



# Foresight: Methodical Guide

Czech Priorities



*The document **Foresight: Methodical Guide** passed through several rounds of reviews among representatives of the public administration. We thank all the experts who participated in the process of drafting the document and provided a lot of valuable suggestions and comments.*

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## Glossary

### **Foresight**

- A tool to uncover future challenges and opportunities. For example, results of foresight include trend analyses, predictions, and scenarios of future development.

### **Foresight study**

- A foresight study refers to the implementation of the entire project, from the initial planning through the analysis of past developments, the future and potential recommendations or measures, to the consolidation and presentation of the results.

### **Drivers**

- Factors that cause the emergence or influence the development of a certain phenomenon or system (trends, megatrends, events, technology, etc.).

### **Participatory methods**

- An umbrella term for research methods that use both quantitative and qualitative inquiries in direct collaboration with those affected by a specific problem.

### **Strategic planning**

- A process in which the entity (institution, organization, company) defines its plans or development trajectories and decides on allocating resources to implement a specific plan.

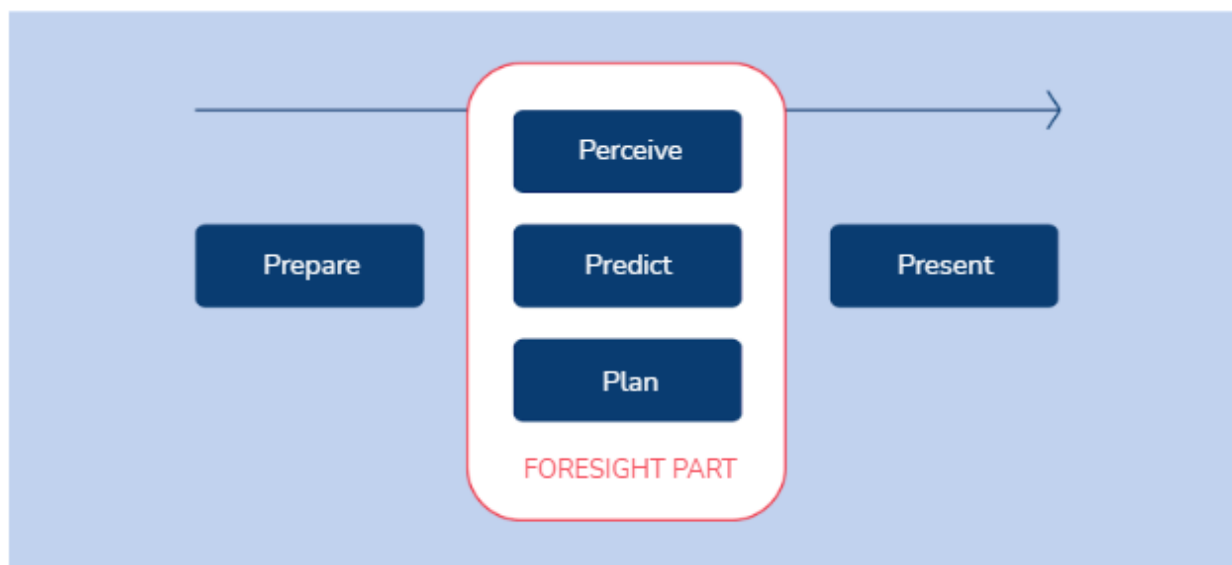
### **System**

- Any environment that is the object of a foresight study: cultural, social, political, environmental, economic, or technological.

## Executive summary

This methodological manual defines foresight, the methodological procedure for processing foresight analyses, and methods of their evaluation. The creation of the methodological manual responds to **the limited awareness of foresight as a research tool** that can make decision-making (not only) of public administration more efficient.

Foresight is a tool that uncovers future challenges and opportunities. For example, foresight results include trend analyses, predictions, and scenarios of future developments. These are used (not only) by public administrations, especially in strategic work, prioritization, or impact assessment of public policies. Foresight uses a set of qualitative (e.g. expert panels, interviews) and quantitative methods (modelling, extrapolation), usually based on expert or public participation. Foresight analysis is performed in five elements:



In the **Preparatory part**, the research area is defined, the methodological setup is proposed and the implementation team is assembled.

**The first foresight part** (Perceive) is the only unavoidable part of the foresight process that should be included in every foresight study. First, it is necessary to understand the topic through available data and by identifying ongoing trends that may impact future developments.

**Predicting** future developments is the second part: the impacts of the phenomenon under study are identified, visions and scenarios for the future are formulated or the future value of the indicator under evaluation is quantified.

The purpose of **Planning** is to define specific actions and steps that lead to a desired future. Each foresight section is characterized by several typical methods; these are briefly introduced in the respective chapters. Detailed methodological procedures can be found on the [Czech Priorities](#) website. Above all, the form of the final **Presentation** must meet the needs of the target group or user of the results.

Setting up **evaluation** processes is crucial especially for control, increasing trust in the studies, and continuous learning processes related to foresight strategies.

# 1 Introduction

**Reflection on future developments**, challenges, and opportunities is a crucial basis for the formulation of strategies and development plans, the focus of subsidy programs and innovation agencies. Even though abroad the **Foresight** tool has been used for a long time (e.g. in the United States, Finland, or the United Kingdom), in Czechia it has not yet been systematically used by the public administration<sup>1</sup>.

This document was created in response to consultations with representatives of Czech public administration institutions, during which their needs and potential for the use of foresight in their agendas were identified. During these interviews, they were asked not only about their interest in implementing foresight methods but also about perceived barriers to its use.

One of the key reasons for the sporadic use is low awareness about this tool, which naturally affects **limited knowledge** of foresight methods and procedures. **The objective of the methodical guide** is therefore to provide representatives of public administration institutions with a definition of foresight and a description of the process of foresight study preparation and basic foresight methods. The methodical guide should contribute not only to the development of foresight activities in public institutions but also to the formulation of policy decisions that have an impact on improving the standard of living in Czech society.

The guide has been prepared using a review of foreign methodologies<sup>2</sup>, examples of good practices, and previous experience with the implementation of foresight studies (especially [FUTURE-PRO](#), [FutuRIS Project](#), and the latest update of [Strategic Framework CR 2030](#)). These findings became the inspiration for the creation of our foresight study process.

In the following chapter, [Foresight](#) is defined and several specific benefits are listed to illustrate where it can be useful. The chapter [Processing the foresight study](#) guides through the different parts of creating a foresight study, which has been called the 5Ps: Prepare, Perceive, Predict, Plan, and Present. The subchapters also list foresight methods that can be used for this purpose. The methods are listed only briefly – their detailed description including step-by-step procedure is available on the [Czech Priorities websites](#). The chapter entitled [Combination of methods in a foresight study](#) outlines how methods can be combined to achieve desired results. Finally, the [Monitoring and evaluation](#) chapter focuses on setting up evaluation mechanisms to ensure the quality of the study. Foresight without evaluation and monitoring lacks transparency, reduces usability, and prevents progressive improvement of analyses.

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<sup>1</sup> The use of foresight in Czechia and abroad, including examples of good practice, is the subject of the Czech Priorities document: [Foresight in the Czech public administration and abroad](#).

<sup>2</sup> In particular: Government Office for Science ([2017](#)), SOIF ([2019](#)) and UNDP ([2018](#)).



## 2 Foresight

Foresight is a **tool** that uncovers future challenges and opportunities. For example, foresight results include trend analyses, predictions, and scenarios of future developments. They are used not only by public administrations especially in strategic work, prioritization, or impact assessment of public policies. Foresight uses a set of qualitative (e.g. expert panels, interviews) and quantitative methods (modelling, extrapolation), which are usually based on expert or public participation.

While the exact future cannot be predicted, alternative futures can and should be understood and explored. The same is true for preferred futures. These should be identified, implemented, and continuously evaluated. Working with futures should precede strategic planning and subsequently administrative activities. Foresight activities are continuous and knowledge is constantly changing as new factors and developments emerge ([Dator, 2019](#)).

### Foresight or forecasting?

The terms foresight and forecasting are often used interchangeably. Forecasting is one method of foresight that either extrapolates current trends into the future or, by aggregating expert judgments, attempts to estimate a future state, usually in relation to a specific context. Forecasting places more emphasis on identifying the most likely future.

### The use of foresight in public administration

Creation of analytical documents for the preparation of strategies

Formulating visions and objectives in strategic work

Prioritisation of long-term investments

Evaluating the impact of public policies

Risk management and preparedness (building resilience)

The use of foresight has a long history and can be considered a recognized research tool. The origins of this specific analysis date back to the late 1940s, the beginning of the Cold War. Specifically, the emergence of the discipline is linked to the US [RAND Project](#), whose goal continues to be to identify the long-term evolution of weapon systems, but more recently also to research social and economic issues ([Hines, 2019](#)). In general, foresight is widely used in the US: approximately 50 government departments have their foresight unit. Outside of government affairs, Foresight also helps in the private sphere. Shell, for example, was prepared for the oil crises of the 1970s thanks to foresight activities ([SOIF, 2021](#)). Before the end of World War II, a systematic insight into the future was also practised, but more in the form of extrapolation of past trends, or forecasting

([Jemala, 2010](#)). This may be the reason why the terms foresight and forecasting are often used interchangeably.

