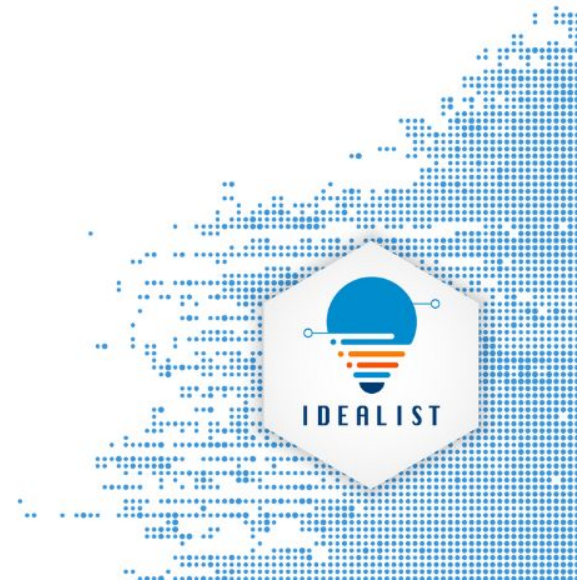# Horizon Scanning: theory & practice

IDEALIST

Before you begin

The following slides contain a presentation that can be used during the workshop after removing the annotations marked "instructions". In addition, the presentation contains slides with a bluish background, which should be hidden, as they are an aid to facilitators.
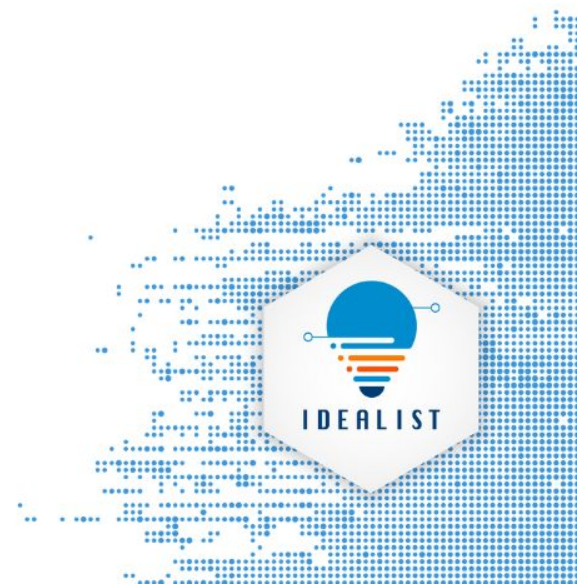
Warm-up: artifacts from the future

You are welcome to carry out the following exercise with the participants as a warm-up.

- *The first picture shows an object from the past - a model of a telephone from the last century. Show it to participants and ask them to identify the object. Collect the answers and show the correct one.*
- *The next picture shows a contemporary model of a telephone. Ask participants to identify the object. Then ask them to imagine that they are living at the end of the last century, when telephones looked very different. Ask them to try to identify the object through this perspective. What might be the responses of a person from the past?*
- *The last picture shows a scene that is normal for people in 2050. Ask participants to identify what is happening in it and what the objects in the picture are used for.*
- *By doing this exercise, you will help participants to realise that the future may seem strange and unobvious at times, that it will be DIFFERENT from what we usually think.*

What's this?

CC BY-SA   https://digitaltmuseum.no/011025226998/mobiltelefon
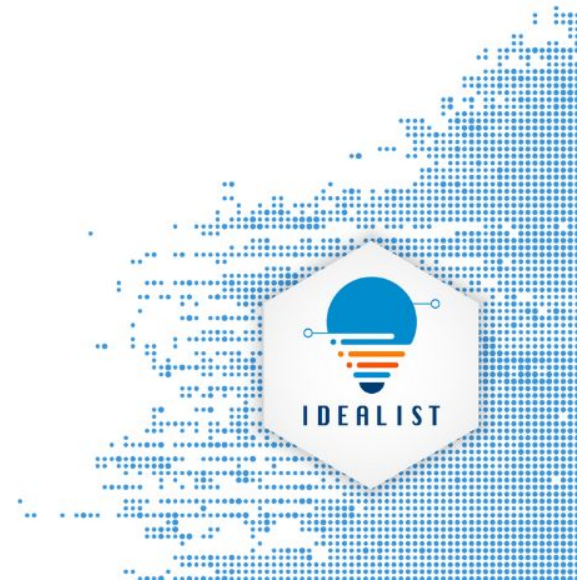
What's this?

CC BY-SA   https://digitaltmuseum.no/011025226998/mobiltelefon

30 years ago...

Motorola International 3200,
first digital hand-held

Introduced in 1992

½ - 1 hour talktime
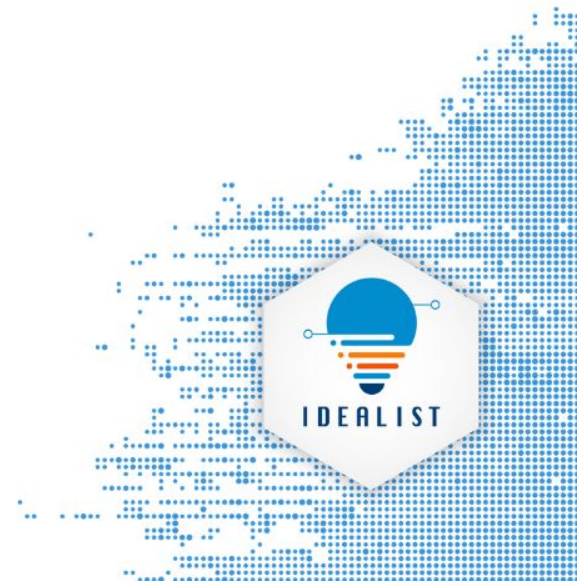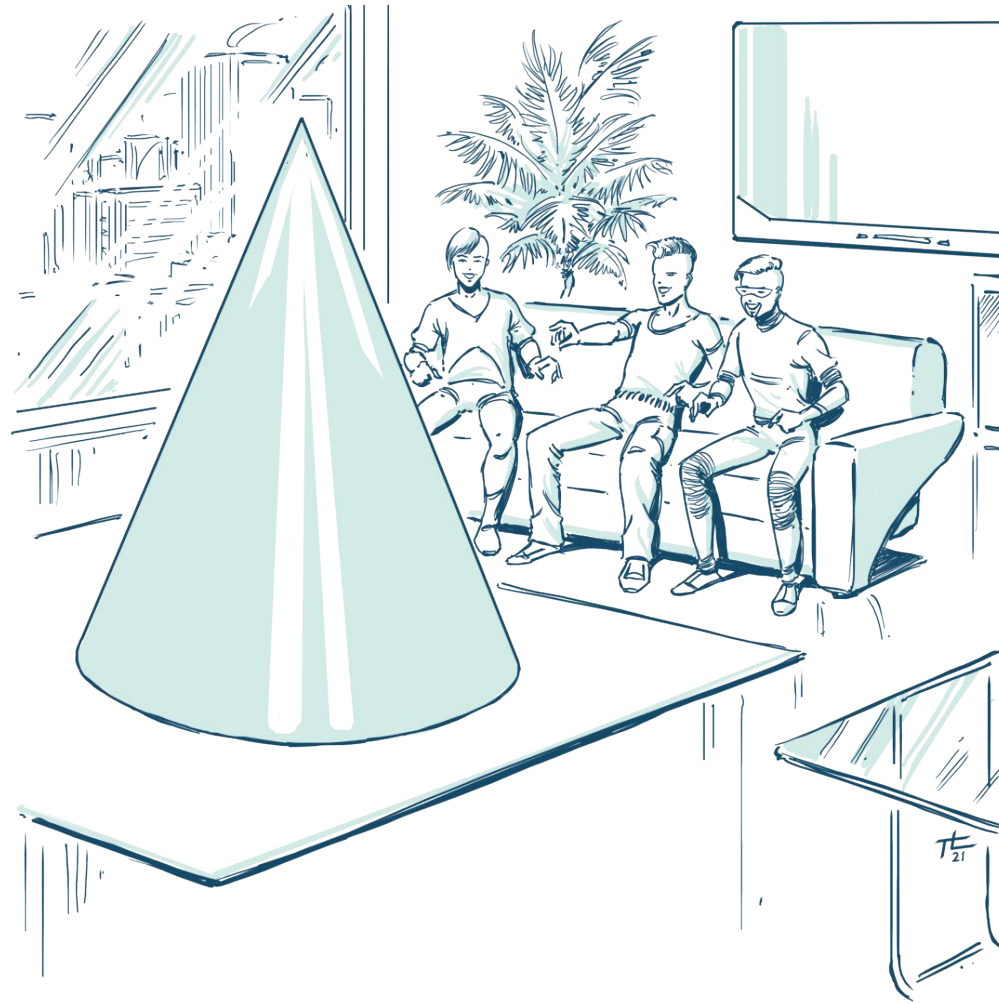
IDEALIST

What's this?

IDEALIST

What's this?

You're living in 1992.

Someone asks you to try to imagine that you're living 30 years into the future - in **2024**.

The photo shows a very common object in 2024.
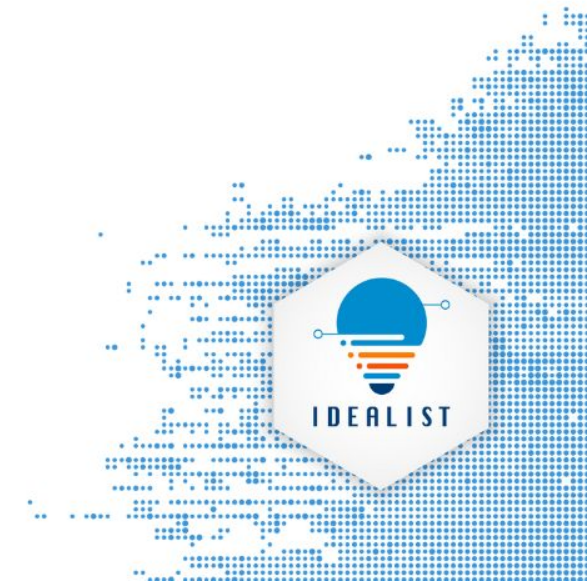What is it???

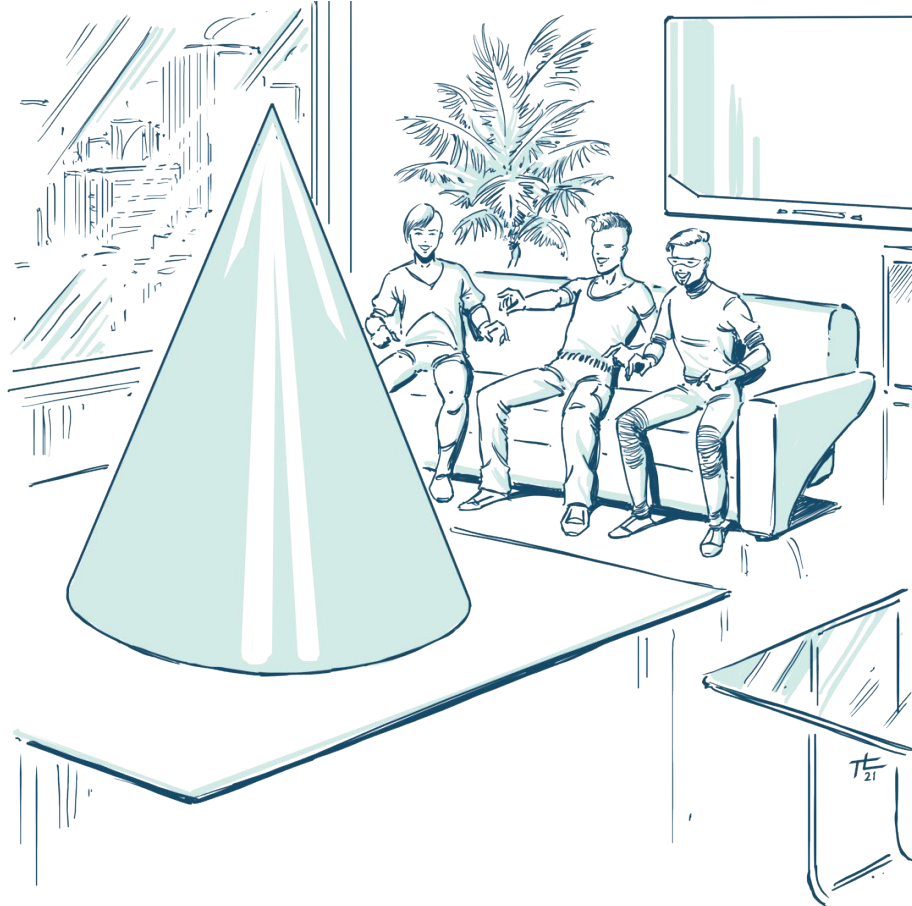IDEALIST

What's this?

