Creating the future :
The use and misuse of scenarios

Published in Long Range Planning

Vol. 29, n°2, pp. 164-171, 1996

Michel Godet and Fabrice Roubelat

Summary

Facing dramatic changes, organisations have not only to be reactive and preactive, but also proactive and thus to link anticipation and action. To transform anticipation into action through appropriation, scenarios should follow four conditions : relevance, consistence, likelihood and transparency. For that purpose, the use of simple formal tools like structural analysis, actors' strategy analysis, morphological methods or probability analysis, illustrated with a case studies on steel and iron industry, are useful to avoid entertainment and to explore all possible scenarios.

La prospective is pre-active and pro-active

All who claim to foretell or forecast the future are inevitably liars, for the future is not written anywhere - it is still to be built. This is fortunate, for without this uncertainty, human activity would lose its degree of freedom and its meaning - the hope of a desired future. If the future were totally foreseeable and certain, the present would become unliveable. Certainty is death. Because the future has to be built, it also cannot be conceived as a simple continuation of the past.

In the late fifties, French philosopher, manager and civil servant Gaston Berger proposed the use of the word prospective to

emphasize the importance of a future oriented attitude. For Gaston Berger, the prospective attitude meant *to look far away*, because la prospective is a long term preoccupation, *to look breadthwise*, to take care of interactions, *to look in depth*, to find the factors and trends that are really important, *to take risks*, because far horizons can make us to change our long term plans, *to take care of the mankind*, because *la prospective* is only interested in human consequences. In this definition, we find the principles which are underlying current works on complexity.

Although the world is changing, the direction of this change is uncertain. *La prospective* does not claim to eliminate this uncertainty through illusory prediction, but aims to reduce it as far as possible, and to make decisions based as little as possible on hypothetical futures. Thus, the first aim of *La prospective* is to illuminate the choices of the present in the light of possible futures. Good forecasts are not necessarily those which are realised, but those which lead to action so as to avoid the dangers and arrive at the desired objective.

Fig. 1
Towards the future : four attitudes

Attitude	Example
Passive	Ostrich
Reactive	Fireman
Preactive	Insurer
Proactive	Prospective manager

In the face of the accelerating pace of change, the uncertainties of the future, and the increasing complexity of phenomena and interactions, an antifatalistic, pre-active (anticipating changes) and pro-active (provoking changes) attitude is essential.

In our modern societies, anticipation is imperative because of the combined effects of two main factors :

- firstly, the acceleration of technical, economic and social change, which necessitates long-term vision : 'the faster you drive the further your headlights must shine' ;

- secondly, factors of inertia inherent in structures and behaviour mean that we must sow the seeds of change today if we wish to harvest them tomorrow.

Over the last two decades we have also noticed that errors of forecasting are often based upon two mistakes :

- overestimation of the pace of change (of technologies);
-underestimation of inertial factors (structures, behaviours).

Therefore, when thinking about the future, we suggest it is useful to start by identifying factors which are unlikely to change.

Unfortunatly, anticipation is not widespread among managers. When all is going well they can manage without it, and when things are going badly it is too late to see any further than the end of their's nose : they have to react, and quickly. However, reaction alone leads nowhere. Remember Seneca's comment : there is no favourable wind without a direction. In other words, action in the short-term reality has no meaning unless it takes place in the long-term context of a plan, because 'the future is the raison d'être of the present'.

Differing from forecasting which is too often coined with econometrics, foresight which remains too passive, futures studies which is too large, strategic prospective is not only an exploratory approach but also a normative one. Continuing the tradition of strategic planning and strategic management, strategic prospective emphasizes the importance of long range and alternative thinking in strategic decision processes.

From anticipation to action through appropriation

The best ideas are those that people discover by themselves. The phenomenon is well known : a good idea will move up the company hierarchy more easily if the boss believes it comes from him ; one should adopt this same reasoning with people one wishes to convince and involve.

Any thinking which is not appropriated by those concerned has a great chance to be rejected.Thus we discover the three components of the Greek triangle : prospective thought gives

content to mobilisation, maintains motivation (ie : motives for action) and nourishes strategic will.

