FUTURES THINKING METHODOLOGIES – OPTIONS RELEVANT FOR "SCHOOLING FOR TOMORROW"
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Introduction

There are numerous papers and books on methodologies and use of future-oriented work: But many of these studies either focus on only one methodology and/or are not very user friendly in their presentation of the methodologies described. The aim of this paper is therefore to give a comprehensive and use/user oriented view of a range of methodologies within area of research and studies of trends and driving forces that may shape the future. In this particular context, the term 'methodology' covers both the actual methods used and the approach to the design of a future study (i.e. how different methods may be combined.). The main theme will be scenario development, but since this is a quite ambiguous concept it is often hard to draw the line between scenario methodologies and other future-oriented methodologies. We will therefore not only focus on scenario methodology per se, but also on the wide variety of future-oriented methodologies that are often used as a basis for scenario development.

Methodology

Managing two different kinds of reasoning

Essentially, future-oriented work is focused on learning and on using new insights to achieve a variety of different ends. In order to describe the functions of many of the different methodologies related to future-oriented work, it would seem appropriate to use a terminology developed within the field of cognitive theories of learning. In his study from 1967 on test and measures of intelligence, Hudson identifies two seemingly different form of thinking (skills): Convergent and Divergent thinking.

Convergent thinking is essentially about traditional problem solving. Convergent thinking typically involves bringing material from a variety of sources to bear on a problem, in such a way as to produce the "correct" answer. This kind of thinking is particularly appropriate in science, maths, and technology, since it involves description, observation, deduction, and/or prioritisation in relation to a given problem. Divergent thinking is a skill broadly related to the creative elaboration of ideas prompted by a stimulus. In a conventional line of thought such thinking is more suited to artistic pursuits and studies within the humanities.

This terminology may be used to describe most of the methods and tools applied within future-oriented work. There is a range of methods designed to foster divergent and 'out of the box' thinking and there is a range of methods used to foster convergent and synthesis-oriented thinking. Although one may think that scenario and future analysis with its more or less explicit focus on the question of 'what if' would be heavily biased towards divergent processes. This is *not* the case. Good future study design must balance the divergent and convergent processes in order to facilitate a process where the use of the two different

ways of thinking produces a result which is exploratory and creative and rooted in facts, numbers, and explicitly stated rational assumptions.

Phases and actors

The need to base scenarios on divergent as well as convergent thinking means that a range of methods is used in the development of scenarios. Seen from a process design perspective, it is useful to think of scenario processes as consisting of the following phases:

1. Mapping and delineation of the subject matter
2. Identification of critical issues and trends
3. Assessments of trends (scenario creation)
4. Use (implications and dissemination)

Phase one can largely be considered as involving convergent thinking while phase two and three and four will involve convergent as well as divergent thinking. Generally speaking, most of the divergent processes are group processes which often demand significant interaction with 'outsiders' and process consultants, while convergent process may be individual as well as group-oriented.

A scenario project may be designed and carried out in numerous different ways by a wide variety of actors, but for the purpose of this article it may be useful to identify a set of actors that may or may not be involved in a scenario process:

A scenario team who is planning and facilitating the process. The scenario team may either be external consultants or an internal unit. The work load of the team may depend on the degree to which activities are delegated to other parties. In one extreme the scenario team may only be doing project management, and in the other extreme the team may be doing all the analysis and project management themselves.

A customer who has ordered the scenario analysis. The customer may be more or less involved in the description of the aim of the scenario analysis and the work carried out. A helpful rule of thumb is that the customer should be involved as much as possible.

Stakeholders and experts may reside inside and outside of the organisation that is the customer. Experts are important to involve since they may possess knowledge needed by the customer and the scenario team to develop the scenarios. Stakeholders are important to involve since they may affect - and be affected by - the scenario analysis.

Society in general may be involved through NGO's and/or layman. This is useful to gain insights and perspectives that are more neutral and 'street wise' to balance the stakeholder and expert perspective that may be biased by personal interests.

In the following, the aims and methods of the four phases of scenario work will be described.

Phase one: Delineation and Mapping

Naturally the delineation a scenario analysis is an important matter. A range of important issues must be considered and these may described using the framework introduced by Philip Van Knotten (2004). An

assessment of the value of the three 'macro characteristics'[1] of this framework may help to guide the general process design and the practical choice of methods and tools.