The Government Office for Science ([2021](#)), the foresight unit of the UK Government Office, mentions several specific benefits of foresight. **Foresight deepens the knowledge of the drivers** that influence a given area. This makes it possible to develop analytical bases for strategies that take into account the wider context. **Foresight helps identify gaps in current research** to better understand drivers and potential threats or opportunities. **Foresight contributes to consensus among stakeholders** and mobilizes them. This can help to identify themes and priorities of different strategies. **Foresight helps to identify the impacts of policy decisions**, which can inform actors about the need to make concessions to planned changes. **Foresight contributes to strategy development**. Those that use foresight are resilient because they reflect current and future developments. **Foresight helps identify investment opportunities** because it can define the direction in which, for example, technological progress will take.

The focus of foresight is diverse and suitable for all thematic areas. At the **national level**, it is particularly beneficial if studies are carried out in the following areas:

- in which future developments are highly uncertain (conflicts, social trends)
- with rapid development (technology development and long-term R&D investment planning)
- where it is necessary to establish consensus on visions and goals (sustainable development)
- with a high degree of complexity and interdependence (obesity)
- highly vulnerable to development at the global level (migration, pandemics)
- that pose major threats (cyber security, natural disasters)

At the **local and regional level**, several illustrative examples of concrete use can be given:

- Development of high-speed internet infrastructure: Should the city invest in the construction of a fibre-optic network, or will it be technologically possible to provide wireless internet of adequate quality and reliability in the near future?
- Basis for the Municipal Development Programme: How do citizens imagine the future of the town? How will the population structure evolve? What public services will be necessary to provide?
- Urban planning: How to use Prague's north-south arterial road beyond the transport corridor?
- What impact will the construction of a mini-zoo, swimming pool, or lookout tower have on the development of the village?
- Municipal expenditure: How will climate change affect the municipal budget?

**The impact of foresight is difficult to measure: it is usually long-term, indirect (influence on attitudes, awareness and policy dialogue) and significantly influenced by the complexity of**

**the social and political environment.** Identified trends may eventually evolve in a different direction because an unexpected trend, technology, or policy measure has emerged. Despite this fact, several examples of good practice can be observed abroad, where foresight has helped to determine (not only) political decisions<sup>3</sup>. For instance, foresight knowledge is used in research, development, and innovation to define long-term investments. A relevant example is the [BOHEMIA](#) project, which provides an overview of research and innovation needs and opportunities and co-determines the focus of Horizon Europe.

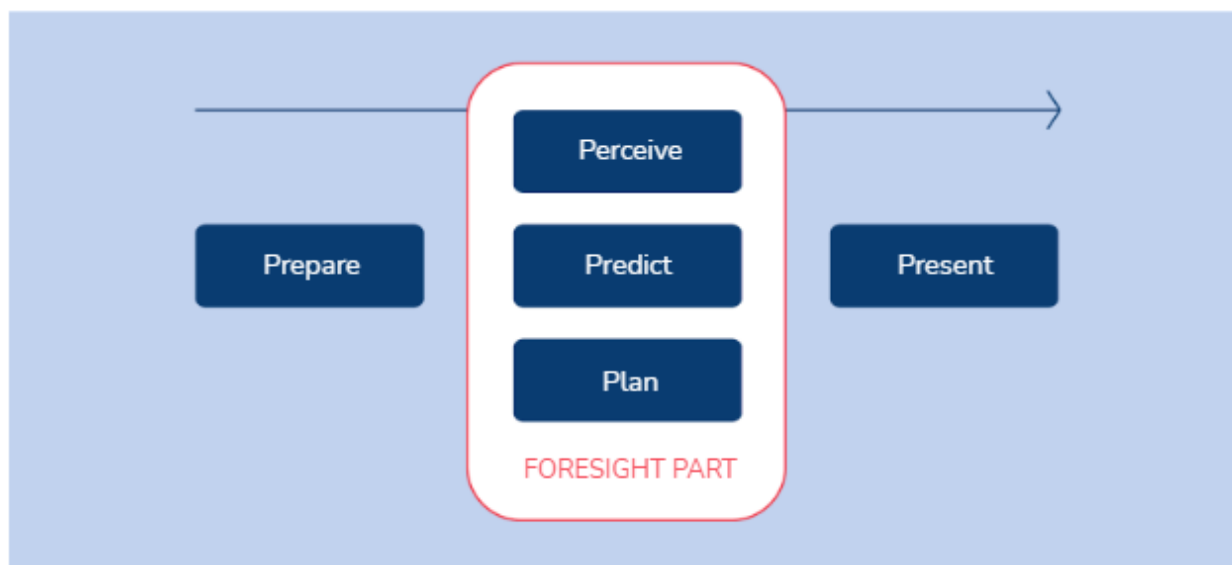
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<sup>3</sup> Selected examples are presented in the study [Foresight in the Czech public administration and abroad](#), which also seeks to identify the optimal institutional anchoring of foresight in the public administration of the Czech Republic.

### 3 Processing the foresight study

The essential parts of a foresight study vary according to the authors of the methodological manuals. For instance, Voros (2003) divides foresight into three parts: analysis (What appears to be happening?), interpretation (What is actually happening?), and prospection (What could happen?). This author was followed by Pazour et al. (2017) when they extended the mentioned sections by adding another question: What could we do? Voros (2003) states that although the process seems to be linear, there is much feedback from the later parts to the earlier ones.

This methodical guide defines a total of **five parts** of the foresight study, where the identification of future challenges and opportunities (foresight) itself refers to the parts **Perceive, Predict, and Plan** (see diagram below).



The **Prepare, Present**, and the first foresight section of **Perceive** are considered essential parts of any study. The first two parts mentioned above **are not** foresight, they only remind us that the study needs to be properly planned first and in the final phase properly presented to the users of foresight (political representatives, stakeholders, or the public). The foresight part of **Perceive** is considered an integral part by nature of any research: first, it is essential to understand the topic: the past development and the current state of the system under study, including the identification of long-term trends. Only after using the current knowledge can one proceed to the other foresight parts, if this is the aim of the study. **Not all parts are necessary for a study** – it always depends solely on the objectives.

All parts are presented in detail in the following chapters, including a **list of suitable foresight methods** and their brief description. A **detailed description** of the methodological procedure is

published in the [methodical index of the Czech Priorities website](#). However, the description of the procedure serves rather as an inspiration for the research itself: the methods can be approached in different ways (workshops, interviews, questionnaires, expert panels, gamification, etc.). At the same time, it is important to consider that some methods are applicable during all foresight parts, as shown in the table below.

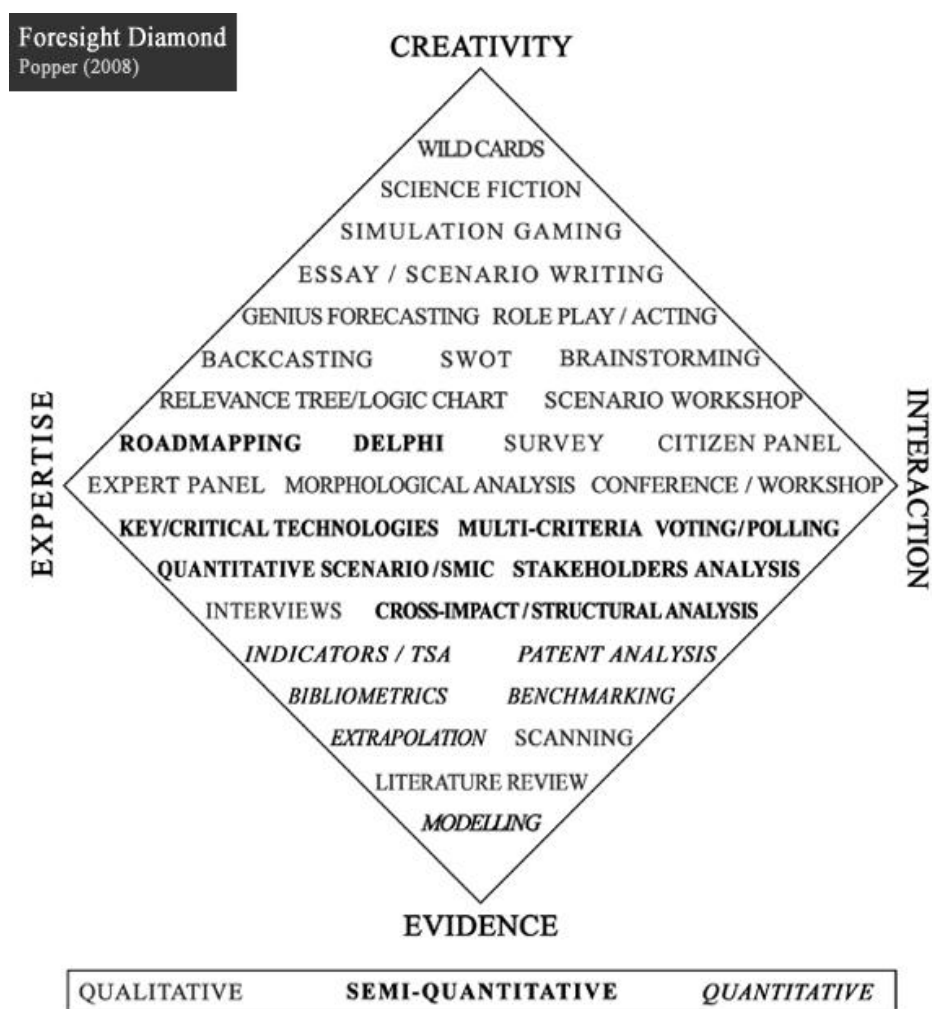
Method	Application in the foresight process		
	Perceive	Predict	Plan
Desk research	✓	✓	
Horizon scanning	✓	✓	
Delphi	✓	✓	✓
Text analysis	✓		
Three Horizons		✓	
Futures wheel		✓	
Visioning		✓	
Scenarios		✓	
Judgemental forecasting		✓	
Cross impact analysis	✓	✓	
Modelling and simulations	✓	✓	
Roadmapping			✓
Wind tunnelling			✓
Backcasting		✓	✓