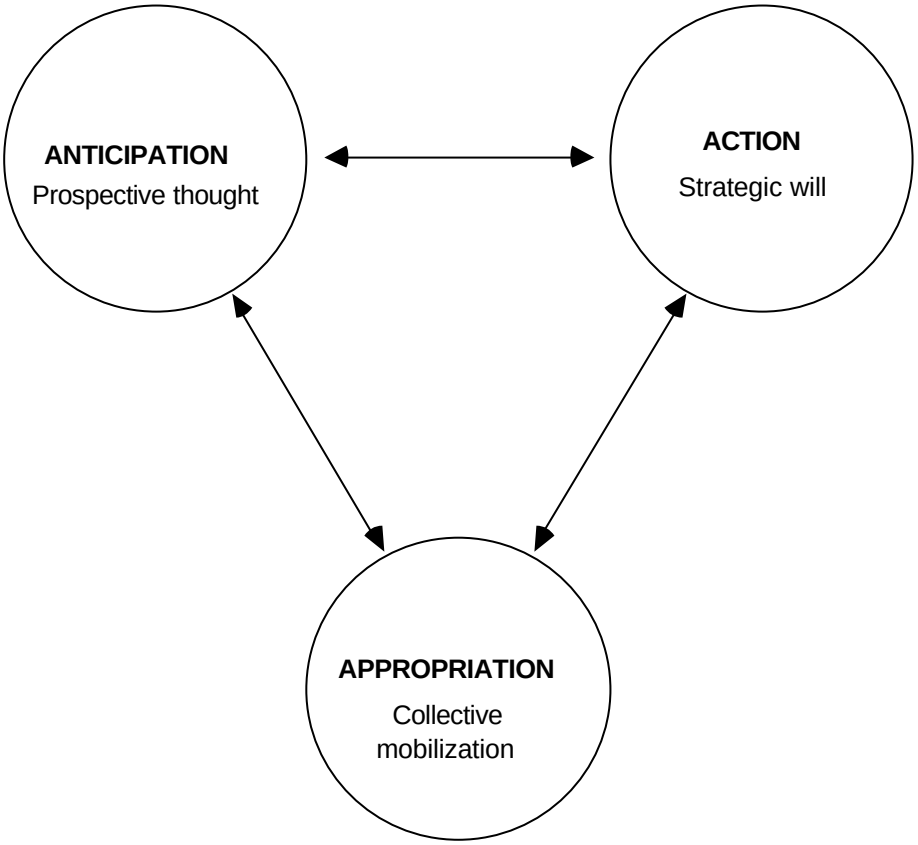
We can define these three components as ‘Logos’ (thought, rationality, discourse), ‘Epithumia’ (desire in all its noble and not so noble aspects), ‘Erga’ (action and realization). The marriage of passion and reason, of heart and mind, is the key to successful action. Let us give the same message in colour : the blue of cold reason associated with the yellow of warm feeling produces the green of brilliant action.

A person cannot be reduced to a rational mind (the left hemisphere) ; he is also driven by the emotional faculties (the right hemisphere). So it is time we stopped opposing intuitive vision and rational thinking. Both are necessary ; it all depends on circumstances. Rational and heuristic schools of scenarios planning are only apparently in opposition ; in fact they are complementary.

A sound initial reflection, imbued with relevance and coherence, reinforces the efficacity of action and reaction in the face of events. The same applies to reflexes : they are better after intensive training.

Fig. 2
THE GREEK TRIANGLE

- PROSPECTIVE THOUGHT
- STRATEGIC WILL
- COLLECTIVE MOBILIZATION



PROSPECTIVE GIVES CONTENT AND DIRECTION
TO COLLECTIVE MOBILIZATION

Source : Godet M., From anticipation
to action

Using simple rational tools in order to stimulate imagination, coherence and appropriation.

There is no universal tool ; no one method is a panacea ; available data are both overabundant and incomplete. Furthermore, a model is not reality, but a means of looking at reality. All these considerations lead us to point out that the scope of each method or model is relative.

