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TWINRD
ECODIGITAL FUTURES

MACROECONOMIC MODELLING OF R&D FOR THE TWIN TRANSITION

D6.2 | TWINRD CDE Plan

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Executive Summary

This deliverable provides the project's **plan for Communication, Dissemination and Exploitation (CDE)** , including guidelines on how to reach the identified target groups; monitor events, media work, etc.; communicate project concepts, goals, activities, meetings, events to all stakeholder groups via online/offline channels; create means to disseminate scientific methods, findings, policy prescriptions to scientists, policymakers, and stakeholders; promote exploitation potential of new models, results, methodological novelties, policy implications, during and beyond the project lifetime, through consortium partners' networks and ongoing activities. It also defines **indicators for monitoring CDE activities**. The online communication strategy defines ways to monitor performance, such as social media channels to use, content created and shared with appropriate hashtags and audiences/contacts, references on partners' websites, etc.

As mainstream interactive communication activity, the TWINRD project will **engage four main target groups in an interdisciplinary process**, applying an innovative integrated approach to understanding to what extent, why and how green and digital R&I results translate into the economy to meet the twin transitions ('green' and 'digital') objectives. The **detailed planning of the interactive workshops** is included in this deliverable, mapping the stakeholders to be invited and describing the online events design.

The CDE plan will be updated in deliverables '**D6.3 TWINRD CDE Plan - Update 1**' on Month 18 and '**D6.4 TWINRD CDE Plan - Update 2**' on Month 36 to reflect the results and outcomes of the project during the 1st and 2nd reporting periods, respectively

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List of Acronyms and Abbreviations

3H	Three Horizons
CDE	Communication, Dissemination and Exploitation
CMS	Content Management System
EC	European Commission
EU	European Union
GDP	Gross Domestic Product
H2020	Horizon 2020 Program
KPI	Key Performance Indicator
MS	Milestone
NGO	Non-Governmental Organization
PDF	Portable Document Format
PNG	Portable Network Graphics
R&D	Research and Development
R&I	Research and Innovation
SCNAT	Swiss Academy of Sciences
SME	Small and Medium-size Enterprise
WP	Work Packages

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Introduction

TWINRD is set to transform Europe's macroeconomic modelling to support the Twin Transition, focusing on harmonizing sustainable economic development with digital progress. Current models employed at the EU level, although supportive of strategic planning in sustainable research and innovation (R&I), often fail to capture the extensive scope of R&I activities, especially in emerging green and digital technologies.

To address these gaps, TWINRD (**macroeconomic modelling of R&D for the Twin Transition**) aims to enhance existing models like GEM-E3 and NEMESIS by integrating innovative and interdisciplinary approaches that more accurately represent R&I policies. This will include the introduction of new data and technology classifications, specifically improving the modelling of green and digital technologies and refining tools to evaluate the impacts of R&I policies on socio-economic and environmental outcomes.

In commitment to openness and collaboration, TWINRD will make all models and resources developed freely available on its online platform, encouraging transparency and community engagement. The TWINRD's Open Stakeholder Forum will facilitate active stakeholder interaction and inclusive dialogue, co-designing research and scenarios to ensure findings are comprehensive and actionable both for the scientific community and policymakers.

Over three years, TWINRD brings together four leading research institutes and SMEs with extensive expertise in economic modelling and the R&I sector. This collaboration spans applied and research-oriented environments, including systems analysis and data management, ensuring a multidisciplinary approach to achieving the project's goals.



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1. TWINRD's Communication, Dissemination and Exploitation

The key purpose of TWINRD's Communication, Dissemination, and Exploitation strategy is to increase the project's impact by effectively sharing its scope, activities and results to ensure identified stakeholders can co-create, use and benefit from project outputs. Stakeholder engagement, which is at the heart of the transdisciplinary/interactive communication process in this impact-driven work package, is detailed in Section 2.

To increase the visibility of TWINRD's effort, accompany the dissemination of project results, empower stakeholder activities, and **generate academic, policy, and overall societal impact,** several outreach assets and actions have already been identified and partly implemented.

Core outreach activities and actions include:

- creating an impactful visual identity for the project (see 'D6.1 Visual Identity and Website');
- developing appropriate digital and non-digital communication channels, tools, and promotional materials to enhance the project's visibility and impact;
- identifying and communicating key project messages;
- pursuing an efficient online communication strategy;
- supporting activities across WPs and ensuring their visibility;
- supporting participation in stakeholder engagement activities;
- producing insightful scientific publications;
- feeding existing synergies with the economic modelling research community that can support and benefit from the project's modelling upgrades to advance the evaluation of R&I policies around the intertwined progress of green and digital transformations;
- promote exploitation potential of new models, results, methodological novelties, policy implications, during and beyond the project lifetime, through consortium partners' networks and ongoing activities;
- defining KPIs and providing tools for monitoring the performance of CDE activities.

1.1. TWINRD's Visual Identity and Project Branding

The project's visual identity is designed to make TWINRD a unique, recognisable brand across all communication channels. Having a clear image, as well as a strong message, is essential to ensure that target groups easily recall the project and its frame of action. TWINRD's Visual Identity is detailed in D6.1 submitted in M6 – June 2024.

Visual identity elements include:

- project logo and guidelines on how to use and place it;
- project brand colours and typography specifications (font types and sizes);

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- project templates for deliverables, letterheads, PowerPoint presentations, social media cards, newsletters and digital signatures.

1.2. Key Messages

Can we go Green & Digital? Yes, we can model (better)!

This project teaser, along with the project tagline which appears in the logo (**Ecodigital futures**), evoke a vision in which environmental sustainability (eco) and digital transformation (digital) are integrated to create a harmonious, forward-looking society. Such vision drives the project's activities towards supporting ecodigital futures by enhancing models for the evaluation of R&I policies around the intertwined progress of green and digital transformations.

On top of the latter public-facing message, to narrate the project's modelling journey and highlight TWINRD's commitment to an integrated, collaborative approach in advancing green and digital transitions, the following key messages have been identified.

- **Integrated Approach to R&I Translation**: TWINRD adopts an interdisciplinary process to understand how green and digital R&I results impact the economy, aiming to meet twin transition objectives.
- **Engagement with R&I Policymakers**: Policymakers at all levels are crucial in shaping innovation strategies and frameworks. TWINRD engages them to ensure policies are informed by cutting-edge research, responsive to evolving needs, and aligned with societal goals.
- **Collaboration with Business Innovation Leaders**: TWINRD collaborates with business leaders in green and digital sectors to accelerate the adoption of sustainable technologies, identify market opportunities, and drive positive economic and environmental outcomes.
- **Fostering Social Innovation**: By engaging social innovation leaders, TWINRD prioritizes social impact and inclusion, fostering cross-sector collaboration to address complex societal challenges and empower marginalized communities.
- **Synergies with European Scientific Community**: TWINRD builds partnerships with researchers and consortia from H2020 and Horizon Europe projects, enhancing knowledge exchange, interdisciplinary collaboration, and contributing to sustainable development.
- **Understanding Stakeholder Motivations**: TWINRD makes extensive use of detailed analysis of stakeholders' motivations and expectations as these are essential to create mutual understanding of R&I pathways and the implications of new macro-model tools for R&I policy assessment.
- **Actor Constellation Method**: TWINRD uses the actor constellation method to identify and engage stakeholders who can contribute to and benefit from the project, recognizing the complexity of global, multi-level governance.

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1.3. Communication Channels, Tools and Materials

At the heart of TWINRD's Communication, Dissemination, and Exploitation strategy is the design and implementation of promotional channels, tools, and materials to reach target audiences, disseminate messages and outputs, and ensure their exploitation. The promotional channels are the routes through which key project messages may find the desired destinations. These include the TWINRD project website, TWINRD's social media account on LinkedIn, and other online channels like partners' websites and those of the granting authorities (European Commission, CINEA, etc.). Among the tools to facilitate project outreach and provide an informative framework for project ambitions and activities to a broader audience are newsletters and press releases. Based on the project's visibility needs, additional promotional materials might be developed, including a project leaflet and/or a project roll-up banner.

1.3.1. TWINRD Website

The TWINRD website (**www.twinrd.eu**) is a highly visual, content-oriented, and user-friendly hub, balancing project technicalities with stakeholder communication to inform on the project's modelling upgrades to advance the evaluation of R&I policies around the intertwined progress of green and digital transformations. Go live date: **June 28, 2024**.

