

The Scenario Method for Education

Facilitator Manual

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I Background information

1.1 The scenario method: from business to education

In a business setting

The scenario method was originally developed to deal with future uncertainties facing business. The method allows us to think outside the present framework by transplanting ourselves into the future. We imagine what the future is going to be like, and realize there are a number of uncertainties. On the basis of uncertainties with a high impact, we design and investigate a number of possible futures. We make these possible futures into plausible scenarios by back-casting a plausible path which includes seminal events and actors.

With the future scenarios worked out, we can chart either a reactive or a proactive course. In the reactive course, scenarios are used for a defensive purpose and the organization prepares and plans for all possible futures, regardless of their desirability. In a proactive course, the goal is to achieve the most desirable scenario; in this case, we chart a strategy to steer events away from the most likely towards the most desirable scenario.

In a business setting, the aim of writing future scenarios is to maximize a company's ability to anticipate and act on the possible futures in order to make strategic choices in a competitive global market. It can also be used to allow groups to work together with a common purpose, while using the opinions, expertise and values of every member. A (virtual) company can thus use the scenario method to map all the different perspectives held by its employees and formulate a shared vision on the role and goals of a company.

In an educational setting

In an educational context, we use the scenario method as a tool for learning and research in different higher educational settings. The aim in an educational setting is to broaden students' perspective on future developments in the field in which they are studying and challenge the assumptions on which their ideas about the field are based.

The underlying assumption is that developing future scenarios stimulates students to think 'out of the box', recognise developments in society which are relevant to their field and acknowledge the interdependence and complexity of systems.

We can arrive at plausible and inspiring scenarios only on the basis of thorough research into relevant environmental factors and current developments in the field. The scenario method has not yet been used extensively in education, except in a few cases whereby students are familiarised with the methodology on the grounds that they may come across it in their future profession. In such cases the methodology is an aim in itself. The scenario method has seldom been used as an *educational tool* whereby students achieve specified learning aims such as thinking out of the box and exploring environmental factors. Such aims may be important elements in an educational programme. In addition, writing future scenarios can help stimulate creativity, critical thinking skills and the questioning of mental models and personal values.

In addition, the method can be used to:

- help students become aware of important value systems within their field, and their own position in relation to these
- encourage students to anticipate future developments on the basis of relevant research
- stimulate students to expand their thinking horizon by examining changing perspectives and exploring the complexity of contexts
- encourage critical reflection on the value and validity of expert opinions
- help students formulate policy recommendations based on solidly constructed arguments

Learners develop a host of competencies. They learn to map the relevant environment for their field, to choose and apply research methods, to think outside the box, to do historical research, to collaborate with fellow-students, to allow for multiple answers. In short, the scenario method allows students to develop their thinking and strengthens their research and reflective judgment skills.

Learning through writing future scenarios is based on a socio-constructivist approach with an emphasis on knowledge construction rather than knowledge transmission. The role of the facilitator is to participate with students in constructing reality by engaging them in open-ended inquiry that elicits and challenges students' conceptions about their field of study. A learning group will undergo and shape the learning process communally.

Learning activities include fore-casting and back-casting, extrapolation and projection, charting trends and breaks in trends, and mapping the contribution of the main actors and stakeholders. Students find out what the present situation is, how past developments led up to this point, and what extrapolations and experts say about the future. They learn to consult formal research using statistical extrapolations and informal research such as media scans. They learn to weigh the opinions of experts and dissenting voices countering prevailing trends.

Their research is motivated by the shared aim of making scenarios plausible and encouraged by the interactive structure of the scenario method. The emphasis throughout the whole process is on interaction and through this interaction, knowledge construction.

We recommend that attention should be paid to both process (research into developments) and product (the future scenarios). Formulating assessment criteria for both the scenarios and the underpinning arguments is an important aspect of this. A prerequisite for feasible, well argued scenarios is sufficient time for students to carry out and evaluate their research. If this time is not available, the facilitator will need to make choices depending on the learning aims he wishes to emphasise.

1.2 Summary of the 8 steps

The method developed for use in an educational setting can be broken down into three phases: an analysis of future trends, followed by development of the scenarios, and culminating in a reflection on and response to the future scenarios. The phases involve eight steps, as follows:

Step 0: The facilitator chooses the theme and time frame (see section 1.4)

Phase I: Analysis

Step 1: Brainstorm visions of the future

Step 2: Investigate trends

Step 3: Choose driving forces

Students find, discuss, and check future visions for the field from a wide variety of sources. They distil a number of trends from these visions. They look for the driving forces underlying the trends we foresee.

Phase II: Development and presentation of the scenarios

Step 4: Form a scenario template

Step 5: Develop the scenarios

Step 6: Present the scenarios

Students choose as scenario axes two driving forces with high impact and high uncertainty; these form the scenario template and four scenarios. These scenarios are developed by and presented by four subgroups.

Phase III: Reflection

Step 7: Evaluate the scenarios

Step 8: Formulate policy recommendations

Students reflect on what the most likely, most desirable, and worst case scenario is. They formulate policy recommendations to avoid the worst case scenario. They decide what the most likely and the most desirable scenarios are for their field, how they will develop over time and what recommendations they can make to contribute to the desired future.

1.3 The roles of the facilitator

Doing the scenario method with students involves more than just following a step-by-step method and presenting four plausible future scenarios. The eight steps merely provide the *structure* for the process. Building scenarios involves thinking together and reflecting upon one's knowledge. The facilitator's task is to get students to recognize their own involvement and vision for their field, to chair a meaningful discussion about future challenges and driving forces, and to help build a generative scenario template. The facilitator may opt to use variations on the eight steps, or to shift the emphasis within the process in order to achieve these goals.

Box 1: Main roles of the facilitator

- Introduce each new step properly, explain the intention, relevance and procedure.
- Give clear information to the students about the learning goals, requirements of each phase, assessment criteria and -procedure.
- Emphasize the quality of interactions between students.
- Emphasize the role of values and emotions (for example by using 'best/worst future visions').
- Let the students explore 'what they do not know', get them out of their comfort zone; get the students to think outside the box, to think in extreme terms, absurd or laughable thoughts (which they have to back up later by research).
- Get the students to think from various perspectives, for instance by giving them different roles.
- Encourage students to trust their intuition.
- Stimulate them also to look critical at the claims of "experts" and fellow students.
- Maintain the dynamics of the scenario process, for instance by giving substantial tasks between the sessions.