The imperfection of the tools, the inaccuracy of data, and the subjectivity of interpretations are unavoidable realities, which prompt us to opt for pluralistic and complementary approaches. As far as possible, the results of a model should be tested for their sensitivity to a variety of data inputs and to the use of another tool. Only sufficiently robust results should be considered credible.

The main interest of methods is not only that they provide results, but also that they should be the occasion for structured thought and intelligible communication on a given theme. From this point of view, our recommendation to researchers and practitioners is clear ; the container matters little so long as one is intoxicated by the content- communication. The most important thing in a study is not so much the resulting report, as the process of involvement leading to it.

What is too simple is stupid and wrong, what is too complex is usefulness. The idea is to use tools which are simple enough to be appropriative by the users and customers of the results. Such appropriation is necessary to turn anticipation into action (see the Greek Triangle).

To construct scenarios and strategies, we need such simple and rational tools in order to stimulate imagination, to improve coherence and to facilitate appropriation.

For that reason, we have elaborated a toolbox which classifies problem-solving methods as follows :

1. Asking the right questions and identifying the key variables : futures workshops and structural analysis with MICMAC method ;

2. Analysing trends and actors' strategies : retrospective studies and MACTOR method ;
3. Reducing uncertainties to likely scenarios : morphological analysis, experts methods (Delphi, cross-impacts),;
4. Identifying and assessing of strategic options : multicriteria analysis and MULTIPOL method.

Most of these tools are now available on diskettes (PC and MAC). However, users must be cautious and choose proper tools for each problem. Researchers too often apply the same tool indiscriminately to any problem just because they know it !

The scenario method

The scenario method which we discuss here was largely developed at the time the author was in charge of the Department of Futures Studies with the SEMA Metra Consulting Group, from 1974 to 1979. During the eighties it was improved at the Conservatoire national des arts et métiers with the support of institutions like EDF, Elf, and the Ministry of Defence.

It is now clear that setting up such an approach in prospective, with more than fifty actual applications undertaken in companies and public administration, contributed to :
- stimulating strategic thought and communication within companies ;
- improving internal flexibility of response to environmental uncertainty, and providing better preparation for possible system breakdowns ;
- reorienting policy options according to the future context on which their consequences would impinge.

The future is multiple and several potential futures are possible ; the path leading to this or that future is not necessarily unique. The description of a potential future and of the progression towards it comprises a 'scenario'. The word 'scenario' was introduced into futurology by Hermann Kahn in his book The Year 2000, but the usage there was primarily literary, imagination being used to produce rose-tinted or apocalyptic

predictions previously attempted by authors such as Anatole France, or George Orwell.

What is a scenario ? "A description of a future situation and the course of events which allows one to move forward from the original situation to the future situation ". Two major categories of scenario can be identified :

- exploratory : starting from past and present trends and leading to a likely future ;
- anticipatory or normative : built on the basis of different visions of the future ; they may be either desired or, on the contrary, feared.

These anticipatory or exploratory scenarios may, moreover, be trend-driven or contrasted, depending on whether they incorporate the most likely or the most unlikely changes. The word “scenario” is often misused and serves to qualify any set of hypotheses. We recall that the hypotheses must simultaneously comply with the three prerequisite conditions, viz., relevance, coherence and likelihood.

In France, the OTAM team was the first to use a scenarios method, in a study of geographical futures undertaken for DATAR. US researchers, Gordon, Helmer, Dalkey, and others, have developed several rather more formal methods to construct scenarios. All these are based on discussions among experts : Delphi, cross-impact matrix, etc. Developments are regularly published in journals, Futures, and Technological Forecasting and Social Change.