The website's main objectives are to:

- showcase TWINRD's scope and activities to improve the dissemination of project results, raising awareness among the modelling community to integrate innovative and interdisciplinary approaches that better represent R&I policy;
- inform consortium members, stakeholders, and target groups of new developments, milestones, and insights relevant to the project;
- embed a stakeholder online forum (approximately around M10 - October 2024) that will be regularly updated, allowing efficient engagement of stakeholders and supporting the co-development, openness and free availability of data and models developed by the project;
- provide TWINRD with a repository containing all public-facing documents, deliverables, publications, and materials developed in and by the project.

As the primary project promotional channel for broad outreach, the website will convey the project's aims and intended impacts and showcase project results as they become available. It will also promote project events, provide information on project partners, and grant open access to TWINRD-produced materials, including scientific presentations and papers, newsletters, press releases, and media coverage.

Aiming to increase its visibility, the website will be continuously promoted through other project-owned communication and dissemination channels such as social media, newsletters, etc., and will be referenced in all project-branded materials and templates. Partners are

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encouraged to host a TWINRD-dedicated page on their company websites including a description of the project and a link to the official website.

An overview of the Website's design, structure and management is provided in D6.1 submitted in M6 - June 2024.

1.3.2. TWINRD Social Media

Social media will be employed by TWINRD as a channel to communicate and interact both with target audiences and the general public through the sharing of real-time information and links to more in-depth dissemination resources. Social media activity will also be directed towards **building a community around the project** and creating cross-collaboration networks with related EU projects and CINEA initiatives. LinkedIn (@TWINRD - Ecodigital Futures) has been selected as the most appropriate for the project's tone and scope.

1.3.2.1. LinkedIn

Given its professional nature, LinkedIn is the ideal social network to report project activities, progress, and outcomes among the **scientific community** and **professional stakeholders**. LinkedIn content will be geared to draw in expertise, exchange insights, foster collaboration with peers, and increase overall awareness of the project. The possibility of connecting TWINRD's Open Stakeholder Forum to a private LinkedIn Group will be explored to offer a dedicated space for exchanging knowledge, fostering targeted discussions, and building stronger connections among the EU scientific community, business innovation leaders, social innovation leaders and policymakers involved in R&I.

Using **hashtags** on social media is an effective way to increase the visibility of your content and connect with target groups and communities who are active within the project's research realm. Social media analytics have shown it is best to use a combination of project-relevant 'niche' hashtags and broader, trending hashtags to extend the reach. As such, depending on the content and key message posted, TWINRD will use a combination of:

- *'niche' hashtags*, such as #TwinTransition | #GreenTransition | #DigitalTransition | #DigitalTransformation | #MacroeconomicModelling | #R&I | #ResearchImpact | #RInnovation | #Greenovation
- and *broad hashtags*, such as #Green | #Digital | #SustainableDevelopment | #SustainableInnovation | #GreenTech | #CircularEconomy

To improve visibility and impact, TWINRD will keep track of the performance of these hashtags and refine its social media strategy based on which ones generate more engagement. Social media activity will be monitored through in-built analytics tools.

Project partners will always be tagged and mentioned in TWINRD posts to encourage interaction by sharing, re-posting, and commenting on project posts both through their company and personal profiles. Partners are also invited to properly reference the project when reporting on project activities and outputs.

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1.3.3. TWINRD Newsletter

The project newsletter is one of the main communication tools that will keep the target audience informed about the project's progress. Newsletters (in English) will be issued roughly at a 6-month interval between month 9 and month 36 and disseminated through TWINRD's network.

Each newsletter will feature concise articles and updates coming from across the work packages. Contents will be based on deliverables, key updates, milestone announcements, publications, and attended and/or upcoming events. The newsletters will contain recent news on Twin Transition and the modelling research community, flashes about the status of the project, and feedback coming from stakeholder engagement activities.

To maximize diffusion, all newsletters will be shared through the following routes:

- e-mails to subscribers (registration to the newsletter is open via the project website or upon e-mail request);
- link to the online version of each issue shared via social media from TWINRD'S accounts and promoted by partners' social media channels;
- downloadable from the website as a PDF;
- shared by partners via their mailing lists.

As WP6 leader, ISINNOVA will be responsible for designing, implementing, and issuing newsletters, while all partners will commit to providing timely reporting on project progress and results, in their respective work packages, which will feed the newsletters' contents. Regular calls for content will be circulated to partners one month before each issue to collect relevant content from their respective research and activities.

1.3.4. Media Relations & Press Releases

At least three press releases will be published during the project's key moments to announce relevant outcomes (i.e. issuing of certain public deliverables and reaching certain milestones) and to present the final outputs. Possible moments for press release delivery may be:

- **Conceptual modelling of the Twin transition** (M18, July 2025 – Insights from Deliverable 4.1)
- **Twin transition: concept and challenges** (M22, November 2025 – Insights from Deliverable 5.1)
- **Model-based assessment of the Twin Transition & TWINRD Legacy** (M36, December 2026 - Insights from Deliverable 5.2)

ISINNOVA will issue project press releases in coordination with all partners and ask for inputs on possible media contacts to reach. Project partners are also encouraged to share press releases via their channels and, if necessary, take care of local translations for publication in national media. Project partners will work with the national press individually to present the

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project and its outputs. All press coverage will be available on the TWINRD website. Articles in international (non-academic) press will also be pursued.

1.3.5. δs

Partners are encouraged to host a TWINRD-dedicated page (like this one) on their company websites which includes a description of the project and a link to the official website. Promotion via partners' channels also entails announcing project activities through website news, social media posts, and newsletters.

1.4. Dissemination and Exploitation Activities

Several dissemination and exploitation actions and activities are in place to support TWINRD in mobilizing acquired, processed, and accumulated knowledge for the macro-economic modelling of green and digital R&I impact debate. Project dissemination efforts will concentrate on reaching all stakeholder groups, from academia to policymakers to civil society. A combination of project-led engagement activities and events, scientific publications and conferences, policy briefs and attendance at external dissemination events are at the core of TWINRD's knowledge exchange efforts. All dissemination and exploitation efforts will both engage and leverage the TWINRD's Open Stakeholder Forum whose purpose and operation are detailed in Section 2.

1.4.1. Stakeholder Workshops

As part of TWINRD's broader stakeholder engagement framework, a series of participatory foresight workshops will be conducted, guided by transdisciplinary integration methodologies (detailed descriptions are available in Section 2). These workshops aim to facilitate collaborative policy scenario-building and impact assessment exercises. Additionally, they will serve as dissemination forums for sharing and discussing the generated knowledge and information.

1.4.2. Scientific Publications and Conferences

One of TWINRD's major concerns is for key scientific outputs to be disseminated in academia and amongst the research modelling community. At least **5 open-access scientific publications** with results will be published in relevant high-impact journals, prioritising fully gold open access, while publication of special issues will be sought. As with datasets and all new models and/or modules produced within the project, a post-print version of papers will be made available through a TWIRD-dedicated open data repository (Zenodo).

Partners will also be encouraged to present breakthroughs during and after the end of the project with at least **10 presentations in scientific conferences** or workshops and other EC events to keep the scientific community updated. In addition, the TWINRD's Open Stakeholder Forum will be created including a representative and balanced sample of relevant stakeholders with an annual conference organised in Athens to discuss key project findings and co-design the future research agenda.

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1.4.3. Policy Briefs

Project outputs and findings distilled from TWINRD's collaborative policy scenario building and impact assessment exercises will feed into the production of a series of policy briefs. Specific guidelines will be developed to ensure the policy briefs' format, timing and quality successfully and concisely discuss outcomes and implications for the use of the new models in R&I policy assessment, becoming actionable documents for the targeted audience of decision-makers and innovation leaders in the field of (sustainable) R&I. Acquired knowledge and results will also be made available through additional visualization formats such as datasets, infographics, and presentations.

1.4.4. Project Events

TWINRD envisions three project conferences (possibly timed during the project's General Assemblies) aimed at extending the discussion on key project findings and the co-designing of the future research agenda beyond the Consortium members.

A concluding conference at the EU level will be held to update European and national policymakers, industry experts, other stakeholders, and the wider modelling research community on the project's advancements in modelling and data. The event will also highlight advanced research and innovation strategies for achieving sustainable and equitable growth through the twin transition.