Source: Own elaboration

**Foresight is never just about one method.** The methods are complementary; the outputs of one method form the inputs of the next. As with conventional research, the **combination** of quantitative and qualitative methods is particularly useful in foresight.

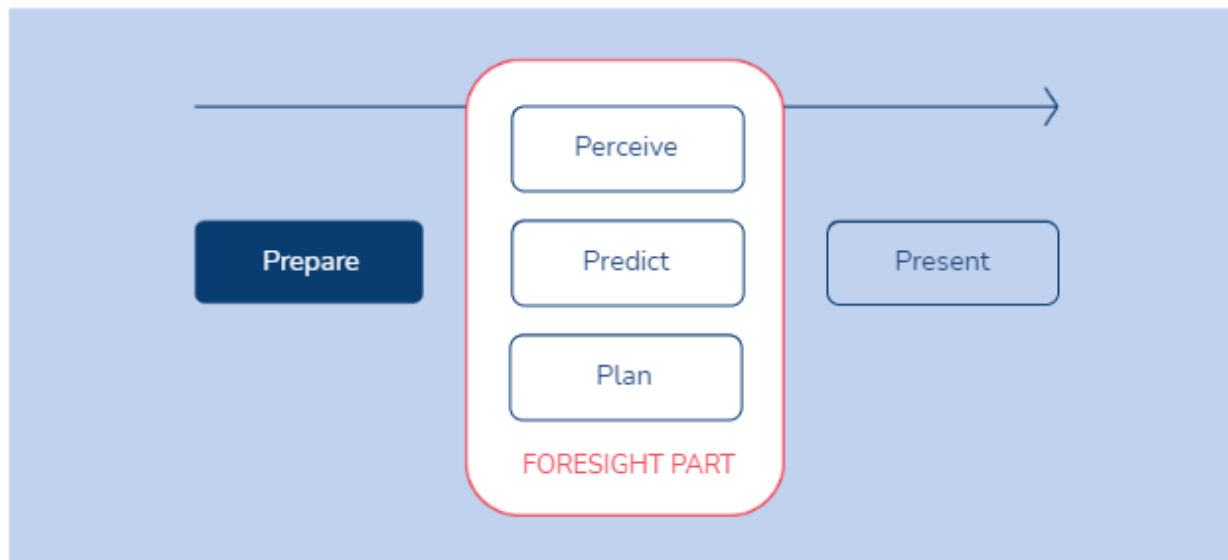
In the individual foresight sections, only those methods that have been assessed as the most acceptable in terms of clarity, effectiveness and frequency of use are presented. However, there is a wider range of foresight methods. For further inspiration, one can visit the Government Office for Science ([2017](#)), SOIF ([2019](#)) or Pazour et al. ([2017](#)). Below is also presented the so-called Foresight Diamond, which shows the position of foresight methods in terms of qualitative and quantitative methods and in terms of other aspects: expertise, creativity, interaction and evidence (statistical data).

Figure 1: Foresight diamond



Source: Popper ([2008](#))

### 3.1 Prepare



Although the aim of the methodological guide is primarily to introduce foresight, a lot of attention must also be given to the **preparation of the foresight study** itself, as the foresight process can be time-consuming and requires thorough planning of organisational, time, personnel, financial and technical capacities. At the same time, however, some flexibility needs to be allowed.

During the preparation part, it is crucial to clearly define the focus of the study and present all aspects of the process to the end user. The aim of the preparatory part is therefore to stimulate a discussion among the contracting authority about **how the study will be conducted**: to set the parameters of their research and to discuss the assumptions for the study.

The introductory part involves considering several aspects, which are listed below in the form of a checklist. For example, it is important that relevant **political representatives (and users in general)** are involved in the foresight process. It is advisable that they become familiar with the progress of the study before the actual implementation. Otherwise, there is a risk that the results of the foresight study will be new and incomprehensible to the user group and the foresight study will not be used. Some important aspects are, of course, the selection of methods, the assignment of competencies in the team or defining the time horizon. Only after a comprehensive consideration of all the presented topics it is suitable to proceed to the elaboration itself.

### **Starting Point**

- ✓ What are the challenges we face?
- ✓ What are our competencies?
- ✓ What are our responsibilities?

### **Policy Milieu & Socio-Economic Culture**

- ✓ Does the focus of the study match the agenda of key political actors?
- ✓ Is there a consensus in the political environment on the urgency of the problem under study?
- ✓ Is it possible that the political and socio-economic environment will suddenly change?

### **Target Audience**

- ✓ Who will use our results?
- ✓ Which actors should be affected by the study?

### **Desired Outcomes**

- ✓ What do we want to achieve?
- ✓ What should be the specific output of the study?
- ✓ Can the achievement of the expected results of the study be evaluated retrospectively?

### **Resources – Human, Financial, Time, etc.**

- ✓ Do we have enough experienced staff?
- ✓ Do we have sufficient funds?
- ✓ Do we have enough time to do the study?
- ✓ Do we have adequate technical backup and access to suitable facilities?
- ✓ Are there data and findings that can be built upon in the study?



### Organisation & Management

- ✓ Who will be involved in the study?
- ✓ Will an expert group with a consultative function be called in?
- ✓ Who is best placed to mobilise experts and raise awareness of the study?

### Coverage

- ✓ What topic will the study focus on?
- ✓ What topics are no longer under study?

### Time Horizon

- ✓ How far into the future will the study look?

### Methods

- ✓ Which foresight methods are most appropriate for the chosen topic and objective of the study?

### Participation – Nature, Extent & Frequency

- ✓ Will the study involve a small group of experts and stakeholders or the general public?
- ✓ Which experts will be included in the study in terms of areas of expertise?
- ✓ Does the involvement of a selected group of society (e.g. students, artists) make sense?

### Formal Products

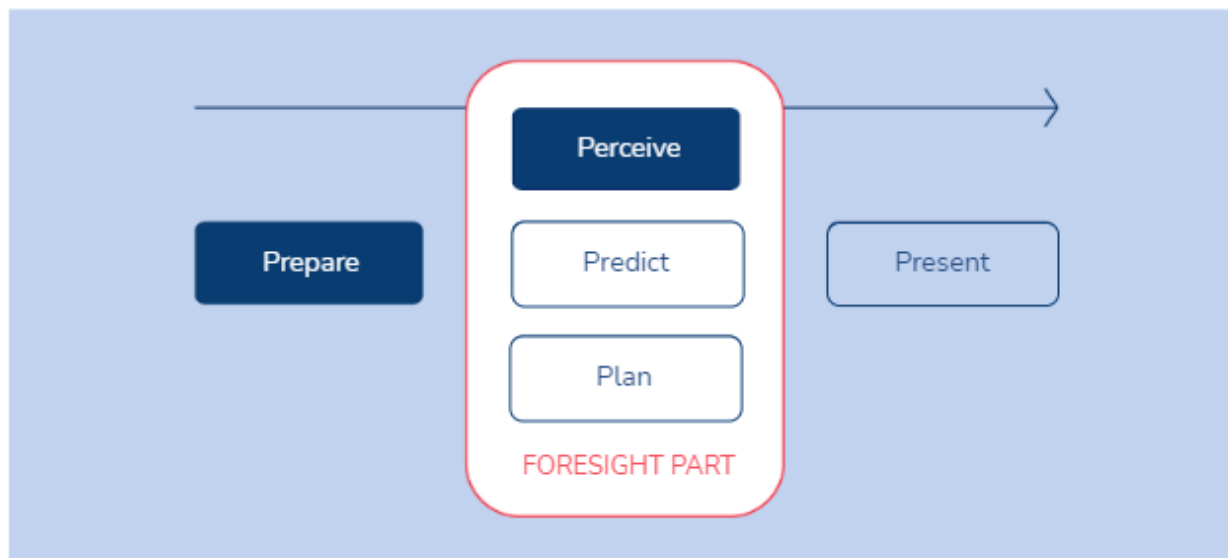
- ✓ What is the most appropriate form of study output (project report, conference, etc.)?
- ✓ What form of output will have the greatest reach to relevant actors and what is the intended use?