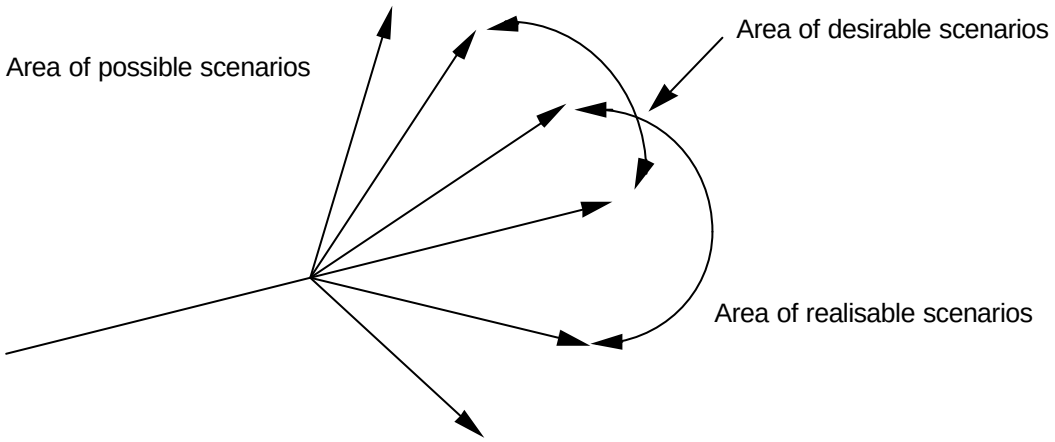
In practice, there is no one scenario method, but rather a variety of methods of construction (certain simplistic, others sophisticated). However, a kind of consensus seems to have been reached ; the term ‘scenario method’ only applies to an approach which includes a number of specific steps (systems analysis, retrospective, actors' strategies, elaboration of scenarios) which interrelate as discussed below.

Classically, a distinction is made between the following : possible scenarios, ie, everything that can be imaged ; realisable scenarios, ie, all that is possible, taking account of constraints ;

desirable scenarios, ie, which fall into the possible category, but which are not all necessarily realisable.

According to their nature or their probability, these scenarios may be termed 'reference', 'trend-based', 'contrasted' or 'normative'. In principle, a trend-based scenario, whether or not it is probable, corresponds to the extrapolation of trends at all points where choices are to be made. It is among the realizable scenarios, which have a higher than zero probability, that we find contrasted (unlikely) scenarios and the field of development where the most probable scenarios are found. As regards desirable scenarios, these are found certainwhere within the possible zone, and are not all necessarily realizable.

Fig. 3
From anticipation to action



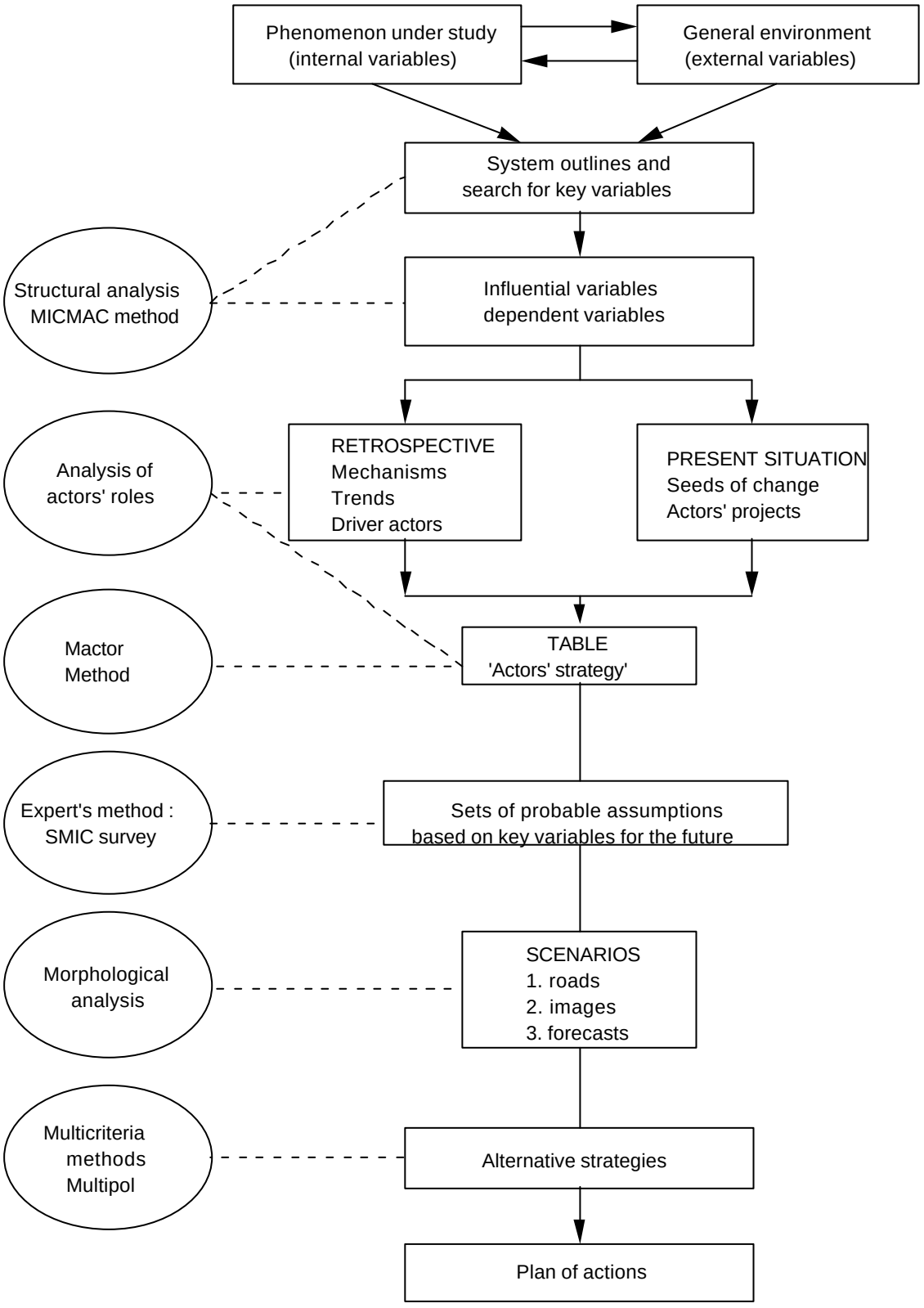
There is often confusion between scenarios and strategies. While scenarios depend on the type of vision adopted (exploratory, normative or retroprojective) and on probability, strategies depend on attitudes adopted in the face of possible futures.