The first macro characteristic is related to the general goal of the scenario analysis. The goal of any scenario analysis (in a policy context) may be positioned between the poles of exploration and pre-policy research. Exploration is traditionally the most common objective of scenario work. Scenario processes may be used to explore everything from the development of macro trends to particular subjects of interest in a given area of policy. This kind of processes primarily focuses on scenarios as a vehicle of learning rather than a tool for decision making. Pre-policy research involves a great deal of exploration as well but is at the same time directed at serving more specific policy oriented goals[2]. Roughly speaking, this means that the study design must comprise different methods for bringing the scenarios into a strategic and decision-oriented framework to be used by the administration and/or the politicians.

The second macro characteristic is related to the balance of the process design. The analytical design of a scenario process may be more or less biased towards the intuitive (divergent thinking) or the analytical (convergent thinking). In general terms, the position on this spectrum is related to issues such as the balance of the following dichotomies: use of qualitative vs. qualitative data, use of participatory scenario design vs. model-based scenario design, and inclusive vs. exclusive approach to the identification of the participants in the participatory processes. The choice of design must be based on an evaluation of the goal of the process, the capacity and the 'work-culture' of the participants involved, and the context in which the scenarios are going to be used/disseminated.

The third macro characteristic is related to the complexity of the scenario analysis. Scenario analysis may vary from being very simple to being quite complex. The complexity of a given analysis should ideally be based on an evaluation of the goal of the process, the capacity and the 'work-culture' of the participants involved, and the context in which the scenarios are going to be used/disseminated. Most often, scenarios used for pre-policy research are more complex than scenarios used for exploration.

As noted several times above, decisions as to the positioning of a study on the spectrums of the three 'macro drivers' may be a complex matter, since decisions related to one driver may influence decisions related to another driver. This issue will addressed in further detail in the section on examples of process designs.

While delineation is related to goals, design, and complexity of the scenario analysis, 'mapping' is related to the process of establishing an overview of the subject matter. This is most often a task of the scenario team and is done through *relevance trees*, *desk research,* and *interviews*.

Relevance trees are particularly know from technological foresights, but may in principle be applied to any subject matter. The method bears some similarities with mind mapping, and its aim is to describe the position of a given subject in a hierarchy of clearly defined sub-subjects. If the method is used successfully, the relevance tree gives a clear overview of a given subject and may also be used as a tool to identify the scenario team's knowledge of the different sub-subjects. The challenge related to this method is that it may become very complex quite quickly and the important issues may 'disappear' in the numerous descriptions of sub-subjects and their relations.

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[1] A range of 'micro characteristics' are connected to the macro characteristics and these may be used for a more detailed inspiration in the delineation of a study.

[2] In 'Understanding Best Practice in Strategic Futures Work', these policy oriented goals are broken down in the following categories: 1) Influence Policy, 2) Formulate Policy and 3) Implement policy.

Desk research should involve a wide variety of sources. The World Wide Web is an excellent tool for this, and good sources of information are government agencies, non-governmental organisations, international constancy companies, research communities, and on-line and off-line journals related to the subject. This research may also be used as input for the identification of experts for the various form of interviews and participatory processes that may be used in during the scenario analysis.

In this phase of the project, interviews should be focused on experts with a broad knowledge of the subject matter, since the aim of this phase is the mapping and general description of the subject of the analysis.

Phase Two: Identification of critical issues and trends

Data analysis

Identification of critical issues and trends should involve divergent methods (typically participatory events) as well as convergent methods. On any given subject there will be a range of information available that, with a little analysis, may be transformed into interesting insights on trends and issues. Methods for these types of analysis are known from different scientific fields and are generally of a convergent character.

More often than not the use of technology is an important driver of change, and there often an explicit focus on the potential use and development of technology in a scenario analysis. A way of doing this in a quantitative manner is to conduct *patent analysis,* since the patterns of patents may indicate the potential interest and breakthrough of technology. Good patent analysis may be an important quantitative input in a scenario analysis; there is range of patent analysis services and tools available on the market, but there are three important pitfalls to beware of:

1) Companies may use patents as a strategic tool to discourage other companies from doing research in a given technological field – hence the presence of many patents in a given area does not necessarily indicate that new technologies are about to hit the market.

2) There is a black box effect related to patent research, since patents only become public some time after they have been filed.

3) If knowledge is needed on a very specific technology, patent research may be very time-consuming, since every patent must be studied closely to understand the specifics of a given patent.

