[D5.2] FORESIGHT TOOLBOX

IDEALIST

3 INDUSTRIAL ECOSYSTEMS TACKLING SUPPLY CHAINS DISRUPTIONS AND BOOSTING ADVANCED TECHNOLOGIES UPTAKE

DELIVERABLE INFORMATION

DELIVERABLE 5.2	FORESIGHT TOOLBOX
Related Work Package	WP5 - Beyond Strategic Foresight
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[1] R=Document, report; DEM=Demonstrator, pilot, prototype; DEC=website, patent fillings, videos, etc.; OTHER=other

[2] PU=Public, CO=Confidential, only for members of the consortium (including the Commission Services), CI=Classified

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Executive Summary

The IDEALIST project aims to enhance the resilience and technological adaptability of SMEs within the European Union. This document outlines a Foresight toolbox designed to help manufacturing SMEs identify long-term changes and emerging trends as well as disruptors, anticipate their impacts, and develop strategies to address them. The toolbox explores the concept of Horizon Scanning as a main approach to alerting organizations to potential disruptions (threats and opportunities) before they become widely apparent. The document also provides a detailed, practical guide for conducting the Horizon Scanning process in the form of a series of workshops, including suggested schedules and templates.

1. Introduction

Funded under the HORIZON-CL4-2023-RESILIENCE-01 call, IDEALIST represents a consortium of 14 partners from across 7 European countries who have come together to enhance the resilience and technological adaptability of SMEs within the European Union.

IDEALIST stands for “3 InDustrial Ecosystems tAckLing supply chains dISrupTions and boosting advanced technologies uptake”. This ambitious initiative seeks to address the urgent challenges faced by SMEs in the Energy-Intensive Industries, Aerospace & Defence, and Mobility, Transport & Automotive sectors, promoting resilience, sustainable practices, and advanced technological adoption in the face of global disruptions such as the COVID-19 pandemic and geopolitical conflicts.

IDEALIST's core mission is to empower SMEs within these crucial industrial ecosystems to not only anticipate and withstand unexpected global challenges but also to emerge stronger and more competitive. This core part of the project is aimed at identifying supply chain disruptions and opportunities for the uptake of advanced technologies.

The project is composed around the following work packages:

- WP-WP3 Project Management
- WP4 Beyond Matchmaking
- WP5 Beyond Strategic Foresight
- WP6 Beyond Technological Uptake
- WP7 Beyond Supply Chains
- WP8 Beyond Pilot Projects
- WP9-WP10 Beyond Dissemination
- WP11 Beyond Communication

In WP5, in order to increase their organisational resilience, companies targeted by the IDEALIST will be equipped with concrete foresight tools and methodology enabling them to anticipate early signals of change in their strategic environment, to envision impacts of potential disruptions and prepare for future challenges. WP5 is structured along four main tasks, as follows:

- T5.1. Foresight needs assessment and toolbox design / M1-M6
- T5.2. Training the trainers / M5-M6
- T5.3. Horizon Scanning with the focus groups / M7-M12
- T5.4 Using Horizon Scanning outcomes for decision-making / M13-M36

This deliverable is the output of Task 5.1

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The objective of this deliverable is to provide foresight tools and templates needed to implement a Horizon Scanning process with a view to strengthen strategic foresight practices of manufacturing SMEs to better identify longer-term changes/trends, anticipate their impacts for the future and build organisational competencies to deal with them.

This deliverable operationalizes the D5.1 Foresight Process Guidelines, it specifically provides a Foresight toolbox related to the enhancement of Horizon Scanning competences by the key target groups of the IDEALIST project that is representatives of 11 industrial clusters.

The main goal of the toolbox is to identify supply chain disruptions and opportunities across the three industrial ecosystems of the IDEALIST project - Energy-Intensive Industries, Aerospace & Defence, and Mobility, Transport & Automotive sectors.

More specifically, the toolbox translates the Horizon Scanning process into a workshop-based format, which gives the participants the opportunity to learn theory and practice related to Horizon Scanning, and which enables them to execute full Horizon Scans of their industrial ecosystems on their own after the project ends.

2. Foresight toolbox - Horizon Scanning theory

There are many different ways of setting up the Horizon scanning process, which can be organised in a highly structured manner or in an informal way. In the IDEALIST project the methodological process of Horizon Scanning - aimed to identify and analyse potential disruptors affecting the future of three industrial ecosystems - consists of the following steps:

0. Preparation
1. Scanning and collecting data
2. Interpretation and filtering
3. Sense-making
4. Communicating the results
5. Using the information in decision-making

Each step of Horizon Scanning is described in more detail below.

2.1 Preparation

0. Preparation	1. Scanning and collecting data	2. Interpretation and filtering	3. Sense-making	4. Communicating the results	5. Using the information in decision-making

Prior to launching a Horizon Scanning process, it is essential to define the following aspects:

- Scanning frame: Define the key questions driving the rationale behind the planned exploration of the future. Consider the scope: specific thematic area or exploratory? Geographic reach? Time horizon (10, 20, 30 years)? Avoid narrowing the scope too much initially to get a comprehensive picture of the topic under study.

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- Scanning needs: Clarify objectives of Horizon Scanning. Whose policy or strategy is going to be influenced? Who are the end users of the outputs? Determine the characteristics of the end-product (format, length, etc.). Get approval and support from senior management regarding the process, product, and resource allocation.
- Horizon Scanning team: Form a diverse team, consisting of a core organizing team and a group of scanners. The number of scanners depends on the needs and their time commitment. Prioritize diversity in backgrounds and experience for the scanners.
- Data Collection: Set up the logistics for collecting signals before scanners begin. Create online forms (e.g., Google Sheets, Miro) or use offline tools like Excel.
- Horizon Scanning training: Consider offering a practical walk-through of the HS methodology and tools to the HS team. Based on the feedback from participants and facilitators make necessary methodological improvements and modifications.

2.2 Scanning and collecting data

0. Preparation	1. Scanning and collecting data	2. Interpretation and filtering	3. Sense-making	4. Communicating the results	5. Using the information in decision-making

2.2.1 Main objective

The goal of this step of Horizon Scanning is to collect relevant information about the external environment of the topic under study. The collected information usually falls into three main categories:

- Drivers, which are influential forces of changes that are currently shaping or have the capacity to shape or transform a given system. They can take on different states and thus affect a system in many ways, therefore are often called uncertainties.
- Trends, which depict historical change over time (up until the present). They are changes that are measurable/observable, which means that quantitative or qualitative data can be collected, which can illustrate the historical pattern. They have a clear direction of change and dynamics (increasing, decreasing, holding steady).
- Signals of change, an early indication that disruptive change could be underway.

2.2.2 Approach

In this step, inputs are being collected from stakeholders who are affected by the future under study. This approach puts emphasis on the following aspects:

- Comprehensive systems analysis, which aims at a thorough examination of all components and interactions within the system by collecting information falling into such categories as: geopolitics, technology, society, economy, environment, ethics etc., which cover a broader context of the topic under study.
- Unbiased data collection, which emphasises the importance of gathering information from a wide range of diverse sources (both academic and non-academic) while minimising personal biases.

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- Identification of the most uncertain and vulnerable elements of the analysed system, that have the most significant impact on its evolution.

2.2.3 Recommended methods and tools

- Rip van Winkle method, which allows to identify the most crucial and vulnerable assumptions regarding the future of a given topic presented in the form of "yes/no" questions.
- Desk research - "manual" scan of relevant sources: websites, recent academic and popular press publications, social media feeds, exhibitions, conferences etc.
- STEEP is a framework, which allows to cluster inputs along social, technological, economic, environmental, and political etc. categories.

2.2.4. Implementation

2.2.4.1 Online format (Horizon Scanning workshop)

Participants are given two tasks. The first task requires the formulation of a limited number of "yes/no" questions about the future of a topic under study (usually from 5 to 10 questions); which then should be clustered and assigned descriptive labels underlying recurring themes. The identified themes become key drivers of change of the analysed system/topic under study.

The second task implies that participants execute a desk research looking for emerging issues (signals of new). The searching can be directed or undirected. A directed approach requires that participants are given a pre-defined list of sources to analyse. An undirected approach means that participants may scan for signals anywhere and are encouraged to look beyond their own thematic, social or regional "bubble". Each participant is requested to deliver a list of mapped signals for further, collective analysis.

2.2.4.2 Other formats

If scanning and collecting data takes place in another format participants still execute the same two tasks; the only difference is that the "yes/no" questions about the future and the mapping of signals are collected via two surveys (by filling in online forms). In such a way a wider pool of stakeholders can be invited to take part in Horizon Scanning activities and all the inputs can be stored in an evolving database, which is being built and expanded in a crowdsourced format.

After the surveys end, inputs need to be processed by the organiser of the Horizon Scanning process, presented to the participants who would then analyse, cluster and discuss the findings. This can be done at a physical or online meeting.

2.3 Interpretation and filtering

0. Preparation	1. Scanning and collecting data	2. Interpretation and filtering	3. Sense-making	4. Communicating the results	5. Using the information in decision-making

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2.3.1 Main objective

The goal of this step is to analyse, organise and prioritise the findings of scanning.

2.3.2 Approach

In this step, inputs are being analysed by stakeholders who are affected by the future under study. This approach puts emphasis on the following aspects:

- Granularity of the inputs, participants review the scanning results and prepare detailed descriptions of collected signals.
- Quality of the inputs, participants double-check if all information is provided and if it is sufficiently forward-looking.
- Prioritisation of the inputs, participants assess signals using impact vs time metrics.

2.3.3 Recommended methods and tools

- Signal description form, this tool captures key details about each collected signal.
- Time vs Impact Analysis (TIA), this method allows to assess each signal against two metrics: the level of impact and the moment of peak influence of a signal.

2.3.4. Implementation

2.3.4.1 Online format (Horizon Scanning workshop)

Participants are given three tasks. In the first task they are asked to describe collected signals in a template. The type of information sought for may include: the title of the signal, the source, short description, a general shift in understanding that a signal brings about, the envisaged impacts on the system under study, the opportunities, risks or challenges it may bring for stakeholders affected by the change.

In the second task participants are requested to assess each signal using two variables: the type (positive or negative) and the level of impact of each signal on the system under study, and the time when a signal is supposed to be the most impactful on the ecosystem. The assessment scales may vary but the recommended ones are (-5: +5) for estimated impact and (2 - 30 years ahead) for estimated time horizon.