What's this?

Imagine that you're living 26 years from now, in the **2050s**.

This is a very common scene in the 2050s.

What's happening here???

IDEALIST

The future will be......

The future will be……
DIFFERENT

Agenda

CONTEXT:

- Goals & flow of the workshop
- HS within the IDEALIST project
  - Participants
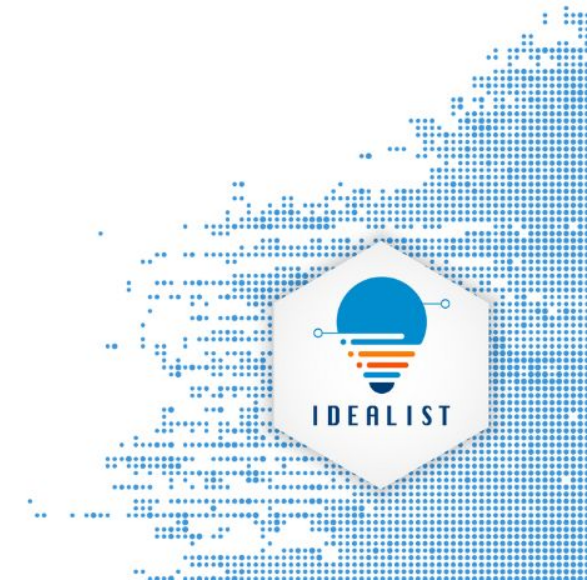 - Organisation of work
  - Expected results

THEORY:

- Introduction to foresight, futures literacy
- Introduction to Horizon Scanning

PRACTICE:

- Launching the group Horizon Scanning exercises

IDEALIST

Detailed flow of the group work

Instructions: This is a sample time schedule of activities. Adjust the hours to suit your conditions. Take into account the duration of each activity.

10:30-11:20 **Exercise 1 UNCERTAINTIES & DRIVERS** (in groups)

10 minutes break

11:30-12:00 Report-back (plenary)

12:00-13:00 **Exercise 2 COLLECTING SIGNALS** (in groups)

60 minutes lunch break

CERTIFICATE!

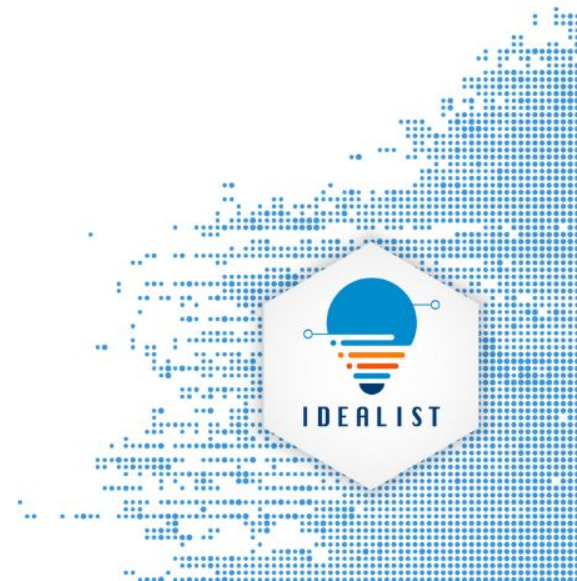14:00-15:50 **Exercise 3 ASSESSING SIGNALS & MAP OF DRIVERS** cont. (in groups)

10 minutes break

16:00-16:30 **Exercise 4 SENSE-MAKING** (in groups)

16:30-17:30 Report-back in plenary, summary, Q&A, Next steps, Evaluation form

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HS within IDEALIST: Expected results

- **A map of drivers and disruptors in three industrial ecosystems:**

  - Energy-intensive industries,

  - Aerospace and Defence,

  - Mobility, Transport & Automotive

- An increased understanding of the forces of changes that are shaping (local) industrial ecosystems, discerning critical or highly influential drivers from less influential ones.

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Introduction to Futures Literacy and foresight

Instruction: lead your audience through the explanations and check their understanding of the terms.

How to correctly think about the future?

- *The future is uncertain. Phenomena such as conflicts, crises, but also innovations and groundbreaking discoveries shatter people's ideas of security and confidence. Without visions of the future that inspire hope and encourage cooperation, we risk a slide toward disempowerment. By thinking about the future, on the other hand, we are able to make better informed decisions. We can shape our own future.*
- *When introducing the concept of foresight, it is important to understand the three premises upon which the considerations about the future rest.*

How to correctly think about the future?

- The future is **not predictable**. We are therefore forced to consider what the plausible futures are.

- The future is **not totally predetermined**. There is an infinite number of potential alternative futures, some of which may be more probable than others.

- To some extent, **future can be shaped** by our choices in the present. Even though we cannot determine which of the infinite possibilities for a future will eventuate, we can influence the probability of a certain outcome with our choices (both actions and indications) in the present.

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What is futures literacy?

Futures Literacy is not the ability to predict the future, instead, it refers to the capacity to diversify why and how we use futures. By futures we mean the ideas, images, conceptions and feelings we have about a time later than now (Richards et al 2020).

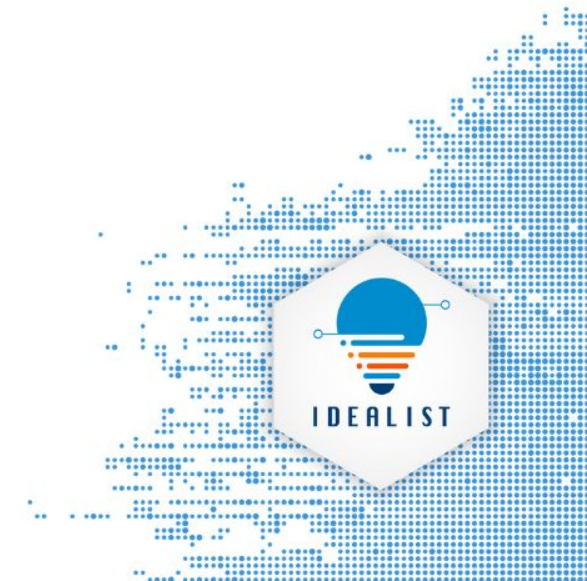*Futures Literacy calls for (Miller 2019):*
- *being conscious when we use futures;*
- *being reflective about the futures we use (our ideas, images, conceptions and sentiments about the future); and*
- *being able to switch between different types of futures (e.g. probable, desirable, strange, transformative etc).*

Summing up, a futures literate person can answer the question: "What is the possible future and how do I use it?" and has acquired the skills needed to decide why and how to introduce the non-existent future into the present decision-making.

Futures Literacy skill

AGENCY & EMPOWERMENT

USING THE FUTURE TO RETHINK THE PRESENT

FUTURES LITERACY

FOSTERING DIVERSE FUTURES
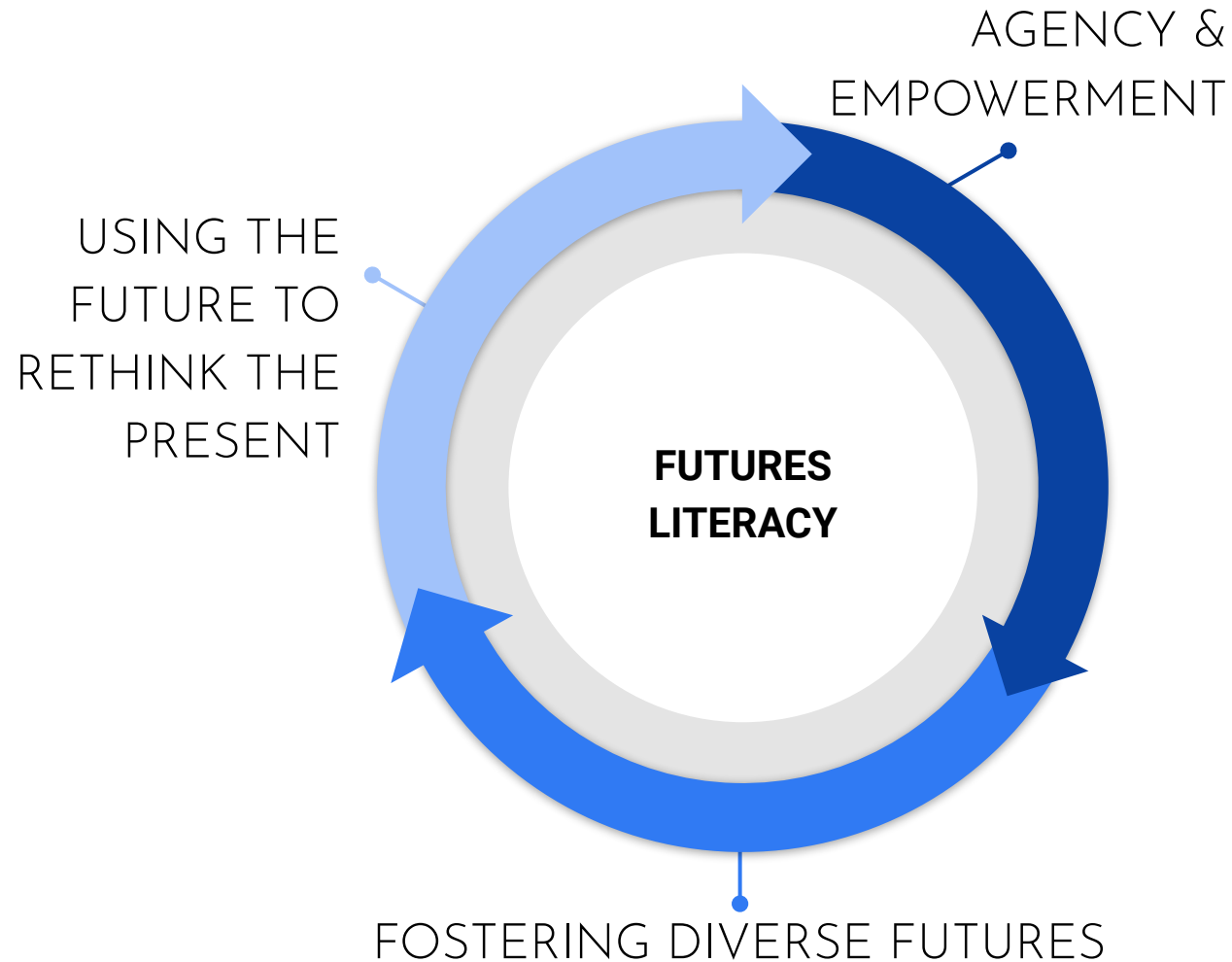
- **Futures Literacy** is a competency that allows people to better understand the role of the future in what they see and do.

- It is an individual skill, which can be enhanced in the methodological process, known as **foresight**.

- A Futures Literate person does not have the ability to predict the future

IDEALIST

How does Futures Literacy link to foresight?

Futures literacy is an individual skill, which can be enhanced in the methodological process, which is called foresight. Foresight is an intellectual and creative exercise designed to help decision-makers develop and make choices, challenge long-held beliefs and/or orthodoxies, focus their resources and attention, and prevent and anticipate certain developments.

What is foresight? 1/2

- **Foresight** is a process that enhances persons' or organisations' abilities to understand all the internal and external factors and alternative decisions that form the space of possible, plausible, probable or preferred futures paths.

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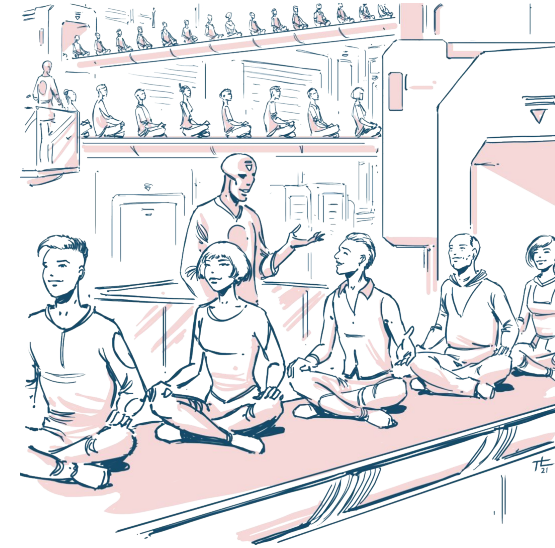
What is foresight? 2/2

- Thanks to such knowledge, persons and organisations are able to **identify issues that are of major importance for the future and the present**, they have a better understanding of what is relevant and what can be ignored, and they are better informed to make strategic and visionary decisions facilitating their long-term plans and objectives.