During the process the facilitator fulfils different roles: he is teacher, trainer, coach and assessor. It is important to be aware of the different roles on different occasions and to be clear about this to students. The facilitator uses his expertise to keep asking questions of the participants, but does not participate as an expert in the making of the scenarios.

1.4 Choice of theme and time frame

The structure of the scenario-making exercise is given by the theme and time frame selected. In a business setting, the theme will arise out of an investigation of the most important issues facing a business. In the educational setting, the facilitator chooses the theme and time-frame depending on the aim of the course in which the method will be used.

The facilitator chooses an important issue in the field of study of the student, and which strongly appeals to the feelings of the students, for example "The state of water management in Eastern Europe in 2016", "Secondary education and ICT in 2016", "Infrastructure in 2016". In general, a more specific theme will yield useful information and allow for focus, while an interdisciplinary theme will broaden horizons.

The time frame depends on the theme. As a rule of thumb, use 10 years into the future, close enough to get an image for the future and far away enough to allow for radically new developments. If the

field is subject to great changes, such as information technology, a shorter time-frame of 5 years may be chosen. In the case of infrastructure, where plans are made far in advance, a 15-year time frame may be more appropriate.

1.5 ICT

The methodology involves blended learning, using face to face learning to stimulate high quality interaction, develop thinking and reflection skills, and e-learning to order and store ideas, carry out research, share information between sessions and publish final products on the web.

ICT Resources include :

1. a graphic brainstorm software application such as Inspiration for inventories with links to evidence and arguments (www.inspiration.com).
2. an Electronic Learning Environment (ELO) (e.g. Blackboard or BSCW) for course information, group work, out of class activities.
3. a website, for example www.scenarioleren.nl, to publish products and results.

II Explanation of the phases

2.1 Phase I: Analysis of future trends

! Warning: The steps in this phase can improve students' level of thinking on a higher (meta) level. However, when this phase is done superficially, the outcome will probably lead simply to reinforcement or confirmation of already existing ideas.

2.1.1 Explanation of Phase I

Summary

In Phase I students focus on the factors which may have a great impact on the future development of the field. They find, discuss, and check future visions for the field from a wide variety of sources. The group holds a strategic conversation to find the driving forces behind the events and trends they foresee.

Homework: 6 hours, research and making reports

Duration of the session: 4 hours

Reiteration of further research and strategic conversation may be necessary at the end of the session.

Explanation

STEP 1 Brainstorm visions of the future

Students image the future through a variety of tools and back up their views by formal and informal research.

Examples of tools to create an image of the future are:

- an essay *Day in the life of the student 5/10/ 15 years hence*;
- questions for the future, surfacing strategic issues and concerns in the field, such as: Oracle-questions; Best & Worst Possible World; Critical Decisions (see Appendix 1). The facilitator encourages the students to envision their own idea of the future.

STEP 2 Investigate trends

Students may propose as many ideas about the future as they wish, but then they must do research and produce evidence to show that a trend is held as plausible, either by the mainstream or by dissenting voices. Not only *the variety of sources* but also the *quality* of the information is emphasized. Students can find trends and predictions from a wide variety of sources, from the official sources for the field to unexpected dissenting voices found in unlikely places.

Formal sources include scientific publications, statistical projections and reports by governmental think tanks. Informal sources include diverging opinions expressed in a wide variety of publications. For example, students can do a Media Scan in which they scour all types of magazines for information on the topic, even in such unlikely places as fashion, technical, or hobby magazines.

Only trends which have backing from research may remain. All competencies involved in doing research in the field can be practiced here. Use STEEP (Societal, Technological, Economic, Environmental, Political factors) or DSTEP (Demographic, Societal, Technological, Economic, Political factors) to make sure that all relevant domains are covered.

The facilitator needs to make sure that the students know from the beginning precisely what is expected of them in this phase.

Box 2: Tips for the assessment of the analysis of the context of the field

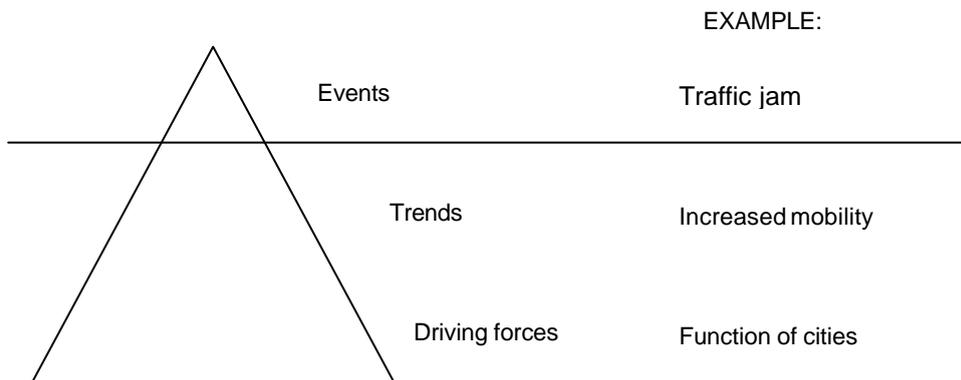
- Be explicit about the evaluation and assessment.
- Are the students assessed in this phase?
- What ‘products’ are evaluated? Individual or team products? Written or oral presentations (e.g. explanations to fellow students)?
- Who will evaluate: peers or facilitator?
- What are the assessment criteria? Specify the required level and depth of research.
- What are the consequences when the criteria are not met?

STEP 3 Choose driving forces

The *search for driving forces* lies at the heart of the scenario method. Here a deeper learning can occur: a deeper understanding of the processes in the field, including unknown aspects. The facilitator engages the students in an evaluation of the listed future events and trends (chain of events), in order to find the underlying driving forces which act upon the field.

The facilitator should bear in mind that the search for driving forces must lead in the end to the process of choosing the axes for the scenario template. There has to be a certain amount of discomfort: the scenarios should not become science fiction, but neither should they be too ordinary.

The driving forces may be obvious, but they may also be several layers removed from the more visible forecasts. The skill of the facilitator lies in getting the students to dig deeper to find driving forces which are not so obvious at first sight.



Facilitators report that this phase is the most difficult one to guide. The aim is to get students to think outside the box, to talk about things they don’t know and they don’t have control over. Box 3 lists facilitator tips to stimulate the search for driving forces and structure the discussion towards suitable scenario axes.