Biblio-metric analysis may be used separately or in conjunction with patent analysis. This analysis is less technology-oriented than patent analysis, and may be used to track the development of the interest in a given technology or academic subject. As such it may act as a trend indicator, but there may be other benefits from such an analysis: An integral part of this analysis is an 'actor' analysis where the main experts (and their historical relations) in a given field can be mapped out and used later in the scenario process. It is important to note that the success of any biblio-metric analysis is strongly connected to the identification and use of key search terms.

Extrapolation of historical trends or theorems may be also used as an inspiration to assess different possible developments. An example from the field of technology is Moore's law, which has been a highly cited law used to assess the development of the capability of micro chips in particular and computers in general.

S-curves is another 'rule of thumb' that may be used to describe the uptake of technology, products, and ideas in particular markets and society in general. This rule of thumb indicates that the uptake of a given concept will be slow in the beginning but may at a certain state reach an almost exponential growth rate before the concept 'matures' and the growth stops. Naturally, the challenge is to estimate the nature of the s-curve (when will the exponential growth begin and end).

While the methods described above mainly rely on the use if available data that can be computed and analysed by the scenario team, there are a variety of methods related to a structural and 'asymmetric' interaction with experts as well as with laymen. These methods may be of both convergent and divergent character.

Convergent participatory methods

Although a scenario team may be very knowledgeable on the subject of their study, it is highly improbable that the team members are true capacities in the subject and know its logic inside and out. Although much knowledge can be acquired through desk research and data analysis, the involvement of experts may help achieve specific insights or gain new perspectives on a given subject. Therefore, the use of input from experts and stakeholders is key to a successful scenario analysis. Identifying the right experts may be a challenge and as a rule of thumb one should consider:

1. Identifying and involving experts with different perspectives on the subject
2. Ensuring that experts with various background are involved (for example business, academia, and NGO's)
3. Ensuring that different stakeholder perspectives are represented

When the 'population' of experts has been identified they may be involved in a variety of ways:

Interviews may be conducted *face to face*, via *telephone,* or in *focus groups,* and may be conducted in a structured, semi-structured, or unstructured manner. Face to face interviews should be used for key experts and stakeholders where important input may be expected. Meeting face to face will allow the interviewer to interpret body language and other 'seconday' sources of information. Most often, face to face interviews will be semi-structured in order to facilitate the unfolding of a natural conversation that is kept with certain boundaries by a semi-structured interview guideline. Telephone interviews are the obvious solution when resources are unavailable to conduct face to face interviews with the stakeholders and experts. Finally, focus groups are a very effective form of gaining input from a range of different expert and stakeholders at the same time. Most focus groups are conducted on the basis of set of questions that are addressed in a relatively un-moderated discussion by the participants of the focus group.

Although it is often described as a competing methodology to scenario development, a *Delphi analysis* may also be used to form the basis of scenario process. Delphi analysis is a structured brainstorming process carried out through an iteration of 2-4 rounds of semi-structured questionnaires. A range of experts are asked to give input on a given subject, and through the iteration of questionnaires are confronted with the inputs of the other experts. They are then asked to evaluate responses of the other experts and restate any of their initial responses. This process may be repeated through several iterations, and eventually some sort of consensus will be reached about the subject matter.

Consensus conferences may in some ways be considered as a 'real time' Delphi analysis where the participants must come to agreement on a complex question. Different parties are allowed to state their case in relation to the question, but at the end of the day some sort of consensus must be agreed on. If a common agreement can't be developed through the discussions in the conference, a vote may be taken to ensure that a tangible result is produced in the 'conference'

Generally speaking, laymen may be included via the same methods as experts but, there are a few exceptions. Delphi analysis is designed for experts and may therefore not prove to be very constructive for laymen. Face to face interviews and telephone interviews are very resource demanding and are often reserved for experts, while the opinions of laymen can be introduced via focus groups and questionnaires.

The methods described above may arguably be applied in a convergent as well as a divergent manner. This could be done simply by asking 'divergent' questions in the various interviews. But most experience shows that it takes much more process facilitation to think divergently, and that various tools often must be introduced to force people to think 'outside' the box. This is the major reason for labelling the methods above as convergent.

Phase three: Scenario creation

The purpose of this phase is to develop a set of internally consistent scenarios[3]. Generally speaking, scenarios can be developed and used in a normative or exploratory manner. Normative scenarios greatly resemble the creation of visions for the future. Often only one or two scenarios are developed, and the main purpose of those is to identify the 'perfect future' of a given subject. The scenarios may then be use as a tool to identify actions that must be taken by different actors if the visions for the future are to be realised. This method is most often used by organisations that have a very clear political agenda and set of goals they wish to pursue without too much debate on the uncertainties of the future. In this sense the phrase "normative scenario" almost becomes an oxymoron.