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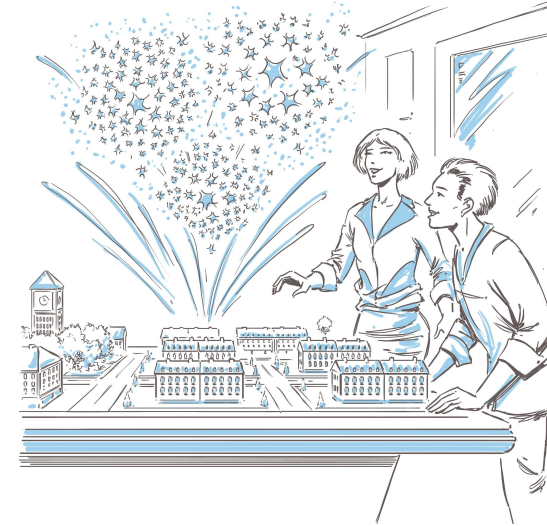
How does Futures Literacy link to (strategic) foresight?
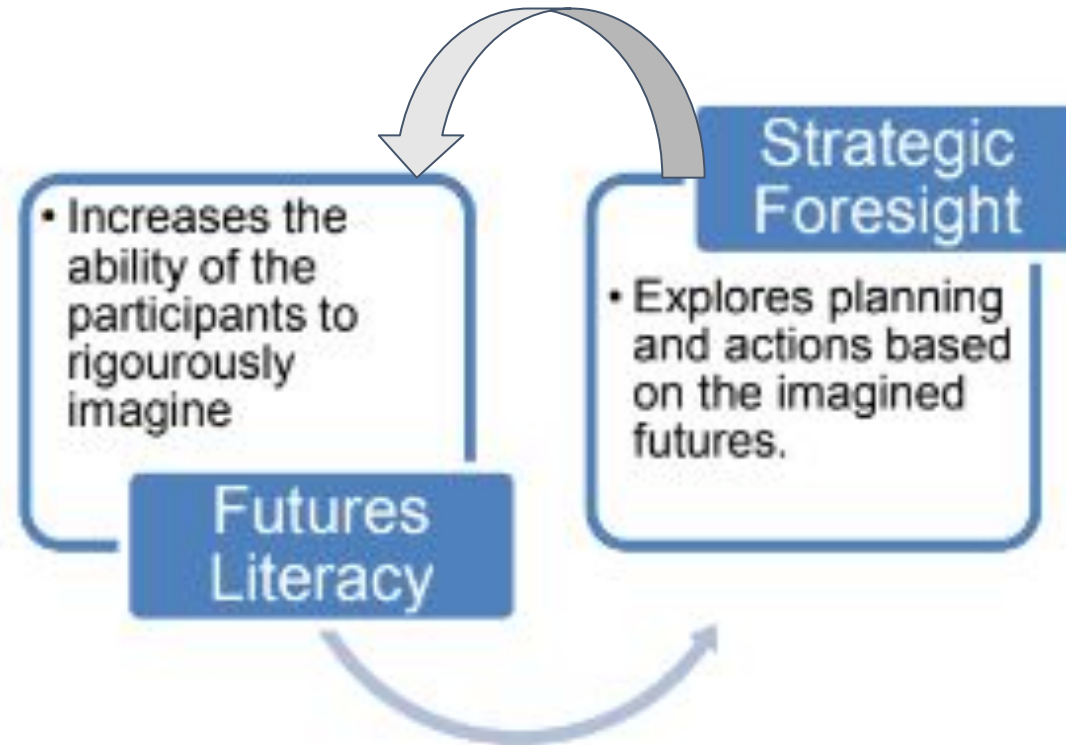

Source: OECD 2023
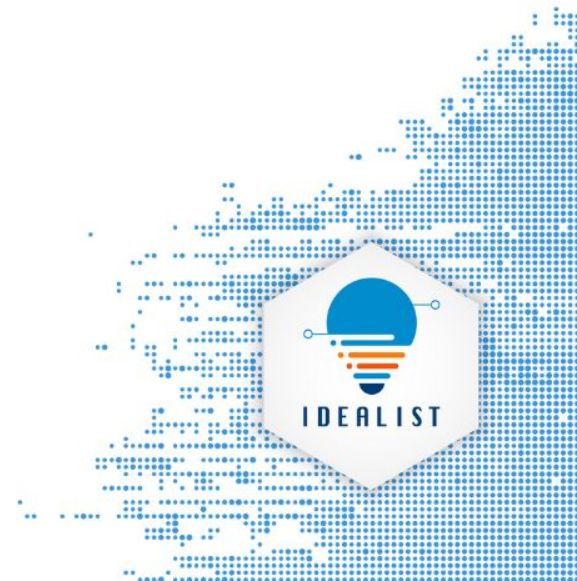
Forecast vs foresight

- *When we think about the future we tend to extrapolate past data assuming that current trends will continue.*
- *This assumption is incorrect because dynamics and uncertainty of the environment "produce" discontinuities, which disrupt trends.*
- *Many trend disruptions are possible, making way for many possible futures.*
  That is why in Futures Studies we do not forecast ONE future, but we anticipate MANY possible futures.

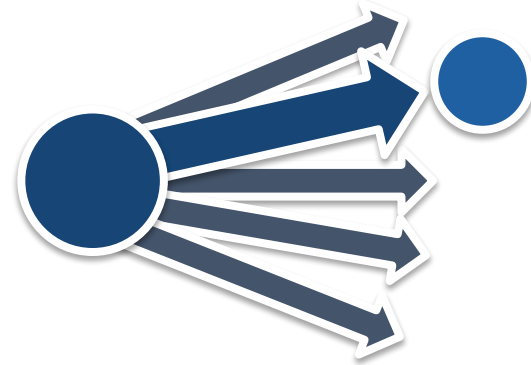# Foresight goes beyond forecasting
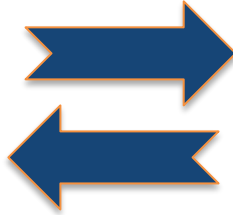
FORECAST ⇄ FORESIGHT

Input (data) => Output (Forecast)

Inputs (things happening)
=> Analysis => Interpretation => Forward looking
=> Outputs (Options/ Scenarios)

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IDEALIST

"

*"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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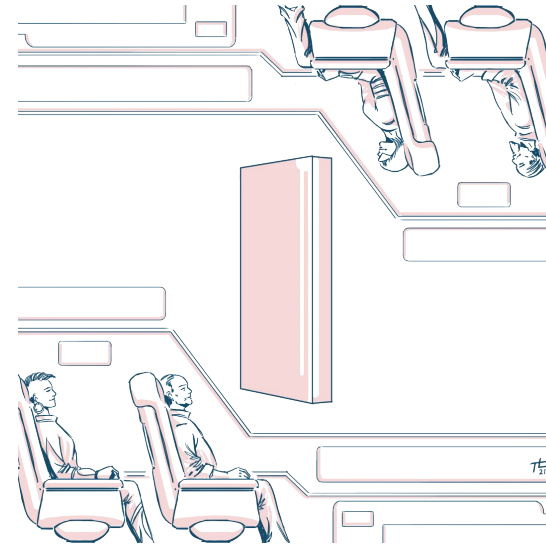
Unique value proposition of foresight 2/2

- 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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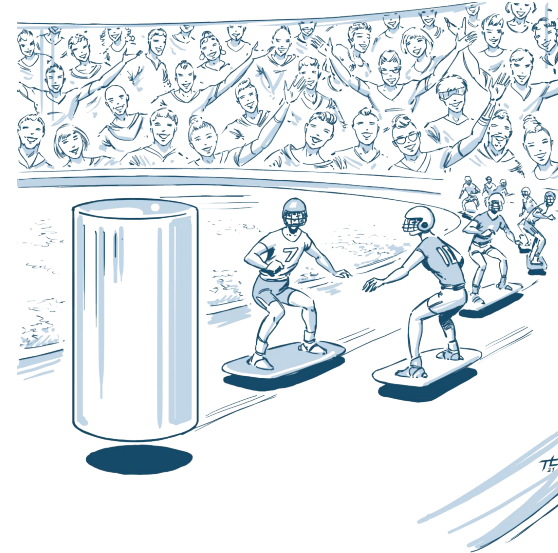
Group work principles

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.

IDEALIST

"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."
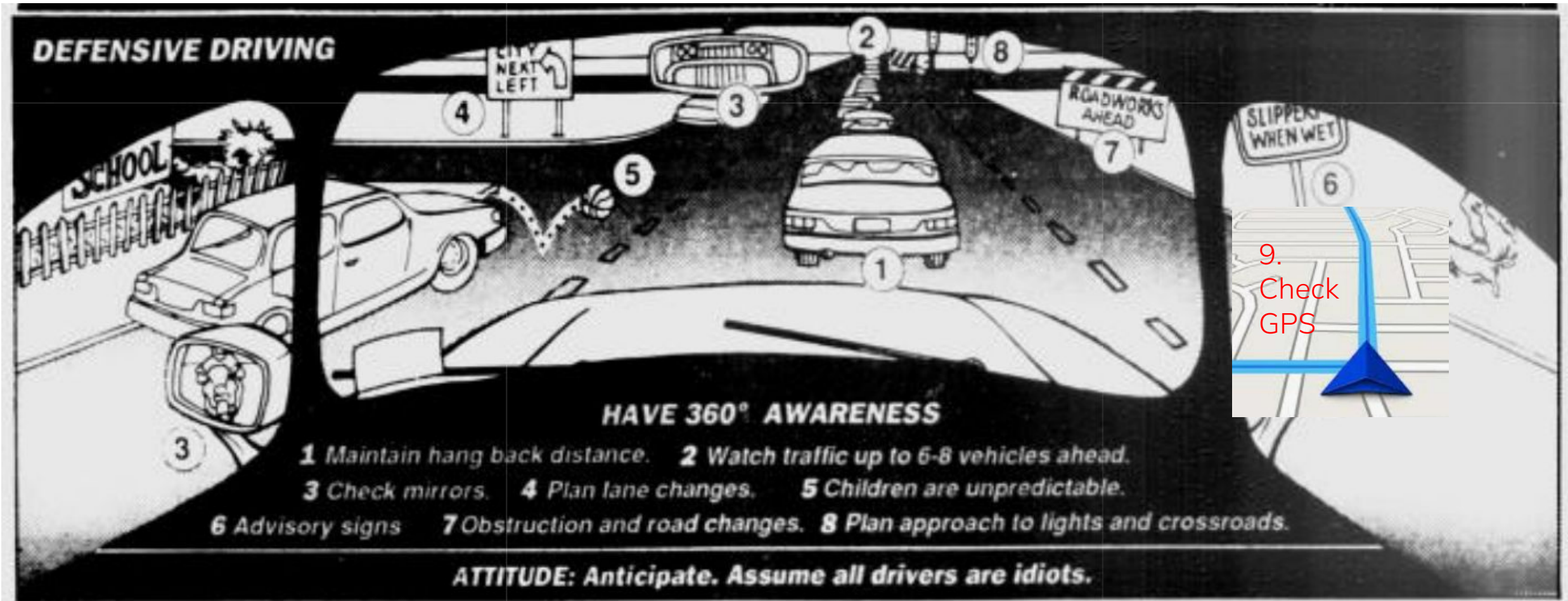
Pierre Wack (Shell)