### **Policy Intervention**

- ✓ How to advocate for the implementation of the study in political decision-making?
- ✓ In which parts of the study can political representatives be included?
- ✓ How to formulate recommendations and actions for follow-up strategies and policy decisions?

Source: Own elaboration on the basis of Miles et al. [\(2016\)](#)

## 3.2 Perceive



The first foresight part can be understood as analytical. The main objective is a comprehensive evaluation of the current situation, a closer understanding of the system under study and the identification of potential indications of new trends and developments. Understanding the current state of the system and how the system works is important for anticipating the future. Only after this part is completed it is possible to move on to the remaining two foresight parts, if this is consistent with the purpose of the foresight study.

However, the Perceive part is not just about aggregating information and analyzing historical data. By understanding the current state and evolution of the system to date, early warning signs, long-term trends and indications of future developments can be identified. Our own ideas are largely biased by our experience, values, ideas, etc. This section should prevent biased knowledge and gather evidence about things we know (known knowns), don't know (known unknowns), know others (unknown knowns) and extend knowledge to those factors we know nothing about (unknown unknowns).

The methodological approach may follow a [STEEP](#) framework, which allows the research to take into account all relevant areas (the context in which the study is being conducted) and influences, while not neglecting any. Each letter refers to a different area of the system: Social, Technological, Economic, Environmental, and Political. Depending on the need and relevance, Legal, Values, Health or other areas can also be included in the framework.

The processing of the first foresight part can be implemented through several methods. Four are listed and briefly described below: Desk research, Horizon scanning, Delphi and Text

analysis. In both this and the following two foresight parts, only commonly used methods are selected with a clear processing procedure.

Desk research	
Objective and description	Desk research, or secondary research, refers to the collection and analysis of already available information and datasets. The main objective is to describe and understand the current state of the system or indications of future developments.
Approach	Desk research is an apt name, as the method is primarily conducted by searching for articles, datasets, or periodicals in an online environment. The systematic collection of information can be supported by the <a href="#">STEEP</a> approach to ensure that all relevant perspectives are covered.
Output	The form of the output is not fixed. The output can be considered as a report, or in the case of quantitative analysis, graphs and tables.
Interpretation and further use	With the help of desk research, a comprehensive overview of the topic can be obtained. It serves primarily as an input to the other foresight parts Predict and Plan and as an approach to other foresight methods.
Example of a study	The aim of the first part of the Government Report on the Future ( <a href="#">Prime Minister's Office – Finland, 2017</a> ) was to answer questions about the future of work and the implications of the ongoing changes. The outputs of this study were elaborated by a group of experts and further discussed at 40 workshops and seminars.

Delphi	
Objective and description	Delphi is an iterative and anonymous consultative process that aims to aggregate expert and informed estimates to identify and prioritise strategically important issues.
Approach	Unlike interviews or an expert panel, Delphi is conducted anonymously and in several rounds. Consultations are usually conducted online. After aggregating the findings from individuals in the first round, feedback is collected in the second round and respondents can adjust their assessment accordingly.
Output	An appropriate output is a list of topics that should be prioritised by relevant actors and addressed by actions or strategies.
Interpretation and further use	<p>The results of this method are a useful input to the <a href="#">futures wheel</a> foresight method, which examines the impacts of selected issues. The Delphi can also be fluently built upon by creating <a href="#">scenarios</a>.</p> <p>The Delphi findings are useful as a basis for formulating strategies. An example is the social sector: Delphi experts define key areas of concern (e.g. energy poverty) that a long-term strategy document should reflect in order to prevent the problem.</p>
Example of a study	Lintonen et al. ( <a href="#">2014</a> ) aimed to predict changes in drug use in Finland by 2020. The Delphi method was used with the participation of drug experts from the EU national network. The results indicate that Finnish society will have to prepare for an increase in demand for drug-related care, both in terms of the content of care and the financing of services.

Horizon Scanning	
Objective and description	Horizon scanning can be considered an essential part of a foresight study. The aim is to better understand the nature and pace of change and to identify indications of future opportunities, threats and likely developments based on weak signals and trends.
Approach	The method combines <a href="#">desk research</a> and collective deliberation. It is a synthesis of media and academic articles that contain information about future developments or new trends in society.
Output	The typical output of the method is a short report that describes the issue in detail – weak signals, trends, etc., which, in addition to describing the topic, also deals with the relationship between the topic and the policy or strategic area addressed by the foresight. An important part of this is so-called sense-making, i.e. why the authors think the topic is important and what other questions the topic raises. However, this question can be answered using deliberative methods such as <a href="#">Delphi</a> or an expert panel.
Interpretation and further use	<p>The reports written will help determine the direction in which the system under study is heading. In the next step, <a href="#">visioning</a> or <a href="#">scenarios</a> can be made based on the information obtained.</p> <p>The results are valuable background material, especially for strategic activities, as they reveal the near future. As an example of use, municipal development programmes can be mentioned, because, for instance, technological advances or trends in leisure activities have a great impact on the infrastructure of a city.</p>

Example of a study	The aim of the research by Flick et al. ( <a href="#">2020</a> ) was to explore the opportunities, challenges and future developments of ICT in the area of health and ageing. The horizon scanning method was based on interviews and analysis of literature and policy documents. The authors identified weak signals of change in technology, companies, the general environment of everyday life (smart homes) and the lives of seniors.
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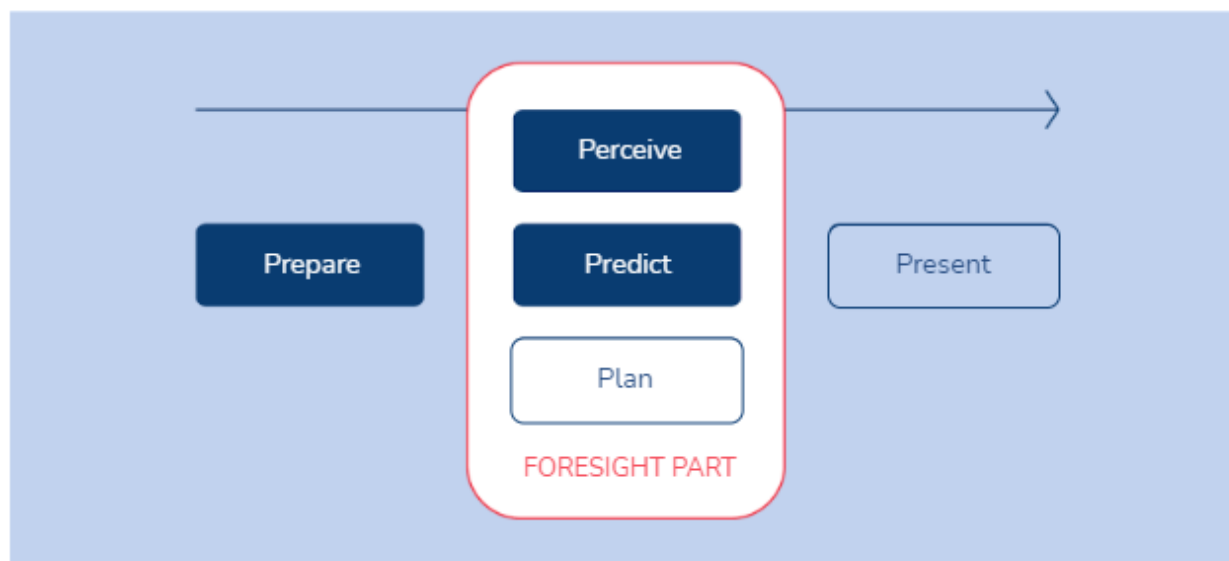
Text analyses	
Objective and description	The objective of text analysis, or text mining, is to identify unrecognised patterns, breakthrough phenomena, and generally any insights in large amounts of raw, structured, and unstructured data.
Approach	Computer <a href="#">software</a> is used to achieve the results. Generally, however, the analysis itself must be preceded by a collection of relevant data sources.
Output	As in the case of <a href="#">desk research</a> , the form of the output depends solely on the author and the contracting authority of the study.
Interpretation and further use	<p>It is appropriate to combine the method with, for example, <a href="#">scenarios</a> or impact analysis of the <a href="#">futures wheel</a>.</p> <p>The results, which may for example include the identification of new trends, potential threats or investment opportunities, serve as a basis for strategic plans.</p>

Example of a study

In their research, Rosa et al. ([2021](#)) introduce a new method of text analysis and focus on the use of thematic modelling to conduct comparative analysis. The aim of this analysis is to see how citizen-derived forecasts differ from other institutional forecasts.



