in achieving and valuing CEDAR's outcomes. For example, benefits in Slovenia's healthcare sector are evaluated based on both economic savings and the perceived reduction in corruption risk, which contributes to sector-wide improvements in accountability. Stakeholders' perceptions are crucial to CBA in this context, as they reflect the broader societal and operational value of CEDAR's solutions.

4. Sustainability and Long-Term Value: Beyond immediate gains, CBA in CEDAR assesses the long-term viability of maintaining CEDAR solutions post-project. For instance, if the initial cost of technology and training in Italy leads to sustained crime prevention capabilities, the long-term savings would exceed the initial investment. Similarly, in Ukraine, the ability to maintain effective foreign aid monitoring creates sustained benefits, potentially enhancing CEDAR's attractiveness for future adoption across the EU.

3.3 SWOT

A SWOT analysis, which stands for Strengths, Weaknesses, Opportunities, and Threats, is a strategic planning tool used to assess the internal and external factors that could impact an initiative or organisation. Unlike cost-benefit analysis, which focuses on the economic evaluation of a project, SWOT analysis provides a broader strategic overview by examining both the potential advantages and challenges. In CEDAR, SWOT analysis is applied at the EU level to generate informed policy recommendations that support the adoption and integration of transparency-enhancing digital tools in public institutions.

Key Elements of the CEDAR SWOT Analysis

1. Strengths: The analysis explores internal factors that can support the integration of CEDAR's solutions within EU public institutions. Strengths may include existing infrastructure for digital data management, technical expertise among policymakers, and any pre-established policies aligned with transparency goals. By identifying these strengths, the SWOT analysis helps determine areas where CEDAR's solutions can align with or build upon current capabilities, ensuring a smoother transition to transparency-focused digital governance.

2. Weaknesses: This aspect focuses on internal limitations that may hinder the adoption of CEDAR's digital tools, such as a lack of technical expertise, insufficient funding, or resistance to change within public institutions. Recognising these weaknesses allows CEDAR and policymakers to devise strategies that mitigate these issues, whether through additional training, support, or gradual implementation approaches. Understanding internal limitations is particularly important in ensuring that policy recommendations are both feasible and aligned with institutional capacities across various EU countries.

3. Opportunities: External opportunities are identified to highlight potential benefits that transparency-focused technologies can bring to public institutions. This may include increased public trust, alignment with EU-wide digital transformation goals, and advancements in data-driven policy-making. By capitalising on these opportunities, CEDAR's policy recommendations can emphasise how the adoption of digital transparency tools not only enhances governance but also contributes to broader EU objectives, such as digital sovereignty, enhanced accountability, and regulatory compliance.

4. Threats: The analysis also considers external risks that could undermine the success of integrating CEDAR's digital tools. These threats may include data privacy concerns, cybersecurity risks, and potential resistance from public officials wary of increased transparency. By identifying these threats, CEDAR can work with policymakers to create robust strategies to address these risks, such as enhancing data protection measures, conducting awareness campaigns, or gradually introducing transparency-enhancing tools to build acceptance.

Key Considerations in CEDAR's SWOT Analysis

In CEDAR's context, a few considerations are essential for conducting an effective SWOT analysis:

Stakeholder Collaboration: Given the EU-wide focus, involving a broad range of stakeholders, including policymakers, public officials, and technology experts, is crucial to capture diverse perspectives. This collaborative approach ensures that the strengths, weaknesses, opportunities, and threats identified reflect the complex landscape of EU governance and digital transformation.

Policy-Driven Context: SWOT analysis in CEDAR is specifically geared toward generating actionable policy recommendations. Therefore, the analysis focuses not only on institutional readiness but also on aligning recommendations with EU policy priorities, such as the EU Digital Strategy and the European Data Strategy. By tailoring SWOT findings to policy goals, CEDAR provides relevant, actionable insights for decision-makers.

Future-Oriented Assessment: Since SWOT is aimed at long-term policy recommendations, the analysis emphasises anticipated challenges and opportunities rather than solely current conditions. This forward-looking perspective is essential in preparing public institutions for future digital demands and ensuring the sustainability of CEDAR's recommendations.

3.4 Usability Testing

Usability testing is a method used to evaluate the user-friendliness, functionality, and overall experience of digital tools by observing how real users interact with them. In CEDAR, usability testing is specifically applied to assess the interactive visualisation modules, which are designed to support data transparency and accessibility for public sector stakeholders. Unlike broader evaluation methods such as SWOT or cost-benefit analysis, usability testing focuses narrowly on the interface and user experience to ensure the modules are intuitive, efficient, and satisfy end-user requirements.