1.4.5. Clustering Activities with the EU scientific community

Building synergies with the EU scientific community, notably H2020 and Horizon Europe projects involving macro-economic modelling consortia stakeholders, enhances knowledge exchange, fosters interdisciplinary collaboration, and strengthens the European research and innovation landscape, ultimately advancing collective efforts towards sustainable development and societal well-being. Collaboration with these actors will be sought through common dissemination activities and invitations to take an active part in TWINRD's stakeholder events and the Open Stakeholder Forum.

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2. Transdisciplinary/Interactive Communication Process

The interdisciplinary/interactive communication process is organised as a coherent participatory impact assessment exercise, articulated in three phases, aiming to **overcome the potential communication barriers** between the different categories of involved stakeholders. The upgraded GEM-E3_RD and NEMESIS models, and the new TWINRD macroeconomic model, are used as 'boundary objects'.[1] The three phases are staged as follows:

- **First phase**: Structured dialogue to discuss **green & digital R&I investment priorities**, aligned with stakeholders' expectations about reduction/neutralization of harm (tendential sustainable development perspective) vs positive impact potential (transformative regenerative development perspective). Modellers and the involved stakeholders together will aim to identify the relevant R&I topics and the potential uses of green and digital technologies and discuss the factors of success (barriers to remove or opportunities to exploit to enable technology adoption and diffusion). The discussion will be supported by the TWINRD technology flow matrix analysis.
- **Second phase**: Structured dialogue to discuss to what extent and how the R&I priorities selected in the first phase can be **incorporated in the structure of the upgraded GEM-E3-RD and NEMESIS models, and in the new TWINRD macroeconomic model**, co-designing ways to represent R&I drivers/factors of success in the models body (with new assumptions about existing parameters and variables, or adding new feasible functionalities) or new assumptions for simulation runs.
- **Third phase**: Structured dialogue to discuss **R&I policy strategies to accelerate the twin transition in the EU**, with the aim of delivering new policy insights on ways to enable better social and environmental impacts This discussion will be supported by the modelling-based simulations (e.g., GDP, productivity, employment, consumption, investment, emissions, competitiveness) of tendential and transformative policy scenarios.

Each phase will include preparatory activities (stakeholders' mapping and invitation process, targeted surveys and key stakeholders' interviews to focalise the topics/questions for discussion), and will culminate in workshop events, each engaging TWINRD modellers and a range of 10 to 20 stakeholders, and follow-up activities (minutes, feedbacks and reporting).

2.1. Stakeholder Engagement Strategy

Developing and implementing a comprehensive stakeholder engagement strategy is the primary objective of the participatory activities conducted within WP6 of the TWINRD project.

[1] A boundary object refers to an artifact, concept, or entity that can be shared and understood by different disciplines or groups, acting as a point of interaction and communication. In our project case the boundary objects will be the conceptual design descriptions of the upgraded models and the new macroeconomic model, clarifying models' capabilities, underlying assumptions and typology of simulation outcomes, and an infographic of the qualitative foresight model of four intertwined transitions (green, digital, cultural/lifestyle, governance).

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This strategy aims to facilitate meaningful interactions and collaborations with stakeholders throughout the project lifecycle, particularly to co-design the research and modelling enhancements and evaluate their usefulness. Applying transdisciplinary methods, the project aspires to co-create the research questions, legitimise the implementation process, and model development, and improve the communication, usability, uptake, and relevance of modelling results to the wider society.

Establishing meaningful linkages between science, policy, and society presents significant challenges. Specifically, engaging stakeholders in a meaningful way involves identifying the appropriate stakeholders and cultivating trust. Delivering impactful outcomes for decision-makers is similarly challenging and is intertwined with technical model challenges. Political factors, such as competing agendas and a lack of transformative commitment from stakeholders, also influence the interplay between science and policy.

To cope with these challenges, the entire work structure of TWINRD is operationalised with the help of a heuristic transdisciplinary integration methodology for model co-development, application to scenario building and policy roadmaps' co-creation exercises. Acknowledging that flow of knowledge spans across communities with different disciplinary and/or stakeholders' perspectives, this mechanism ensures policy-relevant (demand-oriented) yet impartial (sound and scientifically relevant) flow of comprehensive (analytical and detailed) yet comprehensible information (for all researchers/policy makers/stakeholders involved).

This strategy will maximise the impact of the project by enhancing: (i) general visibility and dissemination to potential users; (ii) engagement of policy, science, business, and social stakeholders in a two-way communication activity aimed to increase the mutual understanding of twin transitions drivers, modelling assumptions and simulation outcomes' usefulness for R&I policy assessment; (iii) the engagement of researchers and modelling teams in a TWINRD community of practice.

This stakeholder engagement strategy is continuously updated and refined throughout the duration of the project, incorporating feedback, evolving stakeholder needs, and emerging insights to ensure its effectiveness and relevance. Refined versions of the stakeholder engagement strategy will be included in deliverables D6.3 and D6.4.

2.2. Transdisciplinary integration methodology

2.2.1. The heuristic approach to transdisciplinary integration in TWINRD

In the TWINRD project, transdisciplinarity is understood as a 'heuristic integrative research approach' that adds cooperation between academic researchers and non-academic practitioners to the inner-scientific cooperation between various disciplines, facilitating the combination of inputs into an integrated output. This knowledge integration is more than just adding up disciplinary findings, and instead means the combination of heterogeneous knowledge stocks with the aim of creating an identifiable synthesis product and new insights that go beyond putting different findings side by side. To meet this challenge and achieve

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mutual understanding between diverse actors with different scientific backgrounds and traditions of thought, it is necessary to have a common frame of reference. In the TWINRD project case, a common frame is provided by:

- the **project objectives**, and especially objective 6 (O6: Links with policy makers and stakeholder engagement to co-design the research and diffuse the results). The project will be strongly based on an inclusive co-design approach with target groups and other relevant stakeholders, from academia to policy, industry to civil society.
- using the **existing models GEM-E3 and NEMESIS and their improvements, as well as the new TWINRD macroeconomic model,** to more accurately represent R&I policies and the modelling of green and digital technologies.
- using a **Three Horizons participatory foresight framework** to structure participants (researchers and stakeholders) tendential and transformative scenarios building activities.

The aim of TWINRD is to develop *structured dialogues* to co-design the integration of twin transition technologies in updated macro-economic models, co-create green and digital R&I transition scenarios and deliver recommendations related to R&I strategies and policies. It is important to note that:

- After a first modelling co-design and R&I policy assessment iteration that will be tested within the TWINRD lifetime, the same heuristic approach of knowledge integration should be used to replicate integrated assessment exercises, continuing to involve both researchers and stakeholders in a **permanent TWINRD community task**, as a form of project exploitation activity.
- The whole TWINRD project scope is too wide to develop a meaningful dialogue mixing all the twin transition related issues simultaneously in only one general discussion. It is suggested therefore, after having identified and classified a wide range of stakeholders by their thematic expertise and interest, to engage them in a first **model user requirements-modellers capabilities matching workshop with specific thematic clusters sessions** (to let users and modellers understand what "should" and "can" be done by using which model and negotiate stakeholder-driven research questions) and then to develop **structured dialogues for specific extensions or user-driven scenario exploration tasks**.

To maximise the project impact, a **protocol of the transdisciplinary heuristic approach** tested in the project will be developed, producing guidelines for the replication of the approach in other R&I and macro-modelling policy evaluation exercises in future projects.

2.2.2. Three Horizons foresight framework

The analysis of potential impact of green and digital technologies will be framed using the Three Horizons foresight methodology[2] and a specific *transition scenarios meta-narrative*

[2] The Three Horizons participatory foresight methodology is a tool that helps to structure the thinking about the future of a multi-disciplinary & multi-stakeholders' group in ways that spark innovation. It describes three patterns or ways of doing things and how their relative prevalence and interactions evolve over time. The change from the

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focusing on transformative transition scenarios towards a Transparent, Responsible, Inclusive and Sustainable regenerative economy paradigm (Ayadi, Sessa, 2020). This is a foresight meta-narrative that helps to cocreate long term visions of transitions in the way we interact with nature (green transition), in the way of conducting work (digital transition), in the way of living and being (behavioural and lifestyle changes) and in the way of governing (public government and corporate governance and organizational patterns of change). The transition scenarios meta-narrative, presented in Figure 1 below, is used to explore green and digital technology transitions intertwined with demographic, behavioural and governance change scenarios.