In the third task participants are requested to create maps of drivers of a system or topic under study taking into account the results of the first step of HS, that is: the identified drivers and the results of quantitative assessment of signals. After the results of the two steps are visualised, participants discuss the linkages among signals and drivers. Finally, they pinpoint the most critical drivers and signals, that is the ones characterised by the highest impact and shortest time horizon.

2.3.4.2 Other formats

If the step of interpretation and filtering data takes place in another format participants still execute the same three tasks; the only difference is that first two tasks can be implemented using surveys and online forms. In such a way a wider pool of stakeholders can be invited to take part in Horizon Scanning activities and all the inputs can be stored in an evolving database, which is being built and expanded in a crowdsourced format. It is

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also recommended that the final task, that is the review of the signals and their assessments plus the visualisation and discussion of the results should take place at a meeting (physical or online). All three tasks can be implemented iteratively, which depends on the time and budgetary constraints of the organiser of the Horizon Scanning.

2.4 Sense-making

0. Preparation	1. Scanning and collecting data	2. Interpretation and filtering	3. Sense-making	4. Communicating the results	5. Using the information in decision-making

2.4.1 Main objective

The aim of this step is to identify emerging needs and possible implications for decision-making.

2.4.2 Approach

In this step implications of signals are being analysed by stakeholders who are affected by the future under study. This approach puts emphasis on following aspects:

- Adaptation, participants review what could be the first decision to adapt to change.
- Optimisation, participants reflect on what resources they already have that could be realigned and optimised to prepare for change.
- Preparedness, participants consider what they would like to have, which they are missing so far, to be better prepared for change.

2.4.3 Recommended methods and tools

- Sense-making template to structure participants' thinking.
- A brainstorming workshop to launch participatory reflection on the results of previous steps of HS and the challenges ahead.

2.4.4. Implementation

2.4.4.1 Online format (workshop)

Stakeholders are invited to participate in a sense-making workshop, in which they are asked to select one of the signals identified in previous stages of the HS process and place it in the template with the corresponding impacts.

In the next step they are asked to answer three questions:

- What would be your (cluster's/SMEs') first decision/action to adapt?
- What do your company/cluster already have that could be optimised to meet the implications of the signal?
- What do you wish your company/cluster already had in place that it doesn't have today?

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When answering the questions, participants are asked to refer to the following categories: people, technologies, knowledge, processes, networks, rules, vision, mission, values. By doing so they will comprehensively approach the problem ahead.

2.4.4.2 Other formats

Sense-making by definition requires gathering diverse perspectives, analysing information, and collectively constructing a shared understanding of the issue at hand. It requires real-time interaction, enabling immediate clarification and deeper understanding through dialogue and shared exploration.

Summing up, it produces tangible outcomes such as shared understanding, a cohesive narrative, or actionable recommendations, when executed in a workshop format (either physical or online).

2.5 Communicating the results

0. Preparation	1. Scanning and collecting data	2. Interpretation and filtering	3. Sense-making	4. Communicating the results	5. Using the information in decision-making

2.5.1 Main objective

This step aims to showcase and highlight the value of the results achieved in previous HS activities among a broad stakeholder audience.

2.5.2 Approach

In this step, inputs are being communicated to stakeholders who are affected by the future under study. This approach puts emphasis on the following aspects:

- Increase in stakeholder awareness and better understanding of disruptors impacting specific industrial ecosystems.
- Assessment of participants' Futures Literacy level.
- Familiarisation with the methods, tools and approaches to Horizon Scanning, which increase Futures LIteracy.

2.5.3 Recommended methods and tools

- Validation workshop to communicate the results to stakeholders and obtain feedback based on their needs.
- Individual coaching sessions tailored to the needs of stakeholders
- Futures Literacy survey

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2.5.4. Implementation

2.5.4.1 Online format (workshop)

In the first step, a validation workshop is held to demonstrate the outputs of Horizon Scanning. In addition, a part of the HS process gets replicated during the workshop. This provides participants with hands-on experience using the tools and allows for the identification of additional signals that may have been missed in previous steps.

The second step entails online coaching sessions with Foresight and Horizon Scanning experts and a selected pool of stakeholders (i.e. SMEs). These sessions include an assessment of the stakeholders' strategizing needs, as well as an evaluation of their Futures Literacy level through the questionnaire & exercises designed for this purpose. Based on the results of the assessments and the identified needs, stakeholders are given a demonstration of the selected methods and tools of Horizon Scanning.

2.5.4.2 Other formats

The success of this step of Horizon Scanning can also be achieved by preparing high-quality communication material (report, presentation, video etc.) making sure that they effectively convey complex findings of Horizon Scanning making them accessible and relevant to the target audience.

Secondly, online validation workshops and coaching sessions can be replaced with organisation of other types of communication activities and events, such as a dedicated HS conference or a participation in thematic meetings, organised by umbrella organisations in order to reach a wider number of stakeholders. The chosen event format depends on the needs of stakeholders, as well as on the time or budget constraints

2.6 Using the information in decision-making

0. Preparation	1. Scanning and collecting data	2. Interpretation and filtering	3. Sense-making	4. Communicating the results	5. Using the information in decision-making

2.6.1 Main objective

This step aims to illustrate how the outcomes from earlier phases of Horizon Scanning can inform and enhance planning and strategic decision-making.

2.6.2 Approach

In this step signals are communicated and their implications are analysed by stakeholders who are affected by the future under study. This approach puts emphasis on following aspects:

- Clear understanding of the future landscape - the drivers of change and signals - by stakeholders.
- Participants' readiness to move towards the integration of the results in their decision-making process.

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- Getting participants' recognition about what is possible in the present and in the future; and thus increase their resilience.

2.6.3 Recommended methods and tools

- Strategizing workshop, to demonstrate connections between big-picture thinking and stakeholders' business reality.
- Moonshot idea template, to brainstorm radical solutions to anticipated challenges using disruptive innovation (optional).
- Future-proofing template, to test how future changes might affect the ability to deliver a particular project or set of strategic objectives (optional).

2.6.4. Implementation

2.6.4.1 Online format (workshop)

Participants are invited to a strategizing workshop, in which they are given three tasks. In Task 1 participants are presented with the consolidated and prioritised list of signals and drivers of change and are given room to reflect about them and their potential implications on the system under study, its actors and stakeholders.

In Task 2 participants are requested to consider the implications of the signals and drivers (in this: challenges, risks and opportunities) in order to identify potential emerging needs that arise for the ecosystem, actor or stakeholder under study.

Finally, in Task 3 participants are requested to address key needs by identifying specific actions that they can undertake - in a short & medium time-frame - to achieve organisational goals in the face of anticipated risks and opportunities. In addition to specific actions, they may recommend to modify organisational goals addressing emergence and uncertainty embodied in the list of signals & drivers. At this stage, organisers of the strategizing workshop may use Moonshot and Future-proofing templates[3] to facilitate the process of individual and collective brainstorming.

2.6.4.2 Other formats

This step of HS aims to help stakeholders (i.e. SMEs) improve their performance and achieve their goals in volatile environments. Apart from the workshop format, coaching sessions can be organised with Foresight and Horizon Scanning experts and a selected pool of stakeholders (i.e. SMEs). It is recommended that sessions follow the structure of the workshop outlined in the section above.

[3] For methodological guidance visit the results section of the Mind The Missions project and download a Future-Proofing Toolkit: https://sites.google.com/view/mindthemissionsproject/home

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3. Foresight toolbox - Horizon Scanning practice

3.1 Preparation

Before actually holding the workshop (or a series of workshops) - that is a key format of the Horizon Scanning process - you should consider key practical components that will enable effective work. Namely these are the goal, the group and the materials.

3.1.1 Learning objectives

Think of what you want to achieve. What should be the outcome of the Horizon Scanning (HS) process? Specify as clearly and accurately as you can the main objective of the Horizon Scanning. Focus on the ecosystem(s) within which you are conducting Horizon Scanning. What trends are essential for it? What challenges does it have to face in the future? Think about who could benefit from an in-depth analysis of the signals and drivers of change, and how? Who should be the audience for the horizon scanning results? With whom they might be shared?

Walk through the structure of the Horizon Scanning translated into the workshop-based exercises and see if it is clear to you. Adapt the schedule as suitable for the group. Consider how you will divide participants into subgroups.

Remember to book time for the follow-up work with the results of the Horizon Scanning workshop.

Draw up the timetable.

3.1.2 The group

Think about the participants. Are they a homogeneous or a diverse group? Aim for the most transdisciplinary pool of participants. Are they more or less within the scope of the target audience for Horizon Scanning activities? If this is the case, invite them to the workshop(s).

Try to adapt the agenda according to the group composition and its assumed Futures Literacy level. What level of theoretical introduction to Foresight and Horizon Scanning is needed for the group?

3.1.3 The materials

Consider whether Horizon Scanning activities and exercises should take place online or onsite. If onsite, think of the ideal location for the workshop(s). Try to find and book the most suitable place. Remember to consider the furniture setup, which should allow for both individual and group work.

Print or order all working templates (see annexes). Use a large, ideally A0 format. The paper needs to be thick enough so that marker pens do not bleed through to the back. Find a space where you can place a map of drivers' templates (table, board, wall). All Horizon Scanning templates constitute annexes to these guidelines and can be downloaded from the IDEALIST website.

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Remember to bring sticky notes, marker pens, tape, scissors. You should also organise notepaper for all participants.

If the format of the Horizon Scanning workshop(s) is online, you may use the model Miro board template available here (the contents is locked but after copy paste, there will be possibility to edit and work with the template).

3.2 Structure of a Horizon Scanning workshop

Holding the Horizon Scanning process - for example in the workshop(s) format - will require not only skillful performance but also some thinking beforehand. It is our strong recommendation to structure the Horizon Scanning process and consequently, the workshop(s) into following modules:

1. **Introduction to foresight** (plenary session; background information on Futures Literacy, Foresight and Horizon Scanning based on slides which can be downloaded from the IDEALIST website): Toolbox - Horizon Scanning Theory and Practice.pptx
2. **Uncertainties & drivers** (in groups; use of Rip van Winkle method to reveal participants' assumptions about the future)
3. **Report-back** (plenary session with brief introduction to collecting signals)
4. **Collecting signals** (in groups; signals being collected individually using the suggested sources - or other reliable ones - which can be found in a collecting signals template)
5. **Assessing signals & map of drivers** (continuation of in-group exercise with use of templates and Gsheet which can be found on the IDEALIST website): GSheet Horizon Scanning Training Idealist
6. **Sense-making** (in groups; using sense-making template)
7. **Report back & summary**

Suggested presentation materials are available on the IDEALIST website. Recommended schedule of the Horizon Scanning process - in the workshop(s) format - can be found at the end of this document (to be adapted for specific needs of the group taking part in the process).