### 3.3 Predict



Once we **perceive** the topic comprehensively, we can move on to the second foresight part, whose main objectives include, for example, assessing the impact of policy decisions or estimating the development trajectory of the system. This section formulates scenarios for future developments, descriptions of the state of the future and visions of (non-)preferred futures. However, the emphasis is not on one future, but on multiple alternative futures that we consider likely, preferred or undesirable.

This phase is of great importance as it is complicated to formulate measures without knowing the evolution of the system. Therefore, if the formulation of measures is the aim of the study, this section **must be followed** by the last part: Plan. Otherwise, this is the **end** of the research – in this case, however, there is a risk that the foresight study will have only a limited impact on political decision-making.

As in the previous part, the key **methods** are listed below: three horizons, futures wheel, visioning, scenarios, judgmental forecasting, cross-impact analysis, modelling and simulation.

Cross-impact analysis	
Objective and description	Cross-effects analysis is an analytical approach used to estimate the interaction of a given set of events. Thus, the objective is to determine how the occurrence of one event will affect the

	occurrence of other events.
Approach	Most often this method is used in quantitative form using questionnaires or <a href="#">Delphi</a> (if the estimates are accompanied by an explanatory comment).
Output	The output is a matrix that contains how the events interact.
Interpretation and further use	<p>The results of the method are a valid input to <a href="#">Delphi</a> in the Plan part. At the same time, the analysis should use the impacts identified using the <a href="#">futures wheel</a> method.</p> <p>This allows relevant experts and stakeholders to discuss the impact of key events on their own development visions. Furthermore, the results are a useful basis for prioritising actions: it is advisable to prioritise those measures that most closely target the potential impacts of the most likely and influential event.</p>
Example of a study	The aim of the study by Panula-Ontto et al. ( <a href="#">2018</a> ) was to map the important drivers of change over the period 2017–2030 in electricity consumption and generation in Finland. The changes were analysed using a cross-impact model based on a modelling process consisting of workshops, panel discussions and individual expert work. The model was then analyzed using the computerized technique of calculating the cross-impact of EXIT.

Futures wheel	
Objective and description	A futures wheel is a form of structured brainstorming that illustrates the impact that major events or trends may have on the

	area or the policy under study. Simplistically, a futures wheel can be understood as a mapping of impacts in the form of mind maps.
Approach	As the futures wheel is to some extent a brainstorming exercise, it is advisable to use participatory approaches such as a workshop, expert panel or <a href="#">Delphi</a> .
Output	The output can be described as a structured list of direct and indirect consequences of a given event or trend.
Interpretation and further use	<p>The futures wheel is most appropriately followed by a <a href="#">cross-impact analysis</a>, in which probabilities of occurrence and descriptions of interactions (feedback loops) are assigned to the identified impacts.</p> <p>By its very nature, the futures wheel is a suitable tool for adjusting planned measures. If a measure proves to have undesirable effects, it must be adjusted accordingly.</p>
Example of a study	Defila et al. ( <a href="#">2018</a> ) used the method in their research on the future of energy policy from a consumer perspective. The objective was to determine how consumers themselves perceive the potential changes and what impact the changes could have on their lives.

## Modelling and simulation

Objective and description	Modelling and simulation (also referred to as forecasting or extrapolation) are processes of creating and experimenting with a mathematical model that simulates the behaviour of a real process or system over time. The model estimates unknown values based
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	on an extension of a known sequence of values or facts.
Approach	The method depends primarily on the collection of quantitative data and its processing in appropriate computer software.
Output	The output is specific numerical predictions of the further development of the system including their detailed description.
Interpretation and further use	<p>Simulations are useful inputs to <a href="#">scenarios</a> because they provide a background that illustrates how the system will continue to evolve based on established indicators. The scenarios can then be followed by the identification of adequate recommendations if this is the subject of the study.</p> <p>The outputs can be used as a basis for developing strategies as they illustrate the further development of the system. They can also be used as impact analysis – they provide quantified estimates of the system development after the implementation of the planned policy.</p>
Example of a study	Based on a mathematical model, Gössling and Peeters ( <a href="#">2015</a> ) estimate how the rate of natural resource use in tourism will evolve until 2050.

Scenarios	
Objective and description	Scenarios can be defined as specific stories that describe how the future may unfold. The aim is to take into account several variants of future developments.

Approach	A combination of a workshop and complementary research to support the scenarios is useful. However, scenarios can also be formulated using other participatory approaches and foresight methods ( <a href="#">backcasting</a> , <a href="#">futures wheel</a> , <a href="#">three horizons</a> ).
Output	The outputs are short stories that comprehensively and systematically describe possible future states of the system under study. Stories should be concise, coherent, plausible and clearly differentiated. The outputs of the scenarios can also be worked with in a creative way: they can be presented e.g. through an art competition, a theatre performance, etc.
Interpretation and further use	<p>In general, scenarios should be followed up by the methods of the final part of the Plan section, so that the results of the scenarios are directly transformed into concrete actions in political, strategic or other decision-making. The scenarios can be seamlessly followed up, for instance by <a href="#">wind tunnelling</a>, in which the measures under study are subjected to a relevance assessment in the formulated scenarios. Follow-up use of the <a href="#">backcasting</a> method is also advisable.</p> <p>The scenarios serve to take into account several options for future developments. They help to identify potential threats and opportunities that stakeholders will face and the necessary trade-offs that need to be made in strategic plans.</p>
Example of a study	The aim of the European Commission study ( <a href="#">2022</a> ) was to map the scale of change that the Covid-19 pandemic may bring to the context of the EU itself and EU research and innovation policy. The five scenarios were designed in a process that included Horizon Europe Network and horizon scanning methods, online workshops and scenarios.

Three horizons	
Objective and description	The three horizons method considers how the discussed <a href="#">scenario</a> or the future, in general, will evolve depending on the trends and progress of the system. The added value involves the distinction between current reality, whose relevance is gradually decreasing (1st horizon), and developments that transform the current state of the system (2nd and 3rd horizons).
Approach	The three horizons can be seen as a framework or guideline for discussion among survey respondents: the development of individual issues is identified. The best way to approach the method is through participatory methods: workshop, expert panel or <a href="#">Delphi</a> .
Output	The output is a visual map illustrating the evolution and interactions of the observed driving forces.
Interpretation and further use	<p>Since the three horizons illustrate the interaction of the problems, it is appropriate to follow up by identifying the impacts within the <a href="#">futures wheel</a> method, or in the next part by <a href="#">wind tunnelling</a>, to formulate relevant strategic recommendations.</p> <p>Also in this case, the results can be considered a valuable basis for strategic planning, which thanks to this method will reflect not only the current state of the system but also future developments and potential threats and opportunities. Naturally, the method can also be useful for identifying investment opportunities, as it identifies which areas are progressive and which areas will soon cease to be relevant.</p>
Example of a	Jordan ( <a href="#">2021</a> ) used the method in his research on the future

study	development of wartime aviation. The research aimed to understand the process of ongoing change in this area related to the technological advances associated with the Fourth Industrial Revolution.
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Judgemental forecasting	
Objective and description	Judgemental forecasting is a method of informed estimation of future developments most often used in complex multi-sectoral problems or situations with insufficient data.
Approach	The Forecasting Tournament is a tool that, using financial and social incentives, can ensure the effective collaboration of a group of participants to dynamically obtain high-quality expert estimates and arguments.
Output	The output of the method contains probabilistic, numerical and verbal predictions to the given questions. They modify and add comments to the published predictions according to their own judgement, allowing them to communicate with each other in real-time to inform and complement each other.
Interpretation and further use	<p>Because judgmental forecasting provides specific quantifications, it is useful to build on judgmental forecasting with <a href="#">Delphi</a> to analyse what the estimates mean for future developments.</p> <p>Forecasting is useful for sudden events such as humanitarian crises or wars, among others. For example, judgmental forecasting can be used to aggregate predictions about the number of war refugees as a result of the conflict.</p>