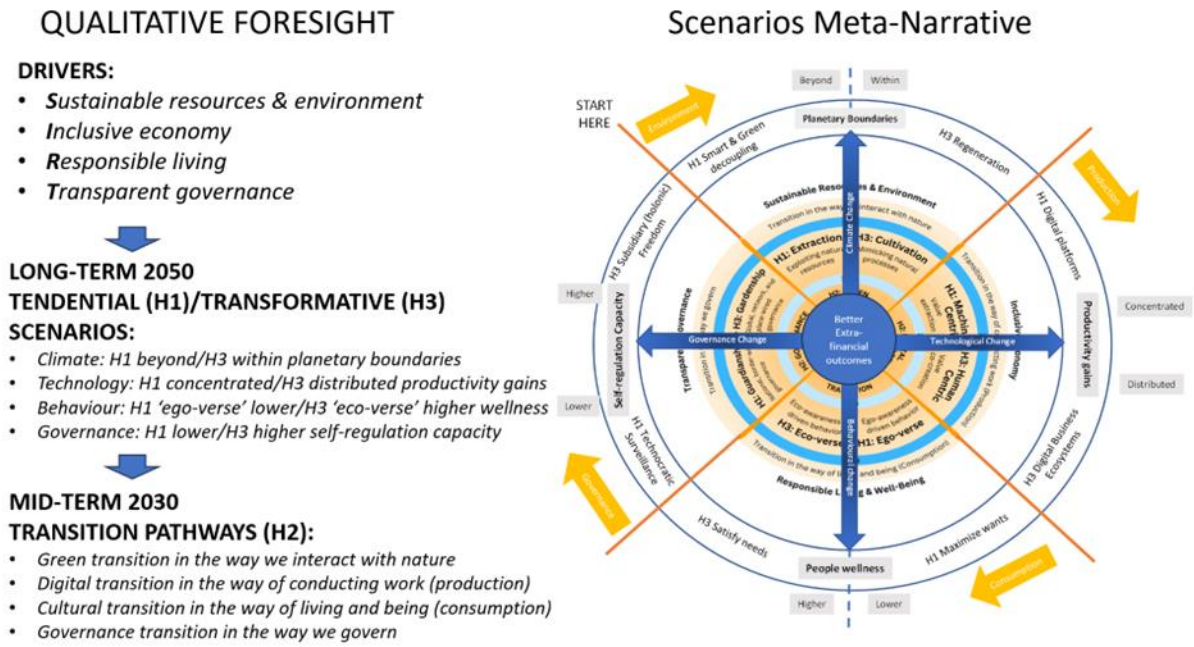


Figure 1 – Transition scenarios meta-narrative. *Source: Own elaboration*.

As shown in the figure, this transition scenarios meta-narrative considers four intertwined structural changes:

- **Climate change** is triggering an **ecological conversion** in the way of interacting with nature, from the tendential green scenario exploiting more efficiently natural resources and

established pattern of the first horizon (H1 tendential scenario) to the emergence of fundamentally new patterns in the third (H3 transformative scenario) occurs via the transition activity of the second horizon (H2 window of opportunity). The methodology not only makes us think in interactive patterns, but more importantly it draws attention to the three horizons always existing in the present moment, and that we have evidence about the future in how people (including ourselves) are behaving now. As told by the main author, "the essence of Three Horizons practice is to develop both an individual and a shared awareness of all three horizons, seeing them as perspectives that must all come into the discussion, and to work flexibly with the contributions that each one makes to the continuing process of renewal on which we all depend. We step out of our individual mindset into a shared space of creative possibility." (Sharpe, 2013).

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ecosystems (H1 extraction prospect) to the transformative regeneration scenario renewing natural resources and ecosystems (H3 cultivation prospect).

- **Technological change** is triggering a **digital transition** in the way of conducting work, from the tendential big platform economy scenario, where business initiative and productivity gains are concentrated in the hands of few companies (H1 machine-centric prospect), to the transformative digital business ecosystems scenario, where the same are distributed across a network of large, medium and small agents and creative workers (H3 human-centric prospect).
- **Behavioural change** is unfolding, caused by demographic and cultural factors **transforming the way of living and being**, from the tendential maximizing individual wants scenario (H1 ego-verse prospect) to the transformative satisfying good life needs scenario (H3 eco-verse prospect).
- **Governance** change is needed to cope with the increasing complexity of our societies, **transforming the way of governing,** from an tendential top-down technocratic surveillance scenario (H1 guardianship prospect) to a transformative scenario empowering citizens and place-based self-regulation capacities (H3 'gardenship' prospect).

The Three Horizons methodology and transition scenarios meta-narrative will be used therefore in the TWINRD dialogues to discuss two typologies of scenarios: tendential (H1) scenarios, mostly envisaging the deployment of the currently dominant technological and sustainability policy trends; and the more transformative (H3) scenarios, which consider not only the impact of new technological and economic measures, but also possible behavioural, social and cultural changes switching towards a regenerative economy paradigm (see box below).

Switching to a regenerative economy paradigm

We are in a situation where rapid change to a healthy relationship with the planet is in order. In this respect, the concept of 'regeneration' and 'regenerative growth' moves our frame of discourse from 'doing things to nature' to 'participate as partners with and as nature'. By taking this regenerative worldview, we radically change the concept of sustainability. The question in **sustainable development** was "How can the economy work in such a way that we sustain or do not hurt the underlying (ecological and social) support systems?" Now, the question in **regenerative development** becomes "How can the economy work in such a way that we improve the capacity of the underlying support systems?" As shown in Figure 2, the key message is that it is no longer enough not to do harm, we need to do good.

Today's companies operate in a world of complex, interlinked systems – markets, communities, ecosystems, etc. Business can only thrive in a strong society. Society, in turn, can only prosper if its needs are being met by a healthy natural environment. Adopting therefore a **systems analysis approach**, these relationships are best described as nested dependencies of the economy on the society and environmental conditions, with the business shifting progressively from creating only

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shareholder value (while externalizing social and environmental losses), to *sharing value* only with some stakeholders (partially reducing environmental and social harms), to eventually *creating system value* regenerating social and environmental benefits for all. But how can any specific business that is taking its own purposeful actions be sure it is helping, rather than hindering, the economic, environmental and social progress?

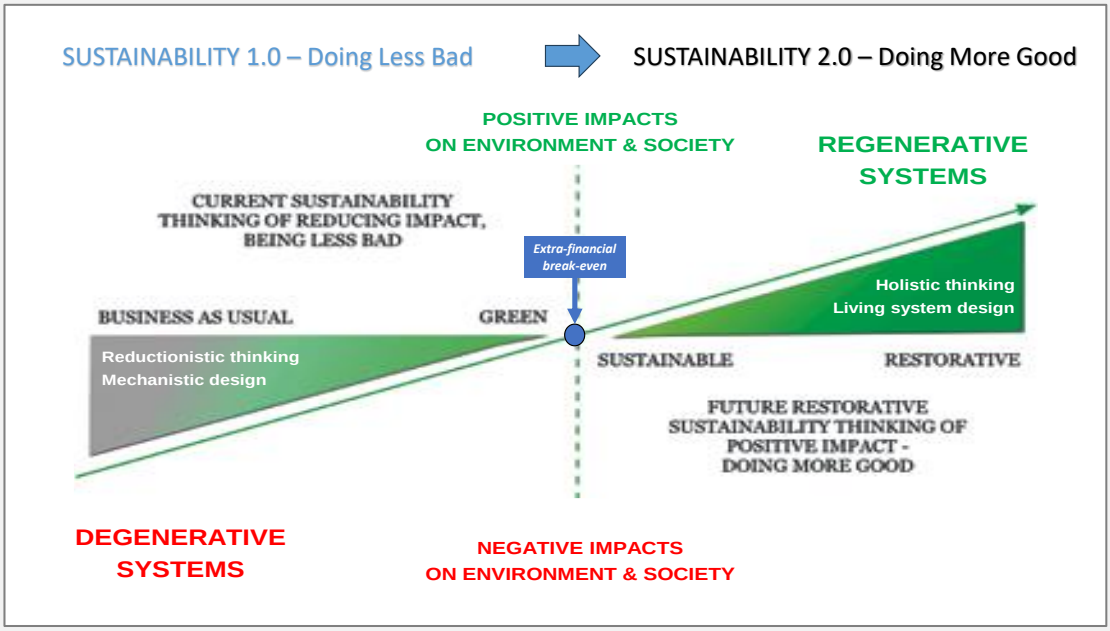


Figure 2 – 3H methodology applied to envision conservative vs transformative sustainable development scenarios. *Source: Adapted from J. Fullerton (2015), Regenerative Capitalism, Capital Institute, p. 43*

To answer, any business should consider the full range of impacts may have across two independent dimensions – positive versus negative, and direct versus indirect. **First, any business must reduce and eventually eliminate its own direct negative impact** by avoiding all actions that undermine wellbeing and degrade the environment. Eliminating its own negative impact, a business achieves an "**extra-financial break-even point**" where all its actions do not harm the social and environmental dimensions. **Second, a regenerative value-driven business may go beyond the extra-financial break-even**, doing better by: i) creating directly positive impact itself acting to foster wellbeing or restore the environment; ii) amplifying indirectly the positive impact of others, helping them to take actions fostering well-being or restoring the environment; iii) reducing indirectly the negative impact of others, helping them to avoid actions that undermine wellbeing or degrade the environment. A regenerative business is driven therefore not just by profit but by impact and profit together, so that it delivers systemic social and environmental improvement.