Table 1. Proposed agenda of a 1-day Horizon Scanning workshop for the organisers

Horizon Scanning Process/Exercise		Time needed
Introduction to Foresight		30 minutes
Uncertainties & drivers	Rip van Winkle exercise	20 minutes
	Clustering uncertainties	30 minutes
Coffee break		10 minutes
Report-back		30 minutes
Introduction to Horizon Scanning		30 minutes
Scanning and collecting signals		60 minutes
Lunch break		60 minutes

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Assessing signals & map of drivers	Describing signals	60 minutes
	Assessing signals	30 minutes
	Map of drivers	20 minutes
Coffee break		10 minutes
Sense-making		30 minutes
Report back & summary		60 minutes

It is recommended to conduct a Horizon Scanning process over a longer period of time. If the format of delivery is a workshop, then ideally, the process should be divided into at least three 1-day workshops, adjusting the duration of Horizon Scanning activities accordingly.

3.3 Annotated agenda of a 1-Day Horizon-Scanning Workshop

Table 2 contains all the key information for the facilitator of a one-day Horizon-Scanning workshop, which can be used as a kind of sprint in Horizon Scanning when there is not enough time in the organisation for a long-term process, decisions need to be made very quickly and insights need to be obtained for this, to take advantage of the presence of a unique group of people or as one of many methods in a more complex process. The structure of the workshop replicates all the key phases of Horizon Scanning, which can be implemented either periodically or continuously and iteratively.

If you are running an online workshop, use the template we have prepared especially for the occasion on Miro: DELIVERABLE_5.2_IDEALIST_HORIZON_SCANNING_BOARD.

If you are running an offline workshop, use the templates as annexes to the document **IDEALIST_Deliverable 5.2 Foresight toolbox.**

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Table 2. Annotated agenda for the facilitator of a one-day Horizon-Scanning workshop

TIMING	SLIDES	OBJECTIVES AND TOPICS	INSTRUCTIONS FOR FACILITATORS AND INPUT	TOOLS, TEMPLATES AND MATERIALS
40 min		Plenary session I 1. Outline the Workshop Goal 2. Present Workshop Structure 3. Outline Workshop Schedule 4. Introduce participants to the concept of foresight and futures literacy, emphasizing the importance of anticipating and preparing for change.	**Workshop Instructions: Enhancing the Resilience and Technological Adaptability of SMEs** 1. **Outline the Workshop Goals:** • Identify key drivers of change in each ecosystem • Anticipate long-term changes and emerging trends in the context of each ecosystem • Develop strategies to address disruptions and challenges **2. Present Workshop Structure:** • Introduction to Foresight: Theoretical background on Futures Literacy, Foresight, and Horizon Scanning. • Uncertainties & Drivers: Participants use the Rip van Winkle method to reveal assumptions about the future. • Report-Back: Plenary session with a brief introduction to collecting signals. • Collecting Signals: Participants collect signals relevant to their ecosystem, using provided templates. • Assessing Signals & Map of Drivers: Participants assess the impact and timeline of signals	Workshop Materials: • Printed templates for each exercise (Annexes 1-7) • Sticky notes, marker pens, tape, scissors • Notepaper for participants • A0 format paper for the Map of Drivers template • Google Sheet for signal assessment • Optional: Miro board template for online workshops

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	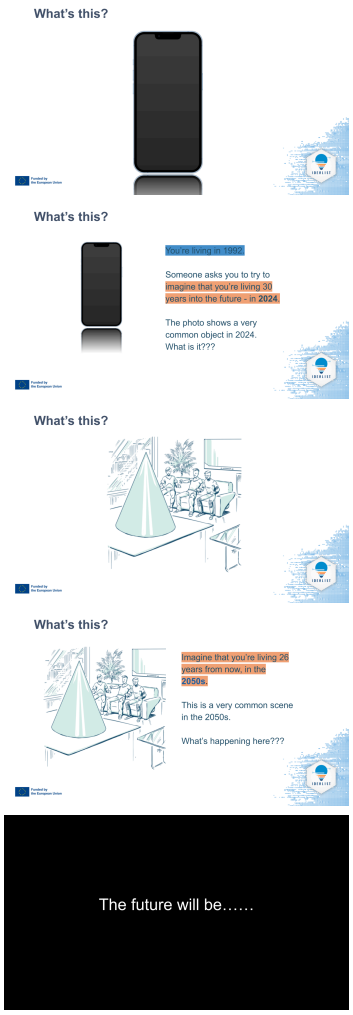		using provided templates and a Google Sheet. • Sense-Making: Participants analyze how their cluster or company could adapt to signal implications. • Report Back & Summary: Final discussions and conclusions. **3. Outline Workshop Schedule:** ○ Introduction to Foresight: 30 minutes ○ Uncertainties & Drivers: 20 minutes ○ Clustering Uncertainties: 30 minutes ○ Coffee Break: 10 minutes ○ Report-Back: 30 minutes ○ Introduction to Horizon Scanning: 30 minutes ○ Scanning and Collecting Signals: 60 minutes ○ Lunch Break: 60 minutes ○ Assessing Signals & Map of Drivers: 60 minutes ○ Assessing Signals: 30 minutes ○ Map of Drivers: 20 minutes ○ Coffee Break: 10 minutes ○ Sense-Making: 30 minutes ○ Report Back & Summary: 60 minutes **Additional Notes:**	

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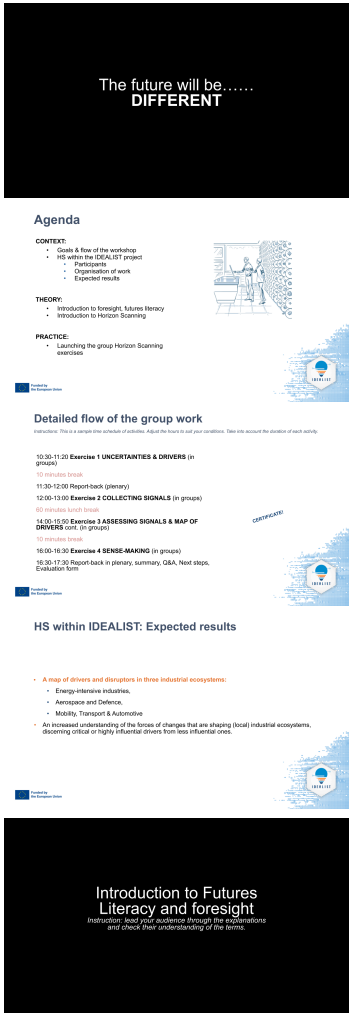

- Adapt the schedule and content to the specific needs of the participants.
- Encourage a transdisciplinary approach and diverse participation.
- Provide clear instructions and guidance throughout the workshop.
- Facilitate discussions and ensure active engagement.
- Emphasize the practical application of foresight tools and methodologies.

4. Introduce participants to the concept of foresight and futures literacy, emphasizing the importance of anticipating and preparing for change.

Key Concepts:

- Future is unpredictable: Foresight doesn't predict but explores plausible futures.
- Future is not predetermined: Many possible futures exist; our choices influence outcomes.
- Foresight benefits: Informs decision-making, challenges assumptions, focuses resources.

Introduction Flow:

1. Warm-up Exercise (Optional): Show images of past and future

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objects to illustrate how perceptions of the future change.
2. Introduction to Foresight: Define foresight, futures literacy, and horizon scanning.
3. Futures Literacy: Explain the ability to use the future to rethink the present.
4. Foresight vs. Forecast: Highlight the difference between exploring multiple futures and predicting a single outcome.
5. Benefits of Foresight: Discuss how foresight helps organizations adapt and thrive in uncertainty.
6. Horizon Scanning: Introduce the systematic approach to identifying early signs of change.

Additional Notes:

- Encourage interactive discussions and questions from participants.
- Emphasize the practical applications of foresight in various industries.
- Provide a clear overview of the workshop agenda and exercises.
- Create a welcoming and inclusive environment for diverse perspectives.
- Adapt the content and pace to fit the participants' background and interests.
- Consider using real-world case studies to demonstrate the value of foresight.

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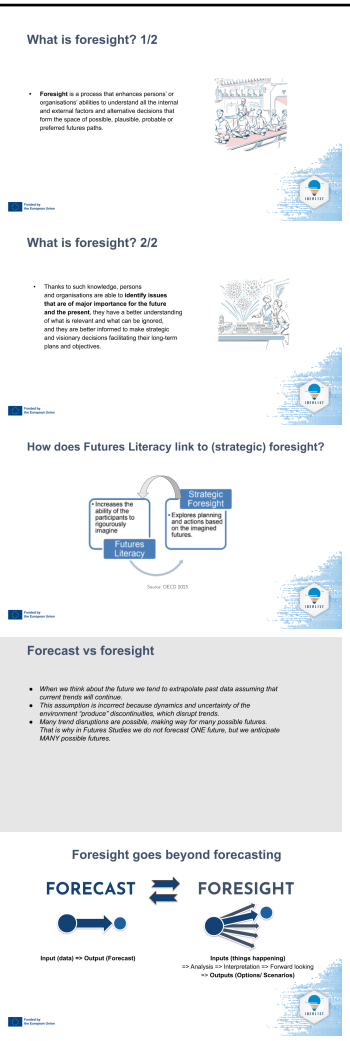

- Highlight the connection between foresight and strategic planning.
- Encourage participants to reflect on how foresight can be applied to their own work.

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> *"An important risk companies face is that major shifts in the business environment can make entire investment strategies obsolete, ultimately resulting in the loss of their competitive position. In anticipating such shifts, forecasts are of little help given that they are usually based on the assumption that tomorrow's world will be much like today's."*
> *(Cornelius, 2005)*

Unique value proposition of foresight 1/2

- The key value of foresight lies in its ability to obtain sufficient details (insights) on the external situation sufficiently **early** to enable an internal organisational **response**, such as:
  - taking advantage of emerging opportunities by changing organisational goals or
  - addressing potential adverse consequences of emerging threats by taking adaptive, mitigative or preventive actions related to existing organisational goals.

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Unique value proposition of foresight 2/2

- To sum up, the main benefits of **foresight** are as follows. Foresight:
  - helps decision-makers develop and make choices,
  - challenges long-held beliefs and/or orthodoxies,
  - focuses resources and attention of decision-makers,
  - helps prevent and anticipate certain developments.

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Group work principles

Instructions: Define the rules for working in subgroups. You can add/remove elements from the list according to your convenience.