Introduction to Horizon Scanning
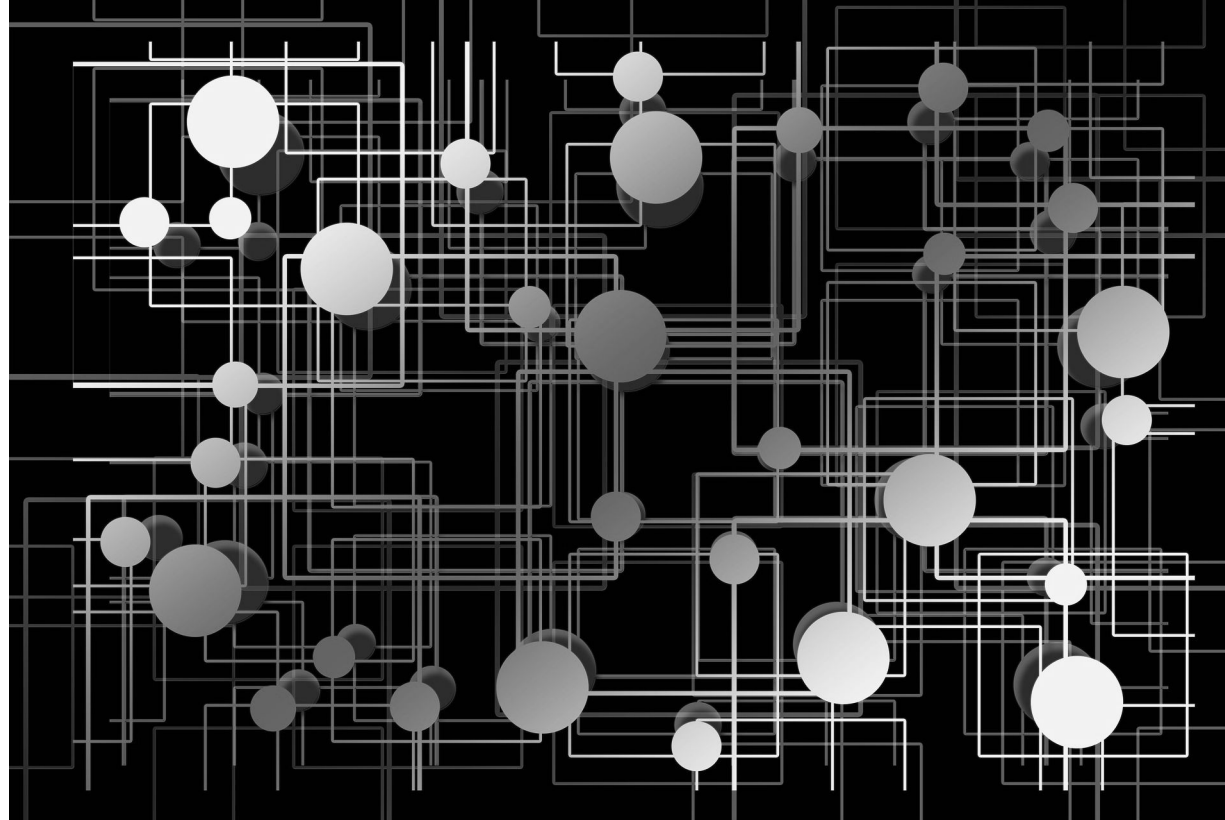
Part 1 - Plenary II

About Horizon Scanning

- *Horizon Scanning is the foundation of foresight. It involves a structured approach to identifying early indications of potentially significant developments. These may manifest as signals of new, emerging trends, unexpected events (wild cards), or persistent issues and risks, including factors that challenge established assumptions.*

- *Horizon Scanning can either be broad and exploratory, or focused and targeted based on the specific goals of projects or tasks. Its objective is to discern what remains stable, what might evolve, and what is in a state of continual flux within the timeframe being examined. Various criteria are applied during the process of searching and filtering information. The timeframe for analysis can range from short- to long-term perspectives.*

Horizon Scanning needed during periods of rapid change and uncertainty.

DEFENSIVE DRIVING

HAVE 360° AWARENESS

1 Maintain hang back distance. 2 Watch traffic up to 6-8 vehicles ahead.
3 Check mirrors. 4 Plan lane changes. 5 Children are unpredictable.
6 Advisory signs 7 Obstruction and road changes. 8 Plan approach to lights and crossroads.

ATTITUDE: Anticipate. Assume all drivers are idiots.

9. Check GPS

Key concepts: External & internal forces of the ecosystems

https://pixabay.com/illustrations/system-web-news-network-connection-2457648/

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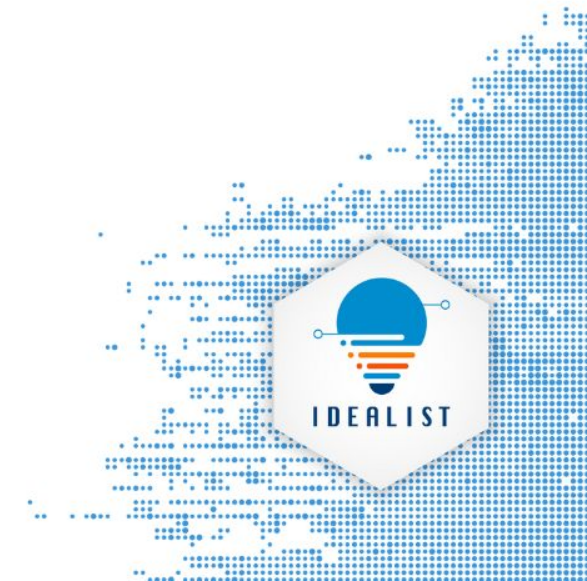
Key concepts: Generic foresight framework

INPUTS

Things happening

ANALYSIS/ INTERPRETATION

What is really happening?

FORWARD-LOOKING

What could happen?

OUTPUTS

What might we need to do?

STRATEGY/ POLICY

What will we do?.

HORIZON SCANNING
Trends, Drivers & Signals
(can be: political, economic, societal, technological, environmental, legal etc.)

Source: Voros 2003

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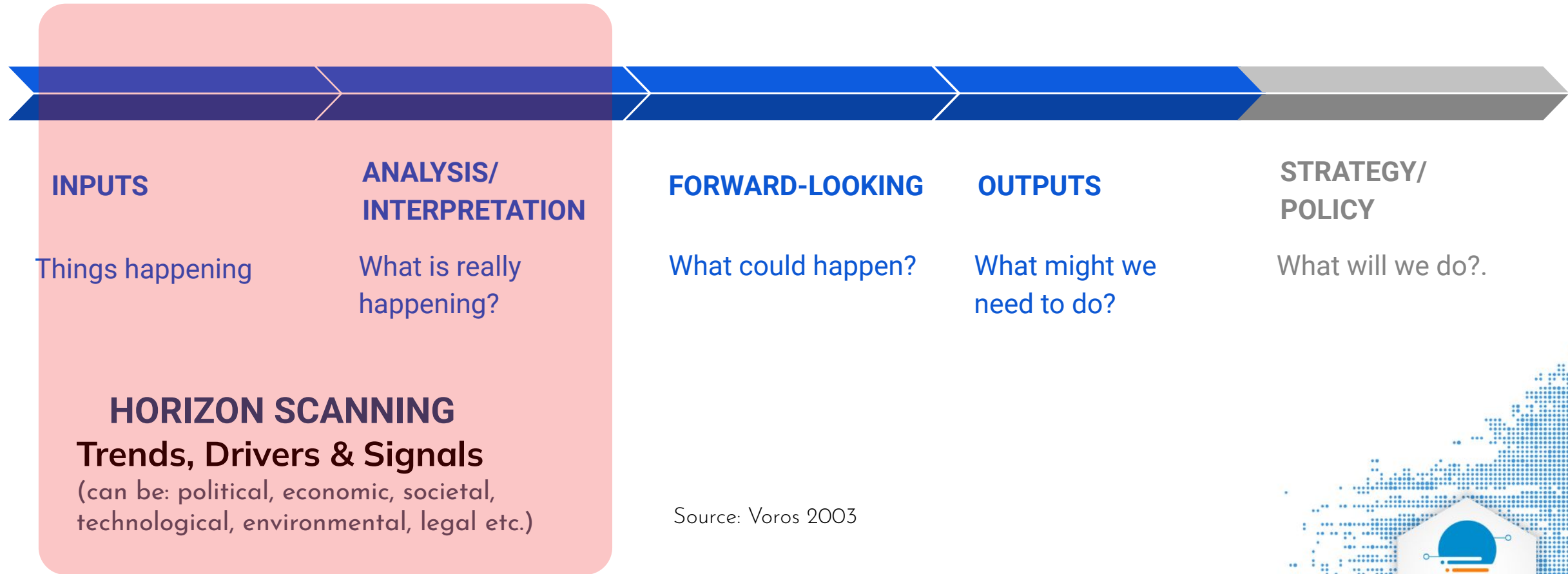
Key concepts: Horizon Scanning

- Thoughtful scanning is the **foundation** of foresight.
- **The objective** in scanning is to identify developments that could fundamentally change or disrupt the issue or system that we are studying in unexpected ways. The challenge is to look for early signs or weak signals that change is occurring.
- These changes can take **many forms**:
    - a new technology, economic restructuring, a famine, new values, new gender roles, new ideas, etc. The list is open ended. In the absence of data, weak signals are the evidence that disruptive change could be underway.

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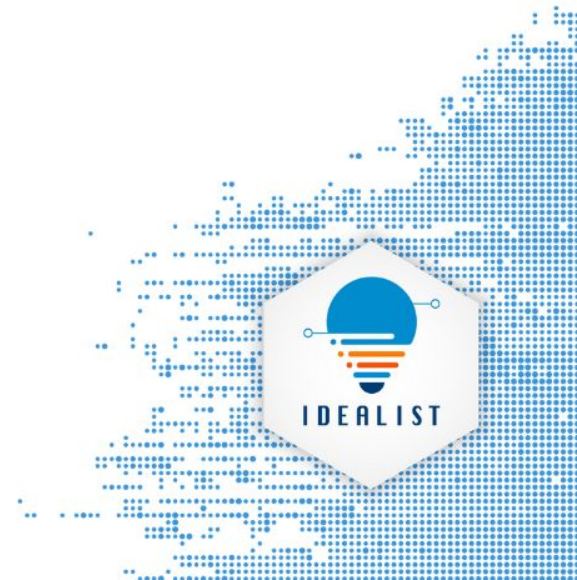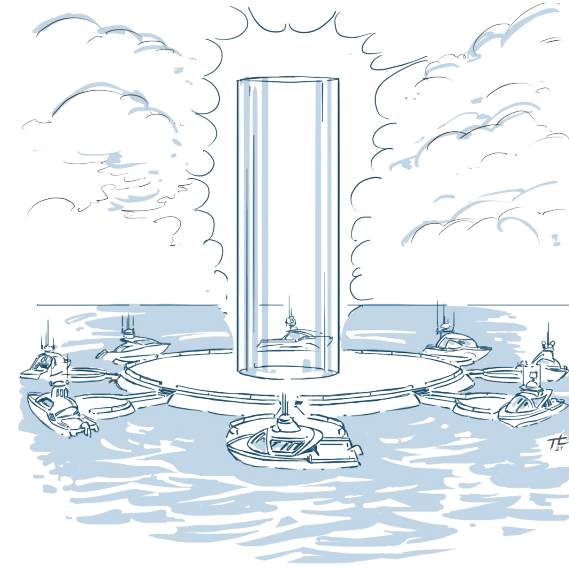
Key concepts of HS: Trends, drivers, signals

"Driver"
"Driver"
"Driver"
"Driver"

"Signal"
"Signal"
"Signal"
"Signal"

**Focus Group I
Aerospace
and Defence**

"Trend"
"Trend"
"Trend"
"Trend"

"Driver"
"Driver"
"Driver"
"Driver"

"Signal"
"Signal"
"Signal"
"Signal"

**Focus Group II
Energy Intensive
Industries**

"Trend"
"Trend"
"Trend"

"Driver"
"Driver"
"Driver"
"Driver"

"Signal"
"Signal"
"Signal"
"Signal"

**Focus Group III
Mobility, Transport,
Automotive**

"Trend"
"Trend"
"Trend"

IDEALIST

Key concepts: trend definition

Definition of a trend:

- A historical change over time (up until the present).

- Changes that are measurable/observable, which means that quantitative or qualitative data can be collected, which can illustrate the historical pattern.

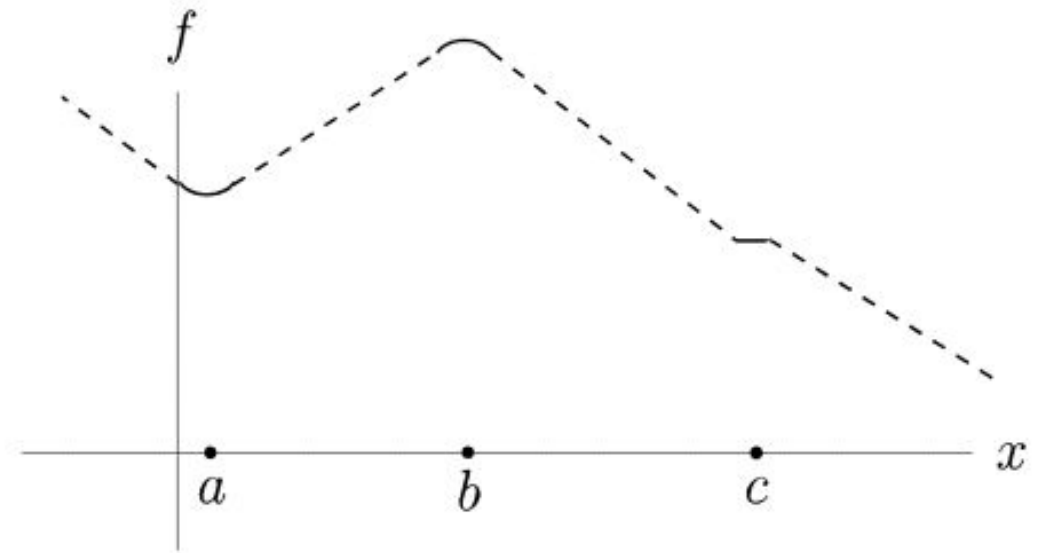- Indicate a clear direction of change and dynamics.