In this process, conversations 'across the boundaries' will help participants to disclose the ingrained disciplinary or mind frames, filtering their own vision of the reality of such things as, for instance, what is driving the adoption of a certain innovation. Modellers could discover hidden motivations and drivers, that could be feasible to include in a model to build more realistic representations, while stakeholders could overcome mental barriers against innovation by better understanding potential benefits or how to handle trade-offs, thanks to

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formal modelling outputs.

2.3. The Co-design process

As already mentioned, TWINRD conducts an open and transdisciplinary research process based on establishing links with policy makers and stakeholder engagement to co-design the research and diffuse the results. A series of interactive workshops will be implemented at different stages of the project allowing the identification of green and digital R&I priorities, aligned with stakeholders' expectations (introductory workshop), the co-design of the enhanced R&I modelling and integration of twin transition technologies in the upgraded macro-economic models (intermediate workshop), and the evaluation of green and digital R&I transition scenarios and their wide uptake and exploitation by the target groups (final workshop).

In addition, an **TWINRD's Open Stakeholder Forum** will be created, to gather all relevant stakeholders and actors and provide open access to research data, methods, and models used in TWINRD. Annual conferences will be organised to establish an interactive dialogue within the TWINRD's Open Stakeholder Forum enabling the synthesis of project results and distil policy-relevant information.

This transdisciplinary process will help us **explore the multiplicity of perspectives on macroeconomic modelling**, understand how new models and scenarios address concerns from diverse stakeholders as well as **map actionable knowledge and ensure usability** via participatory development and validation.

At the end of its implementation path, the TWINRD co-design process is expected to provide the following key outcomes:

- Co-produce the guiding questions to ensure transformational impact of our modelling framework in practice.
- Implement an interactive, transdisciplinary approach to inform modelling improvements and ensuing scenarios.
- Validate all project outputs to ensure policy relevance, usefulness in business, and societal robustness.

2.3.1. Which types of stakeholders to be involved

As mainstream interactive communication activity and through the lens of a multi-layer stakeholder analysis, TWINRD will engage **four main target groups** in an interdisciplinary process, applying an innovative integrated approach to understanding to what extent, why and how green and digital R&I results translate into the economy to meet the twin transitions ('green', and 'digital') objectives.

The target stakeholder groups are:

i. **R&I policymakers at all scales**: As key drivers of research and innovation policy, policymakers play a crucial role in shaping strategies and frameworks to foster

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innovation and address societal challenges. Their decisions influence funding allocations, regulatory environments, and collaborative initiatives, impacting the direction and effectiveness of research and innovation efforts. Engaging with policymakers at various levels ensures that policies are informed by the latest research findings, responsive to evolving needs, and aligned with broader societal goals.

ii. **Business innovation leaders in the green and digital transition fields**: Business innovation leaders operating in the green and digital transition sectors are at the forefront of driving sustainable and technological advancements. Their expertise, investments, and market strategies shape the development and adoption of innovative solutions aimed at reducing environmental impact, enhancing efficiency, and meeting evolving consumer demands. Collaborating with these leaders facilitates the identification of market opportunities, accelerates technology adoption, and promotes the scalability of innovative solutions, ultimately driving positive economic and environmental outcomes.

iii. **Social innovation leaders**: Social innovation leaders are catalysts for addressing complex societal challenges through innovative approaches that prioritize social impact and inclusion. Their initiatives span a wide range of areas, including healthcare, education, poverty alleviation, and community development, aiming to create positive change and empower marginalized communities. Engaging with social innovation leaders fosters cross-sector collaboration, amplifies the impact of research and innovation efforts, and ensures that solutions are responsive to diverse social needs and perspectives.

iv. **European scientific community, notably H2020 and Horizon Europe projects, macro-economic modelling consortia**: The European scientific community, encompassing researchers, institutions, and consortia involved in H2020 and Horizon Europe projects (e.g., WorldTrans[3], PRISMA[4], LOCOMOTION[5], NAVIGATE[6], DIAMOND[7]), as well as macro-economic modelling consortia, represents a rich source of expertise and knowledge across diverse disciplines. Their collaborative research endeavours drive scientific advancements, inform evidence-based policymaking, and contribute to addressing global challenges. Building synergies with these stakeholders enhances knowledge exchange, fosters interdisciplinary collaboration, and strengthens the European research and innovation landscape, ultimately advancing collective efforts towards sustainable development and societal well-being.

Given this spectrum of 'diversity', the detailed consideration of each stakeholder's motivations and expectations will be relevant and beneficial to create a mutual understanding of the

[3] https://worldtrans-horizon.eu/
[4] https://www.net0prisma.eu/
[5] https://www.locomotion-h2020.eu/
[6] https://www.navigate-h2020.eu/
[7] https://climate-diamond.eu/

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implications of R&I pathways towards the twin transitions, and how the new macro-model tools and outcomes can contribute to improve R&I policy assessment. The actor constellation[8] method will be used to identify the stakeholders that could contribute to and benefit from the project using, acknowledging the increasing complexity of global, multi-level governance (Jänicke, 2008; Feldoff, Fanderl, Stockmann, Gahle, 2019).

2.4. Stakeholder engagement plan

2.4.1. Organisation of stakeholders mapping and database

TWINRD implements a comprehensive strategy for identifying, engaging, and maintaining the involvement of relevant stakeholders throughout the co-design process. This strategy involves several key components:

- **Stakeholder identification and inclusion**: The project takes a rigorous approach to identifying and including all relevant stakeholders in the co-design process. This process is designed to be inclusive and transparent, ensuring that stakeholders from various sectors, disciplines, and geographic regions are represented.
- **Continuous engagement**: The project is committed to keeping stakeholders engaged over the duration of the project. This includes regular communication, updates, and opportunities for collaboration and feedback to ensure ongoing participation and commitment.
- **Examining stakeholder types and contributions**: The project examines the different types of stakeholders involved and their expected contributions to the project. This analysis considers the specific interests, expertise, and capabilities that stakeholders bring to the table, ensuring that their involvement is meaningful and productive.

This tailored approach ensures that stakeholders are appropriately engaged based on their relevance to specific aspects of the project. Understanding what kinds of stakeholders would be most useful involves a nuanced assessment of their expertise, perspectives, and potential contributions.

For this purpose, it can be useful to tabulate information on stakeholders. Doing this enables researchers to order and group stakeholders (e.g. by sector or expertise) and ensures that researchers explicitly consider and categorise how the identified stakeholders would contribute to the project and why they might wish to become involved. Table 1 shows an example containing details of the types of potential stakeholders, reasons to involve them, and reasons why they might wish to engage with the project (Durham et al., 2014). Applicants should also explain why not engaging with some stakeholders when relevant.

[8] According to the Swiss Academy of Sciences (SCNAT), an actor constellation is a role-play map, in which all scientific and societal actors involved in a project are represented and positioned around the central research question. The distance from an actor to the research question, and to other actors, expresses how relevant (s)he is in the project.