- Treat everyone with respect.
- Listen attentively to what others have to say.
- Think outside the box.
- Do not judge or interrupt others' speeches.
- Participate in the discussion.
- Stay on topic.
- Comments should be concise and relevant.
- The group facilitator decides who's next to speak.
- The group facilitator is neutral and does not participate in the discussion.
- Take a break when needed.

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> ***"The ability for which managers are most celebrated — the ability to get things done — is only one part of their necessary skills. Equally important, and much harder to come by, is the ability to see ahead."***
> *Pierre Wack (Shell)*

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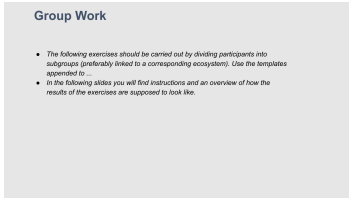
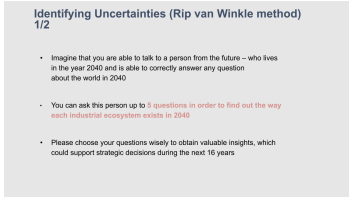
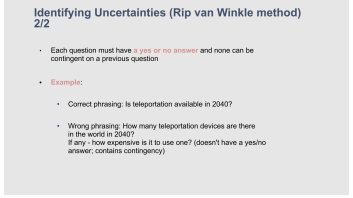
20 min	   	Group work I [Mapping uncertainties and drivers of change] Module 1: Rip van Winkle part 1. Identifying uncertainties	**Uncertainties & Drivers** Help participants identify and articulate uncertainties about the future of their industrial ecosystem, fostering a deeper understanding of potential drivers of change. **Key Concepts:** ● Future is uncertain: Encourage participants to embrace uncertainty and explore a range of possibilities. ● Rip Van Winkle method: Use this technique to stimulate creative thinking and uncover hidden assumptions. **Rip Van Winkle Exercise:** ● Explain the exercise: Imagine that you are able to talk to a person from the future - who lives in the year 2040 and is able to correctly answer any question about the world in 2040. You can ask this person up to 5 questions in order to find out more about the way each industrial ecosystem exists in 2040. Note: you can only ask a question in such a way that the person from the future can only answer YES or NO. The example: Are there parking lots for flying cars in Madrid? YES/NO. Please choose your questions wisely to obtain valuable insights, which could	Annex 1: Rip van Winkle exercise template

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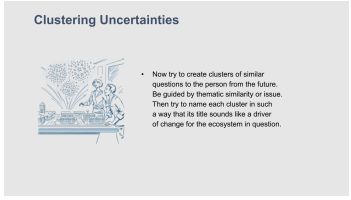
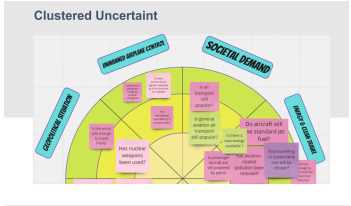
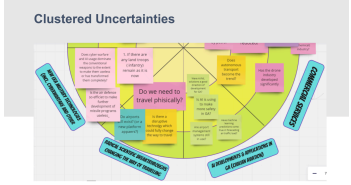
			support strategic decisions during the next 17 years. • Distribute the "Rip van Winkle" template (Annex 1). • Give participants time to brainstorm and write down their questions. • Have each participant present their questions to the group. • Facilitate a discussion to transform questions into uncertainties.	
30 min	  	Group work I [Mapping uncertainties and drivers of change] Module 1: Rip van Winkle part 2. Clustering uncertainties and formulating drivers	**Clustering Uncertainties and Formulating Drivers** Guide participants in organizing their identified uncertainties into meaningful clusters and formulating concise drivers of change that represent the key forces shaping the future of their industrial ecosystem. **Key Concepts:** • Clustering: Grouping similar uncertainties together to reveal patterns and common themes. • Drivers of change: Broad, overarching forces or trends that drive the emergence of multiple uncertainties (e.g., technological advancements, regulatory shifts). • Collaborative sense-making: Encouraging participants to work together to interpret and derive	Annex 2: Clustering drivers template

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	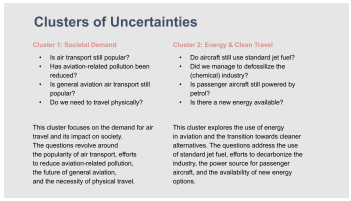		insights from the clustered uncertainties. 1. **Review Rip Van Winkle Results:** • Briefly recap the uncertainties generated in the Rip Van Winkle exercise. • Remind participants of the focus on long-term, impactful uncertainties. 2. **Clustering Activity:** • Instruct participants to form groups of 4-5 people. • Distribute sticky notes and markers. • Ask each participant to write down one uncertainty per sticky note, using concise language. • Have groups collectively cluster similar uncertainties on a shared surface (e.g., whiteboard, flip chart paper). • Encourage discussion and iteration to refine the clusters. 3. **Formulating Drivers:** • Guide groups to identify the underlying driver of change represented by each cluster. • Emphasize that drivers should be broad,	

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			impactful, and relevant to the ecosystem. • Have groups write down each driver on a separate sticky note. • Aim for approximately 8 drivers per group. • Use the "Clustering Drivers" template (Annex 2) to capture the collective insights. **Additional Notes:** • Encourage diversity: Ensure all voices are heard and diverse perspectives are considered. • Capture insights: Document the clusters and drivers for use in subsequent workshop modules. • Adapt the instructions and group size based on the number of participants and available time. • Consider using online collaboration tools for virtual workshops (Miro board). • Emphasize the iterative nature of the clustering process. • Encourage participants to think critically and challenge assumptions. • Use the identified drivers as a foundation for horizon scanning and strategic planning.	
10 min		BREAK		

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15 min		Plenary session II Report back from Rip van Winkle and clustering activities	**Report Back from Rip van Winkle** To share and compare the drivers of change identified by each group during the Rip van Winkle exercise. **Time:** 5 minutes per group **Process:** 1. **Group Selection:** Randomly select a group to present first. 2. **Presentation:** Ask the group to briefly present their identified drivers of change. They can use their Miro board or simply list the drivers. 3. **Clarifying Questions:** Allow other participants to ask clarifying questions about the presented drivers. 4. **Repeat:** Repeat steps 2-3 for each remaining group. 5. **Common Themes:** After all groups have presented, facilitate a brief discussion to identify any common themes or patterns across the drivers.	
15 min	PART 1	Plenary session II Introduction to Horizon Scanning (PART 1) Introduction to Horizon Scanning. Scanning for Signals (PART 2)	**Introduction to Horizon Scanning (PART 1 and PART 2)** Introduce participants to the concept of horizon scanning and its role in foresight. Familiarize them with the characteristics of weak signals and guide them on how to	

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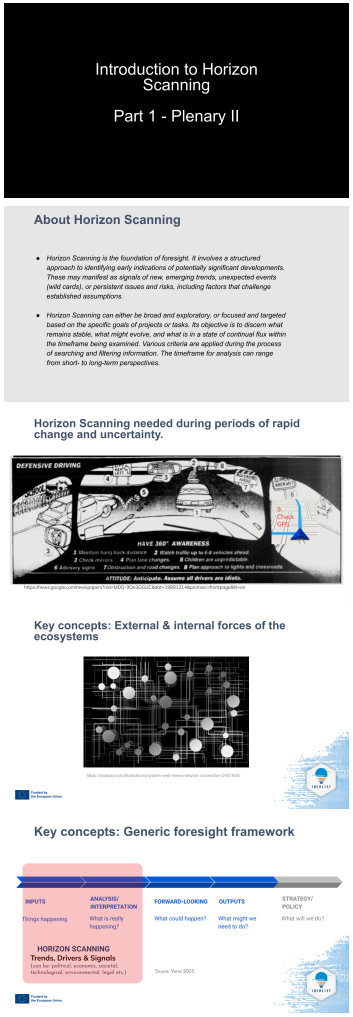

identify and collect such signals effectively.

Key Concepts:

- Horizon scanning: A systematic approach to exploring the future by identifying early signs of potential change and disruption.
- Weak signals: Early indicators of potential change or disruption that may seem insignificant or peripheral at present.
- Diverse sources: Signals can emerge from a wide range of sources, including scientific publications, technological advancements, social and cultural trends, and unexpected events.
- Signal criteria: Good signals are plausible, novel, significant, and timely in relation to the ecosystem under consideration.

Presentation Flow:

1. Introduction to Horizon Scanning:
    - Define horizon scanning and explain its importance in anticipating and preparing for future changes.
    - Emphasize the proactive nature of horizon scanning and its focus on identifying emerging trends and weak signals.
2. **Characteristics of Weak Signals:**

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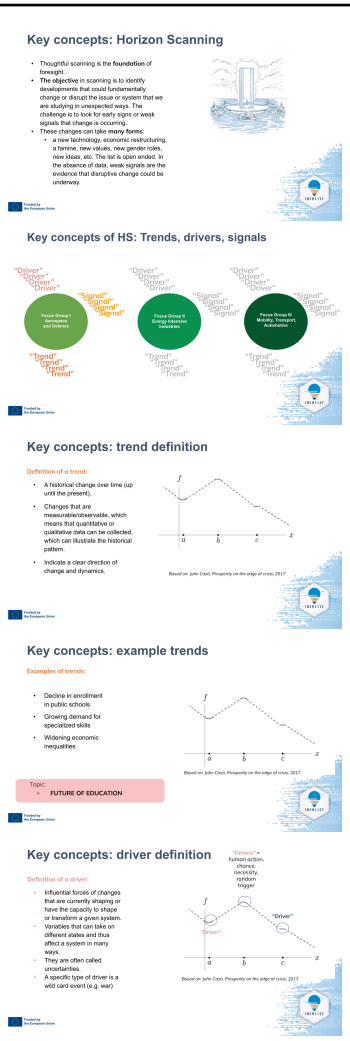

- Explain the concept of weak signals and their role in foresight.
- Discuss the criteria for assessing the quality of weak signals (plausibility, novelty, significance, timeliness).
- Provide examples of weak signals from various domains to illustrate these characteristics.