Box 3: Tips to guide the search for driving forces

- Provoke exaggerated or absurd ideas to find new perspectives on the issue.
- Students sometimes tend to cluster events around a theme; this is static. Ask the students about the movement they see in the future, about the trends they see.
- Be aware of the fact that a trend can provoke a counterforce.
- Be alert when trends with opposite outcomes are mentioned. Jot them down: they can possibly be used to form scenario axes.
- The evaluation of the driving forces is on impact and level of uncertainty. Key uncertainties should be given special attention.

Two ways to stimulate the search for driving forces

1. Make use of mind mapping software such as *Inspiration* while arguing the position of the driving forces by assessing the level of impact on the theme, and the level of uncertainty.
2. Draw an impact diagram on the floor. Students take up a position and argue for why the driving forces should be in that position.

Suggestion for homework

Students prepare themselves for the search for driving forces: in subgroups they make a selection of driving forces (6 - 8) and give them a position in the impact diagram. Arguments are based on research done in step 2.

Product: Positioning of driving forces in an impact diagram with links to clusters of events and trends backed up by research. This impact diagram can then be uploaded to the website.

2.1.2 Necessary materials and preparations

Non-digital materials

- Blackboard or Flipcharts.
- Markers.

Digital materials/ICT

- Laptop with graphic brainstorm or mind mapping software application for presentations of research (for example *Inspiration* and PowerPoint). Students need to become acquainted with the software.
- Data projector (Beamer).
- Electronic Learning Environment (ELO, for example Blackboard or BSCW) for group work. The facilitator prepares by creating a workspace for common use (communication, file sharing, evaluation).

* In Step 1 student can post their essays - if they use this form - in the ELO of the institution.

* In Step 1 and 2 the graphic brainstorm software application is also used to add extra information in the form of links to data and research, notes explaining terms, and arrows showing relationships.

* In Step 3 the group uses the graphic brainstorm software application. Different events, trends and driving forces can be identified by using different colours and shapes.

- The graphic brainstorm software application is used in the group to cluster trends and create the impact diagram.

- Website. The product of the previous step(s) can be published on www.scenarioleren.nl so it is available for further use and reference.

Background information

Appendix 1

2.1.3 Example of an Uncertainty/Impact Board: Infrastructure in 2016

The impact diagram on the following page was produced in *Inspiration* by students following a minor in Extreme Engineering at the Institute for Technology of the University of Practical Education in Amsterdam (Hogeschool van Amsterdam). The chosen topic was *Infrastructure in 2016*.

The impact diagram shows the trends and driving forces in infrastructure identified in the brainstorm session and during the search for driving forces. E.g. the driving force 'function of cities' can be 'spread across regional centres' at one extreme or 'concentrated in metropolis' at the other. The position of each trend and driving force is positioned according to its impact and relative uncertainty.

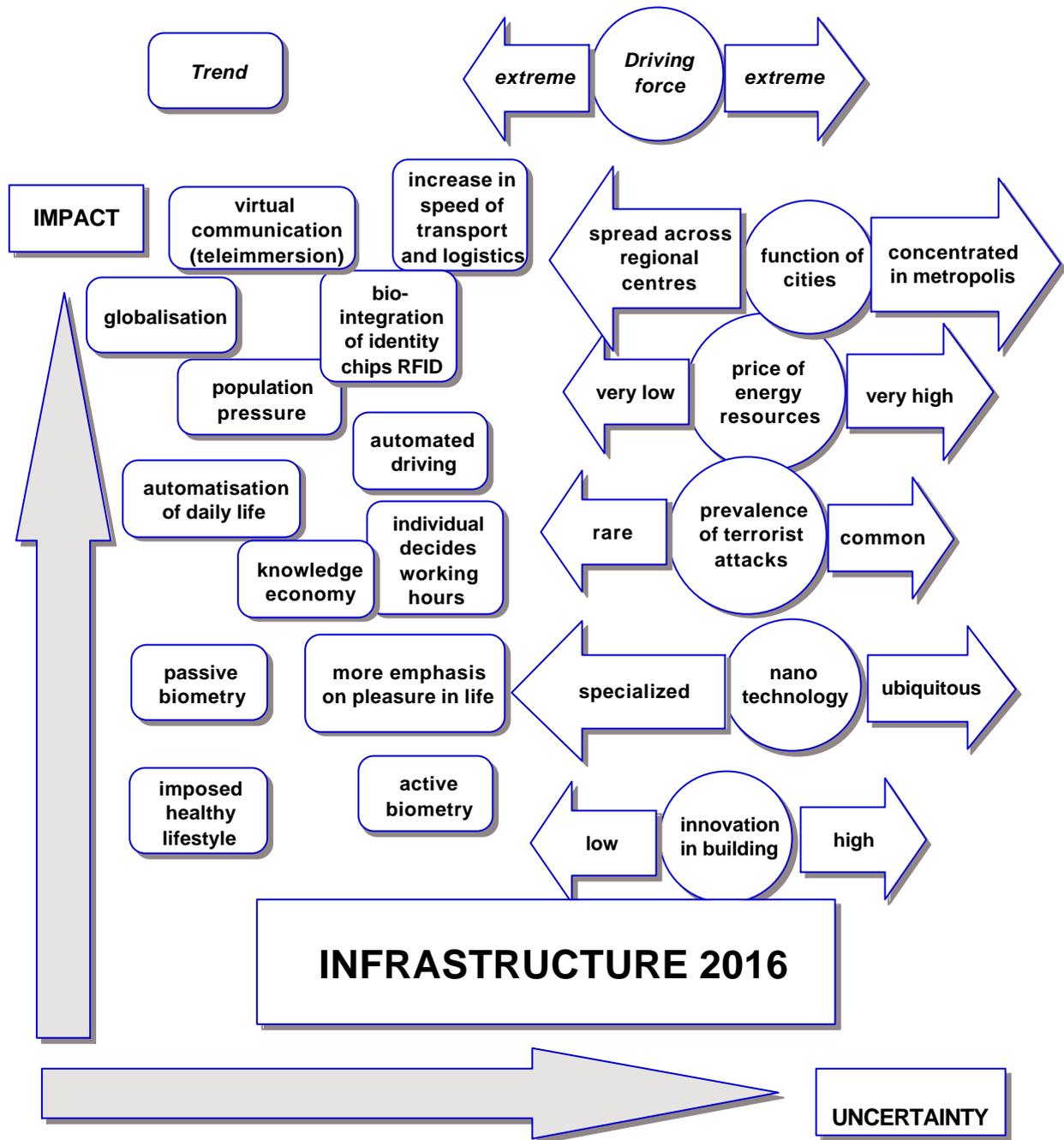


Figure 1: example of impact diagram.