Apparently, it is the concept 'normative' which gives rise to this confusion. In the case of scenarios the word 'normative' is

used in a retroprojective sense, whereas it naturally refers to the notion of norms and objectives when we are talking about strategy. In other words, there are no scenario-objectives, but only strategies.

We usually follow a logical sequence to implement the scenario method process. During this process, we may or may not use the tool-box for problem solving in long range planning.

Fig. 4
The scenario method



Source : Godet M., *From anticipation to action*

The objectives and length of such a paper does not allow us to describe in details each path of the scenario method and each technique used[1]. However, we would like to emphasize the utility of probability analysis with Smic-Prob-Expert, as it was implemented during a scenario building process studying possible futures for iron and steel industry..

The probability of scenarios in the iron and steel industry and its surprising results

As the 1995 Profutures[2] workshop emphasized it, probability analysis is not widely accepted by long range planners and consultants. For some of them, probability analysis is a danger because some important evolution can be excluded. To support probability analysis, we do have exactly the same argument, which we developp with the case study.

In 1990-1991, after several months of thinking about the future of the steel industry in France by the year 2005, a group of industrial experts built six global scenarios. Useful to feed forecasting models for this industry these six relevant and consistent global scenarios were based upon three main hypotheses :

H1 weak economic growth (less than 1,8 %)
H2 strong environmental constraints
H3 strong competition with other materials

The six scenarios were the following ones :

Black (S1) weak growth of GNP and strong competition from other materials

Gloom (S2) weak growth of GNP without strong competition from other materials

Trend driven (S3) continuation of the current situation

Ecology (S4) strong environmental constraints

---

1 All are described in detail with case studies in Godet M., *From anticipation to action*.

2 Profutures is an international network devoted to the promotion of prospective and futures studies methodology. 1995 workshop held in Paris and gathered scenario planners coming from Europe, USA and Australia. For further details see Bain and Roubelat (1994).