Based on: John Casti, Prosperity on the edge of crisis, 2017.

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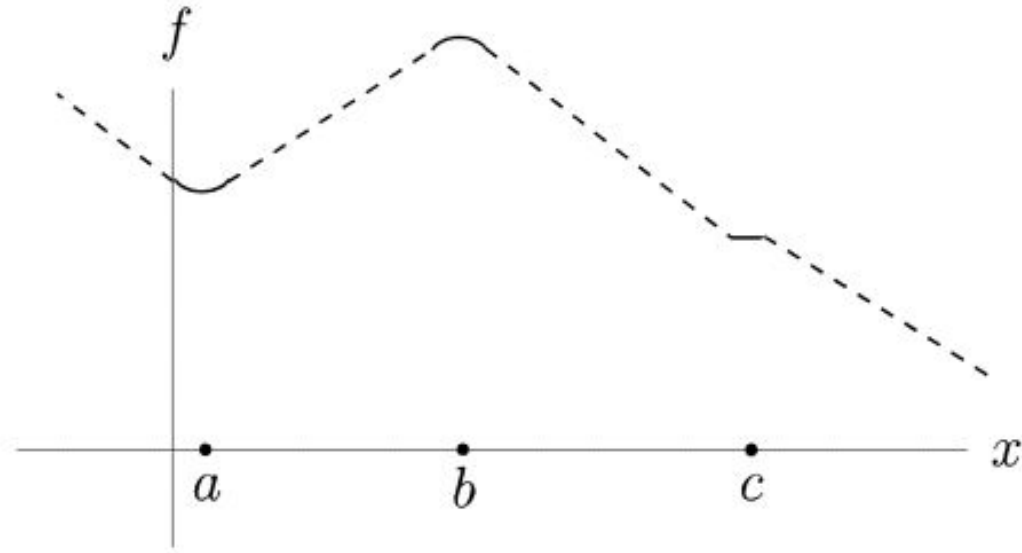
Key concepts: example trends

Examples of trends:

- Decline in enrollment in public schools

- Growing demand for specialized skills

- Widening economic inequalities

Based on: John Casti, Prosperity on the edge of crisis, 2017.

Topic:

▷ **FUTURE OF EDUCATION**

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Key concepts: driver definition

Definition of a driver:

- Influential forces of changes that are currently shaping or have the capacity to shape or transform a given system.
- Variables that can take on different states and thus affect a system in many ways.
- They are often called uncertainties.
- A specific type of driver is a wild card event (e.g. war)
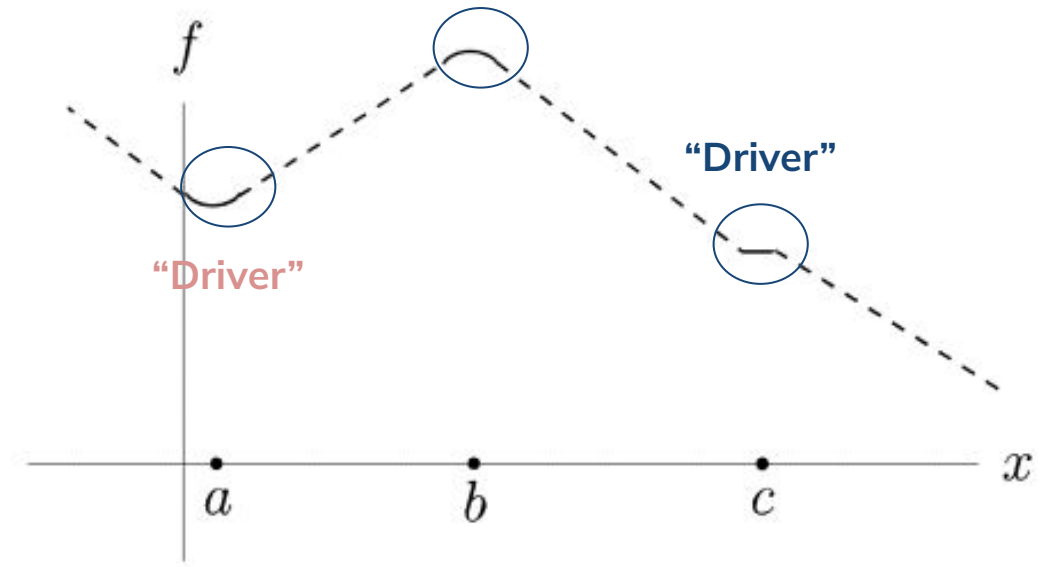
Based on: John Casti, Prosperity on the edge of crisis, 2017.
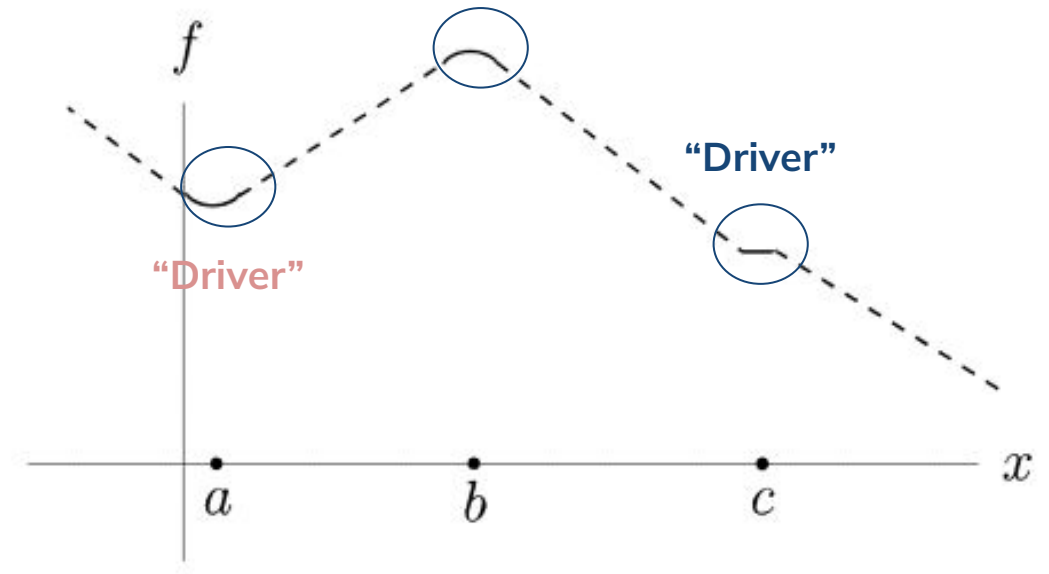
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the European Union

IDEALIST

Key concepts: driver examples

"Drivers" = human action, chance, necessity, random trigger

Examples of drivers:

- Demographic shifts
- Regulation and government policies
- Performance metrics
- Teacher qualifications

- Global pandemic threat

Based on: John Casti, Prosperity on the edge of crisis, 2017.

Topic:
▷ **FUTURE OF EDUCATION**

IDEALIST

Methodological process of Horizon Scanning

1. Identify and frame the scanning **needs** (topic, participants, expected outcome)

2. Scanning and collecting data: collect relevant **information** about the external environment

3. Interpretation and **filtering**: analyse, organise and prioritise the findings

4. **Sense-making**

5. **Communicating** the results

6. Use the information in **decision-making**
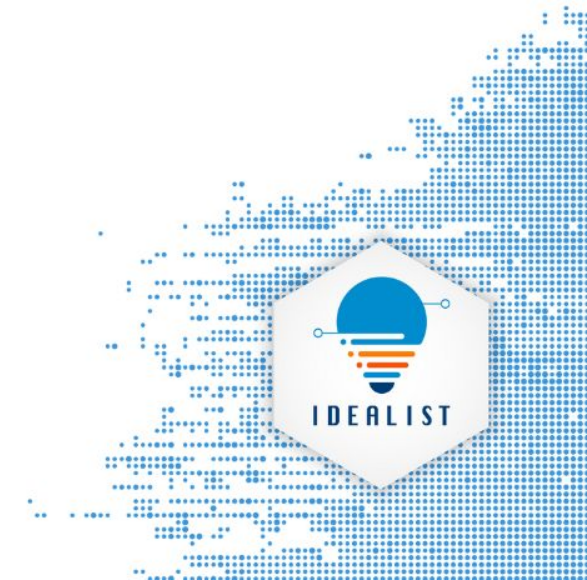
Identifying Uncertainties

Group work

Group Work

- *The following exercises should be carried out by dividing participants into subgroups (preferably linked to a corresponding ecosystem). Use the templates appended to ...*
- *In the following slides you will find instructions and an overview of how the results of the exercises are supposed to look like.*

Identifying Uncertainties (Rip van Winkle method) 1/2

- 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 the way each industrial ecosystem exists in 2040**

- Please choose your questions wisely to obtain valuable insights, which could support strategic decisions during the next 16 years

# Identifying Uncertainties (Rip van Winkle method) 2/2

- Each question must have **a yes or no answer** and none can be contingent on a previous question

- **Example**:

  - Correct phrasing: Is teleportation available in 2040?

  - Wrong phrasing: How many teleportation devices are there in the world in 2040?
    If any - how expensive is it to use one? (doesn't have a yes/no answer; contains contingency)
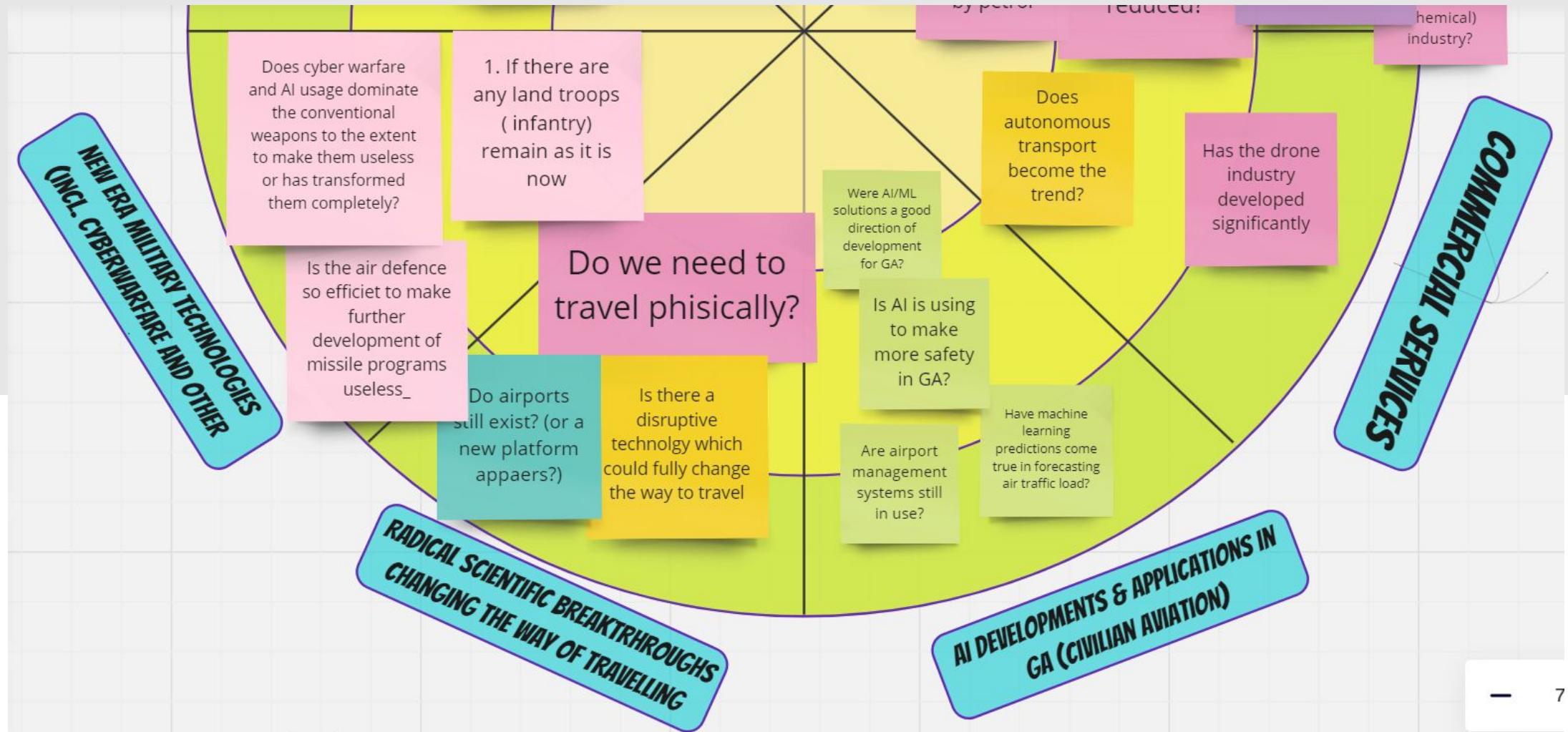
Clustering Uncertainties

- Now 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.