In the following we will therefore focus on the creation of exploratory scenarios, which are concerned with the uncertainties of the future. They are created in order to understand just how different the future may become and what may drive these changes. This means that the scenarios must be divergent in order to create a large 'scenario space' in which different futures and logics may be unfolded. Consequently, exploratory scenarios should be

1. Plausible: Logical, consistent and believable
2. Relevant: They should highlight key challenges and dynamics of the future
3. Divergent: They should differ from one another in strategically significant ways
4. Challenging: They should challenge fundamental beliefs and assumptions

Much of the actual scenarios is often created by a group of people (a scenario group). More often than not their work is guided and facilitated by a scenario team. The scenario group may consists of representatives from the customer or be an expert group appointed by the customer and the scenario team to perform the task.

In this phase of a scenario process a wide range of information will already have been identified and analysed, and the scenario team should have developed an intimate understanding of the dynamics and drivers of change related to the subject field.

The task of the scenario team is therefore to use this knowledge as direct and indirect input in their facilitation of the scenario group's work with the development of the scenarios. A scenario process may take anything from one to four days depending on the complexity of the issues and the goals related to the scenario process. Generally speaking, the process will move through the following phases:

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[3] Scenarios may be purely 'model based' or created through a participatory effort (Van knotten 2004) involving a scenario team, a customer, experts and stakeholders, and sometimes even laymen. In the following we will mainly deal with the participatory methods related to scenario development.

1. Identification of drivers and trends
2. Consolidation of trends
3. Prioritisation of trends
4. Identification of scenario axes
5. Actor analysis

When these phases are completed the scenario team will typically be able to write snap-shot scenarios[4] on the subject. If more thorough scenarios are to be developed where the different possible scenarios are described in more detail, then more work must be done. This typically involves some sort of back-casting from the future scenarios to the present, and tools for this will be described following the description of the following five phases.

Identification of drivers and trends

Although the scenario team may already have identified a wide range of drivers and trends in their preparation for the workshop, it is important that the scenario group as well gets the opportunity to do a full brainstorm on drivers and trends. The purpose of this brainstorm is 'divergent' in the sense that members of the scenario group are invited to think 'out of box'. The purpose of this is to cover the areas and possible trends that have not been covered by the 'convergent' research carried out in phase two by the scenario team. Getting the participants to a brainstorm is easy, but getting them to think 'out of the box' is not that easy. Therefore, a typical brainstorming session consists of two parts. In the first part everybody is asked to write on post-its all the drivers and trends influencing the subject; these are then hung on the wall for all to see. When the participants have seen all the post-its they are allowed to a few extras if they have been inspired by some of them. This first part will typically reproduce many of the results created by the scenario team through the convergent methodologies. Therefore a range of different tools are applied in the second part to facilitate 'out of the box thinking':

Drawing on the *'stream of consciousness'* concept from literature, an effective tool is to ask one participant to do a stream of consciousness on a concept or picture. While the participant is doing his or her stream of consciousness, the other participants write down new drivers and trends inspired by the stream of consciousness.

Another tool is to ask one or more of the participants to use *metaphors* to describe the dynamics and drivers of change. An example could be to describe an organisational unit and the potential developments of its external relations as a Savannah in Africa – who are the hunting lions, who are the untouchable elephants, is there a waterhole and, if so, is it full of crocodiles? The other participants may then be inspired by the internal logic of the Savannah system to see new trends and drivers of change in the subject domain.

In *forced pairs,* two categories of different concepts that are both related to the subject are prepared by the scenario team. For example: If the subject is the school of the future, one category could hold concepts of possible breakthrough technologies and the other category could hold concepts of traditional learning and social activities in the school. Participants take turns drawing one concept from each category and will then have to create some sort story-line based on this. While the storyline is being developed, the other participants may then write down new drivers inspired by the forced pairs.

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[4] Van Notten (2004)
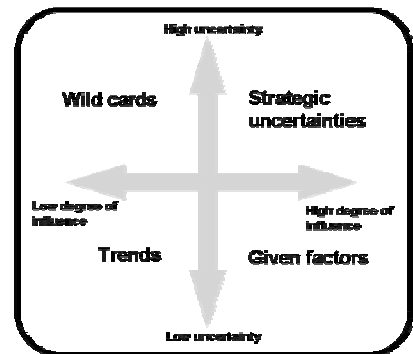
Consolidation of trends

When the brainstorming phase is finished the participant will typically have produced between 50 and 200 post-its with description of drivers. Many of these drivers may be the same or be very closely related. In order to reduce the level of complexity, the drivers of trends therefore have to be consolidated into some generic categories. There may be from 10 to 30 generic categories which will then be used in the future work.