2.2 Phase II: Development and presentation of the scenarios

2.2.1 Explanation of Phase II

Summary

In Phase II the scenario axes are selected, the scenario template is built, and students develop and present the four scenarios.

Homework: 32 hours for research, development, creation and presentation of scenario (Step 5) in small groups

Duration of the session: 8 hours (Step 4: 2 hours, Step 5: 4 hours in small groups, Step 6: 2 hours)

Explanation

STEP 4 Form a scenario template

By looking at the “High Uncertainty/High Impact” corner on the impact diagram (see figure 1), students list the driving forces with related extreme outcomes. They have to choose the most important driving forces: these are used to make the scenario axes.

Once the list is narrowed down to a few axes, two axes are used to make a scenario template. The axes must be independent of each other (i.e. not deal with the same driving force) and must present four possible quadrants. The facilitator can try out several possible combinations of axes to form the template. Making finally balanced axes and templates requires some skill and practice.

Box 4: Tips to guide the formation of a scenario template

- Take time to develop a common language: check if everybody knows what is meant by a specific driving force, and ask what trends they clustered behind it?
- Experiment with various possibilities and look for the axes which provide new insights into the situation, rather than axes which provide four futures which already exist today.
- Don't let yourself be seduced into choosing too quickly. Tell the students that the search for driving forces and the formation of a scenario template may take some time, but that it is necessary to do it properly in order to enjoy developing the scenarios later on, and to enhance the quality of the policy recommendations.
- Make sure during the discussion that
 - * the driving forces are flanked by extreme directions (to make a continuum);
 - * the two sides of the axes are opposites and that their meaning is clearly defined and understood (avoid yes/no extremes);
 - * both ends are neutral (avoid value judgments);
 - * the two axes do not overlap in meaning.

Possible variant

The horizontal axis is a social trend, while the vertical axis represents a dilemma of those asking the question (for example: should we move to specialize or generalize?).

Example of choosing scenario axes from the impact diagram

In figure 1, there are five driving forces: *the functions of cities, the price of energy, the likelihood of terrorist attacks, the development of nanotechnology, and the amount of innovation in building*. These five driving forces are flanked by extreme values, drawn in the arrows. For example, the energy price varies from very low to very high. In the case of nanotechnology, the students thought that it would certainly be present in 2016, but could not agree on whether it would be ubiquitous or only used in specialized applications. They also thought the impact of nanotechnology for infrastructure was not so high.

The facilitator must now help the students to choose two axes to form a template with four different scenarios. The axis *regional centres - metropolis* is seen as vital to the development of infrastructure, and was also rated to have the highest impact. In this example, it can be matched with any of the other driving forces; this will lead to scenarios with an emphasis on social context (*prevalence of terrorist attacks*), on technological developments (*nanotechnology* or *building innovation*), or on the type of logistics and transport systems (*energy prices*). Three templates are thus possible. In this case, the other axis that was chosen was *energy prices*, because it was felt it had the greatest impact on the kind of large infrastructure projects that the students would propose in their study of “Extreme Engineering”.

Choosing the scenario axes is a crucial step in the process, and one which novice facilitators can find a bit daunting. Keep in mind that if the procedure is followed correctly, if value-free extremes are chosen for high impact uncertainties, and if the two axes do not resemble each other, then an interesting template will come out of it. It can be useful to suggest several templates, evaluate them briefly, and choose the one that seems most appropriate or most challenging. If it is found that it is difficult to develop distinct scenarios from the template, retrace your steps and make a new template. You can even return to the trends to formulate deeper driving forces, taking into account your experience of researching scenarios.

STEP 5 Develop the scenarios

Once the dimensions are chosen and the scenario template is built, the students are divided into four groups. The facilitator gives each group a quadrant to develop. The four teams are freed from wondering what the future will look like; each team can now concentrate on a *specific future*.

Box 5: Student instruction for the development of the scenarios

Criteria for the content

- The scenario has to be internally consistent and match the quadrant extremes.
- The trends which are ‘certain’ have to be part of all scenarios.
- The scenario has to be written *from the perspective of the future* (as if we are already living 5, 10 or 15 years hence).
- The scenario looks back on how things happened this way, using speculative *back-casting*.
- The scenarios must be *plausible*; all research methodology used in step 2 is applied here, but this time selectively. Only facts and predictions supporting the scenario are used.

Demands and suggestions for the presentation

- The scenario is like a film scenario. It is a story, in which main actors and events make a possible world plausible. Actors and events must be included in the back-casting.
- The scenario needs to have a catchy name, like a publicity slogan, which reflects its essence. The name becomes a shortcut for the whole scenario in people's minds. Examples: McAdemy, Super-market.
- The scenario has more impact if it is presented creatively, to help the audience make the leap into the future. Television shows, interviews, newspaper articles, role play between key players make the scenario come alive.
- Use supporting material, data projector (beamer) presentations, handouts, or involve the audience in a play.
- Some elements need to make us realize the time really is different from now. Provide *estrangement*, for example by displaying new communication methods, or by extrapolating the career of famous people, or by using new invented terminology.
- Emotions in the scenarios are important. Using emotions to visualize a future world produces powerful images which also help to stretch our thinking. What makes you happy or hopeful, what makes you angry, what do you perceive as threatening?

Possible variants

Emotions can be used in different ways.

1. Make all scenarios *positive*. The students will withhold judging the scenarios until the final reflection phase.
2. Present two variants of each scenario, one 'written-to-scare' and the other 'written-to-inspire'.

Box 6: Tips for the feedback and assessment of presentation of the scenarios

- Be explicit about the feedback and assessment
- Are the students assessed in this phase?
- Are the students evaluated individually (preferred by many students) or as a team? Are they evaluated by means of a written or oral presentation?
- Who will evaluate: peers, the facilitator, or an external expert?
- What are the assessment criteria? Specify the required level and depth of research, the demands for the presentation, the required consistency and the need to incorporate all the certainties into the scenarios.
- Do the students get the opportunity to improve their scenario on the basis of feedback after the first presentation?
- What are the consequences when the criteria are not met?