Clustered Uncertaint
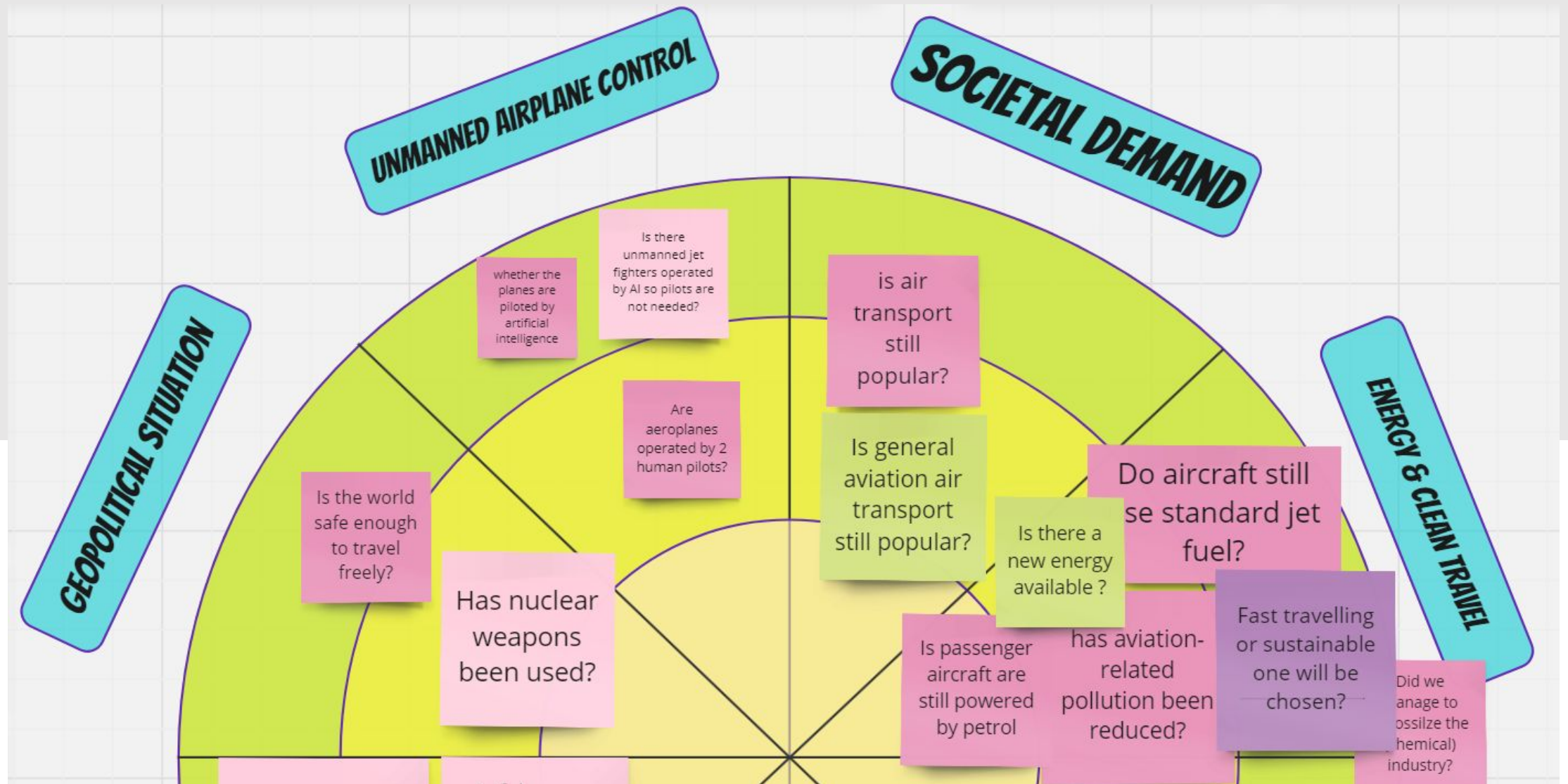
Clustered Uncertainties

Clusters of Uncertainties

Cluster 1: Societal Demand

- Is air transport still popular?
- Has aviation-related pollution been reduced?
- Is general aviation air transport still popular?
- Do we need to travel physically?

This cluster focuses on the demand for air travel and its impact on society.
The questions revolve around
the popularity of air transport, efforts
to reduce aviation-related pollution,
the future of general aviation,
and the necessity of physical travel.

Cluster 2: Energy & Clean Travel

- Do aircraft still use standard jet fuel?
- Did we manage to defossilize the (chemical) industry?
- Is passenger aircraft still powered by petrol?
- Is there a new energy available?

This cluster explores the use of energy in aviation and the transition towards cleaner alternatives. The questions address the use of standard jet fuel, efforts to decarbonize the industry, the power source for passenger aircraft, and the availability of new energy options.

Introduction to Horizon Scanning

Instructions: Walk participants through the following slides on Horizon Scanning, paying particular attention to understanding what characterises a good signal.

Part II - Plenary II

Key concepts: Horizon Scanning

- Scanning for weak signals must be distinguished from searching for information.
  - In searching, the research scope is fairly well defined, often based on an analyst's particular interests and expertise on a topic.
  - Scanning looks for new insights outside an analyst's existing mental model.
  - **In scanning, we do not necessarily know what we are looking for**, hence the scope is broad, often shedding light on previously uncharted unknowns.

IDEALIST
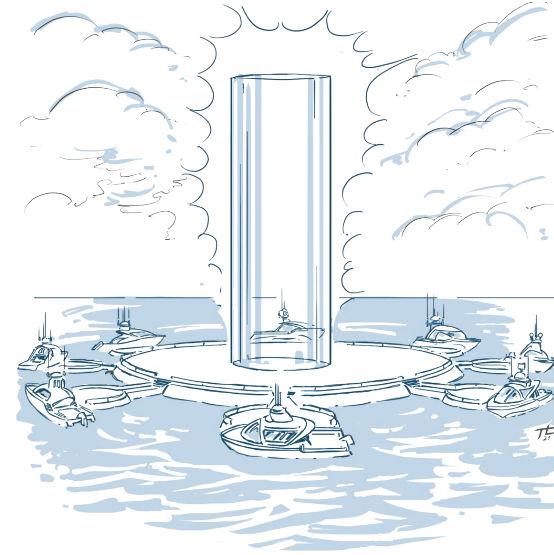
Key concepts: scanning guidelines

What shifts shall we look at:

"Signal"

- Shifting behaviors and preferences
- Shifting attention and narratives of key actors
- Shifts in business models, new models of collaboration etc.
- Scientific or technological advancements (nano-bio-cogno-info)
- Inefficiencies and gaps in systems or regulations
- ....

IDEALIST
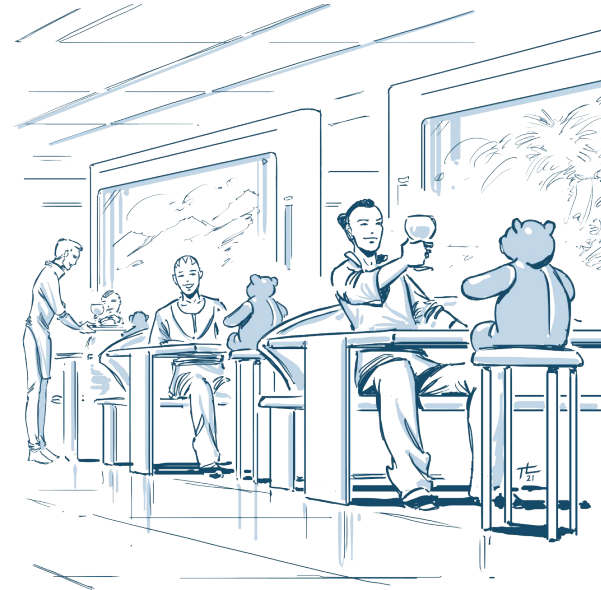
Key concepts: signal examples from the past

General signals that became a disruptive change:

- The rise of e-commerce platforms like Amazon disrupted traditional retail models
- Popularity of social media platforms like Facebook and Twitter in the early 2000s disrupted the way people communicate and share information
- The passage of GDPR in the EU in 2016
- The development of blockchain technology in the early 2010s, which challenged traditional financial systems
- The SARS and MERS outbreaks in the early 2000s

Signals that were a fad:

- 3D television

"Signal"

IDEALIST
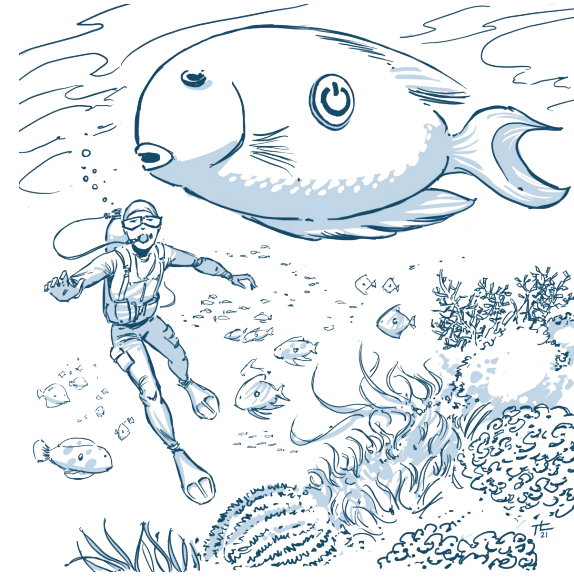
Key concepts: signal definition

- **Definition of a signal:**

- The evidence that disruptive change could be underway.
- For example: emerging technology, emerging trend, sign of new, potential wild-card (e.g. surprising localisation of a signal; surprising & revolutionary development, leap, disaster, social change)

"Signal"

IDEALIST
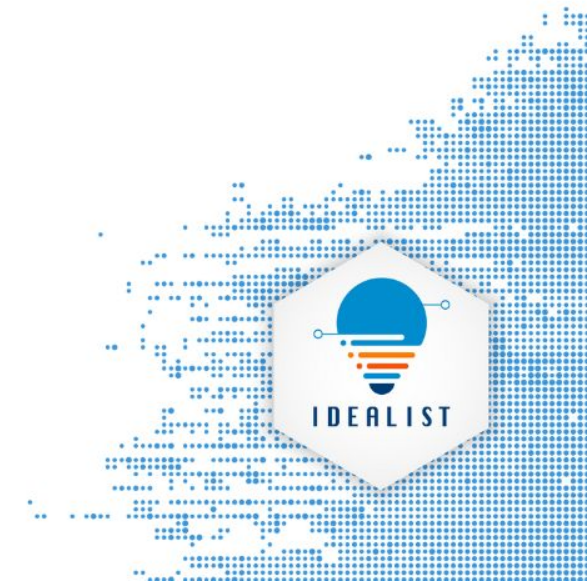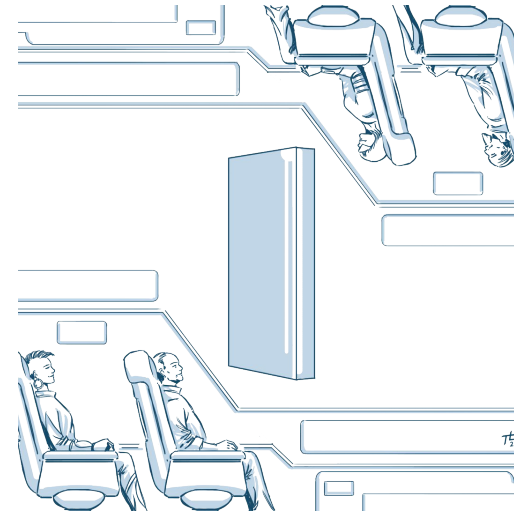
What makes a good signal? 1/2

- The ideal weak signal meets the following criteria:
- **PLAUSIBILITY** – there is some evidence that the change is occurring or could occur.
- **NOVELTY** – the change is new or relatively unknown to you and the stakeholders who would be affected by the potential consequences.
- **SIGNIFICANCE** – the consequences are significant. They might cause a very large disruption in one domain, or have broad consequences that affect several domains.
- **TIMELY** – this weak signal is relevant for the time period of interest. Depending on the timeframe of analysis one can be interested in potential consequences that could occur within 5-10-15-20-30 years.