Prioritisation of trends

The aim of this phase is to gain some perspective on the relationship between the drivers and identify the drivers that seem most fitted and most interesting to form the back-bone of the scenarios. The following are three quite different tools that may be used for this.

Cross impact analysis is a very useful tool to illuminate the relationships between the different drivers and trends identified in the consolidation phase of the scenario workshop. Each driver is influence on the each of the other drivers is valued on a scale from 1-10 where 10 means strong impact. The numbers entered may then be used in different ways. One way is to look at the score of each factor and range the 3 highest scoring factors as the most important since they have the strongest impact on other factors. Another way is to determine the most important factors as those which influence the most of the other factors with more than 6 points[5]. Essentially the calculations may be made in many different ways as long as it is done in a consistent manner that ensures that it is possible to do a fair comparison of the trends and drivers and use this to identify the most important ones.

Although it seems intuitively correct to identify the strongest drivers as the ones that should form the backbone of a scenario, there may be other considerations to take into account. For example there may be great uncertainties connected with development of some drivers, while the development of other drivers is quite certain (the development of demographics is a good example of the latter). Another issue is the organisation's opportunity to influence or act on a given driver. These two considerations are reflected in the *prioritisation matrix*, where the drivers are positioned in the matrix illustrated in the figure. As a rule of thumb, the most 'interesting' drivers to work with in a scenario context are the ones positioned in the 'strategic uncertainties' quadrant.

A faster and less analytical tool is to conduct a Rabbit race. Each factor is written on a post-it note and hung on a 'race track' consisting of a the starting line, the finish line, and 7-10 steps in between. The participants then take turns moving a factor 1 step closer to the goal line. When 2-4 factors have reached the goal line the exercise is stopped and the 2-4 most important factors have been identified.

Finally, different kinds of open and closed voting systems may be used to determine the most important factors.

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[5] An illustrative example: Factor one may influence factor A and B with 10 points and factor C with zero point giving a total of 20 points. Factor two may influence factor A, B and C with six points each giving a total of 18 points. According to the use of the two calculation methods described factor one or two will be described as the most important.
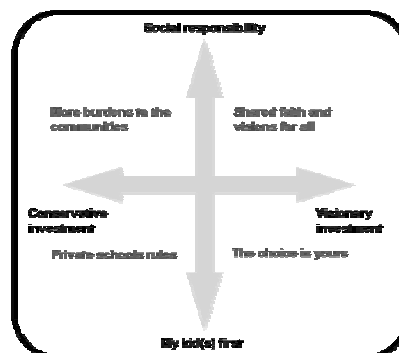
Identification of the scenario structure

The challenge in this phase is to manage the complexity of the many drivers in a way that will allow the scenario team to create a range of internally consistent scenarios. A scenario structure may be made in numerous ways, but in the following we will examine two of the most popular.

The two by two matrix

A structure for four scenarios is created by selecting two of the most important drivers identified in the previous phase and using these to create a matrix of four different scenarios.

An example could be four scenarios on 'The school in Europe in 2015'. The driver 'parents' social values in relation to their children's education' is considered to be the most important driver of change. The two different values of this driver are: 1) a 'My kid first' culture vs. 2) a 'Social responsibility' culture. The other important driver is 'national governments investments schemes in schooling,' and the values of this are 1) 'visionary' vs. 2) 'conservative'. This creates four different scenarios, which are reflected in figure the rest of the drivers are then expanded within the logic of the four different scenarios to see how they would play-out. The advantage of this method is that it is a relatively simple way to create scenarios without too many drivers with too many different values. This makes it an excellent approach for development in scenarios through participatory methods. The disadvantage is that it primarily is the uncertainties of the two selected drivers that are played out. This may lead to the developed 'scenario space' being too confined.

Multiple driver scenarios

The multiple driver scenario approach creates scenarios based on a large number of drivers. Doing this increases the level of complexity of the work, but may also result in scenarios that are closer to the level of complexity of reality. In principle, any number of drivers greater than 4 may be used in this method. Values are identified for each driver in same manner as in the previous method. This means that if nine drivers have been identified, then 2^9 scenarios may be developed. Clearly this number of scenarios cannot be developed, so the challenge is to identify the 3-4 scenarios that best fill the 'scenarios space'. The advantage of this method is that it will allow the practitioners to develop complex yet consistent scenarios that will be very useful for work on possible implications of the different scenarios. The disadvantage is that this approach is very difficult to manage in a group, since choosing 4 out of 2^9 is a very complex matter.