In the project, usability testing is conducted by psychology and user experience (UX) experts who guide participants through task-based evaluations within the visualisation module. By having users perform predefined tasks, the testing measures key indicators such as task success rates, time taken to complete tasks, and overall user satisfaction. These indicators provide direct feedback on how well the module meets user needs and aligns with CEDAR's objectives of promoting transparency and ease of use.

Key Aspects of Usability Testing in CEDAR:

1. Task-Based Testing: Usability testing is structured around specific tasks that participants are asked to complete within the visualisation module. These tasks may include locating specific data points, filtering information, or navigating between different views. By focusing on these tasks, testers can identify usability issues, such as confusing layouts, challenging navigation paths, or unclear visual cues. This task-based approach ensures that the visualisation tools are not only functional but also designed in a way that supports efficient and effective use.

2. Quantitative and Qualitative Metrics: Usability testing gathers both quantitative data (e.g., task completion times, error rates, and success rates) and qualitative feedback (e.g., user satisfaction and perceived ease of use). Quantitative metrics allow testers to measure the efficiency and accuracy of the visualisation module, while qualitative feedback provides insights into users' subjective experiences, helping to uncover potential frustrations or areas for improvement. Combining these data types gives a comprehensive view of the module's usability.

3. User Satisfaction and Psychology Expertise: Psychology and UX experts play a critical role in interpreting user behaviour and satisfaction. They can observe nonverbal cues, such as hesitations or repeated actions, which may indicate underlying usability issues. Additionally, experts can analyse verbal feedback and participant reactions to gauge emotional responses to the interface, an essential component in designing tools that users find approachable and intuitive. This psychological insight helps the project to refine its visualisation modules to better meet user expectations.

4. Iterative Improvement Process: Usability testing is often conducted iteratively, allowing for continuous feedback and adjustments. After each testing session, findings are reviewed, and design modifications are made to address identified issues. Subsequent rounds of testing assess the effectiveness of these changes. This iterative approach ensures that the visualisation module evolves based on user input, continuously enhancing its usability and effectiveness.

Specific Considerations in CEDAR's Usability Testing:

Diverse User Profiles: Given the range of public sector stakeholders involved, usability testing includes participants from different backgrounds, such as policymakers, data analysts, and technical staff. Testing with a diverse user base ensures that the visualisation module is accessible and intuitive for various types of users, reflecting the broad application of CEDAR's solutions.

Focus on Transparency and Data Accessibility: The primary objective of the visualisation module is to promote transparency and make data easily accessible. Usability testing, therefore, pays particular attention to how well users can understand and interact with the data presented. Metrics such as time spent locating specific information, ease of data filtering, and clarity of visualisations are critical to achieving this objective and ensuring that the module serves its intended purpose.

Task Complexity and Real-World Scenarios: The tasks included in usability testing are designed to mirror real-world scenarios users might face when working with public sector data. By simulating actual use cases, usability testing provides insight into how effectively the module supports users' operational needs, which helps tailor the tool to practical, on-the-job applications.

3.5 Focus Groups

Focus groups are a qualitative research method used to gather in-depth insights from participants through guided discussions on specific topics. In the CEDAR project, focus groups are employed to fulfil adaptive assessment KPIs by collecting detailed, qualitative data on user experiences and attitudes concerning key issues like transparency, ethics, and civic engagement. Unlike other assessment methods, focus groups enable a rich exchange of perspectives among participants, providing a nuanced understanding of how CEDAR's digital governance tools are perceived and their broader impact on public sector transparency.

In the project, focus groups may be conducted with diverse stakeholders, including civil servants, NGOs, and citizens. These sessions explore their experiences, expectations, and satisfaction with CEDAR's tools, uncovering both the perceived benefits and challenges associated with implementing new digital solutions in governance. By facilitating dialogue, focus groups offer insights into user attitudes that go beyond quantitative data, allowing the project to refine its tools and better align them with stakeholder needs and values.

Key Aspects of Focus Groups in CEDAR:

1. Stakeholder-Specific Sessions: CEDAR organises focus groups tailored to various stakeholder groups, such as government officials, non-governmental organisations, and the general public. Each session is structured around topics relevant to the participants' unique roles and perspectives, ensuring that the discussions are meaningful and focused. For instance, civil servants may discuss operational impacts, while citizens might focus on how digital tools affect their trust in government transparency. This segmentation allows CEDAR to capture the specific needs, challenges, and priorities of each group.