Example of a study	The Czech Priorities project of <a href="#">OPTIONS</a> (now <a href="#">FORPOL</a> ) was a series of forecasting tournaments in Czechia aimed at finding the best forecasters in the country and creating an expert forecasting team. The team is available to assist the Government in its efforts to make well-informed decisions, particularly in situations of crisis and high uncertainty.
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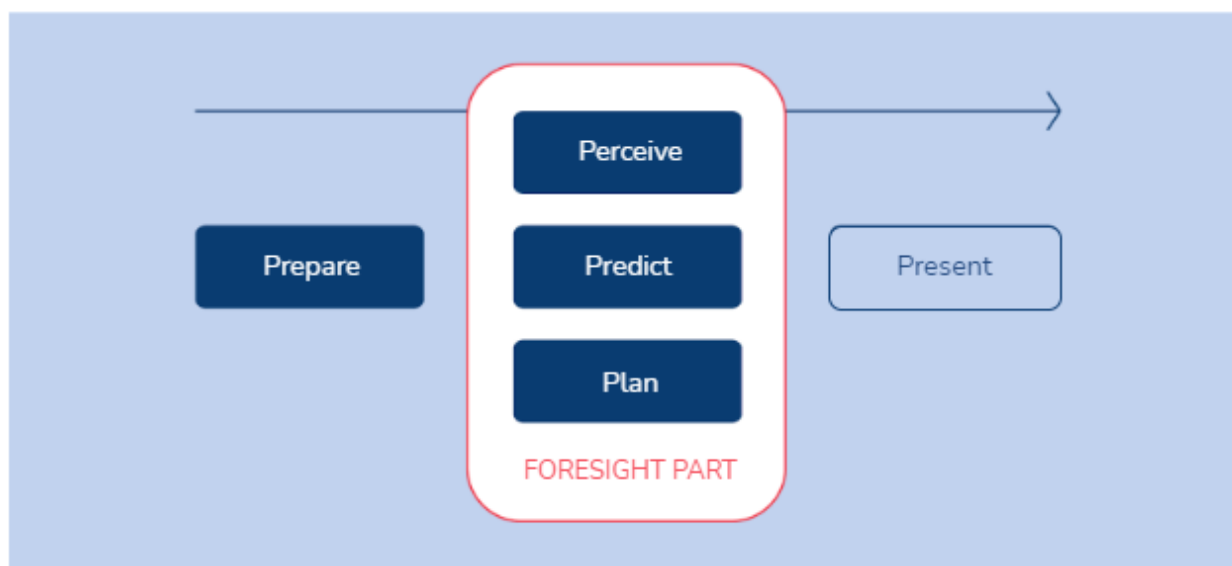
Visioning	
Objective and description	Visioning is a process used to prioritise goals and objectives. The method allows respondents to indicate what a desirable or undesirable future looks like.
Approach	The method provides a high degree of flexibility. Results can be achieved through participatory (workshop, expert panel) and non-participatory (questionnaire, individual interviews) approaches.
Output	The output takes the form of shared aspirations about the future: what should optimally be achieved as soon as possible and what could be postponed. The outputs can be presented in any form, and exhibitions or conferences are suitable for this method.
Interpretation and further use	<p>As the aim is to prioritise objectives and identify a desirable future, it is appropriate to build on this method in the next part by <a href="#">scenarios</a>, <a href="#">backcasting</a> or <a href="#">roadmapping</a>.</p> <p>Visioning helps to clarify expectations and shared goals among stakeholders. The identification of shared visions serves to build consensus among relevant stakeholders on what is to be achieved.</p>



#### Example of a study

The main objective of the CIMULACT (2016) project was to contribute to the relevance of European research and innovation by involving citizens and experts. Respondents employed their everyday life experiences and imagination to articulate their wishes for desired changes and a sustainable future. There were 30 countries involved (including Czechia), each with a day-long workshop where participants debated their visions for the future.

### 3.4 Plan



Following **perceiving** the current situation and **predicting** potential system developments, **planning** can proceed. The outputs are particularly important for **decision-makers**, as they provide the basis for informed decisions on the direction of public policies.

However, it must be stressed that the aim of this part **is not** to prepare a comprehensive strategic plan with a list of specific objectives or priority development directions. Rather, the outputs of this part should guide better policy decision-making by providing recommendations for further decision-making that reflects not only the current state of the system but also future developments.

For planning purposes, it is advisable to implement one of the following methods: roadmapping, wind tunnelling, Delphi, or backcasting.

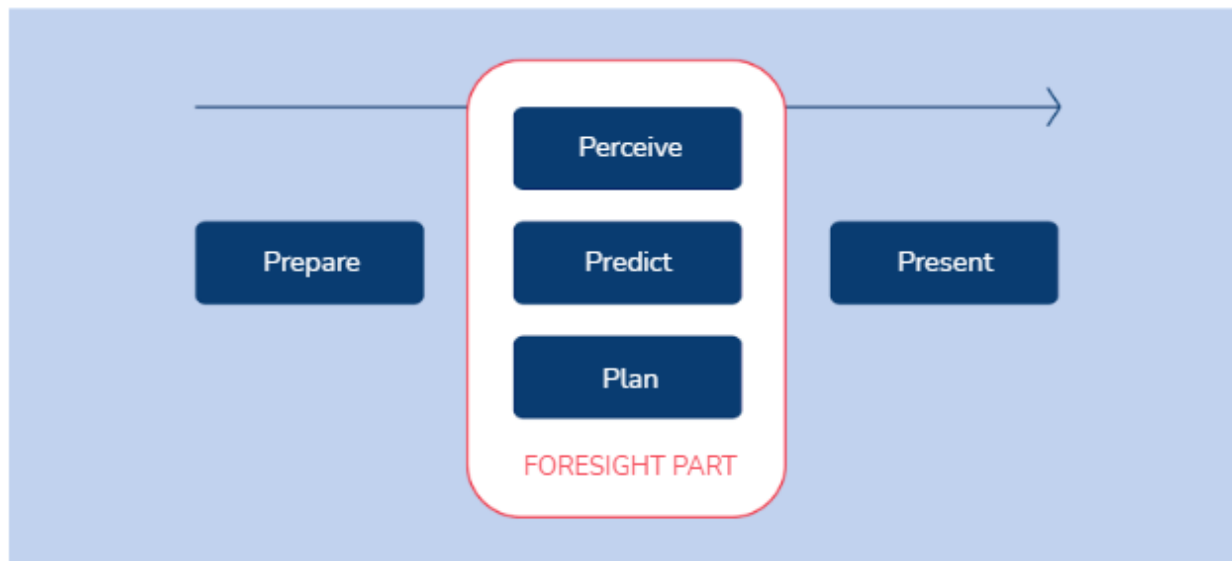
Backcasting	
Objective and description	Backcasting is a method that identifies the necessary steps leading to a preferred future. Respondents identify what needs to change between the present and the future, focusing not only on new measures but also on potential events that disrupt the current state.
Approach	Workshop discussion based on <a href="#">scenarios</a> or <a href="#">visions</a> .
Output	The output is shared ideas about the conditions and next steps that need to happen. At the same time, an indicator system can be set up to monitor the preferred future.
Interpretation and further use	<p>The method could be combined with <a href="#">roadmapping</a> to provide feedback on both outputs and to allow for comparison.</p> <p>The main use of backcasting is to inform strategic planning – it provides the basis for decision-making on planned policy actions.</p>
Example of a study	Höjer et al. ( <a href="#">2011</a> ) explored possible futures for the city of Stockholm by 2050. To use the backcasting method, six images of the future were created, combining spatial dimensions (three versions of changes in the structure of cities), temporal dimensions (two versions of people's pace of life) and technological developments. The images illustrate how a combination of planning, behavioural change and technological development could lead to sustainable energy use.

Roadmapping	
Objective and description	Roadmapping illustrates how research, trends, policy, interventions, etc. interact over time to influence the development of a policy or strategy area of interest. Simplistically, it can be imagined as a timeline into which the variables mentioned above enter.
Approach	Participatory approaches such as a workshop with key stakeholders and experts are appropriate for roadmapping.
Output	The output is a timeline containing events and decision points that illustrate the evolution of the system.
Interpretation and further use	<p>The identified measures, which aim to adjust the expected evolution (sequence of events), may undergo <a href="#">wind tunnelling</a> in the next step to test their robustness with respect to the likely future state.</p> <p>Roadmapping is a typical example of a method that identifies new measures or recommendations that can be used in the action plan of any strategy or policy intervention in general.</p>
An example of a study	Roadmap, produced by the Finnish organisation SITRA ( <a href="#">2016</a> ), describes concrete measures that can accelerate the transition to a competitive circular economy in the country. At the same time, this study highlights best practices and pilot projects that can be easily replicated. The study is a collection of hundreds of ideas, suggestions and expert opinions.

Wind tunnelling	
Objective and description	Wind tunnelling (sometimes also referred to as stress-testing) is used to understand how new or existing policies, strategies or measures may be affected in various <a href="#">scenarios</a> .
Approach	The generally recommended approach is a workshop. However, wind tunnelling can also be implemented using <a href="#">Delphi</a> .
Output	The outcome of the method is feedback and a critical assessment of how a given strategy or measure may be affected by future developments (scenarios). So their future-proofing is being tested. Typically, measures are divided into robust, redundant and those that need modification.
Interpretation and further use	<p>The method can be followed up by <a href="#">backcasting</a>, primarily in relation to measures that need modification. At the same time, new events may be identified during processing that trigger the need to modify the policy.</p> <p>The use of the method is mainly related to the modification of existing action plans. The method makes action plans more resistant to future developments.</p>
Example of a study	Foresight study Read et al. ( <a href="#">2015</a> ) focused on the governance of new technologies, using nanotechnology as an example. To map the government environment, four forward-looking scenarios were developed to capture critical uncertainties. Subsequently, stress tests of key governance elements were conducted to determine how well they could perform in the identified future. Furthermore, the stress test identified strengths, weaknesses, opportunities and

threats to nanotechnology governance in Europe.