Actor analysis

The aim of the actor analysis is to enrich the focus on drivers and trends with an actor focus. Who are the most important actors in the scenarios and how may they be expected to act in the scenarios? These

questions are important to ask and answer if the scenarios are to plausible and usable tools for the work with the implications of the scenarios. Identifying the actors can be done using the same methods used to identify trends. Once a range of actors have been identified, their importance should be evaluated. This may be done using some of the methods that are also used in relation to the drivers.

Phase four: From snapshot to action

Once the five phases described above have been concluded, the scenario team is ready to create a set of snap-shot scenarios. Snap-shot scenarios means, for example, that the four scenarios for the future of schooling 2015 may be described in detailed. But little information may be available on what particular events development that lead to creation of the situation in 2015 (hence the term 'snapshot scenarios'). In cases where the scenarios are to be used for decision making and problem solving it is therefore important that more work is dedicated describe and understand the storylines of the scenarios from 2005 to 2015. This is mostly done via *back casting* where the story of the development towards 2015 is told backwards. Using the major trends and actors identified as a tool the scenario group must describe the major elements in the development in headlines. In practical tern this is done as by posing the following question: 'We know what the situation in 2015 looks like, but what would the situation in 2014 have to look like for this to be a realistic scenario. Once the question in answered it may be posed again: "We know what the situation in 2014 look like..." etc.

Once a richer scenario structure has been developed the scenarios may be used for different kinds of strategic analysis and/or policy formulation. The most important issue here is to remember that the scenarios are tools created to have structured conversations and analysis of the challenges and opportunities that the future may bring. Hence one should avoid the temptation of picking the most preferred and/or likely scenario and analyse how this scenario may be realised. Instead the goal should be to understand the dynamics of change and use this insight to identify initiatives that may do well in all scenarios and under most circumstances.

Future studies in a policy context

Future studies may be used in policy context in a variety of ways ranging from the exploration of different issues to processes of explicit decision-making. In their best practice study (Henley 2001), the Henley Centre distinguishes between the following four objectives of scenario work:

- Illuminate issues

- Influence policy

- Formulate policy

- Implement policy

Practically speaking, though, the line between these four objectives may not always be clear. It may in fact be more useful to simply distinguish between exploration and decision-making as the two major objectives related to scenario development. The differences of these two objectives should be reflected in the process design and methods and tools used. Before we take a closer look at this issue[6] there are other issues that must be addressed regardless of the goal of the scenario analysis.

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[6] This will be done in section 4

It is an often stated truism that the inner dynamics of bureaucracy makes administrative personnel (and politicians) risk-averse. Much of the policy and administrative discourse is therefore tied into 'fact-based' macro economic discourses and models that can be related to economic 'laws' and logic, since this places responsibility 'outside' the individual employee. This poses two challenges when work with scenarios is introduced in a policy context.

First, scenarios are often considered to be anything else than fact-based. It is therefore important to stress and illustrate that scenarios can be just as fact-based as reasoning within a macro economic discourse.
Second, the realm of habits and conservatism may be hard to overcome since there is an element of risk involved in engaging in a totally new method where the results seems quite hard to predict. It is therefore important that all scenario procedures be made quite clear for everybody. If these two cultural barriers can be overcome and the work with scenario development can begin, the following three issues are extremely important for the success of the process.

Create ownership

Ownership from two groups of people is extremely important for the scenario process to become successful. First of all the top management of the organisation and/or unit must behind a scenario process since it will often differ from the 'regular' way of doing things and thereby create a great del of anxiety. Clear statements from top management in relation to the process may help to alleviate this anxiety. Secondly participant in the scenario group (top management may also be represented here) must engage whole heartedly throughout the entire process. Otherwise their input and work will lack the quality needed to develop strong and thought provoking scenarios.

Think holistic

When the scenario group is identified and other experts are included in the process the scenario team should always try to think broad and inclusive as possible. It is often healthy for the process that the scenario group is diverse so a certain creative tension can be created and upheld throughout the process.
There may be many stakeholders and many experts with different background that can enrich the process. If all important actors can't be directly involved in the process, extra expert comities or advisory groups may be created to ensure that they are given an opportunity to come with input.