STEP 6 Present the scenarios

- Each subgroup presents its scenario.
- Give feedback/ assess the presentations according to the specified requirements.
- If the scenarios are flat or do not give new insights an iteration of steps 4, 5 and 6 can be done, by constructing new scenario templates.

Box 7: Tip to raise the standards of the scenario presentations

When the requirements for research and evidence of plausibility of the scenarios are high, it may help to organize a meeting to present the scenarios to external experts. This will be highly motivating for the students. In that case a rehearsal is recommended: in a presentation students check each other on consistency of the scenarios, use of terms, validity of arguments.

Product: Four scenarios. The scenarios can be summarized in a graphic brainstorm software application and put onto the website.

2.2.2 Necessary materials and preparations

Non-digital materials

- Workspace to work in small groups.
- A creative environment and material to inspire the students.

Digital materials/ICT

- Data projector (Beamer).
- Laptop with graphic brainstorm software application for presentations (for example *Inspiration* and PowerPoint).
- Electronic Learning Environment for group work.

* In Step 4 the facilitator or one of the students makes a grid in a graphic brainstorm software application. Fill in the grids with the driving forces. Put the files in the workspace.

* In Step 5 and 6 students can use various IT-tools to write their scenario. They can do research, make drawings (*Inspiration*, *Paint Shop*) or presentations (*Power point*, *Flash*), photos and video

(Pinnacle, iMovie), pictures (using a digital camera).

Save the products in the workspace so it is available for the students, the facilitator, and external experts.

2.2.3 Example of a Scenario Template and Scenarios: Infrastructure 2016

The following Inspiration Mind map shows the Scenario Template designed by students on the theme *Infrastructure in 2016*.

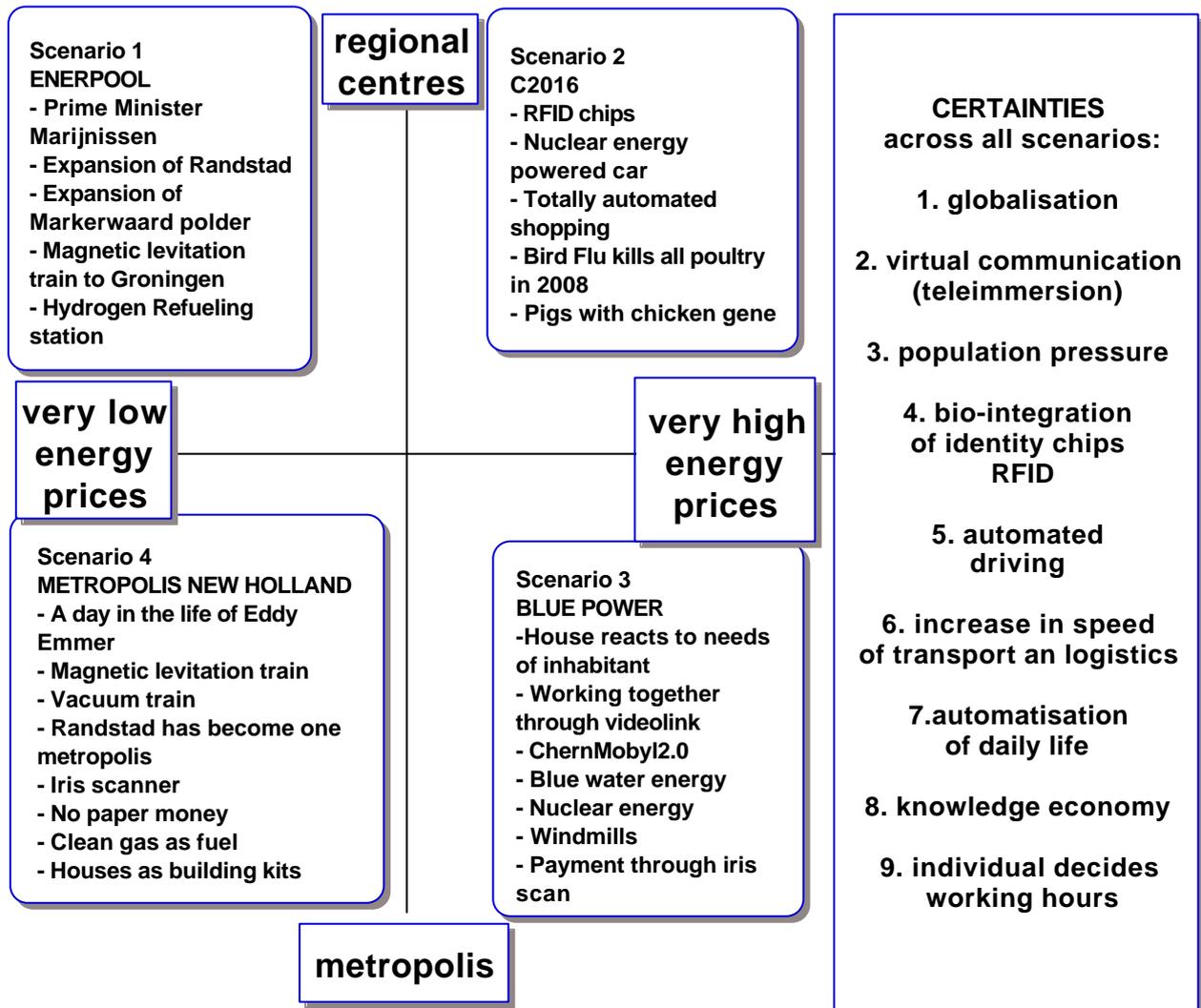


Figure 2: example scenario template.

2.3 Phase III: Reflection on the scenarios

2.3.1 Explanation of Phase III

Summary

In Phase III the consequences of the scenarios for the field are reflected upon.

Homework: 16 hours, writing recommendations

Duration of the session: 2 - 4 hours

Explanation

In this final stage, the facilitator can emphasize that building and presenting the four scenarios is not a way to predict or forecast the future, but rather to show that there are different options in the future, that *the future is open*. The students' values for the future make them prefer one scenario to another, and allow them to make recommendations to steer the future in a specific direction.

STEP 7 Evaluate the scenarios

Divide the floor space into four scenario quadrants (use broad masking tape). All participants stand on the position in the quadrant they feel expresses the Most Likely scenario. The participants motivate their choice through a guided conversation, and may switch. Repeat this exercise for the Most Desirable scenario in the student's opinion. Let them motivate their choices. Repeat again by letting them choose a Worst Case quadrant.