3. **Guiding Questions for Signal Identification:**
   - Present the general guiding questions for identifying weak signals (e.g., What new scientific or technological breakthroughs might be underway?).
   - Discuss how these questions can help participants focus their attention and stimulate their thinking.
   - Encourage participants to consider the specific context of their industrial ecosystem when applying these questions.
4. **Signal Sources and Search Strategies:**
   - Provide a list of potential signal sources (e.g., news articles, research papers,

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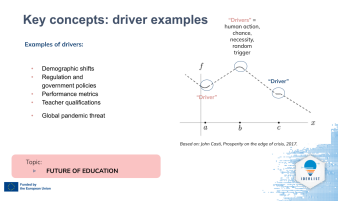
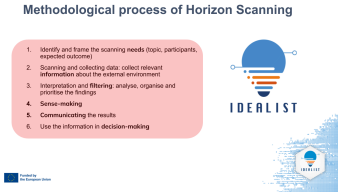
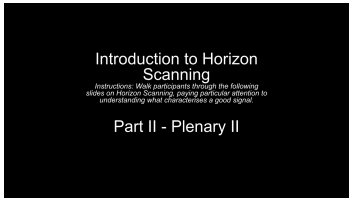
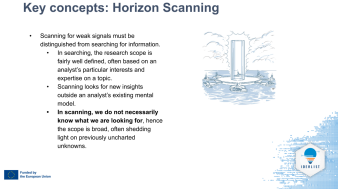
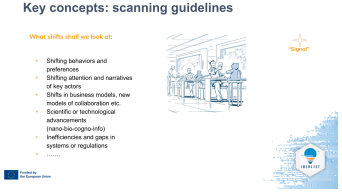




PART 2







industry reports, social media).
- Discuss different search strategies (e.g., keyword searches, trend analysis, expert interviews).
- Emphasize the importance of using diverse sources and methods to capture a wide range of signals.

Specific guiding questions to consider:

- What new scientific or technological breakthroughs might be underway? Does this discovery break previous ways of doing things?
- What new intellectual ideas, beliefs, worldviews are emerging?
- How is a way of living/ culture starting to change?
- Are societal roles / models starting to change? How? Why?
- What are some emerging changes in relation to social media & Internet?
- Are consumption models starting to change? How? Why?
- Are there any emerging shifts in business models or the way we work?
- Are there any new emerging shifts in global norms, practices

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or regulations (e.g. related to trade, taxes, IP, environment)?

Additional Notes:

- Adapt the content and pace to fit the participants' background and expertise.
- Consider using real-world case studies to demonstrate the value of horizon scanning.
- Highlight the iterative nature of horizon scanning and the need for ongoing monitoring and adaptation.
- Encourage participants to reflect on how they can apply horizon scanning in their own work.

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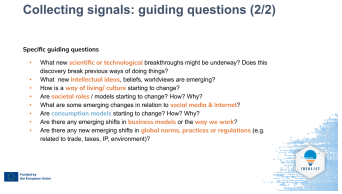
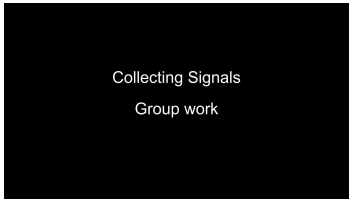
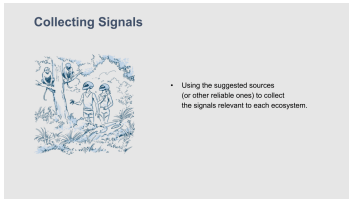
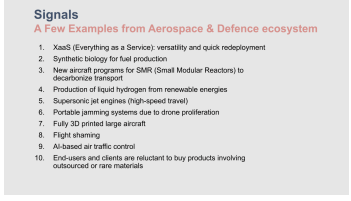
				
60 min	   	Group work II Module 2. Scanning and Collecting signals. Part 1: Collecting signals	**Module 2. Scanning and Collecting signals. Part 1: Collecting signals** The goal of this part of the workshop is to guide participants in actively searching for and collecting weak signals relevant to their industrial ecosystem. This will foster a mindset of curiosity and open-mindedness towards emerging trends and potential disruptions. Participants will be equipped with the tools and knowledge to identify signals from diverse sources, assess their quality, and collaboratively discuss their potential implications. 1. **Signal Scanning Activity:** • Instruct participants to work individually or in pairs. • Provide a list of suggested signal sources (e.g., news articles, research papers, industry reports, social media feeds). • Encourage participants to use diverse sources and search methods.	"Signal Collection Template" (Annex 3).

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	  		• Set a time limit for scanning (e.g., 60 minutes). • Instruct each participant to search for at least two signals. Signals can be found in various forms, such as articles, news stories, reports, or other relevant sources. • Emphasize that signals do not have to be limited to technological changes but can also encompass PESTLE (Political, Economic, Social, Technological, Legal, Environmental) factors. • Remind participants to look for both positive and negative signals. This diversity will provide a more comprehensive view of potential future trends. • Have participants record relevant signals on the template, including a brief description, source, and potential implications. • Provide sticky notes for participants to write down their signals. • Each sticky note should include a brief description of the signal and its source.	

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			2. Signal Sharing, Discussion and Prioritizing: ● Reconvene as a whole group. ● Ask participants to share some of their most interesting or surprising signals. ● Facilitate a discussion to identify common themes, potential impacts, and areas for further investigation. ● Ask participants to prioritise signals. Each participant is given 5 tokens to allocate freely, assigning them to the signals they find most surprising and non-obvious (and potentially most relevant) to the ecosystem. The 5-6 signals with the highest number of votes are then selected for further work. **Additional Notes:.** ● Consider providing a pre-populated list of signal sources or using online collaboration tools for signal sharing. Use our examples. ● Provide links to resources that offer further information on identifying and understanding signals.	

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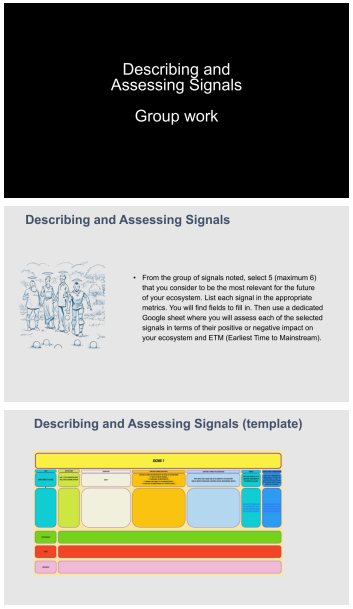
			• Ensure participants have access to these resources either digitally or in print. • Emphasize the iterative nature of signal collection and the need for ongoing scanning. • Encourage participants to reflect on the potential implications of the collected signals for their organization or industry. • Use the collected signals as input for the subsequent signal assessment and sense-making exercises.	
60 min		LUNCH BREAK		
45 min		Group work II Module 2. Scanning and Collecting signals. Part 2: Describing signals	**Module 2. Scanning and Collecting signals. Part 2: Describing signals** From the group of signals identified in the previous exercise, select 5 (maximum 6) that you consider to be the most relevant for the future of your ecosystem. List each signal in the appropriate metrics table. Fill in all the fields in the table with relevant information answering to questions provided in the table. Work individually or as a group when describing each signal. **Metrics Completion:** Explain the fields within the metrics template (Slide and Annex 4: Describing signals template) and ensure participants	Annex 4: Describing signals template

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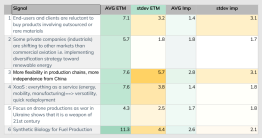
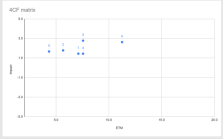
			understand how to populate them accurately. Emphasize the need for clear and concise descriptions of each signal.	
45 min	Describing and Assessing Signals (sample Gsheet for assessments)  Describing and Assessing Signals (sample graph from Gsheet) 	Module 3. Interpretation of results. Part 1. Assessment of signals in GSheet and then listing challenges, risks, opportunities	**Module 3. Interpretation of results. Part 1. Assessment of signals in GSheet and then listing challenges, risks, opportunities** After you describe all the selected signals, move to the next exercise, in which you will be giving numerical assessments in terms of: • the positive or negative impact of each signal on your ecosystem (on a scale from -5 to 5, where -5 indicates an extremely unfavorable impact, and 5 indicates an extremely favorable impact) and • the Earliest Time to Mainstream (ETM, that is the minimum time needed for the signal to mature and be the most impactful on the ecosystem; on a scale from 2 to 20 years). Open or print out a relevant template to proceed. Follow the instruction tab to guide participants through the activity. Downloadable from the IDEALIST project website: GSheet Horizon Scanning Trainin...	Annex 5: Gsheet for signals assessment

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			1. **Signal Assessment:** ● Direct participants to the designated Google Sheet. ● Explain how to assess each signal's impact (positive or negative) on the ecosystem and its Earliest Time to Mainstream (ETM). ● Demonstrate the use of the sample graph to visualize assessment results. 2. **Discussion and Refinement:** ● Facilitate a group discussion on the assessed signals, encouraging participants to share insights and rationale behind their assessments. ● Guide the group in refining their assessments based on the discussion and any new information that emerges. 3. **Finalization:** ● Ensure all participants have completed the metrics and assessments for their selected signals. ● Collect the Google Sheet data for further analysis or reporting. ● Paste the results from GSheets together with	

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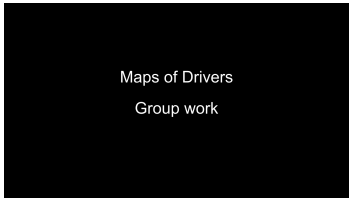
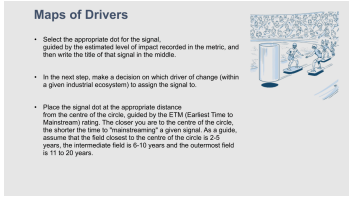
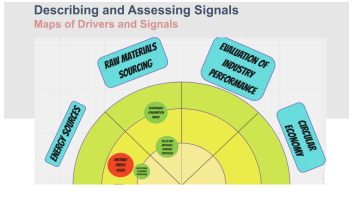
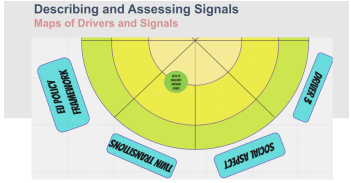
			the matrix into the appropriate place in Miro (if you are implementing an online workshop) or display them in the workshop room before the next task.	
20 min	   	Module 3. Interpretation of results. Part 2: Designing maps of drivers and signals	**Module / Exercise 3 Assessing signals & map of drivers part 3 (Map of Drivers)** 1. Transfer the names of the signals developed in the metrics to the appropriate dot. In the next step you will find instructions for selecting the size and colour of the dot. If you are implementing an offline workshop, cut out the dots from the attached template (part of Annex 6: Map of drivers template) and then use them to create the map. If you are running online, you will find the relevant dots in the template on Miro board DELIVERABLE_5.2_IDEALIST_HORIZON_SCANNING_BOARD. 2. Select the appropriate dot for the signal, guided by the estimated level of impact recorded in the metric, and then write the title of that signal in the middle. • If the impact of a particular signal has been assessed at a value within the - 5 >= -3 range, then	Annex 6: Map of drivers template