Optimistic steel (S5)strong growth of GNP and competitiveness favorable to steel

Optimistic plastic (S6) strong growth of GNP and competitiveness favorable to other materials

At the end of the scenario workshop, experts were asked to discuss single and crossed conditional probabilities of the three hypotheses. Processing the experts' subjective probabilities, the use of the SMIC-Prob-Expert software revealed that the six scenarios cover only 40% of probables :

S5 opt. steel, S4 ecology (010) = 14,7 %
S1 black (101) = 10,8 %
S6 opt. plastic (001) = 7,1 %
S3 trend driven (000) = 5,6 %
S2 gloom (100) = 1,6 %

It appeared that three new scenarios had a greater probability of happening. The three remaining sets of hypotheses (60 % of global probability) each have a higher probability of occurence than the most probable previously mentioned scenarios.

These forgotten but important scenarios were :
S7 black ecology (111) = 23,7 %
S8 green steel (110) = 20 %
S9 green plastic (011) = 16,4 %

The couple (11.) on the first two hypotheses H1 and H2 had been eliminated because in the context of weak growth strong environmental constraints would seem to be a priori a not very probable luxury. The couple (.11) had been eliminated because strong environmental constraints (H2) seemed rather more favourable to steel which at the same time was not subject to strong competition with other materials. Why is it not possible to imagine recycling or biodegradable plastic as suggested by the couple combination (.11) ?

If we do not consider probability analysis as decision criteria, we however think that it cannot be rejected where useful and especially where it can break mental maps and indicate new possible directions. Processing differents sets of probabilities coming from various groups of experts and managers, subjective

probability analysis may also reveal actors' games and believings. In clear, probability analysis is not a tool to close the range of possible futures but to open it.

The dangers of entertainment scenarios

The very use of the word "scenario" can prove dangerous for long range planning : there is a risk of being swamped by media successes or limited to achieve businessmen untertainment with little or no scientific grounding . Let us examine two questions :

- should one consider that using the term "scenario" for any combination of hypotheses (for a given analysis), however attractive this may be, confers a degree of future respectability ?
- need one necessarily draw up full and detailed scenarios when undertaking future thinking ?

The answer is most assuredly : "No!" on both counts. A scenario is not a future reality but a way of foreseeing the future, thereby throwing light on the present in terms of all possible and desirable futures. The test of reality, and a concern for efficacity , should be used to guide *prospective* thinking in order to gain a better mastery of history. A scenarios approach can only be credible and useful if it complies with four prerequisites : relevance, coherence, likelihood and transparency.

In other words, one must ask the right questions and clearly formulate the true hypotheses which are keys to the future. Without this procedure, there is a risk of leaving out a large part of possible futures. With modern probability tools, such as the micro-computer package SMIC- Prob-Expert, it takes only a few minutes to provide results for a group study. Curiously, certain proponents of scenario planning refuse to submit their own thoughts on an issue to a system which is akin to a lie-detector, or which would at least reveal contradictions in their reasoning.

The last prerequisite mentioned above needed to ensure the credibility and usefulness of the scenario method (transparency from A to Z) implies that: *"a clear concept can always be stated clearly "*. This should be the case for any problem, for the methods used

to solve it, for the reasoning behind it, for the results and the conclusions in regard to the scenarios envisaged. Far too often, unfortunately, either the simple reading of the scenarios proves laborious and the reader must invest considerable effort in ascertaining the prerequisite conditions (relevance, consistence), or the literary quality is so low that the reader finds it indigestible and sets it aside. Thus, due to a lack of close and critical review, a number of scenarios remain credible, i.e., they are given the benefit of the doubt and the reader is left feeling certainwhat guilty that he has not read the text through to a logical end.

Without transparency, forthcoming results will be unadaptable and will not enable implication of the actors (the public) that we wish to involve through the scenarios. Naturally transparency and attractiveness of scenarios do not preclude quality of content ; scenarios with catchy titles, or which are presented in an emotion-ridden, pleasurable or doomsday style - such as Alvin Toffler's Future shock - can be convincing. Such works are fiction, i.e., a literary genre which *per se* is quite honourable and often makes for superb reading. A famous example which springs to mind is George Orwell's *"Nineteen Eighty-four"* . However, they rarely contain relevant, coherent or even likely scenarios to be used by decision makers.