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Table 1 - Example of stakeholder identification, categorisation, reasons for engagement, and potential stakeholder benefits for engaging

Stakeholder	Category (e.g., government dept., general public, NGO, potential partner)	Reasons to involve the stakeholder(s)	Why the stakeholder may want to be involved (benefits)
Local authority	Government policy maker	Strengthen science-policy interface and ensure relevance of research outputs	Opportunity to develop better policies based upon rigorous scientific knowledge
Local business	Private sector businesses	Sharing technical expertise and potential contribution of resources to project	Possibility of networking with potential new customers through the engagement process
Environmental & social organizations	NGO	Better access to available data, potential contribution of resources and expertise to project	Interest in using the new data produced. Increased local publicity through engagement. Opportunities for partnering

While mapping the stakeholders characteristics, it can also be useful to consider the following important points, to understand not only what the different categories of stakeholders may be able to contribute, but also what will motivate them to become involved:

- Who is responsible for making decisions that might affect the research?
- Are there policies emerging or in existence that will benefit from or be affected by the research? If so who needs to be informed?
- Which individuals are likely to be affected by the outputs of the research? Who, although not directly affected, may be interested in the results of the research?
- Are there stakeholders that have been involved in similar projects on previous occasions?
- Which groups or individuals may be able to provide relevant information, equipment or resources?
- Who is likely to have a negative view of the research?
- Which stakeholders is it essential to involve? Who is it preferable to involve? Who needs to be consulted? Who needs to be informed?
- Which parties are likely to be the most influential?
- Who will be critical to the final delivery?

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Indeed, there are many factors that might usefully inform the categorisation and prioritisation of stakeholders, such as the nature of their interest in the project or alliances or conflicts between stakeholders. For this reason, Reed et al. propose the use of 'extendable matrices' that not only consider levels of interest and influence, but also attempt to characterize the nature of those interests and document reasons for the level of influence that is ascribed (e.g. considering whether a stakeholder holds more, or less, influence in different contexts or at different times). An example is given in Table 2.

Table 2 - An extendable interest-influence matrix with examples of additional columns that may be added to capture more detail about each stakeholder than is typically possible using graphical techniques

Name of Organisation	Interest (High/ Medium /Low)	What aspects of the research are they likely to be interested in?	If interest is L/M, how might we motivate engagement with the research?	Key Messages from your research for this group	Influence H/M/L	Comments on influence (e.g. times or contexts in which they have more/less influence over the outcomes of your research)	Key contact(s) and best way of contacting them
…	…	…	…	…	…	…	…
…	…	…	…	…	…	…	…

Such a careful consideration of stakeholders' interest, influence patterns and motivations are helpful to better frame later the structured dialogue process.

2.4.1.1. Stakeholders database

ISINNOVA organizes the process of managing the database of stakeholders to be involved in TWINRD. The database will be filled with relevant stakeholder contacts from all project partners and will be continuously updated. The aim is to ensure a good balance of stakeholders across groups (and gender) and also maintaining stakeholder contacts throughout the project's life.

Ensuring a heterogenous representation of stakeholders is very important to the success of effectively co-design the research and modelling enhancements and evaluate their usefulness. It is crucial, during initial engagements with stakeholders, to effectively communicate TWINRD's expectations and in turn receive feedback and perceptions of those expectations from stakeholder, as well as incorporate stakeholder perceptions and expectations into the co-design focus. To have heterogenous stakeholders involved in TWINRD, partners will review the stakeholder database and note in which sectors stakeholders are missing and how to fill those gaps. By doing this, partners are involved in ensuring that the

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database is heterogenous through their active participation in searching for and adding stakeholders of interest.

2.4.1.2. The introductory survey: register in the TWINRD stakeholder pool

The stakeholders will be initially contacted via survey to express their interest in joining the project activities. As core members of the co-design process, they will be told that they may be invited to participate in a series of events and/or activities, including but not limited to the TWINRD's Open Stakeholder Forum, workshops, bilateral meetings/interviews, discussion groups with other stakeholders, and surveys, always in consideration of their valuable time.

The survey will help to map and prioritise stakeholders, providing a clear first assessment of the types of stakeholders the project will need to engage with, and to what extent. However, it is also important to remember that different levels of engagement may be necessary with specific stakeholders at different times of the project. For example, in the first phase of this process, they will be to participate with other experts in three workshops described in the next section.

We expect the respondents' fields of expertise to cover a wide range of disciplines (i.e., sustainability, energy, climate change, digital technologies, economics, policy) to reflect a comprehensive approach to addressing complex challenges and offer valuable insights and contributions to the TWINRD project's objectives and activities.

2.4.2. Planning of the stakeholders' engagement events

The detailed planning of the stakeholder engagement events will be further refined, mapping the stakeholders to be invited and describing the practical details of the events. Workshops with key stakeholder groups will take place in the context of the project (Task 6.2), to inform our activities and outcomes and ensure their relevance. These workshops will also serve as dissemination fora, where knowledge and information generated will be shared and discussed. A final EU conference will take place to inform European and national policy makers, other stakeholders and industrial experts, and the broader modelling research community on the project's modelling and data improvements and advanced R&I pathways to sustainable and fair growth through the twin transition.

2.4.2.1. Strategic foresight workshops with key stakeholders

A core element of stakeholder engagement within the TWINRD project is organising participatory foresight workshops informed by transdisciplinary integration methodologies and leveraging the Three Horizons foresight framework, introduced in section 2.2.2 above, to drive collaborative policy scenario building and impact assessment exercises.

Key research questions will be developed to guide model co-development, scenario building, and the co-creation of policy roadmaps, emphasizing a participatory approach that incorporates insights from societal actors themselves. This collaborative process ensures that scenario-building efforts are inclusive, relevant, and aligned with stakeholder needs and expectations.

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Three main workshops are going to be held, all organised via online conference platforms with a MURAL[9] board supporting the interaction of approximately 30 participants and each lasting 3 hours at most:

- In a first stage (**introductory workshop**), green and digital R&I investment priorities, aligned with stakeholders' expectations about their sustainability vs regenerative economy potential.
- In a second stage (**intermediate online workshop**), to what extent and how the technologies' adoption and diffusion drivers are considered in the structure of the upgraded GEM-E3-RD and NEMESIS models, and in the new TWINRD macroeconomic model.
- In a third stage (**final online workshop**), to what extent and how future green and digital transition scenarios are investigated and represented by different outcomes variables in the modelling based simulations (e.g., GDP, productivity, employment, consumption, investment, emissions, competitiveness).

For each event, ISINNOVA will:

- Ensure a transparent and inclusive participation process and timely invitation.
- Prepare and send background documents to the participants before each workshop.
- A brief will be shared containing information regarding the project, aims and progress as well as the agenda and the objectives of the related workshop.
- Apply the facilitation techniques most suitable for the workshop aims and participants.
- Draft workshop reports to be then analysed to gathered insights for the next stages.

The workflow will be articulated in three consecutive steps as follows: preparatory step phase, on-stage step (online delivery) and reporting step.

Preparatory step, focused on three main activities:

- *Workshop organisation* – selecting dates, streamlining the invitation process, and defining workshops roles.
- *Workshop brief* – prioritizing what to present to make it easily understandable to the workshop participants thus allowing swift and effective interaction during the workshop sessions.
- *Workshop operational design* – selection of facilitation techniques and supporting tools, preparation of agenda, workshop guide and report template.

On-stage step. The three specialised workshops will follow a similar structure in which:

- In the first session, the team shortly recaps the workshop objectives and methods.
- In the second session interactive breakout rooms will be moderated by a member of the team to gather inputs from the participants.
- A plenary will be held to compare and summarize the group's discussion findings.

[9] https://www.mural.co/

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- For each workshop, the following roles will be distributed among the TWINRD team members:
  - *Moderator and rapporteur*:
    - Remind participants of the task and encourage the discussion to begin.
    - Try to keep the discussion on topic by bringing it back if it starts to drift: prompts are provided for each activity.
    - Ensure all participants have a chance to contribute to the discussion: encourage non-contributing participants to engage.
    - Double-check that breakout room has been recording.
    - Capture the key points of the discussion.
    - Synthesise all different perspectives.
    - Share the highlights of the discussion during the plenary session in no more than 5 minutes.
  - *Discussant*:
    - Have the technical role of co-host to share slides.
    - Present relevant project details in no more than 15 minutes.
    - Try to be as receptive as possible to participants ideas and sensitivities.
    - Intervene in the discussion when explicitly requested by participants and moderator.
  - *Note taker*:
    - Have the technical role of co-host to record breakout rooms.
    - Click on recording when the breakout room is open.
    - Capture the discussion by taking as much notes as possible.

Reporting step. To summarize the results of the workshops results and feed them to the next stages of the project.

The next table summarises the features of three workshops, while a more detailed planning of each workshop is illustrated in the next sub-sections.