### 3.5 Present



The presentation of the outputs should reflect the style and needs of the **target groups** that are to be the users of the foresight results. There are more possibilities for presentation with regard to the different spectrums of participation and creativity. Below are a few forms that can serve as inspiration. The importance of this part lies primarily in increasing the chances of adequate implementation of the results, as insufficiently popularized or communicated outputs **may not be used**.

#### Project report

The project report is a basic output that is also widely used, for example, in the field of evaluation. This output is of a more formal nature; suitable primarily for political leaders and relevant policy and strategy makers. The particular emphasis here must be placed on the management summary, which provides an overview of the most important results. This output is suitable for foresight analyses that include all three foresight components and aim at real improvements in policymaking.

#### Example from abroad

The Foresight Unit in the United Kingdom [Government Office for Science](#) had a total of 34 published reports on various topics as of early 2022 (e.g. [Future of mobility](#) or the [Future of the ageing population](#)). The output in the form of a report is also used annually by the European Union ([Strategic Foresight Report](#)) or the National Intelligence Council of the US, which publishes a [Global Trends Report](#) every four years, always when a new president takes office.

### Conference

The conference is a participatory form of dissemination of the project results, which is addressed to a specific audience (professional public, political representatives, public sphere, non-profit organisations, etc.). Like the project report, this output is more oriented towards stakeholder groups whose decisions can influence future developments. At the same time, this presentation of results can provide an opportunity, for example, to form a working group whose activities will contribute to a higher level of implementation of the results through the formulation of a specific strategy based on the methods in the Plan section.

### Example from abroad

The Spain 2050 conference aimed to present and further discuss Spain's transition to renewables and carbon neutrality. The Spanish Prime Minister and the Vice-President of the European Commission, Maroš Šefčovič, [actively participated](#) in the conference. Another example is the [Mont Fleur](#) project that took place in the 1990s in South Africa. Its aim was to stimulate debate on how to shape and develop the country over the next 10 years. The project team discussed the results with more than 50 groups including political parties, companies, experts, trade unions and civil society organisations.

### Websites and multimedia

It is a creative output that also serves to reach a wider public. It has the advantage of easy dissemination and the potential for attractive and user-friendly design. In view of its orientation towards a wider public, the output is primarily suitable for projects that use the methods of Perceive and Predict parts. The website could also include participatory elements: for example, visitors could comment on the results of the foresight study. This would allow the contracting authority to collect feedback and adjust follow-up activities in the long term.

### Example from abroad

An example of participatory use of the website is [2050.earth](#) which shows predictions of the state of the planet, forms and types of employment, and diet, sequentially in 2030, 2040 and 2050. Visitors have the opportunity to get involved with their own vision and vote on the most and least successful ones.

### Public exhibition

The public exhibition is a participatory form of dissemination of the project results for the general public. This form can be particularly effective for the visioning or scenario method,

### Example from abroad

[Museum of the Future in Dubai](#) was founded by the Dubai Future Foundation, an organisation that seeks to create the future of the city based on collective imagination

where, for example, computer animations can show visitors what the future will look like. In addition, the public exhibition offers the opportunity to connect expert knowledge with, for example, works of art.

and inspiration. Another example comes from London, where the [NetZero Industry conference and exhibition](#) took part to support the decarbonisation of industry in the UK and Europe.



## 4 Combination of methods in a foresight study

High-quality foresight studies often require a **combination of methods**. A good illustrative example is The Future of Work: Jobs and Skills in 2030 (see box below), as the study follows the foresight parts of this methodology and appropriately combines several methods.

### Example from abroad: The Future of Work: Jobs and skills in 2030 ([UKCES, 2014](#))

In 2014, the UK Commission for Employment and Skills conducted a comprehensive foresight study to help provide insight into the labour market in 2030. It aimed to analyse not only the stable trends shaping the future of jobs and skills in the UK, but also their potential disruption. The study was carried out in three parts.

The first part focused on the **perception** of future trends in work and skills. For this purpose, **desk research** was used in the first step through a systematic analysis of more than 300 publications focusing on labour market developments. At the same time, 23 **expert interviews** were conducted. Based on the results of the first step, a wide range of possible trends was generated and the most relevant ones for the UK were selected.

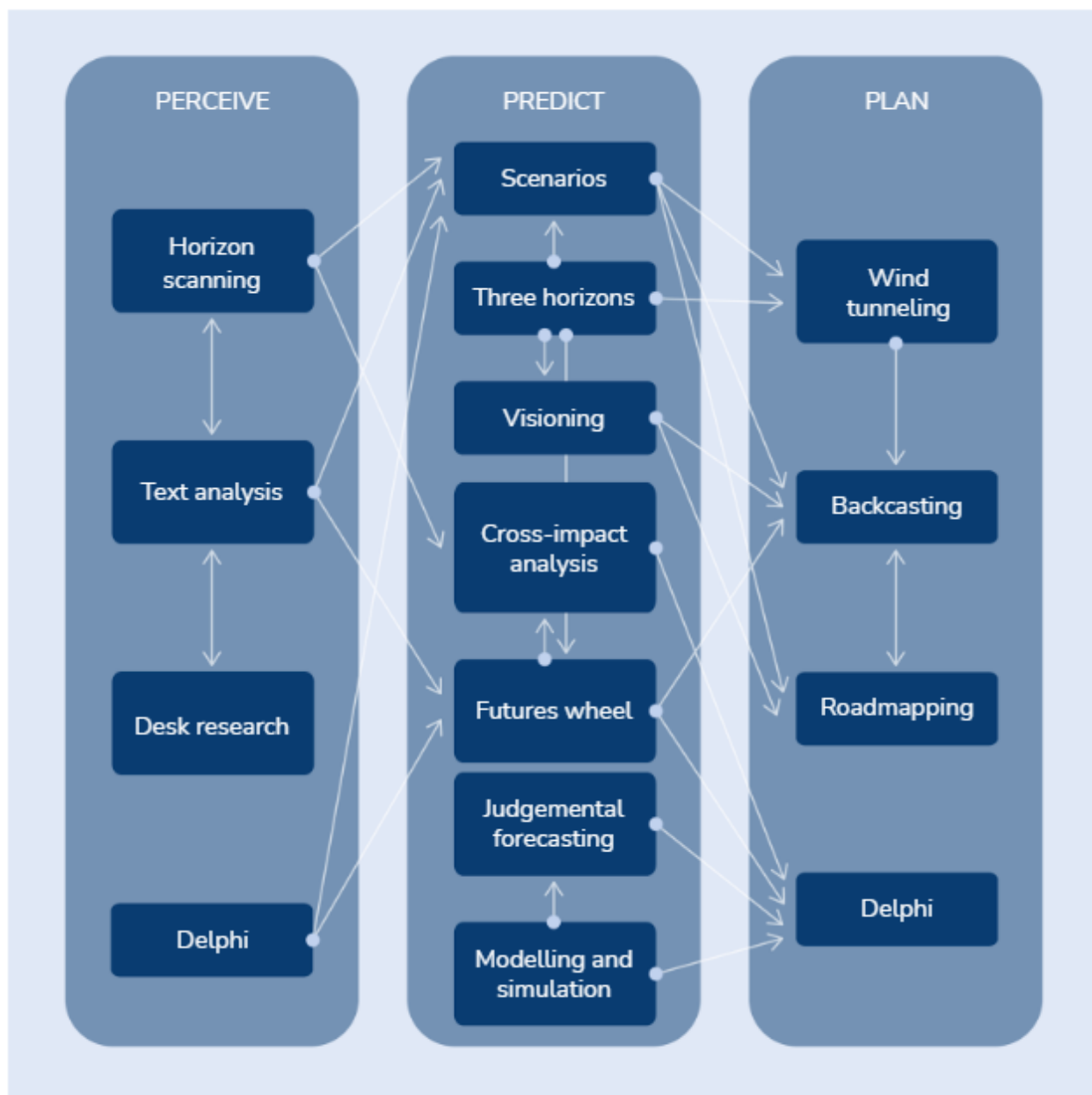
In the second part, **key factor analysis** was used for **prediction**, based on the 13 trends and disruptions they identified, to uncover the most influential factors affecting them. An **expert workshop** and a **cross-impact analysis** were used to identify and project them into the future. The results of these were used to create four **scenarios**, which were elaborated on in more detail during the workshop.