To bring a scientific background in scenario building, some futurists tried to import from hard sciences some concepts such as bifurcations, chaos and catastrophes. However, we do not have to wait that much from such attempts, even if they seem attractive. For scenario building, such concepts may only be used as analogies and may hardly take the same mathematical form than those developed in physics, biology and even econometrics. As French strategist general Lucien Poirier pointed it out, all transposition of a concept outside its original field is hazardous in terms of pertinence. To avoid such risks and to make the difference between transpositions, analogies and just metaphors, the level of the transfer has thus to be specified. These distinctions can be a way to take into account mathematician Benoît Mendelbrot's address to 1993 World Futures Studies Federation conference which warned in substance : I don't know if chaos theory can be useful for you, but it is an interesting metaphor !

By replying negatively to the second question above, we want to make it amply clear that anticipation and scenarios are not synonymous. Too many futures studies have become bogged down over time because a group decided to launch into *"The scenario method "*. But why, we may ask, did they do so ? A scenario is not an end in itself ; it only becomes meaningful when its results and implications are embodied in real action. Undertaking a scenario approach is time consuming (12 to 18 months is not uncommon) and there must be several persons involved, to establish a team context and make the process viable. After three years the leaders of the OECD Interfutures team (1976-1979) announced that they had had insufficient time usefully to exploit all the results ! We can safely add on an extra year for circulating and publicising results.

In most corporate and administrative organisations, such teams will be required to report within the year. In extreme cases, policy-makers may launch a future study that they wish to see finished in a matter of a few weeks. Thus the prevailing conditions are rarely ideal and it is better to throw a little light (rather than no light at all) on the impending decisions. Sheer common sense dictates the simple questions that one should raise at the outstart : what can be done in the given time, using the means available? How can it be done in such as way as to be both credible and useful to the decision-makers ?

From this point of view, it will often be advisable to limit the scenarios to several key hypotheses, say four, five or six. Beyond such numbers, the sheer magnitude of possible combinations is such that the human mind simply gives up. Such straightforward scenarios are used as backgrounds for strategic options such as *"what if...?"* or *"what for..?"*. Short-cuts in a scenarios approach make it all the more crucial to do certain preliminary thinking about the key variables, the trends and the actors' strategies.

One final difficulty that arises when building scenarios and selecting methodology relates to lead-times. Even if one had months, or even years, to finish the assignment, there is a risk inherent in the start-up phase because team members or even the team leader may change as the study progresses. A futures study rarely survives after the departure of the initiator. In major

organisations - given existing staff mobility factors - it is preferable to limit the length of the project to one year and to plan for interim status reports. It is also advisable to identify a preliminary exploratory phase, during which the elements at stake are identified, and a normative phase during which the various strategic policy choices are defined, in terms of items identified in the preceding phase.

References :

Berger G., *Phénoménologie du temps et prospective,* Paris, PUF, 1964.

Bain D., Roubelat F., "Profutures : the birth of the Strategic Prospective and Futures Studies International Network for Applied Methodology", *Futures,* vol.26, n°3, April 1994, pp. 345-349.

Godet M., *From anticipation to action, a handbook of strategic prospective,* Unesco, 1993. Also published in French, Italian, Spanish and Portuguese.

Godet M., et alii, "Global scenarios. Geopolitical and economic context to the year 2000", *Futures,* vol. 26, n°3, April 1994, pp. 275-288.

Roubelat F., "The prospective approach", *The knowledge base of futures studies,* Slaughter R. (ed.), vol. 3, to be published.

The authors :

Michel Godet is professor of strategic prospective at the Conservatoire National des Arts et Métiers and director of LIPS, the Laboratory for Investigation in Prospective and Strategy.

Fabrice Roubelat is researcher at Electricité de France, Corporate Planning Unit and associate lecturer within the LIPS.

Address :

Conservatoire National des Arts et Métiers
Laboratoire d'Investigation Prospective et Stratégique
2 rue Conté 75003 Paris
FRANCE
Tel : (33 1) 40 27 25 30 Fax : (33 1) 40 27 27 43
e.mail : lips@cnam.fr