STEP 8 Formulate policy recommendations

Possible questions for recommendations

- What should we do to curb our scenario away from Most Likely towards Most Desirable?
- How do we avoid the Worst Case scenario?

Possible questions to stimulate the reflection:

- Who wins in what scenario?
- What repercussions do the four scenarios have for society?
- Are these scenarios even considered in the 'Official Future' as you now imagine it?

Box 8: Tip to enhance the judgment process

Make a matrix for the evaluation of the scenarios on risks and possible outcomes. Students have to weigh both in their recommendations.

Product: Recommendations referring to the four scenarios of Phase II.

2.3.2 Necessary materials and preparations

Non-digital materials

Material to 'draw' the axes on the floor such as broad masking tape.

Digital materials/ICT

- Data projector (Beamer)
- Laptop with a graphic brainstorm software application.
- Electronic Learning Environment for group work.

* In Step 7 add text with reasonable arguments for the Most Likely, Most Desirable and Worst Case Scenario. Use the files that were saved earlier.

* Use the electronic learning environment to evaluate the scenario project.

III Additional information for the facilitator

3.1 Embedding scenarios in the elaboration of shared group values: the value ladder

Scenarios tend to be value-neutral explorations of possible futures. They can however also be embedded in an elaboration of what type of world would be desirable. In this case the students first discuss their ethical motivations, and how to act in the face of future uncertainties. The value ladder exercise was conceived and is used by Huib Schwab in his EuroLAB, one-week intensives in which he combines the scenario method with Socratic Dialogue.

Before starting the elaboration of the scenarios, a ‘value ladder’ exercise sets the context.

Steps:

- 1) Individual students are asked to choose the five values that matter most to them, and rank them in order of importance. The facilitator does not give examples of values, so as not to prejudge the outcome.
- 2) The students are then asked to team up with another person, and to come to a joint list of their five most important values. They are not given any rules on how to achieve this: some will debate the relative merits of their choices, while others will make trade-offs, or find overarching values which include their different contributions.
- 3) Then the pairs find another pair to make a joint list for a group of four, and so on, until either all the students come up with a single list of five ranked values, or two large groups remain, which can present their results in turn.
- 4) The joint values of the group are written up in a prominent place and used in the last phase of the scenario building process (step 7) to determine what the most desirable scenario is. Which of the scenarios most strongly exhibit the group values? How is it possible to strive for these values given the differing future scenarios?

- This exercise should be done at speed, taking no more than half an hour in total for a group of around twenty students.

- Students are also asked to reflect on the ways in which they reached agreement. Students often point out that it became harder to reach agreement in larger groups, but will also show surprise at how many values they have in common.

3.2 Embedding scenarios in systems thinking and business

Scenarios are often used in the business world to chart future uncertainties confronting a future vision for business. A team draws up a vision for the future as well as investigating the current reality. They seek to establish ‘creative tension’ between the current reality and their future vision (Fritz, *The Path of Least Resistance*). This tension can be pictured as a rubber band between reality and vision: if it is too slack, there will not be enough challenge in realizing the vision. If the rubber band is too tight, the vision is too much of a challenge. The scenarios are used to map external factors which may have great influence upon the proposed vision. A similar strategy is to use scenarios to test the feasibility and reliability of a ‘Business Idea’ (Van der Heijden, *The Art of Strategic Conversation*).

Scenarios are also used in systems thinking (Senge, *The Fifth Discipline*). Systems thinking produces diagrams which show the dynamic interrelations between the various influences on a given process, and the feedback loops this generates. Scenario making is used as a thinking exercise to come up with different possible future external influences. Senge sees scenario making as a way to challenge the entrenched ‘mental models’ that managers tend to work with.

Applying scenarios to business visions and ideas can be done in an educational setting, although it presupposes sufficient knowledge of systems thinking in the facilitator. It makes sense to embed scenario making in a larger course on systems thinking, or to apply it to a business course in which students test new ideas.

3.3 Emphasizing the process and research

The facilitator can choose to emphasize the process of making the scenarios and the research that goes into this. In this case the emphasis is on the process, and research to determine likely trends and to make the scenarios plausible and consistent, as well as group discussion to find the deeper underlying Driving Forces behind the trends, is allocated the most time. The facilitator's job is to guide the students in researching the various trends in step 2, and the research needed in developing the scenarios in step 5.

Researching trends and scenarios exhibits two remarkable properties:

- 1) The research focuses on finding material that supports an idea, hunch or intuition about the future. A trend for the future is posited in step 1 without extensive prior research. Wild and strange ideas are mentioned alongside more staid predictions about the future. Only when possible trends have been collected do students look for supportive evidence. They do not have to make a full exhaustive sweep of available research on the chosen topic; instead they focus on the particular trend they seek to support. The conclusion is already given in advance, and so the research can focus on very specific material. The students do not have to be objective in considering all the different arguments; they are encouraged to be biased in their search for supportive material. The fact that scenario making is a group process ensures that differing and sometimes competing viewpoints are put forward.
- 2) Scenario making uses both formal and informal knowledge, allows both high-brow and low-brow supporting material. Formal sources include scientific journals, encyclopaedias, statistics from government websites, reports from think tanks, and opinions from recognised experts in the field. Informal knowledge includes off-beat and extreme opinions, the ideas of 'future' gurus, entrepreneurs, or pressure groups as well as positions advanced in the popular press in a wide variety of fields. Much of this unchecked speculation can be found on the open space of the Internet.

3.4 Emphasizing the result

If the emphasis is on the result of the scenario method, extra care and attention should be given to the scenarios, their presentation, and the recommendations based on the scenarios. For example, if the resulting scenarios or recommendations are to be published, or to be used by others as input for their own discussion of the future, the end product will require special attention. Of course, the process of research and discussion will be evident from the result, but it is the result that will be evaluated. The facilitator will decide to spend more time on the last steps in order to ensure quality work. This may include rehearsing the presentations several times, presenting the scenarios in a published form, and emphasizing step 8, in which recommendations are made on the basis of several possible scenarios. The recommendations themselves can be presented or published.

3.5 Iteration of steps

Repeating certain steps of the scenario method adds greatly to the learning of the students. It gives them a chance to go through an unfamiliar process once, compare their outcome with those of others, and improve the second time round.