Table 3 - Structure for the organisation of strategic foresight workshops

WHAT	HOW		WHEN		WHO
	Mode	Methodology	Frame		
User Requirements	Online	Three Horizons	• Breakout rooms • MURAL support	Month 12 (Dec. 2024)	• Team facilitators • Stakeholders
Scenario Analysis	Online	Three Horizons	• Breakout rooms • MURAL support	Month 24 (Dec. 2025)	• Team facilitators

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					• Stakeholders
Policy Recommendations	Online	Three Horizons	• Breakout rooms • MURAL support	Month 28 (Apr. 2026)	• Team facilitators • Stakeholders

2.4.2.1.1. User Requirements Workshop (Month 12 – December 2024)

The User Requirements Workshop aims to kickstart collaborative efforts between modellers and stakeholders. Its primary objective is to confront and reconcile the expectations of all parties, ensuring a shared understanding of useful and feasible stakeholders-driven research and models application.

In this workshop, we will discuss the technology flow matrices produced by the project (MS4). These matrices will help to identify the main contributors, at sectoral level, regarding the development of the different green and digital technologies.

The expected outcome of the Requirements Workshop is a clear set of stakeholders-driven research questions that will be used by the researchers to guide scenario development and model refinement, ensuring that research efforts are aligned with stakeholder interests and priorities.

2.4.2.1.2. Scenarios Analysis Workshop (Month 24 – December 2025)

The intermediate Scenario Analysis Workshop is the project's second strategic foresight workshop, dedicated to scenario development. This workshop focuses on validating realistic scenarios that depict the trajectory based on current policies and practices. The primary objective of the Scenarios Analysis Workshop is to validate and refine reference scenarios that describe the projected future trajectory under existing policies and trends.

During the workshop, participants analyse and discuss research questions related to scenario development and to what extent. Separate sessions will be held to look at how the technologies' adoption and diffusion drivers are considered in the structure of the upgraded GEM-E3-RD and NEMESIS models, and in the new TWINRD macroeconomic model.

By incorporating stakeholder feedback and insights before the final draft of TWINRD Scenario Design / Definition (MS10), the scenarios should become more robust, relevant, and representative of real-world dynamics.

2.4.2.1.3. Policy Recommendations Workshop (Month 28 – April 2026)

The final Policy Recommendations Workshop is the last step of the TWINRD project's strategic foresight approach, aiming to envision and assess desirable policy scenarios. This workshop serves as a platform for stakeholders and modellers to explore to what extent and how future green and digital transition scenarios are investigated and represented by different outcomes variables in the modelling-based simulations.

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By analysing the results of the project's Design of Harmonised Exercise (MS11), participants work on the integration of the two upgraded GEM-E3-RD and NEMESIS models and can assess the potential impacts of different policy interventions, technologies, and societal changes on climate change adaptation and mitigation. Through collaborative discussions and scenario-building exercises, the workshop fosters creativity and critical thinking, enabling stakeholders to co-create plausible and aspirational futures that align with sustainable and/or regenerative development goals.

2.4.3. TWINRD's Open Stakeholder Forum

To enhance collaboration and ensure the broad dissemination of research findings, the project establishes an TWINRD's Open Stakeholder Forum. This forum serves as a dynamic platform for engaging a diverse array of stakeholders, including researchers, policymakers, industry professionals, civil society, and other relevant actors involved in the field of technological and scientific innovation. It will aim to include the representatives of the following groups:

- Academia and research institutes.
- Other EU funded projects within the Horizon Europe framework and beyond with aligned or overlapping scope.
- Public administration/authorities and European, national, and local policymakers (including members of parliaments and public officials in national and EU administrations).
- R&I providers and Technology developers.
- Businesses, R&D groups, and tech start-ups.
- Private investment, and finance suppliers.
- Civil society organizations and NGOs.
- Other relevant groups including international institutions.

The Forum will actively engage stakeholders through targeted outreach efforts, including newsletters, webinars, and collaborative dialogues. These initiatives will aim to involve stakeholders in ongoing discussions, solicit their feedback, and incorporate their perspectives into the project's ongoing activities.

The activity of the TWINRD's Open Stakeholder Forum will culminate with the organisation of the TWINRD conference(s) in a less-advanced EU country like Greece. This will enhance project's impact (in line with WIDERA requirements) aiming to tackle the innovation divide towards a more integrated and cohesive European research and innovation ecosystem, while promoting a more inclusive approach in which all can participate and from which all can benefit. The gathering of key R&I professionals and experts annually in Athens will provide increased local value added with close links between R&I and institutional cooperation to produce high-quality knowledge and help bridge innovation disparities, while allowing the EU

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and widening countries' partners to advance together. ISINNOVA will be in charge of the program coordination of the first conference with stakeholders (i.e., participants, documentation, etc.), while E3M will oversee the logistical aspects (i.e., venue, technical support, etc.) in conjunction with the annual TWINRD General Assembly in M13 (January 2025).

2.4.3.1. Open Access Repository

The TWINRD's Open Stakeholder Forum will provide open and transparent access to research data, methodologies, and models developed throughout the project by granting free access to an open-access repository. The identified repository (Zenodo) was developed under the European OpenAIRE program and operated by CERN. Zenodo plays a crucial role in the TWINRD's data sharing strategy by providing:

- **Long-term Preservation**: Zenodo ensures that data are preserved for the long term, typically committing to preservation periods that extend 20 years or more.
- **Accessibility**: Data stored on Zenodo are made accessible worldwide, without any access restrictions, unless specified otherwise due to sensitive content or intellectual property considerations.
- **Interoperability**: By supporting standard data formats and metadata schemas such as Dublin Core and DataCite, Zenodo enhances the interoperability of datasets, facilitating their use and integration with other data sources.
- **DOI Assignment**: Every dataset uploaded to Zenodo is assigned a Digital Object Identifier (DOI), ensuring that data can be cited properly in scientific literature and tracked across citation networks.

This repository will store all publishable data, publications, deliverables, and outputs and will be continuously updated and maintained to reflect the latest research developments and provide stakeholders with up-to-date resources. By making these resources readily available, the Forum aims to facilitate a deeper understanding of the project's outputs and methodologies among stakeholders.

TWINRD's data management policy (including data sharing and storage) which addresses the diverse needs of its internal team and the external research community to enhance the project's transparency, collaboration, and scientific impact, is detailed in 'D1.3 – Data Management Plan'.

The TWINRD's Open Stakeholder Forum will significantly contribute to the project's success by synthesizing the project results and ensuring that research findings are accessible, actionable, and aligned with stakeholder needs. The Forum will play a crucial role in distilling key findings into actionable policy-relevant information. This process will ensure that the project's outcomes are effectively communicated to and utilized by policymakers and other decision-makers.

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3. Monitoring and Reporting

As WP6 leader, ISINNOVA will regularly evaluate impacts and results achieved through the communication/dissemination initiatives, to ensure an accurate monitoring and reporting of outreach activities.

3.1. Monitoring Sheets

Monitoring activities will rely on the responsible involvement of all partners who will regularly (at least every six months) fill in the monitoring sheets (Annex II) providing information on the communication and dissemination activities they are involved in. The monitoring sheets are designed as Excel sheets and shared with all partners on the project's shared platform.

Each partner must oversee its communication activities and report progress. Accordingly, all project partners will contribute to disseminating and communicating the project within their networks and will provide their feedback to ensure a coherent impact assessment of the communication, dissemination, and exploitation activities.

Intermediate and final reports on Dissemination and Communication are scheduled during and at the end of the project as part of 'D6.5 - Report on academic, policy and societal outreach (including policy briefs)' and 'D6.6 - Report on academic, policy and societal outreach & update (including policy briefs)' (planned at months 18 and 34) to account for all the communication, dissemination, and exploitation activities performed during the project's lifetime and the channels/tools used.

3.2. Key Performance Indicators

Different monitoring tools will be used to assess the overall success/effectiveness/impact of the communication/dissemination activities based on selected Key Performance Indicators (KPIs). Along with quantitative measurements, other qualitative aspects will be taken into account to evaluate TWINRD's performance on the whole, including feedback from stakeholders involved in project activities.

As for the website, Google Analytics will be used to measure traffic, including new/returning visitors; track online activity, behaviour, and engagement, including time spent on pages; and identify drivers of traffic to the site (e.g., how/why the website was reached).

Table 4 provides target values (intended for the total duration of the project) which will be reviewed based on the progress of the project and might be adjusted to reflect changing needs.