In the last part of the **planning** process, the scenarios were used to identify strategic implications, which were completed and refined through a **workshop** with 34 experts from education, trade unions, employers and public policy. Based on the implications, the last step also identified possible steps to actively prepare for future developments.

However, the **combination** of foresight methods **is not completely universal**: some methods can be merged easily, while others cannot. For example, the backcasting method, which is used to plan strategies and formulate measures, needs certain inputs. Its essence is that the participants look from a certain point in the future to the present and discuss what events or policies may have caused the situation. For this reason, it is appropriate to combine this method with, for example, the scenario method, the aim of which is precisely to describe variants of the future state.

In some cases, methods can be combined: e.g. scenarios can be formulated using the backcasting method ([Neuvonen et al., 2014](#)) or Delphi ([Chen et al., 2020](#)). Backcasting in turn can be used in combination with a futures wheel ([Bengston et al., 2020](#)).

The diagram below shows the **usual and most relevant** combinations of methods.



Source: Piirainen et al. ([2012](#))

## 5 Monitoring a evaluation

Academic literature – e.g. Calof & Smith ([2012](#)); Johnston ([2012](#)); van der Steen & van Twist ([2012](#)) – pays great attention not only to the question of the impact of foresight on public decision-making, but also to ways of evaluating the process of creation itself. With the increasing global interest in foresight, the **basic principles** of its monitoring and evaluation are also emerging ([Georgiou, 2003](#)), which can be used to demonstrate that:

- foresight is effectively managed, has an adequate design and communication of results (accountability),
- the cost of foresight studies is proportionate to its purposes (justification),
- and that ways are being sought to improve foresight studies over time (learning).

Evaluations are affected by the very nature of foresight: because they are **long-term** studies, their impact cannot be measured immediately after their completion. Another problem is that some of the impacts are intangible: for example, the objectives of foresight include networking of relevant experts, or continuous scanning of trends and major breakthrough events, as in the case of the [Risk Assessment and Horizon Scanning](#) system in Singapore.

Effective monitoring and evaluation should meet several conditions. It is important to start **designing** the evaluation plan **before or during the conduction** of a foresight study and to develop **evaluation questions** in advance to describe the benefits of the study. Involving evaluation in the foresight process also increases the transparency and credibility of the results, as evaluators can see how foresight is conducted, and what data is used, and can examine its assumptions themselves. Since one of the main principles of monitoring and evaluation is the progressive improvement of foresight methods, the evaluation should **describe and reflect the risks and shortcomings** of the study. Otherwise, subsequent studies risk repeating the mistakes of previous ones. Monitoring and evaluation is a relatively demanding and complex process, for which **sufficient capacity should be allocated** – financial, personnel and time.

### Example of difficult measurability

One of the conclusions of the foresight study may be that there is a risk of an extreme increase in poverty between 2025 and 2030, and policy makers will implement appropriate preventive measures following the study. If there is no sharp increase in poverty in a given year, it is not clear whether this is due to preventive measures or to natural developments that foresight has wrongly predicted.

Piirainen et al. (2012) argues that evaluations of foresight activities **must take into account** the content and **usability** of the outputs (whether the study fulfils its purpose), the **technical implementation** (whether the results are reliable) and the **ethical dimension** (whether the procedures are transparent and potential interests are taken into account). Based on this conceptual framework, this study developed a list in the form of questions that can be used to evaluate any foresight activity.

(A1) Scoping, objective setting  
(A2) Analysis  
(A3) Interpretation

(A4) Prospection  
(A5) Strategizing  
(A6) Monitoring and updating

### Utility and delivery level

#### Input (Pre-activity evaluation questions)

1. Is the question relevant to the problem? (A1)
2. What limitations will we have to take into account in the interpretation? (A3)
3. Do the analysis and interpretation form a sufficient basis for foresight? (A4).
4. Which assumptions and agendas do we have to take into account? (A4)
5. What constraints do we have in strategizing? (A5)
6. What limitations in the future images, visions and (organisational) objectives, resources, and present plans do we have to account for (A5)

#### Output (Post-activity evaluation questions )

1. Are the stakeholders satisfied with the process and methods? (A1)
2. What limitations or assumptions were added by interpretation? (A3)
3. Do the prospects answer the question? (A4)
4. Do the results inspire trust? (A4)
5. Are the prospects challenging and inspiring? (A4)
6. Are the proposed actions and strategies based on the prospects? (A5)
7. Are they feasible given the resources, stakeholders and other constraints? (A5)
8. Are the people willing to commit? (A5)
9. Are the limitations of the prospects accounted for in the plans? (A5)

#### (Sustained) Impact

1. Was the perspective the one that was needed? (A1)

2. Did the analysis prove sufficient to support answering the question/problem? (A2)
3. What limitations did the analysis uncover? (A2)
4. Did the prospection answer the question? (A4)
5. Were the results satisfying to the stakeholders? (A4)
6. Was it engaging and inspiring enough to have an impact on the imagination of the readers? (A4)
7. Were the strategies feasible and were they based on foresight? (A5)
8. Were they implemented? (A5)
9. Were the forecasts on the right level of analysis and depth to support strategizing? (A5)

### Technical level

#### Input (Pre-activity evaluation questions)

1. Is the research problem/question reasonable? (A1)
2. What data do we need to answer the question? (A2)
3. What assumptions and limitations are associated with the methods? (A2)
4. Are the chosen methods appropriate? (A2)
5. Are the chosen analytical methods sufficient to support the interpretation? (A3)
6. What limitations of analysis and interpretation do we have to take into account and which deserve less attention? (A4)
7. Which data and assumptions are still up to date? (A6)
8. Do we need to change methods? (A6)
9. How big an update must we do? (A6)

#### Output (Post-activity evaluation questions )

1. Is the project plan reasonable? (A1)
2. Are the resources sufficient to fulfil the plan? (A1)
3. Are the design and methods suitable to answer the question? (A1)
4. Did we have a reasonable field design, and did we get good data? (A2)
5. Were the reliability and validity of the analysis sufficient? (A2)
6. Do we have sufficient information to proceed? (A2)
7. Do we need new data or different analytical tools? (A2)
8. What limitations are associated with the methods and data? (A2)

9. Is the interpretation compatible with the analysis methodologically and content-wise? (A3)
10. Did we create a plausible interpretation of the analysis as a basis for prospection? (A3)
11. Are the prospects plausible, consistent with the analysis and coherent? (A4)
12. Are the prospects valid and reliable? (A4)
13. What are the main assumptions and limitations behind the prospects? (A4)
14. Do the prospects cover the future and challenge the status quo? (A4)
15. What new assumptions and limitations do we have to account for? (A6)
16. What new actions do we have to take? (A6)

### **(Sustained) Impact**

1. Were the design and project plan reasonable? (A1)
2. Was the analysis solid, reliable and valid? (A2)
3. Were the interpretations reasonable and balanced given the data? (A3)
4. Was the conceptual model solid and convincing enough to enable successful foresight? (A3)
5. Did the research design hold? (A4)
6. Did the recursive chain of assumptions, limitations and agendas in different phases render the prospect unusable? (A4) – How robust and sustainable is the foresight we created? (A6)
7. How much could we update the analysis without a complete redesign? (A6)
8. Did the research design handle changes robustly? (A6)

## **Ethical level**

### **Input (Pre-activity evaluation questions)**

1. Who is the client or beneficiary whose interests are (should be) served? (A1)
2. Are the intentions and agendas acceptable? (A1)
3. What worldview determines which constitutes an improvement? (A1–4)
4. Who is an expert or who should be involved as a competent provider of experience and expertise? (A1)

### **Output (Post-activity evaluation questions )**

1. What measures we can use to determine that the consequences, taken together, constitute an improvement? (A1–4)
2. Who is the decision-maker who is in a position to change the measure of improvement? (A5)

#### **(Sustained) Impact**

1. What resources and other conditions of success are (ought to be) controlled by the stakeholders? (A4–6)

Source: Piirainen et al. ([2012](#))

## 6 Conclusion

Developments in today's globally connected world are extremely dynamic. The crises that have occurred in recent years show that to increase the resilience of public administration, it is necessary to predict possible future developments and take them into account in current political decision-making. At the same time, megatrends (urbanisation, declining birth rates and ageing populations, loss of biodiversity, technological acceleration and digitalisation, etc.) are having a long-term impact on the current functioning of the societal system. Crises, megatrends and other factors enter into policy decisions at the state and local levels.

Foresight, thanks to its wide range of methods, offers an opportunity to systematically examine these issues and transform them into strategic planning. Through foresight, experts and the general public can participate in defining ideas about the future, providing valuable material for political decision-making and, through participation, increasing the confidence of the general public in political decision-making.

However, the use of foresight does not have to be approached exclusively in the context of sudden changes in the elaborated system, such as crises and new trends. Foresight methods can also be used for setting priorities for governance (visioning), cyclical strategic activity or during the preparation of planned measures.



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