2. Exploration of Complex Topics: Focus groups are particularly effective for exploring complex, sensitive topics like ethics, transparency, and civic engagement, which are central to CEDAR's objectives. By engaging participants in the discussion, CEDAR gains insights into stakeholders' attitudes and beliefs, as well as any ethical concerns or transparency issues they may perceive. This qualitative approach is essential for understanding the deeper implications of digital governance tools, helping to identify both the strengths of CEDAR's solutions and areas where improvements may be needed.

3. Guided by Trained Moderators: In the project, focus groups are led by trained moderators who facilitate discussions, ensuring they remain focused on key topics while allowing participants the freedom to express their opinions openly. Skilled moderators use probing questions to delve deeper into specific points, uncovering insights into how participants feel about the transparency and ethical aspects of CEDAR's tools. Moderators also manage group dynamics to ensure balanced participation, allowing for a comprehensive view of varied user experiences and attitudes.

4. Data Collection and Analysis: Data from focus groups is recorded and systematically analysed to identify recurring themes, trends, and unique perspectives. This analysis highlights common areas of satisfaction, concerns, and suggestions for improvement across stakeholder groups. By categorising responses, CEDAR can pinpoint specific needs, such as increased transparency features or ethical safeguards, and integrate these insights into ongoing tool development.

Specific Considerations in CEDAR's Focus Group Application:

Adaptive Assessment Focus: Focus groups in CEDAR are tailored to adaptive assessment KPIs, which require real-time, context-specific data on how stakeholders interact with and feel about the tools. This adaptability allows CEDAR to respond to emerging themes in user experience and attitudes, making iterative adjustments to ensure tools remain relevant and effective as project needs evolve.

Stakeholder Diversity and Representation: Given the diverse range of users affected by CEDAR's digital governance tools, it is essential that focus groups represent various demographic and professional backgrounds. This diversity ensures that the findings reflect a wide spectrum of perspectives, offering a balanced understanding of how CEDAR's solutions impact different segments of society, from policy-making professionals to community members.

Insights into Civic Engagement and Trust: Since CEDAR's focus is on enhancing public transparency and civic engagement, focus groups delve into how these tools influence participants' trust in governance and their willingness to engage in civic processes. Topics might include how digital tools impact perceptions of government accountability or whether they make it easier for citizens to access and understand public data. This feedback is critical for ensuring that the project tools fulfil their intended role in fostering an engaged and informed citizenry.

3.6 Multivariate statistics/analysis

Multivariate statistics, or multivariate analysis, is an advanced analytical approach that evaluates multiple variables simultaneously to understand complex relationships and patterns within large datasets. In the project, multivariate analysis is applied at the EU level to assess broader impacts on digital governance, public trust, and civic engagement (Graeff and Tinggaard-Svendsen 2013). This method enables CEDAR to track and analyse quantitative data across multiple dimensions, offering insights into how CEDAR's digital solutions influence governance outcomes and how these effects vary across regions and conditions.

Multivariate analysis within CEDAR leverages data from open sources, such as TED (Tenders Electronic Daily), which provides valuable information on government procurement activities across the EU. By analysing this open data and data provided by the pilot studies, multivariate analysis helps identify trends in governance effectiveness and reductions in potential corruption. Additionally, this approach can link outcomes at the EU level with specific pilot data from countries such as Italy, Slovenia, and Ukraine, enabling the project to generalise findings while accounting for unique national contexts.

Key Aspects of Multivariate Analysis:

1. Comparative Analysis Across Regions: Multivariate analysis allows to evaluate and compare government performance metrics, such as procurement efficiency, public expenditure, and corruption rates, across different EU regions. This comparative approach helps determine whether the project's digital solutions have a statistically significant impact on governance practices. By examining regional variations, CEDAR can assess how different levels of adoption, regulatory environments, or institutional readiness affect the outcomes of its tools.

2. Tracking Longitudinal Shifts in Public Trust and Engagement: By analysing data over time, multivariate methods enable CEDAR to track changes in public trust and civic engagement linked to the adoption of digital governance tools. Variables such as trust in public institutions, citizen participation rates, and the perceived transparency of government operations can be examined together, providing a holistic view of how digital tools impact citizen-government relationships. This longitudinal analysis is particularly useful for measuring gradual shifts in public attitudes and engagement over the project's duration.