Table 4 - TWINRD's CDE KPIs

KPI	Target	Means of Verification
Number of visits to the TWINRD Website	> 5000	Google Analytics
Number of followers on LinkedIn	> 500	LinkedIn Analytics

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Number of social media engagements (times users have interacted with project posts, including reposts, comments, and likes)	> 600	Multi-platform Analytics
N° of press releases issued	At least 3	TWINRD Records
N° of newsletters issued	At least 5	TWINRD Records/Brevo Records
N° of subscribers to the TWINRD newsletter	> 80	Brevo Analytics
N° of active participation in external conferences/workshops/events	>10	TWINRD Records
N° of articles accepted for publication in peer-reviewed journals	At least 5	TWINRD Records + Zenodo Records
N° of experts attending the stakeholder workshops	30 User Requirements WS 30 Scenario Analysis WS 30 Policy Recommendations WS	TWINRD Records
N° of members of the TWINRD's Open Stakeholder Forum	60	TWINRD Records
N° of attendees to the Final Conference	60	TWINRD Records

4. Conclusions and Next Steps

Most of the tasks concerning the set-up for the core communication activities will take place in the first year of the project, in line with the outline and timing of activities defined in the workplan.

All three project milestones tied to WP6 are timed in the first 12 months. The first two milestones have successfully been achieved by securing TWINRD's online presence (MS1 – M3) and with the production of a sensitive internal report outlining TWINRD's stakeholder engagement strategy (MS2 – M4). The remaining milestone for WP6 is set at M12 (December 2024) with the verification of stakeholder engagement through the organization of the User Requirements Workshop.

Following the development of TWINRD's visual identity (logo and branding guidelines), the project's main communication channels, tools, and products have been established, including the project website, and LinkedIn page. Management of communication channels will continue for the duration of the project. Content creation and dissemination activities will take place to support the activities of the TWINRD's Open Stakeholder Forum which are set to begin at M10 (October 2024).

Public-facing communication will intensify with the issuing of the first project newsletter by M9 (September 2024). Media outreach activities will begin after M18, towards July 2025, with

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the publishing of the first Press Release announcing TWINRD's conceptual modelling of the Twin transition.

Intense stakeholder engagement activities, in terms of events, will take off at M12 but foundational tasks such as stakeholder mapping, database creation, and event planning have already begun. Initial contacts with stakeholders were established through an introductory survey exploring the needs and expectations tied to joining TWINRD's pool of stakeholders.

Exploitation activities will culminate towards the end of the project with the drafting of the policy briefs and other additional knowledge visualization formats such as datasets, infographics, and presentations to maximise the actionability of project insights and outputs.

A visual overview of the main Communication, Dissemination, and Exploitation tasks foreseen during Year 1 is shown in Figure 3.

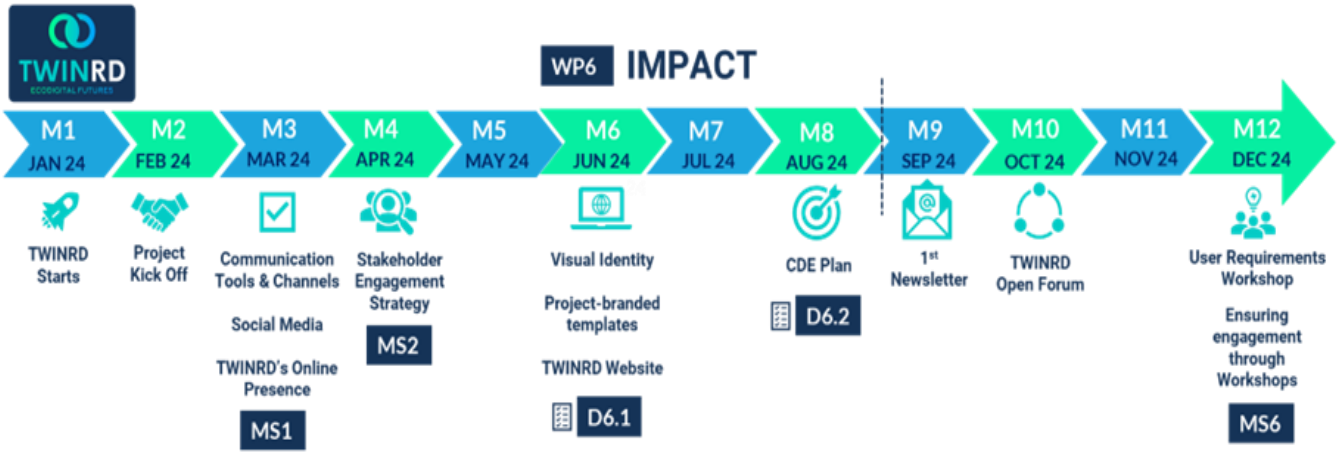


Figure 3 - WP6 Overview for Year 1

An update of TWINRD's CDE Plan (D6.3) is planned for M18 – June 2025 to report on and assess the performance of the project's academic, policy, and societal outreach outlined in this core document and performed during the 1st reporting period.

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Annex I – Screenshots of TWINRD's Monitoring Sheets Templates

FOR ALL PARTNERS

COMMUNICATION ACTIVITIES

Please complete the form using the options in the list. Do not cut/copy&paste cells as this will break the formula.

Communication screen — List the communication activities carried out in the context of the project.

Partner	Date	Name of activity e.g. product, campaign, promotion	Description of implemented communication activity	How? Communication channel	Location incl. online	Link	Who? Target audience	Dissemination level	Outcome Key performance indicators *e.g Total # of people reached*	Comment

Partners	Target audience	Communication channel	Dissemination level
E3M	R&I policy makers at all scales	Website	International
SEURECO	Business innovation leaders in the green and digital transition	Social media	Regional
UNU-MERIT	Social innovation leaders	Print materials (brochure, leaflet, posters..)	National
ISINNOVA	European scientific community, notably H2020 and Horizon Europe projects, macro-economic modelling	Press release	Local
	Civil society	Media article	Other (specify in the comment)
	Citizens	Newsletter	
	Other (specify in the comment)	Interview	
	All	Event (conference, workshop, internet debate..)	
		TWINRD Open Forum	
		Other (specify in the comment)	
		ALL	

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FOR ALL PARTNERS

DISSEMINATION ACTIVITIES

Please complete the form using the options in the list. Do not cut/copy&paste cells as this will break the formula.

Dissemination screen — List the dissemination activities carried out in the context of the project. Include dissemination activities mentioned in the proposal and new ones.

Partner	Date	Name of activity e.g. event, publication name	Why? Insert description of the objectives cosindering project output *Max 200 characters*	What? Type of dissemination activity	Location incl. online	Link	Who? Target audience	Dissemination level	Outcome Key performance indicators *e.g Total # of people reached*

Partners	Target audience	Type of dissemination activity	Dissemination level
E3M	R&I policy makers at all scales	Website	International
SEURECO	Business innovation leaders in the green and digital transition fields:	Social media	Regional
UNU-MERIT	Social innovation leaders	Print materials (brochure, leaflet, posters..)	National
ISINNOVA	European scientific community, notably H2020 and Horizon Europe projects, macro-	Press release	Local
	Civil society and NGOs	Media article	Other (specify in the comment)
	Citizens	Newsletter	
	Other (specify in the comment)	Interview	
	All	Event (conference, workshop, internet debate..)	
		TWINRD Open Forum	
		Workshop	
		Report/Brief	
		Other (specify in the comment)	
		ALL	

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FOR ALL PARTNERS

PUBLICATIONS

Please complete the form using the options in the list. Do not cut/copy&paste cells as this will break the formula.

Publications screen — You need to check if the publications are linked to the project. In case of publications not registered via OpenAIRE, you need to encode the Digital Object Identifier (DOI) and all the rest of information is completed automatically.

Type of publication	Peer - review *yes/no*	Type of PID *Repository*	PID of deposited publication *Insert PID reference*	Link to publication If no PID of publication	Title of the publication For book chapters: title of chapter not of book	PID of publisher version of record	ISSN / eSSN If book insert ISBN	Authors	Title of the journal or equivalent	Number	Publisher	Month/ Year of publication	PID of book If book chapter	Book title If book chapter	Was the publication available in open access through the repository at the time of publication? *Yes/No*	Did you charge OA publishing fees to the project? *Yes/No*	License type

Partners	Type of publication	Type of PID	License type
E3M	Article in journal	DOI	CC BY or equivalent
SEURECO	Publication in conference proceeding/Workshop	Handle	CC BY NC or equivalent
UNU-MERIT	Book/Monograph	ARK	CC BY NC ND or equivalent
ISINNOVA	Chapter in book	URI	Other licences (specify in the comment)
	Thesis/Dissertation	pURL	
	Other (specify in the comment)	Other (specify in the comment)	
		None	

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