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	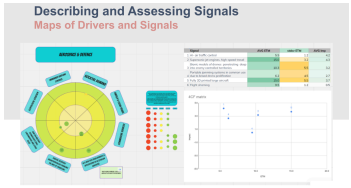		select the **large red dot** and enter the signal name in its centre. • If the impact of a particular signal has been assessed at a value within the - 2.9 >= -1.1 range, then select the **small red dot** and enter the signal name in its centre. • If the impact of a particular signal has been assessed at a value within the - 1 >= 1 range, then select the **small yellow dot** and enter the signal name in its centre. • If the impact of a particular signal has been assessed at a value within the 1.1 >= 2.9 range, then select the **small green dot** and enter the signal name in its centre. • If the impact of a particular signal has been assessed at a value within the 3 >= 5 range, then select the **large green dot** and enter the signal name in its centre. 3. In the next step, make a decision on which driver of change (within a given industrial ecosystem) to assign the signal to. 4. Place the signal dot at the appropriate distance from the centre of the circle, guided by the ETM (Earliest Time to Mainstream) rating. The closer you are to the centre of the circle, the shorter the	

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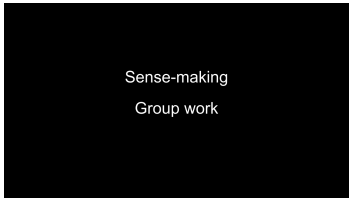
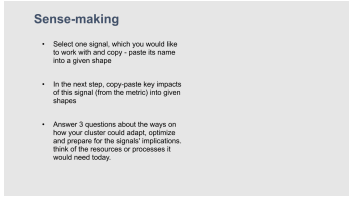
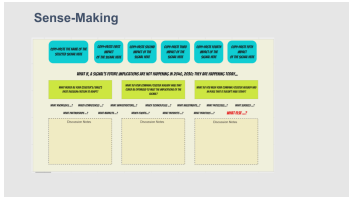
			time to "mainstreaming" a given signal. As a guide, assume that the field closest to the centre of the circle is 2-5 years, the intermediate field is 6-10 years and the outermost field is 11 to 20 years.	
10 min		BREAK		
30 min	  	Module 4. Sense - making	**Sense-making** How to use collected signals in daily practice? Select one signal, which you would like to work with and - write down its name into a given space in the template below. In the next step, write down key impacts of this signal from the metric (output of Module / Exercise 2 Scanning and Collecting signals part 2 Describing signals) into a given space in the template below. Answer 3 main questions about the ways on how your cluster or your company could adapt, optimize and prepare for the signals' implications. Think of the resources or processes it would need today. **What if a signal's future implications are not happening in the 2040s or 2030s; they are happening today...**	Annex 7: Sense-making template

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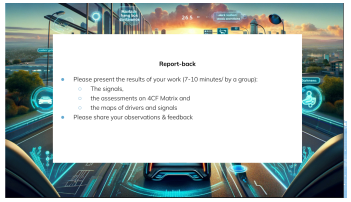
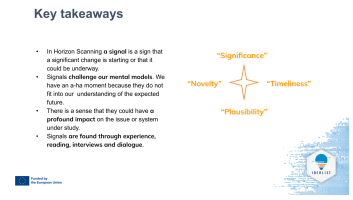
			Question 1: What would be your (cluster's/SMEs') first decision/action to adapt? Question 2: What do your company/cluster already have that could be optimised to meet the implications of the signal? Question 3: What do you wish your company/cluster already had in place that it doesn't have today? Answer the questions taking into account the following categories: people, technologies, knowledge, processes, networks, rules, vision, mission, values.	
60 min	  	Plenary session III (final one)	**Final Plenary Session** 1. **Recap of Key Takeaways:** • Remind participants of the definition of a signal and its characteristics (novelty, plausibility, significance, timeliness). • Reiterate the importance of signals in challenging mental models and identifying potential disruptions. • Emphasize the value of foresight in navigating an uncertain future. 2. **Reflection on the Workshop:** • Invite participants to share their reflections on	

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	 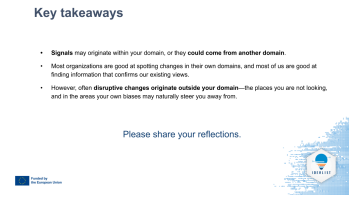 		the workshop, focusing on: • The process of identifying and assessing signals within their ecosystems. • The challenges they encountered in selecting and evaluating signals. • The insights they gained about potential future disruptions and opportunities. **3. Discussion and Q&A** • Open the floor for a broader discussion on the following: • How can participants apply the signal scanning and assessment framework in their ongoing work? • What are the potential benefits and limitations of using this approach? • How can organizations foster a culture of	

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			foresight and continuous learning? ● Address any questions or concerns raised by participants. 4. **Closing Remarks:** ● Thank participants for their active engagement and contributions. ● Summarize the key takeaways from the workshop and highlight the importance of incorporating foresight into strategic planning. ● Encourage participants to continue exploring and refining their signal scanning and assessment skills.	

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5. Annexes

Annex 1: Rip van Winkle exercise template

Module / Exercise 1 Uncertainties and drivers part 1

Rip van Winkle exercise

Imagine that you are able to talk to a person from the future - who lives in the year 2040 and is able to correctly answer any question about the world in 2040.

You can ask this person up to **5 questions in order to find out more about the way each industrial ecosystem exists in 2040**.

Note: you can only ask a question in such a way that the person from the future can only answer **YES or NO**. The example: Are there parking lots for flying cars in Madrid? YES/NO.

Please choose your questions wisely to obtain valuable insights, which could support strategic decisions during the next 17 years.

Name	Question 1	Question 2	Question 3	Question 4	Question 5

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Name	Question 1	Question 2	Question 3	Question 4	Question 5

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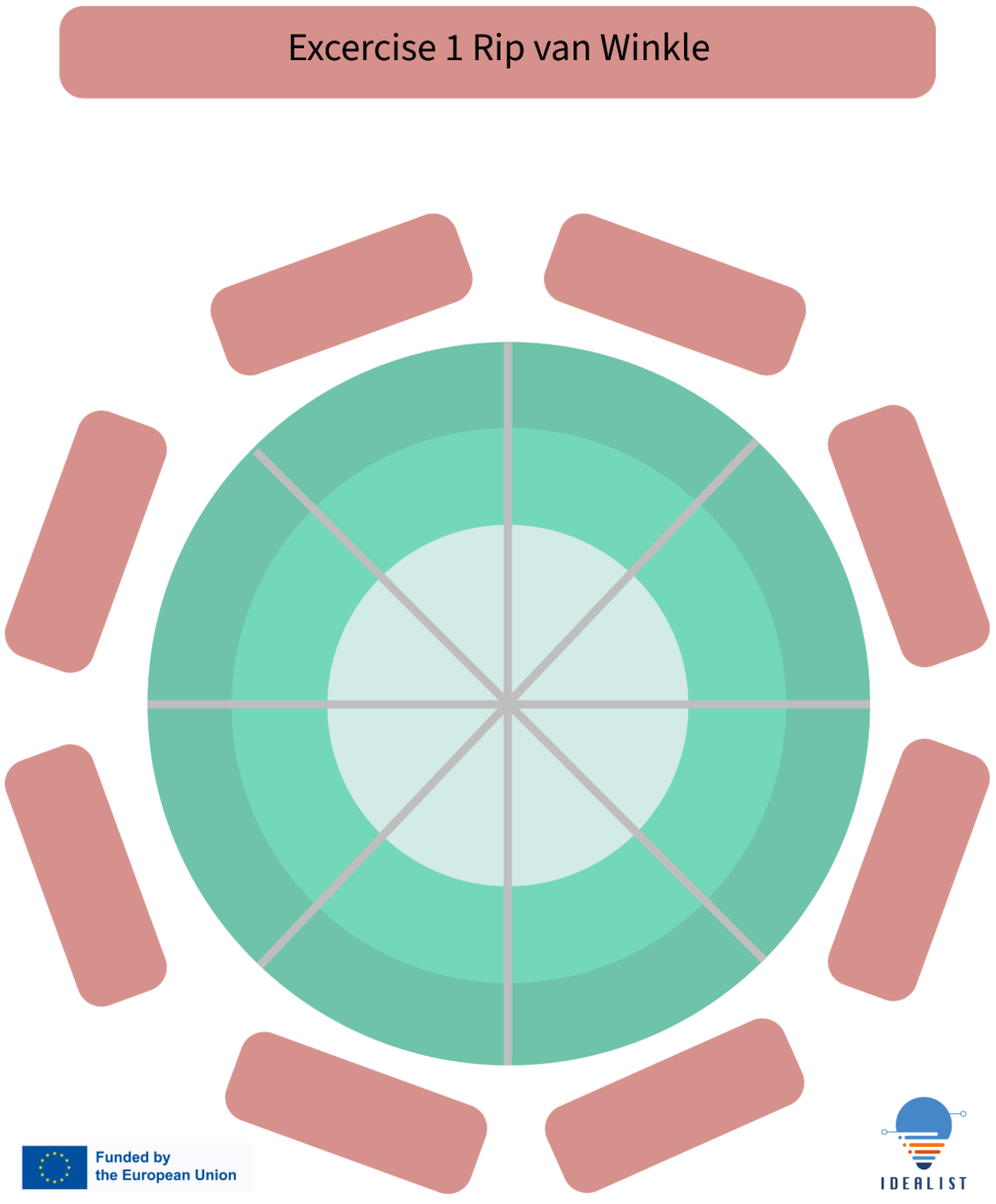
Annex 2: Clustering drivers template

Module / Exercise 1 Uncertainties and drivers part 2

Try to create clusters of similar questions to the person from the future. Be guided by thematic similarity or issue. Then try to name each cluster in such a way that its title sounds like a driver of change for the ecosystem in question (eg. topic: future of education, drivers of change: demographic shifts, regulation and government policies, performance metrics, teacher qualifications, global pandemic threat).



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Annex 3: Collecting signals template

Module / Exercise 2 Scanning and Collecting signals (Collecting signals)

Using the suggested guiding questions and information sources (or other reliable ones) collect the signals relevant to your ecosystem. Each person works independently using the template provided. You can write or draw to illustrate your signal idea. You can use pre-defined categories when ideating your signals. The categories include: society, technology, science, business, governance, habitat, Earth resources, etc.