Manage the anxiety gap

Scenario development may be a process that involves a great deal of anxiety and frustration under way. The initial focus and uncertainties and different opportunities for development means that participants may find it difficult to see that the process will lead to sound and consistent results. Therefore the scenario team must do its best to describe the logic behind the process design and every phase in it to minimise the anxiety of participants and stakeholders.
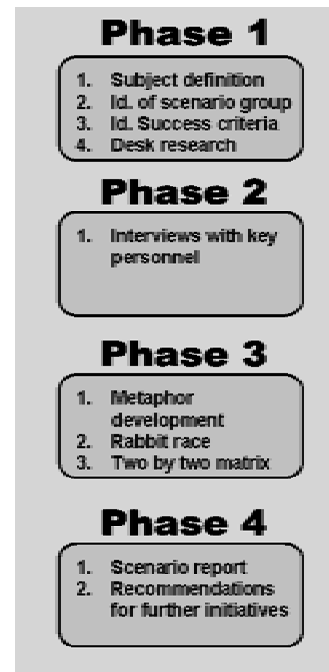
Process design and goal achievement

As noted above, there should be a close connection between the aim of a scenario process, its general design, and the particular methods and tools used. In the extreme this would mean that each given situation will demand a unique design to match its particular challenges. But in practice there is range of aims and uses for scenario development that are rather generic. In the following three such generic aims and process designs will therefore be introduced.

Developing a (shared) knowledge of the environment

The importance of the exploratory elements of scenario development can hardly be overestimated in relation to policy and administration. More often than not there are deeply rooted and culturally-based assumptions about the nature and the state of the environment of the administrative unit and its policy area. Working with scenarios in relation to a particular subject may help the participants to challenge and re-conceptualise their understanding of the administrative environment and the dynamics and trends that drive its development and that of the administrative unit. As such, the major goal of a scenario analysis may 'simply' be to challenge the existing understanding of the administrative environment, its dynamics and challenges in relation to a particular subject. This may then call for a rather quick and not too resource-intensive project design, since the main objective is to develop the understanding of the driving forces in the environment but not necessarily to use this in relation to one particular problem solving activity.
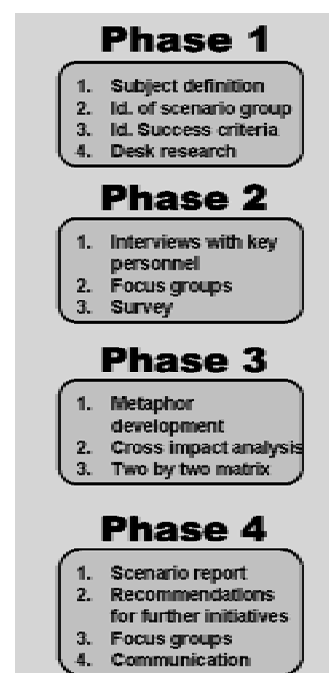
This is reflected in the design proposed for this kind of activity. Phase 1 is (as always) extremely important since it is here that scenario group is formed, 'the rules of engagement' are identified, and the success criteria are identified. Phase two's use of resources is kept to a minimum; the desk research conducted in phase 1 is complemented with a few interviews with key personnel to ensure that the scenario team has developed the correct understanding of the subject matter. Phase 3 is also designed to minimise the use of resources. Trends and driver are identified via the metaphor tool and prioritised in a fast and simple manner via the 'rabbit race'. Finally, the scenarios are developed using the 'Two by two matrix,' since this allows the participants themselves to create the scenarios in a relatively short time. All in all, the actual work with the scenario development may be conducted during a full-day workshop. In Phase 4, the results of the previous phases are reported and a list of recommendation and/or activities related to the subject may be formulated as well.

Using scenarios to strengthen a public discourse

There may be a range of subjects where there is a political interest in initiating or strengthening a public discourse and including as many stakeholders as possible in this discourse. An example of this is technological foresights, where scenarios often play a relatively central role. The development of different scenarios may help to frame the challenges related to a given subject and may therefore be an important tool for policymakers in guiding the public discourse. Furthermore, stakeholders may be included at an early phase of the scenario process, and thereby take ownership of the process and the dissemination of results at a very early stage. This requires a more robust and resource-intensive process design, since a greater number of information sources and stakeholders must be involved, and since there is an greater need for the scenarios to absolutely consistent and precise if they are to be used in a public debate.