IDEALIST

What makes a good signal? 2/2

What makes a good weak signal? Elina Hiltunen suggests a number of ways to recognize a good weak signal:

Makes me laugh

Seems unreal

Not much information about it

Strange/weird

Eureka moment!

Challenges the status quo

Rejected by the establishment

Could be highly disruptive

Never been done before

IDEALIST

Collecting signals: guiding questions (1/2)

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?

IDEALIST

Collecting signals: guiding questions (2/2)

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)?

IDEALIST

Collecting Signals

Group work

Collecting Signals

- Using the suggested sources (or other reliable ones) to collect the signals relevant to each ecosystem.

Collecting Signals

Signals
A Few Examples from Aerospace & Defence ecosystem

1. XaaS (Everything as a Service): versatility and quick redeployment
2. Synthetic biology for fuel production
3. New aircraft programs for SMR (Small Modular Reactors) to decarbonize transport
4. Production of liquid hydrogen from renewable energies
5. Supersonic jet engines (high-speed travel)
6. Portable jamming systems due to drone proliferation
7. Fully 3D printed large aircraft
8. Flight shaming
9. AI-based air traffic control
10. End-users and clients are reluctant to buy products involving outsourced or rare materials
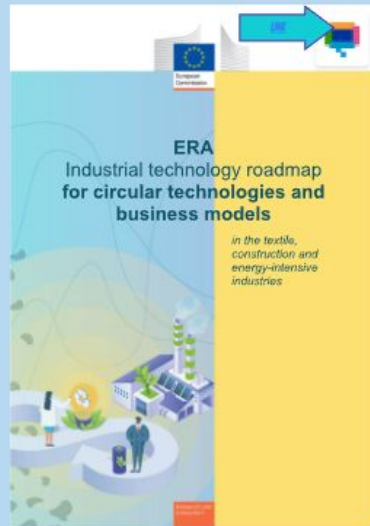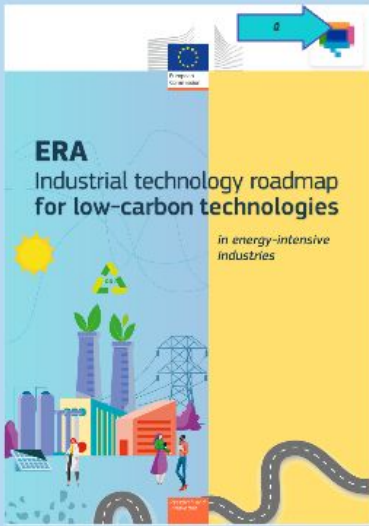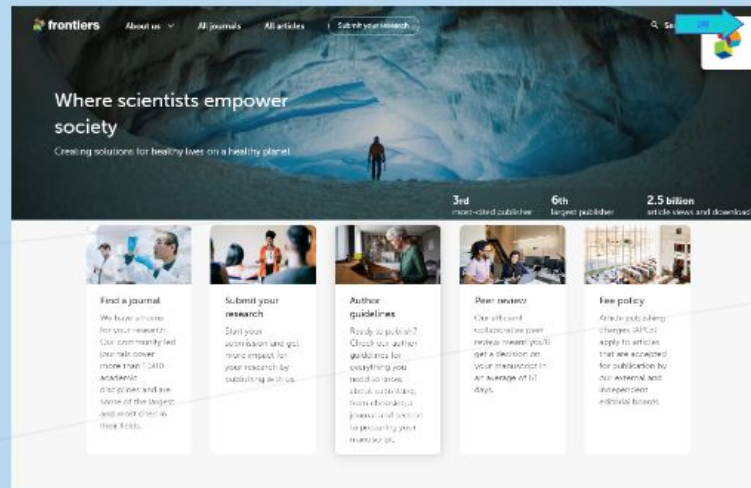
Collecting Signals
Suggested Sources

Collecting Signals
Suggested Sources

Collecting Signals
Suggested Sources

Describing and Assessing Signals

Group work

Describing and Assessing Signals

- From the group of signals noted, 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. You will find fields to fill in. Then use a dedicated Google sheet where you will assess each of the selected signals in terms of their positive or negative impact on your ecosystem and ETM (Earliest Time to Mainstream).

# Describing and Assessing Signals (template)

SIGNAL 1

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 FACILITATES THE UNDERSTANDING OF A POTENTIAL CHANGE…"	WHAT IMPACT DOES A SIGNAL HAVE ON THE ELEMENTS OF THE ECOSYSTEM? THINK OF VARIOUS TECHNOLOGICAL, ECONOMIC, SOCIETAL, ENVIRONMENTAL IMPACTS.	ON A SCALE FROM –5 TO + 5 INDIVIDUAL ASSESSMENT BY THE AUTHOR OF A SIGNAL	(EARLIEST TIME TO MAINSTREAM) THE MINIMAL AMOUNT OF TIME NEEDED FOR THE MAINSTREAMING OF A SIGNAL. THE MOMENT OF MAINSTREAMING IS DEFINED AS THE TIME WHEN A SIGNAL IS THE MOST IMPACTFUL ON THE ECOSYSTEM.

OPPORTUNITIES

RISKS

CHALLENGES

Describing and Assessing Signals (sample Gsheet for assessments)

Signal	AVG ETM	stdev ETM	AVG Imp	stdev imp
1 End-users and clients are reluctant to buy products involving outsourced or rare materials	7.1	3.2	1.4	3.1
2 Some private companies (industrials) are shifting to other markets than commercial aviation i.e. implementing diversification strategy toward renewable energy	5.7	1.8	1.8	1.7
3 More flexibility in production chains, more independence from China	7.6	5.7	2.8	3.1
4 XaaS : everything as a service (energy, mobility, manufacturing)==> versatility, quick redeployment	7.6	3.8	1.4	1.8
5 Focus on drone productions as war in Ukraine shows that it is a weapon of 21st century	4.3	2.5	1.7	1.8
6 Synthetic Biology for Fuel Production	11.3	4.4	2.6	2.1

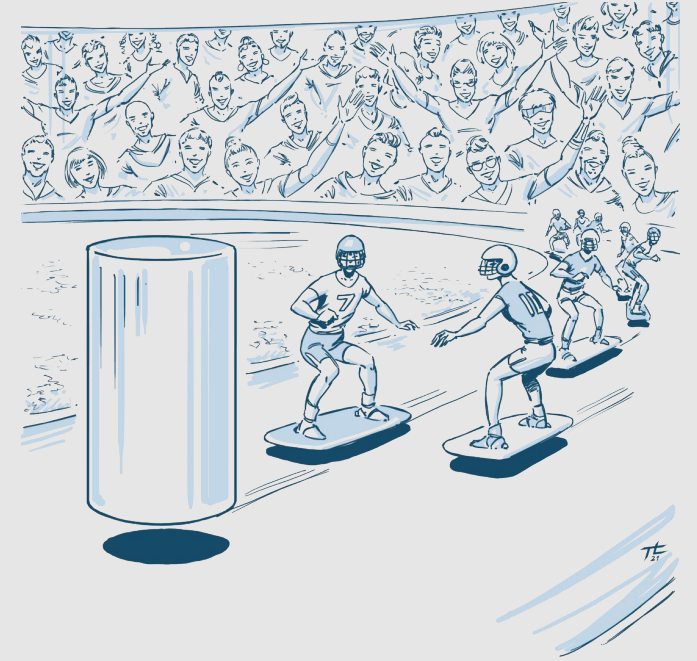# Describing and Assessing Signals (sample graph from Gsheet)
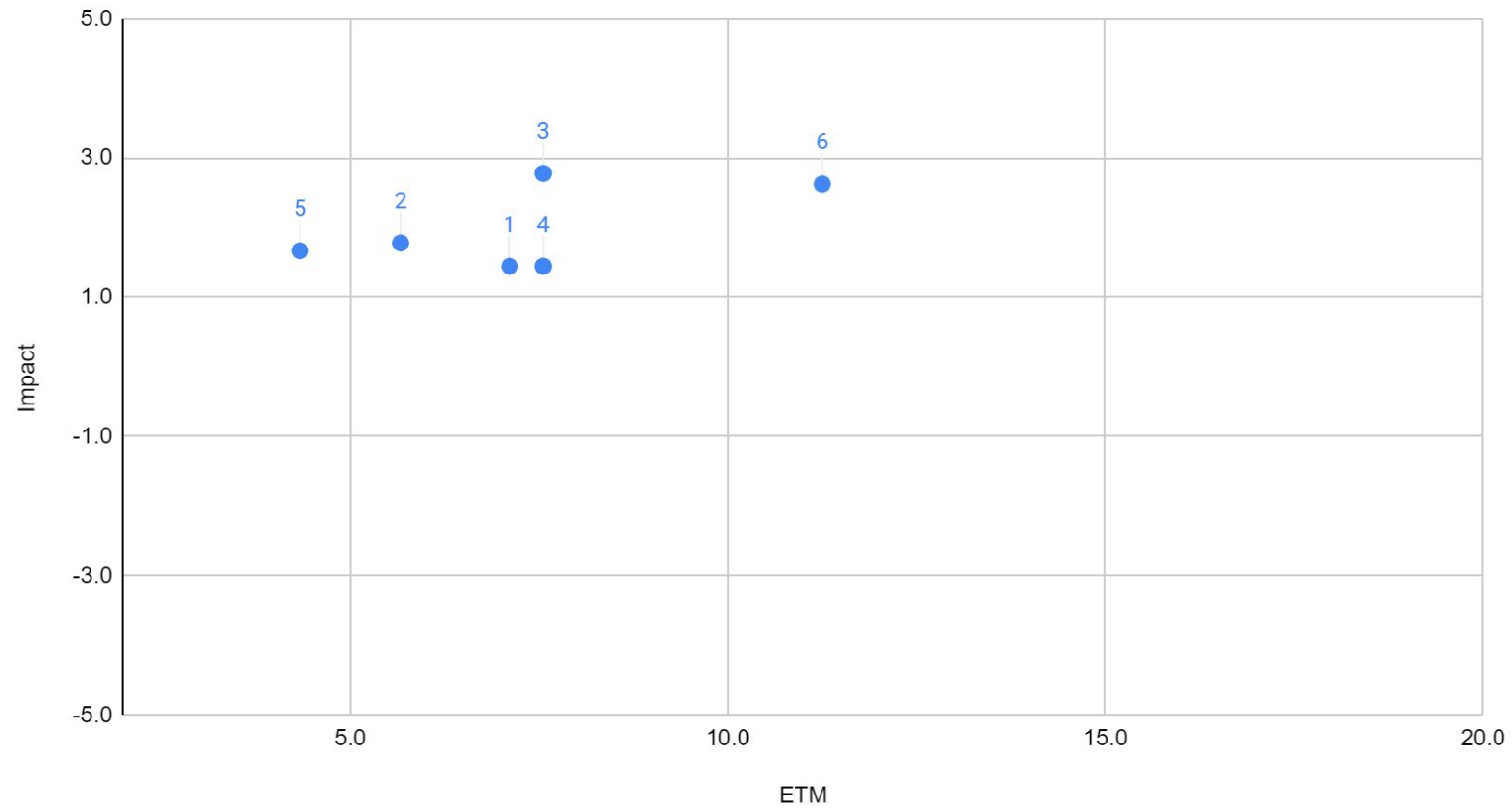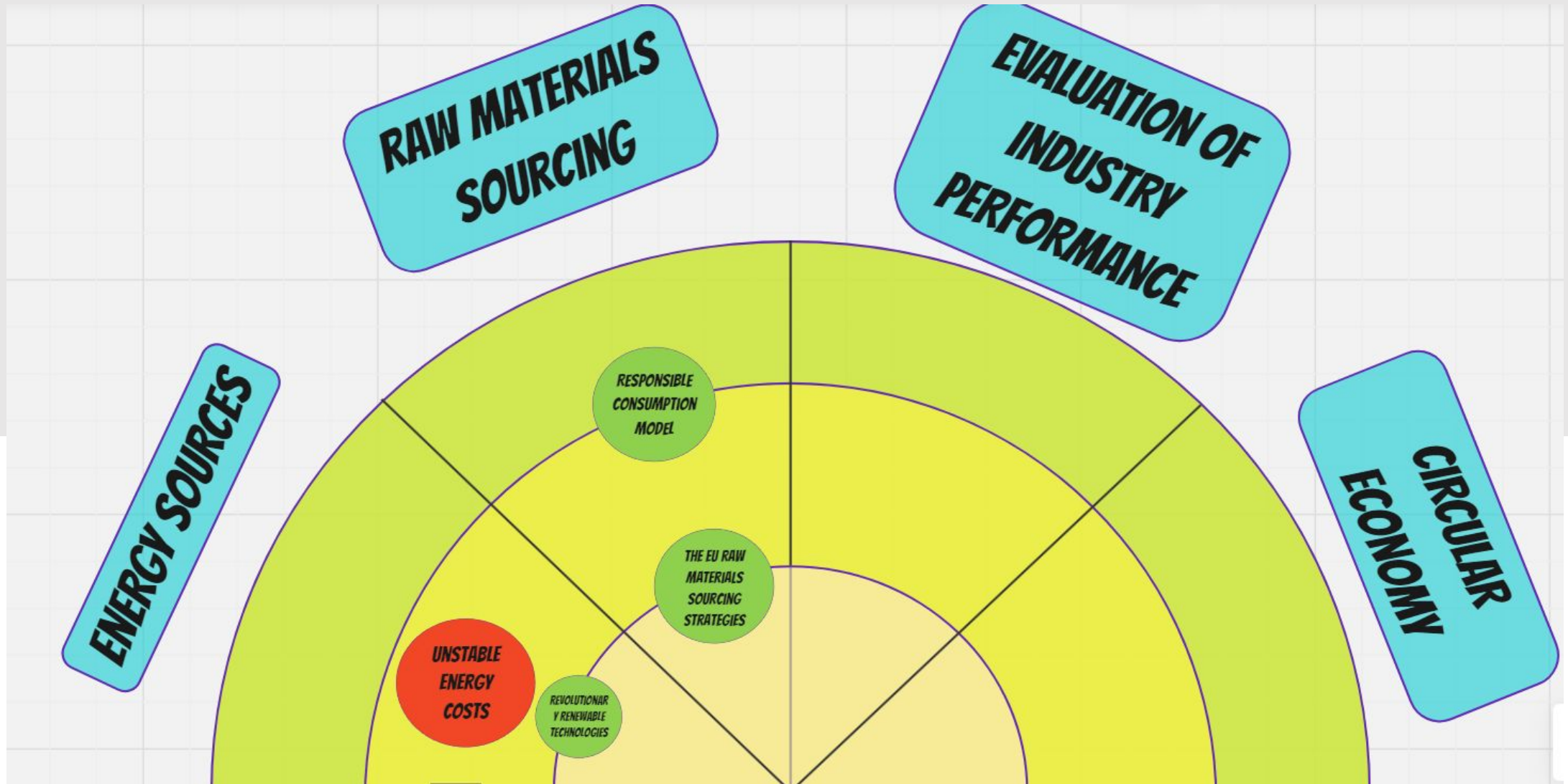
Maps of Drivers