Many students are unfamiliar with the two characteristics of research involved in the scenario method, looking specifically for material to support a trend, and the use of informal and formal sources. Students tend to encounter resistance at this stage: they do not look far enough for supporting evidence, they focus on the official sources and neglect the dissonant signal, or they are happy with extrapolations presented on government websites. If the material they find as supporting evidence is presented and evaluated in a plenary session, feedback on the quality and appropriateness of the material will help them in their next search. This iteration can thus be done after step 2 and also after step 5, when research supports the plausibility of the scenario.

It also helps to repeat the presentation of the scenarios in step 6. Some groups may focus too much on the content and eschew the dramatic elements which make the scenarios alive and powerful. Others may give convincing presentations but without integrating enough material. Giving students the possibility of a dry run allows them to improve upon their initial effort. This is especially relevant if the focus is on the product of the scenario presentations, or if these are given to an outside audience.

Finally, the process of choosing the scenario axes in step 3 and 4 can be repeated. The first set of axes is sometimes rather close to our current understanding, and does not present a novel way to map future uncertainties. After the scenario presentations, it is possible to go back to the impact diagram and make a new quadrant with a different set of axes, or even to return to step 3 in order to find different driving forces. If there is enough time, retracing these steps will yield more thorough and enlightening scenarios and a better understanding of the process of making them.

3.6 Facilitating the learning process

The role of the facilitator is to support the work of the students. The facilitator does not take part in the discussion about the scenarios, in the sense of joining in the debate about possible future trends, the underlying driving forces, and so on. The facilitator must retain a neutral role; otherwise the students will not feel a sense of ownership about the scenarios. This requires vigilance; in our experience it is often very tempting for the facilitator to join in the discussion about future trends, or to profess opinions on the matter. The facilitator does of course lead the discussion and steers the process in the right direction. The facilitator is always one or two steps ahead of the students, highlighting trends that will lead to interesting driving forces, and making sure these are defined with the making of a scenario quadrant in mind. The facilitator also knows whether the emphasis is on the resulting scenarios or on the research as part of the process. The facilitator thus influences the process from behind the scenes, as it were, without taking an open role as one of the participants.

3.7 Challenging groupthink

A homogeneous group of students will often think within the framework of what they already know, which is often the official version of the future, based on extrapolations from the present. The group may all believe, for example, that technological innovations will solve traffic jams in the future. The facilitator may push them to think outside this framework by paying extra attention to dissenting voices in the group, or pointing to places to look for dissenting voices. While the facilitator should not participate in the discussion directly, he can steer the process away from the usual conclusions by insisting on dissenting voices and favouring surprising developments in the discussion of the driving forces. If the students all think that the perception of more crime naturally leads to more law enforcement, the facilitator can raise the opposite possibility, and in doing so provide a counterweight to the opinions of the group and set the stage for a good scenario axis.

Another interesting twist is that building scenarios for the future may actually improve students' historical knowledge of the past. In doing their research on future trends, students can be led to consider how similar challenges have been dealt with in the past. They may realise that more technology tends to solve some problems while at the same time creating others, and that more law enforcement has sometimes led to violent counter-reaction and lessened the feeling of security. They can then evaluate how past developments can teach us about the future, thus learning from the adage that those who have no knowledge of history are condemned to repeat it.

3.8 Background and further reading

For a history of scenario-making in business and public policy, read the entertaining account by Peter Schwartz, *The Art of the Long View*. Kees van der Heijden has written two books on the use of scenarios for business, *The Sixth Sense: Accelerating Organisational Learning with Scenarios* and

Scenario: The Art of Strategic Conversation. He uses scenarios within the context of the elaboration of a Business Idea, and sees scenarios as an element of the “strategic conversation” any business should have about its future. *Scenario Planning* by Mats Lindgren and Hans Banhold is a good handbook for those wanting to learn more about the process of scenario making. It gives examples, and contains a long appendix that lists many research methods to be used in the process. Gill Ringlands’ *Scenarios in Business* presents many case studies to illustrate the method, which allow the novice facilitator to get some idea of how the process works.

Please be aware that all these books are written about the use of scenarios in business, and therefore contain additional steps at the beginning about the main questions facing companies and at the end about the implementation of recommendations based on the scenarios. The use of scenarios in education uses a truncated method, where the first and last steps are skipped. The emphasis is primarily on the learning process of the students, not on the method or on the scenarios as tools to change an organisation. The use of research and learning to think outside the box about the future is common to both applications of the method.

Literature

Fritz R. (1984) *Path of Least Resistance* New York: Fawcett Books

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Senge, P.M. (1990) *The Fifth Discipline* New York: Currency Doubleday

Internet resources

www.gbn.org

www.shell.com/static/royal-en/downloads/scenarios/exsum_23052005.pdf

www.elearninternational.co.uk/

www.nea.org/he/future/index.html

http://athena.leidenuniv.nl/fwn/liacs/iib/content_docs/isp.part_a_b_2006.pdf

<http://www.viktoria.se/publications/98/VRR-98-16.pdf>

Appendix 1 7 questions for the future

Surfacing Strategic issues and concerns

Source: Institute of the Future (Amara & Lipinsky 1983) with additional material by Shell.
See also Van der Heijden (2005, pp. 176 t/m 178) & DOTank, Peter Luttik: www.dotank.nl

1. **The Oracle** . If you could meet with someone who really could foretell the future in your field (a genuine oracle) what questions might you like to ask?
2. **Good World**. If things went well in your field, describe how the situation might evolve.
3. An **Unfavourable Outcome** . If things go wrong in your field, how might that be?
4. **Corporate/ Field culture** . How might the internal culture in your field need to change to produce a desirable outcome?
5. **Learning from the past** What do past events in the field, both successes and failures, teach us?
6. **Future decisions** . What are the critical decisions that need to be faced over the next years?
7. **The Epitaph**. As a contributor to your field, for what would you like to be remembered? What would you like to hear in your farewell speech?