General guiding questions

- What is new and emerging?
- What have I not heard anywhere else?
- Is no one talking about this yet?
- Does this challenge a commonly held assumption about the world or ecosystem?
- Are decision-makers and other stakeholders ready for this?
- Would this have interesting implications or consequences in fields beyond my own?
- What could be found only in one particular place but - when scaled could transform the ecosystem significantly?
- What is so unexpected that gives you an "a-ha!" moment when you come to notice it as a strange future of an ecosystem?

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Specific guiding questions:

- What new scientific or technological breakthroughs might be underway? Does this discovery break previous ways of doing things?
- What new intellectual ideas, beliefs, worldviews are emerging?
- How is a way of living/ culture starting to change?
- Are societal roles / models starting to change? How? Why?
- What are some emerging changes in relation to social media & Internet?
- Are consumption models starting to change? How? Why?
- Are there any emerging shifts in business models or the way we work?
- Are there any new emerging shifts in global norms, practices or regulations (e.g. related to trade, taxes, IP, environment)?

SOCIETY	**Signal 1:** *(Write down the name or draw the signal here)*	**Signal 2:** *(Write down the name or draw the signal here)*	**Signal 3:** *(Write down the name or draw the signal here)*	**Signal 4:** *(Write down the name or draw the signal here)*
TECHNOLOGY	**Signal 1:** *(Write down the name or draw the signal here)*	**Signal 2:** *(Write down the name or draw the signal here)*	**Signal 3:** *(Write down the name or draw the signal here)*	**Signal 4:** *(Write down the name or draw the signal here)*
SCIENC	**Signal 1:**	**Signal 2:**	**Signal 3:**	**Signal 4:**

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E	*(Write down the name or draw the signal here)*	*(Write down the name or draw the signal here)*	*(Write down the name or draw the signal here)*	*(Write down the name or draw the signal here)*
BUSINESS	**Signal 1:** *(Write down the name or draw the signal here)*	**Signal 2:** *(Write down the name or draw the signal here)*	**Signal 3:** *(Write down the name or draw the signal here)*	**Signal 4:** *(Write down the name or draw the signal here)*
GOVERNANCE	**Signal 1:** *(Write down the name or draw the signal here)*	**Signal 2:** *(Write down the name or draw the signal here)*	**Signal 3:** *(Write down the name or draw the signal here)*	**Signal 4:** *(Write down the name or draw the signal here)*
HABITAT	**Signal 1:**	**Signal 2:**	**Signal 3:**	**Signal 4:**

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	(Write down the name or draw the signal here)	*(Write down the name or draw the signal here)*	*(Write down the name or draw the signal here)*	*(Write down the name or draw the signal here)*
EARTH RESOURCES	**Signal 1:** *(Write down the name or draw the signal here)*	**Signal 2:** *(Write down the name or draw the signal here)*	**Signal 3:** *(Write down the name or draw the signal here)*	**Signal 4:** *(Write down the name or draw the signal here)*
OTHER	**Signal 1:** *(Write down the name or draw the signal here)*	**Signal 2:** *(Write down the name or draw the signal here)*	**Signal 3:** *(Write down the name or draw the signal here)*	**Signal 4:** *(Write down the name or draw the signal here)*

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Signal 1: *(Write down the name or draw the signal here)*	**Signal 2:** *(Write down the name or draw the signal here)*	**Signal 3:** *(Write down the name or draw the signal here)*	**Signal 4:** *(Write down the name or draw the signal here)*
Signal 5: *(Write down the name or draw the signal here)*	**Signal 6:** *(Write down the name or draw the signal here)*	**Signal 7:** *(Write down the name or draw the signal here)*	**Signal 8:** *(Write down the name or draw the signal here)*
Signal 9: *(Write down the name or draw the signal here)*	**Signal 10:** *(Write down the name or draw the signal here)*	**Signal 11:** *(Write down the name or draw the signal here)*	**Signal 12:** *(Write down the name or draw the signal here)*

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Recommended information sources for collecting signals

1. ESPAS: https://espas.eu/horizon.html
2. European Commission, Critical materials for strategic technologies and sectors in the EU - a foresight study, 2020: https://rmis.jrc.ec.europa.eu/uploads/CRMs_for_Strategic_Technologies_and_Sectors_in_the_EU_2020.pdf
3. European Commission, Joint Research Centre, Muench, S., Stoermer, E., Jensen, K. et al., Towards a green & digital future – Key requirements for successful twin transitions in the European Union, Publications Office of the European Union, 2022, https://data.europa.eu/doi/10.2760/977331: https://op.europa.eu/en/publication-detail/-/publication/58c3af16-f692-11ec-b976-01aa75ed71a1
4. European Commission, Directorate-General for Research and Innovation, Scaling up innovative technologies for climate neutrality – Mapping of EU demonstration projects in energy-intensive industries, Publications Office of the European Union, 2023, https://data.europa.eu/doi/10.2777/926968: https://op.europa.eu/en/publication-detail/-/publication/2f1ec1d2-1173-11ee-b12e-01aa75ed71a1
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6. Frontiers: https://www.frontiersin.org/
7. Futurism: https://futurism.com/
8. Migali S., Natale F., – (eds.), *Population exposure and migrations linked to climate change in Africa*, EUR 30881 EN, Publications Office of the European Union, Luxembourg, 2021, ISBN 978-92-76-43305-7, doi:10.2760/77546, JRC126594: https://drive.google.com/file/d/1nmI0fu4LeWn51Lq_6eCU0zaSQfX7SM0T/view
9. Millennium Project: https://www.millennium-project.org/scanning/
10. MIT Technology Review: https://www.technologyreview.com/
11. Monitoring European industrial ecosystems. Conceptual, Monitoring and Indicator Framework: https://monitor-industrial-ecosystems.ec.europa.eu/sites/default/files/2023-12/EMI%20Methodological%20Report.pdf
12. New Scientist: https://www.newscientist.com/
13. OpenAIRE: https://www.openaire.eu/
14. Quantumrun: https://quantumrun.substack.com/
15. SciTech Daily: https://scitechdaily.com/
16. Singularity Hub: https://singularityhub.com/
17. Strategic dependencies and capacities: https://commission.europa.eu/system/files/2021-05/swd-strategic-dependencies-capacities_en.pdf
18. Technology: https://www.technology.org/
19. UNDP (2023). UNDP Signals Spotlight 2023. New York, New York: https://www.undp.org/future-development/signals-spotlight/publications/undp-signals-spotlight-2023-insights-undps-futures-network
20. Visual network map of MegaTrends to 2050: https://rossdawson.com/visual-network-map-megatrends-2050/
21. Wired: https://www.wired.com/

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Annex 4: Describing signals template

Module / Exercise 3 Assessing signals & map of drivers part 1 (Describing signals)

Instructions

From the group of signals identified in the previous exercise, select 5 (maximum 6) that you consider to be the most relevant for the future of your ecosystem. List each signal in the appropriate metrics table. Fill in all the fields in the table with relevant information answering to questions provided in the table. Work individually or as a group when describing each signal.

Template to work in

SIGNAL I						
TITLE	SOURCE (LINK)	DESCRIPTION	HOW CAN IT CHANGE OUR OPTICS?	HOW CAN IT CHANGE THE ECOSYSTEM?	IMPACT	EARLIEST TIME TO MAINSTREAM
Short name of a signal	Link - title of publication, event, page, photo, personal intuition	What?	How does it change our perception of the future of the ecosystem? • "It shifts attention towards ..." • "It underlines the importance of ..." • "It brings a new element to the discussion about ..." • 'It facilitiates the understanding of the potential change"	• What impact does a signal have on the elements of the cosystem? • Think of various technological, economic, societal, environmental impacts	Impact on a scale -5 to +5 Individual assesment of the author of the signal	The minimal amount of time needed to the mainstreaming of a signal. The moment of mainstreaming is defined as the time when the signal is the most impactful on the system
Opportunities						
Risks						
Challenges						

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Next step:

After you describe all the selected signals, move to the next exercise, in which you will be giving numerical assessments in terms of:

- the positive or negative impact of each signal on your ecosystem (on a scale from -5 to 5, where -5 indicates an extremely unfavorable impact, and 5 indicates an extremely favorable impact) and
- the Earliest Time to Mainstream (ETM, that is the minimum time needed for the signal to mature and be the most impactful on the ecosystem; on a scale from 2 to 20 years).

Open or print out a relevant template to proceed.

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Annex 5: Gsheet for signals assessment

Follow the instruction tab to guide participants through the activity. Downloadable from the IDEALIST project website: GSheet Horizon Scanning Training Idealist

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Annex 6: Map of drivers template

Module / Exercise 3 Assessing signals & map of drivers part 3 (Map of Drivers)

1. Transfer the names of the signals developed in the metrics to the appropriate dot. In the next step you will find instructions for selecting the size and colour of the dot.

2. Select the appropriate dot for the signal, guided by the estimated level of impact recorded in the metric, and then write the title of that signal in the middle.

- If the impact of a particular signal has been assessed at a value within the - 5 >= -3 range, then select the large red dot and enter the signal name in its centre.
- If the impact of a particular signal has been assessed at a value within the - 2.9 >= -1.1 range, then select the small red dot and enter the signal name in its centre.
- If the impact of a particular signal has been assessed at a value within the - 1 >= 1 range, then select the small yellow dot and enter the signal name in its centre.
- If the impact of a particular signal has been assessed at a value within the 1.1 >= 2.9 range, then select the small green dot and enter the signal name in its centre.
- If the impact of a particular signal has been assessed at a value within the 3 >= 5 range, then select the big green dot and enter the signal name in its centre.

3. In the next step, make a decision on which driver of change (within a given industrial ecosystem) to assign the signal to.

4. Place the signal dot at the appropriate distance from the centre of the circle, guided by the ETM (Earliest Time to Mainstream) rating. The closer you are to the centre of the circle, the shorter the time to "mainstreaming" a given signal. As a guide, assume that the field closest to the centre of the circle is 2-5 years, the intermediate field is 6-10 years and the outermost field is 11 to 20 years.