3. Linking Aggregate EU Data to Pilot State Conditions: Multivariate analysis in CEDAR is also applied to link aggregate data at the EU level with specific conditions observed in pilot states. By incorporating factors like national governance structures, economic conditions, and existing transparency frameworks, CEDAR can analyse how pilot-specific outcomes, such as improved procurement oversight in Italy or transparency gains in Ukraine, translate to broader EU-wide trends. This linkage is essential for determining which aspects of the pilot successes are transferable across different EU contexts.

4. Control for Confounding Variables: In evaluating complex governance data, multivariate analysis allows CEDAR to control for potential confounding variables that might influence results. For instance, variables such as economic stability, policy changes,

and demographic factors can impact public trust and procurement outcomes. By controlling for these factors, CEDAR ensures that the effects observed can be more confidently attributed to the implementation of its digital tools, rather than external factors unrelated to the project.

Specific Considerations for Multivariate Analysis:

Data Sources and Quality: Given the complexity of multivariate analysis, high-quality data is essential (Baur et al. 2020). CEDAR uses reliable open data sources, such as TED, and verifies that all data are consistently available across regions and timeframes. Consistency in data collection helps maintain the accuracy of multivariate analyses, ensuring that comparisons made across regions or time periods are valid and meaningful.

Complex Interactions and Model Selection: Multivariate analysis in CEDAR examines complex interactions between variables. For instance, shifts in public trust may not only be linked to digital governance tools but may also vary based on factors like socioeconomic status or regional political history. Selecting appropriate statistical models that can account for these interactions is crucial. Techniques like regression analysis, factor analysis, and clustering methods help CEDAR capture nuanced patterns and relationships that might otherwise go unnoticed.

Generalisation to EU-Wide Policy Recommendations: The ultimate goal of multivariate analysis in CEDAR is to inform EU-wide policy recommendations. By demonstrating which pilot outcomes can be effectively scaled and predicting potential impacts under varying national conditions, CEDAR's analysis provides evidence-based guidance for EU policymakers. This generalization process is backed by statistical robustness, ensuring that recommendations are both scientifically valid and practically relevant across diverse EU contexts.

4 Pilot Studies Impact Assessment Framework

This chapter contains a short version of the framework for the pilot state studies. The elaborated version of the framework can be found in deliverable D5.1.

The pilot studies in Italy, Slovenia, and Ukraine are part of CEDAR's impact assessment framework but are more tailored to the national conditions than the general framework. However, the overall objective of assessing transparency and efficiency improvements in public governance still remains. Key components are summarised below:

4.1 Italy

The Italian pilot targets transparency in public procurement, focusing on Recovery and Resilience Plan (RRP) funds. By integrating a monitoring layer into the eAppaltiFVG platform, the pilot enhances anomaly detection and safeguards against organised crime. Key goals include:

Governance: Improved oversight through anomaly detection and better interdepartmental data sharing.

Society: Increased trust in governance due to enhanced transparency.

Economy: Prevention of resource misuse and fraud.

Technology: Adoption of interoperable tools for efficient monitoring.

Data collection involves surveys, focus groups, and analysis of detected anomalies, while iterative usability testing refines system functionality.

4.2 Slovenia

In Slovenia, the pilot modernises healthcare procurement by digitising processes for low-value tenders. Objectives include:

Governance: Reducing inefficiencies and malpractice in procurement.

Society: Fostering public confidence in healthcare fund management.

Economy: Cost reductions through streamlined workflows.

Technology: Implementation of interoperable digital tools for real-time procurement tracking.

Data sources include digitised archives, surveys, and focus groups with stakeholders, ensuring the system aligns with user needs.

4.3 Ukraine

The Ukrainian pilot builds on the Prozorro platform to enhance foreign aid transparency in reconstruction projects. It integrates advanced tools like natural language processing (NLP) and computer vision (CV) for multi-factor risk analysis. Goals include:

Governance: Automating risk detection in procurement processes.

Society: Strengthening trust among citizens and international donors.

Economy: Reducing financial losses from procurement fraud.

Technology: Expanding the capabilities of Prozorro with AI-based tools.

Methods include surveys, focus groups, and analysis of flagged risks to quantify improvements.

5 Conclusion

In conclusion, CEDAR aims to drive measurable impacts from its pilot states to a broader EU level by implementing a structured, multi-layered impact assessment framework. Initially, outcomes and impacts are evaluated within the pilot states—Italy, Slovenia, and Ukraine—where specific challenges in public sector transparency and accountability are addressed through targeted data-driven interventions. These pilot activities not only validate CEDAR's solutions but also provide localised evidence of their effectiveness, serving as a foundation for scaling impact across the EU.