Group work

Maps of Drivers

- 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.

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

- 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
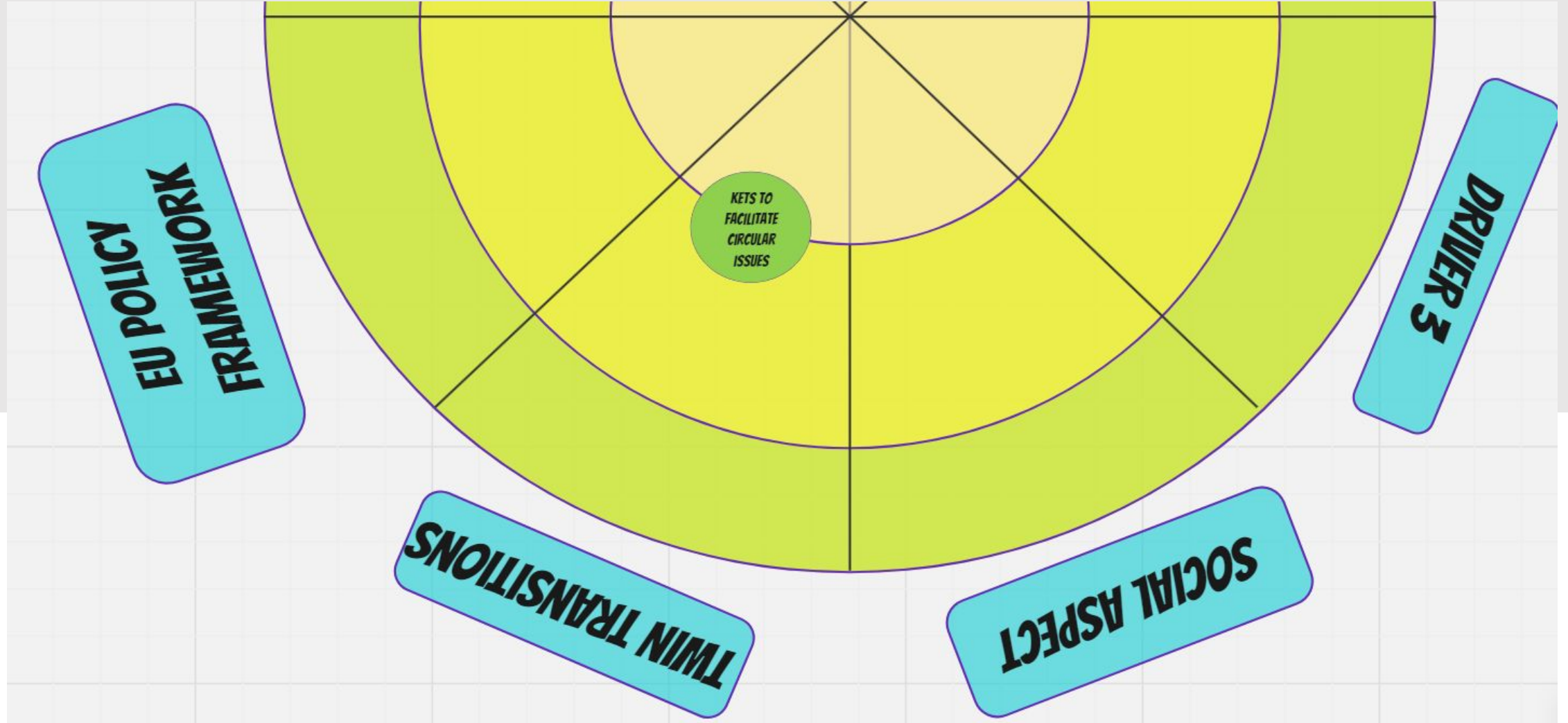 is 11 to 20 years.

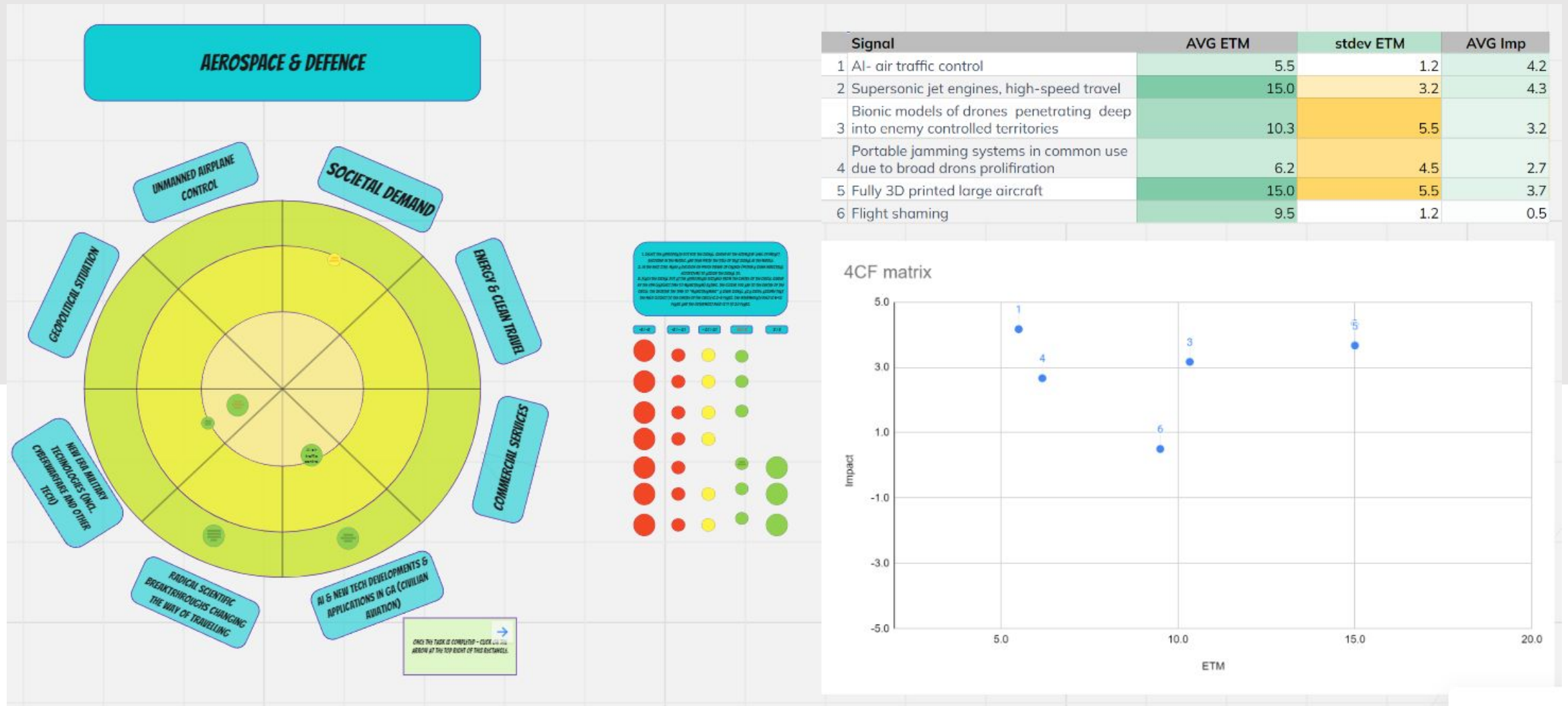# Describing and Assessing Signals
Maps of Drivers and Signals

Maps of Drivers and Signals

Describing and Assessing Signals
Maps of Drivers and Signals

	Signal	AVG ETM	stdev ETM	AVG Imp
1	AI- air traffic control	5.5	1.2	4.2
2	Supersonic jet engines, high-speed travel	15.0	3.2	4.3
3	Bionic models of drones penetrating deep into enemy controlled territories	10.3	5.5	3.2
4	Portable jamming systems in common use due to broad drons prolifration	6.2	4.5	2.7
5	Fully 3D printed large aircraft	15.0	5.5	3.7
6	Flight shaming	9.5	1.2	0.5

Sense-making

Group work

Sense-making

- Select one signal, which you would like to work with and copy - paste its name into a given shape

- In the next step, copy-paste key impacts of this signal (from the metric) into given shapes

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

Sense-Making

Report-back

- Please present the results of your work (7-10 minutes/ by a group):
  - The signals,
  - the assessments on 4CF Matrix and
  - the maps of drivers and signals
- Please share your observations & feedback

Summary & next steps

Key takeaways

- In Horizon Scanning **a signal** is a sign that a significant change is starting or that it could be underway.
- Signals **challenge our mental models**. We have an a-ha moment because they do not fit into our understanding of the expected future.
- There is a sense that they could have **a profound impact** on the issue or system under study.
- Signals **are found through experience, reading, interviews and dialogue**.

"Significance"

"Novelty"   "Timeliness"

"Plausibility"

IDEALIST
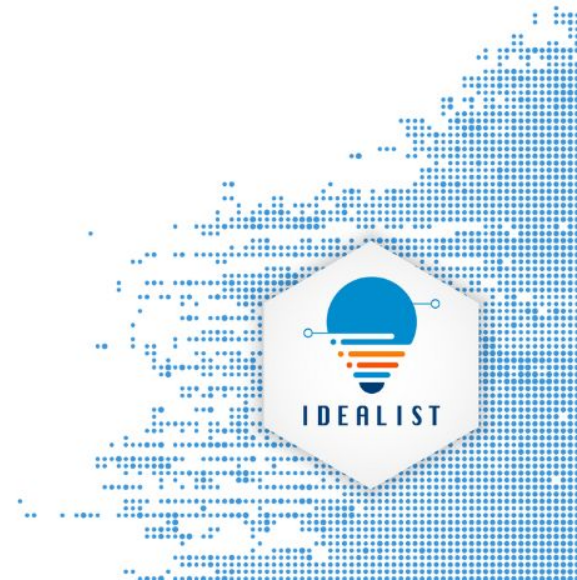
"The more aware the wolf pack is of the terrain in which it runs, the more effectively it hunts"
Pierre Wack (Shell)

Key takeaways

- **Signals** may originate within your domain, or they **could come from another domain**.

- Most organizations are good at spotting changes in their own domains, and most of us are good at finding information that confirms our existing views.

- However, often **disruptive changes originate outside your domain**—the places you are not looking, and in the areas your own biases may naturally steer you away from.

Please share your reflections.

IDEALIST

THANK YOU!