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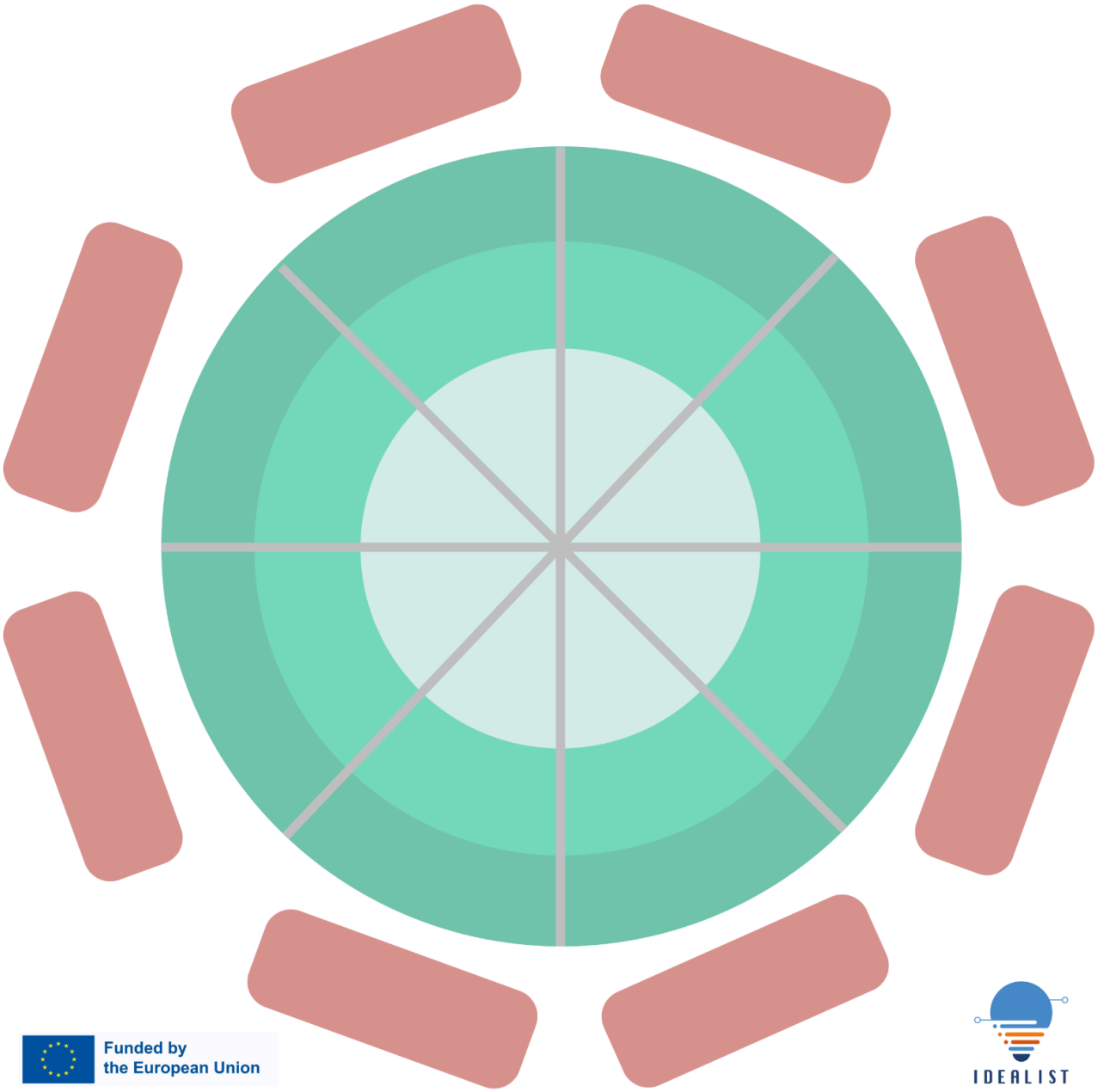
Excercise 3 Map of drivers



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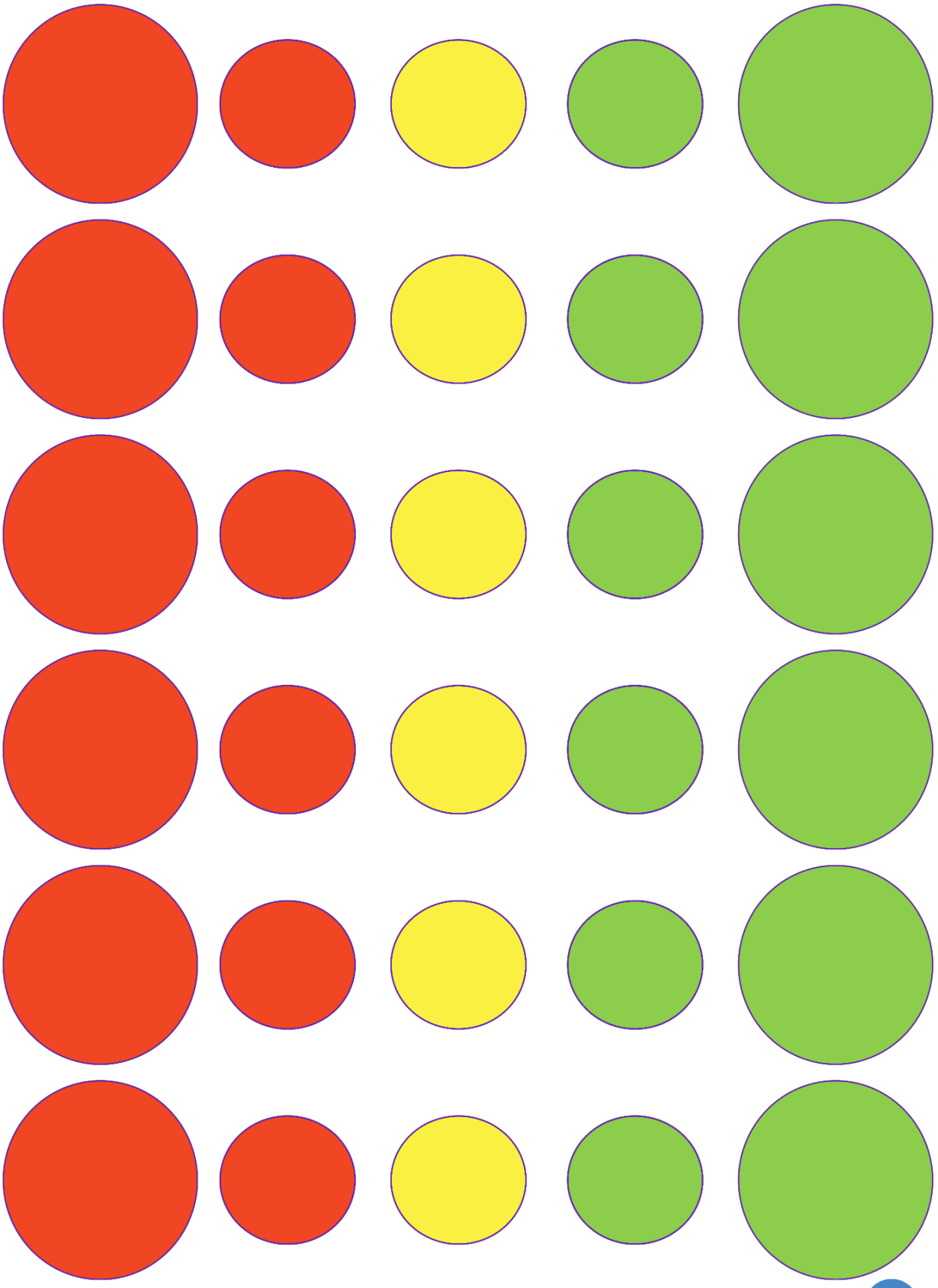

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Annex 7: Sense-making template

Module / Exercise 4 Sense - making

How to use collected signals in daily practice

Select one signal, which you would like to work with and - write down its name into a given space in the template below.

In the next step, write down key impacts of this signal from the metric (output of Module / Exercise 2 Scanning and Collecting signals part 2 Describing signals) into a given space in the template below.

Answer 3 main questions about the ways on how your cluster or your company could adapt, optimize and prepare for the signals' implications. Think of the resources or processes it would need today.

What if a signal's future implications are not happening in the 2040s or 2030s; they are happening today...

Question 1: What would be your (cluster's/SMEs') first decision/action to adapt?

Question 2: What do your company/cluster already have that could be optimised to meet the implications of the signal?

Question 3: What do you wish your company/cluster already had in place that it doesn't have today?

Answer the questions taking into account the following categories: people, technologies, knowledge, processes, networks, rules, vision, mission, values.

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SIGNAL: *(Write down the name of the signal here)*	IMPACT 1: *(Write down the impact of the signal here)*	IMPACT 2: *(Write down the impact of the signal here)*	IMPACT 3: *(Write down the impact of the signal here)*	IMPACT 4: *(Write down the impact of the signal here)*
PEOPLE What are the current capabilities and strengths of your workforce? What additional skills or personnel are required to address the challenges posed by the anticipated impacts of the signal? Are there specific areas where you would need to recruit more staff or build capacity? What training programs or professional development initiatives should be implemented to build necessary skills?				
TOOLS & TECHNOLOGIES How effective are - the tools and technologies that your cluster/company currently uses - in supporting your strategic objectives? What new tools or technologies are required to address the future impacts of the signal? Are there gaps in your technological infrastructure that need to be addressed?				

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What investments should be made to upgrade existing technologies? Should you adopt some specific new technologies? Which exactly?				
KNOWLEDGE What knowledge and expertise has your cluster/company already got? What new knowledge areas need to be developed to respond effectively to the anticipated impacts of the signal? Are there gaps in your current knowledge base that need to be addressed? What initiatives can be taken to enhance knowledge sharing and collaboration? Should you invest in specific research projects or collaborations with other institutions? Which institutions?				
PROCESSES What processes and workflows are currently in place in your cluster/				

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company? How efficient and effective are they in achieving your strategic objectives? What process improvements are needed to respond effectively to the anticipated impacts of the signal? Are there specific processes that need to be redesigned or optimised? Should you implement new processes? What would they be? What strategies can be employed to ensure process improvements are sustainable?				
NETWORKS What existing partnerships and networks does your cluster/company currently rely on? How effective are these networks in supporting your strategic goals? What new partnerships or networks are needed to address the anticipated impacts of the signal effectively? Are there gaps in your current network that could hinder				

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your response to these impacts? How can you leverage existing networks to build new, strategic alliances?				
RULES What rules and policies currently govern operations of your cluster/ company? How effective are these in enabling the organisation to meet its strategic goals? Are there existing rules that may hinder your response to the impacts of this signal? What new rules or policies are needed to address the anticipated impacts of the signal? How can you ensure new policies are effectively communicated and implemented?				
ViSION, MISSION AND VALUES Would your vision still be relevant in the face of the anticipated impacts of the signal? Would your mission still be relevant in the face of the				

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anticipated impacts of the signal? What adjustments to vision or mission should be made to enhance flexibility and responsiveness to the anticipated impacts of the signal? How can you ensure that the values remain aligned with your mission, vision, and goals, while also adapting to changing circumstances and remaining relevant in a dynamic environment?				

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