Appendix 2 Glossary

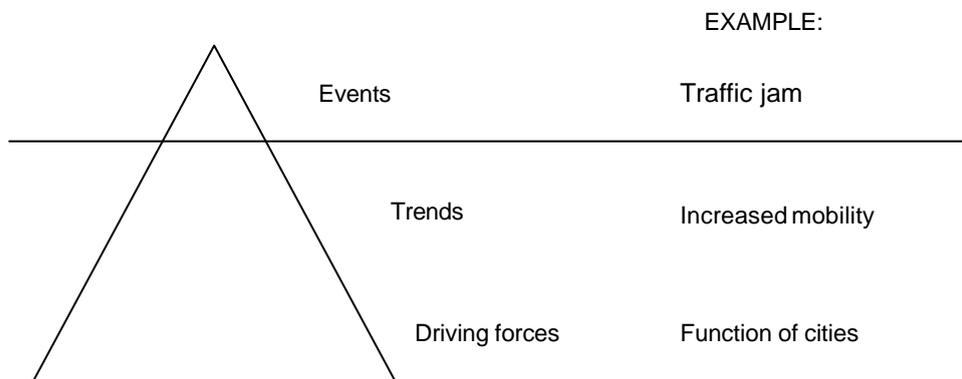
backcasting

Telling the story of how past events led to the future scenario, including seminal events and actors. The process of back-casting helps an audience (and the writers of the scenario) to understand how the scenario came into being.

DSTEP stands for Demographic, Societal, Technological, Economic, Political factors, used as a mnemonic to make sure that all relevant domains are covered during the investigation of the future.

driving force

The underlying factor or process which determines the direction of a trend. On the surface, there are events, which are the superficial symptoms. Several events are connected to a general trend. Driving forces are long-term, mostly hidden developments which underlie trends. The strategic conversation is vital to identifying driving forces.



event

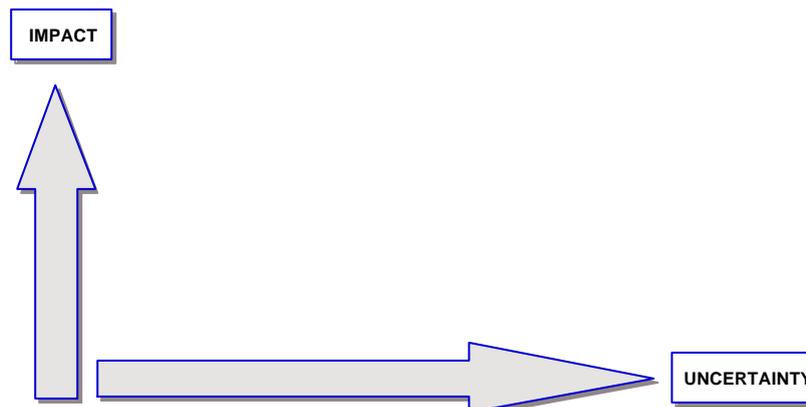
Recognizable event which can be observed and to which a date can be ascribed, such as the signing of a treaty, the introduction of the Euro, or 9/11.

high impact

A high impact driving force will have far reaching effects on the field, and is therefore potentially interesting in a future scenario. The scenario template is built with high-impact and uncertain driving forces.

impact diagram

Trends and driving forces are placed in an impact diagram to select the most interesting and generative scenario axes. The vertical axis shows the level of impact of a specific trend on the theme. The horizontal axis shows the level of uncertainty of the trend. Uncertain trends with the highest impact, which can be found in the top right corner of the impact diagram, are the prime candidates for making the scenario axes.



scenario

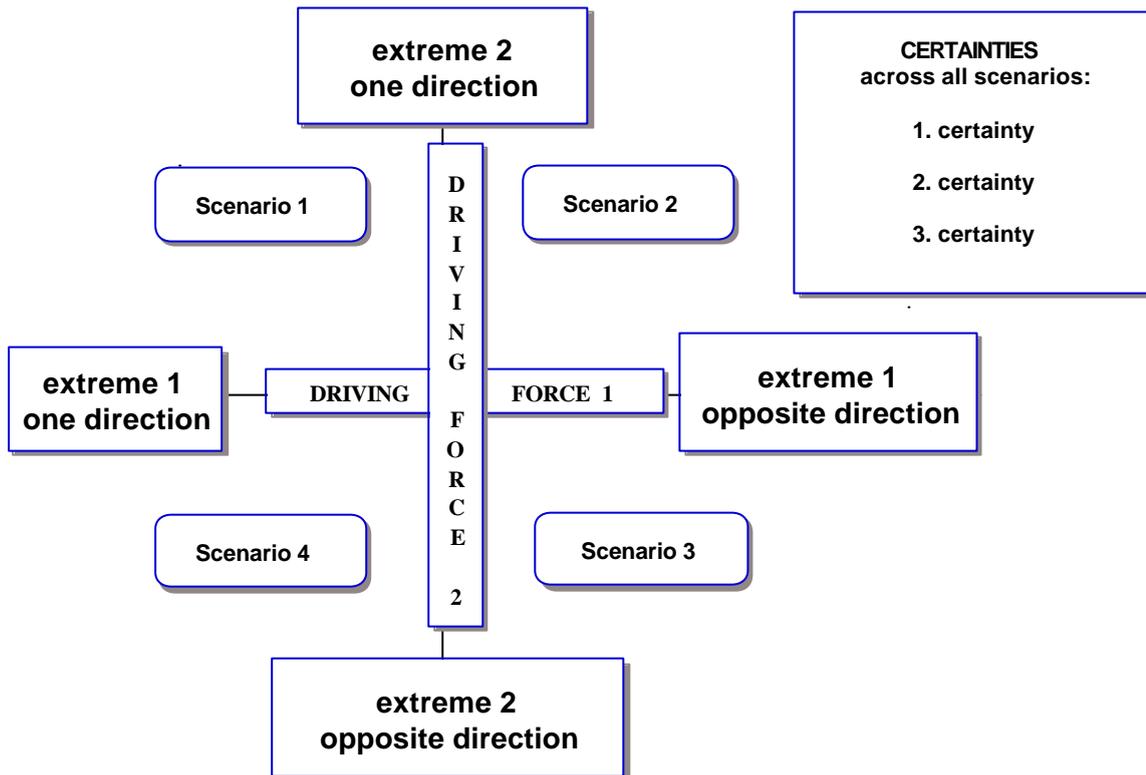
The description (written or spoken) of a future represented in one of the scenario quadrants

scenario method

The phases and steps which lead to the writing of the scenarios

scenario template

The horizontal and vertical axes showing the selected driving forces and four scenario quadrants



scenario quadrant

The part of the scenario template which combines one driving force from the horizontal axis with another from the vertical axis. Within a scenario quadrant there are only certainties.

STEEP stands for Societal, Technological, Economic, Environmental, Political factors, used as a mnemonic to make sure that all relevant domains are covered during the investigation of the future.

Search for driving forces

Interactive evaluation of future events and trends in order to identify the underlying processes exerting influence on events

trend

Chain of events. Several events are connected to a general trend.