The assessment of adaptive outcomes remains an ongoing focus. Although certain methods, such as surveys and formalising partnerships, are well established for operationalising Key Performance Indicators (KPIs), adaptive assessments require further refinement to capture nuanced, real-time feedback effectively. Surveys, one of the primary methods applied, demand careful preparation, particularly in sampling and variable selection. It is crucial to account for national contexts within the pilot states, making coordination with project partners essential for ensuring valid, reliable data collection.

PESTLE analysis serves as a vital tool in bridging pilot-specific results to the broader EU context. By analysing Political, Economic, Social, Technological, Legal, and Environmental factors, PESTLE allows CEDAR to generalise insights from the pilots to similar EU nations, fostering scalable, impactful policy recommendations. This integrated approach to impact assessment ensures that CEDAR's outcomes and best practices are both locally grounded and relevant to the diverse governance landscapes across Europe, ultimately contributing to a more transparent, accountable, and digitally resilient EU public sector.

List of References

Ahamd, Ridzuan, Hashim, Raemah A. and Latiff, Ahmed R. A. (2024). Ethical Behaviour And Integrity Among Employees In The Public Sector: A Critical Review. International Journal of Entrepreneurship and Management Practices, 7 (25), 467-496.

Baur, Nina, Graeff, Peter, Braunisch, Lilli und Schweia, Malte (2020). The Quality of Big Data. Development, Problems, and Possibilities of Use of Process-Generated Data in the Digital Age. Historical Social Research 45 (3), 209-243.

Dickel, Petra und Graeff, Peter (2018). Entrepreneurs' propensity for corruption: a vignette-based factorial survey. Journal of Business Research 89, 77-86.

Fazekas, Mihály, Luciana Cingolani, and Bence Tóth (2018). Innovations in Objectively Measuring Corruption in Public Procurement. In: Helmut K. Anheier, Matthias Haber, and Mark A. Kayser [Eds.]: Governance Indicators: Approaches, Progress, Promise. Hertie Governance Report. https://doi.org/10.1093/oso/9780198817062.003.0007.

Fazekas, Mihály, Sberna, Salvatore and Vannucci, Alberto (2021). Tracing the organisation of corruption in public procurement. Governance 35, 1139-1161.

Ferwerda, Joras, Deleanu, Ioana and Unger, Brigitte (2017). Corruption in Public Procurement: Finding the Right Indicators. European Journal of Criminal Policy and Research 23, 245-267.

Graeff, Peter und Tinggaard-Svendsen, Gert (2013). Trust and Corruption: The influence of Positive and Negative Social Capital on the economic development in the European Union. Quality & Quantity 47 (5), 2829-2846.

Graeff, Peter und Baur, Nina (2020). Digital Data, Administrative Data, and Survey Compared: Updating the Classical Toolbox for Assessing Data Quality of Big Data, Exemplified by the Generation of Corruption Data. Historical Social Research 45 (3), 244-269.

Hipp, Lena, Bünning, Mareike, Munnes, Stefan and Sauermann, Armin (2020). Problems and pitfalls of retrospective survey questions in COVID-19 studies, Survey Research Methods, European Survey Research Association, Konstanz, Vol. 14, Iss. 2, 109-1145.

Janssen, Marijn, Brous, Paul, Estevez, Elsa, Barbosa, Luis S. and Janowski, Tomasz (2020). Data governance: Organizing data for trustworthy Artificial Intelligence. Government Information Quarterly 37. https://doi.org/10.1016/j.giq.2020.101493.

McLaughlin, John A. and Jordan, Gretchen B. (2010). Using Logic Models. In: Wholey, Joseph S. et al. [Eds.]: Handbook of practical program evaluation. Third Edition. San Francisco: Wiley Imprint, 55-80.

OECD/European Union (2024). Measure, Manage and Maximise Your Impact: A Guide for the Social Economy, Local Economic and Employment Development (LEED). OECD Publishing, Paris. https://doi.org/10.1787/2238c1f1-en.

Tacconi, Luca and Wiliams, David A. (2020). Corruption and Anti-Corruption in Environmental and Resource Management. Annual Review of Environment and Resources 45, 305-329.

Thomann, Eva, Marconi, Federica and Zhelyazkova, Asya (2023). Did pandemic responses trigger corruption in public procurement? Comparing Italy and Germany. Journal of European Public Policy. https://doi.org/10.1080/13501763.2023.2241879.

Annex

Funded by the
European Union

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No 101135577