In phase one this primarily means that more attention must be paid to the mapping of subject area, especially the stakeholders' relationship to the subject. In phase two, stakeholders should be involved via focus groups

Phase 1
1. Subject definition
2. Id. of scenario group
3. Id. Success criteria
4. Desk research

Phase 2
1. Interviews with key personnel

Phase 3
1. Metaphor development
2. Rabbit race
3. Two by two matrix

Phase 4
1. Scenario report
2. Recommendations for further initiatives

Phase 1
1. Subject definition
2. Id. of scenario group
3. Id. Success criteria
4. Desk research

Phase 2
1. Interviews with key personnel
2. Focus groups
3. Survey

Phase 3
1. Metaphor development
2. Cross impact analysis
3. Two by two matrix

Phase 4
1. Scenario report
2. Recommendations for further initiatives
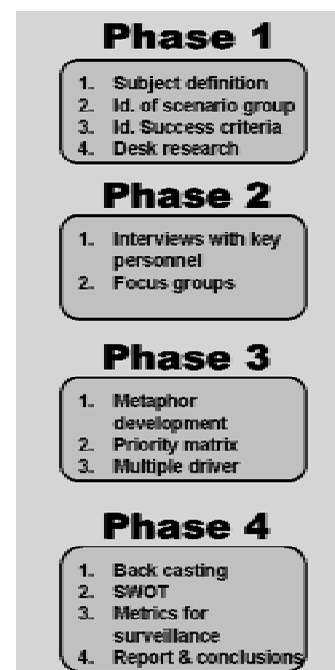3. Focus groups
4. Communication

and/or conferences and workshops, and the scenario team should ensure that stakeholders' input is documented rigorously. In phase three, more often than not the actual development of scenarios is made by a scenario group composed of a range of the major stakeholders and experts on the subject rather than personal from the administrative unit financing the analysis. Again, this is to ensure quality of the process and to insure inclusion of the input by the major stakeholders. Since it is important that the trends be evaluated thoroughly, cross impact analysis would be a good tool to identify the most dominating and important trends. It may be tempting to do very complex scenarios using the 'multiple driver' approach, but one should remember that in order to be debatable the scenarios themselves cannot be made too complex. Therefore the 'two by two matrix' is often chosen in this context.

Evidently, phase four is extremely important in relation to the aim of this type of scenario analysis. Apart from the traditional documentation, other activities should be introduced in this phase. A workshop or focus group can be arranged with representatives from the dominant stakeholders; here, the major conclusions and questions from the study can be presented and discussed and tested. Using the feed back from these sessions, the final reports can be fine-tuned and communication strategy can be developed. The communication strategy will depend on the subject, but should include interactive and participatory activities such as conferences or discussion forums on the internet if the public discourse is to be strengthened.

Decision support

Another widespread use of scenarios in a policy context is for decision support in relation to complex issues with long-term implications. This requires very well-researched and robust scenarios with a large amount of quantifiable data. Basically, the design of phase one is the same as the in the two other generic process designs. In phase two, interviews with key personnel and focus groups should be devoted to broadening the understanding of the subject and possible trade-offs related to the different decisions that may be taken. All in all this is not that different from the two other generic process designs. The real differences are related to phases three and four. In phase three it is important that the scenario group be absolutely clear as to how uncertain the drivers are and how they may influence these drivers since strategic decisions will be taken on the basis of the different scenarios. The priority matrix is often used to identify the most important drivers, but if resources allow a cross impact analysis could/should be made as well. Since the scenarios are to be used as an analytical tool, the multiple driver approach is often most appropriate for the actual scenario development.

Once the scenarios have been created they are put into action in phase four. First of all they are 'back-casted' in order to understand what kinds of plausible development could lead to each scenario. After this, different tools are used for the assessment of how different decisions may play out in different scenarios. If the decisions are closely related to an organisation, a SWOT may be conducted in each scenario and compared in order to assess the different positions and implications in the different scenarios. Based on the input from this work, a decision will then have be taken. Once this is done the scenario team should develop a set of 'metrics' to measure the key drivers and trends identified in the scenarios. This will allow the scenario team and administrative unit to monitor whether the future development within the area plays out in the same way as envisioned in the scenarios. If there are major discrepancies between scenarios and reality, the decisions and development will then have to be reviewed.

Phase 1
1. Subject definition
2. Id. of scenario group
3. Id. Success criteria
4. Desk research

Phase 2
1. Interviews with key personnel
2. Focus groups

Phase 3
1. Metaphor development
2. Priority matrix
3. Multiple driver

Phase 4
1. Back casting
2. SWOT
3. Metrics for surveillance
4. Report & conclusions

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