Chapter 4
Scenario development: a typology of approaches

by
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On the basis of a definition that draws on a wide understanding of the field, Philip van Notten proposes and discusses a typology of scenario methods. This is divided into three "macro" characteristics – goals, design and content – and ten "micro" characteristics within these broad categories. This typology demonstrates the diversity of scenario approaches and the ways and contexts in which they are used, as well as the output they produce. The chapter looks at the organisational cultures and arrangements which can help make scenario exercises most effective, and closes with observations about the value of very long-term thinking.

What is a scenario?

> *"The real voyage of discovery consists not in seeking new landscapes but in having new eyes."*
>
> Marcel Proust

The word "scenario" is derived from the Latin *scaena*, meaning scene (Ringland, 1998). The term was originally used in the context of such performing arts as theatre and film. Kahn (Ringland, 1998) adopted the term

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because of its emphasis on storytelling but the use of the term varies. Sparrow (2000) notes four contemporary uses of the word.

- One use corresponds to *sensitivity analysis*, whether in cash flow management, risk assessment, or project management.

- A second, as used in military or civil emergency planning, is synonymous with the idea of a *contingency plan* defining who is to do what during a particular event.

- A third sense is also synonymous with a *contingency plan* but applied to decision-making in *corporate or public policy*.

- Sparrow argues that planners advising decision makers use a fourth interpretation, regarding scenarios as more *exploratory* so that a scenario is less a strategy and more a *coherently structured speculation*. While the distinction is not always recognised (*e.g.* Godet and Roubelat, 1996), this fourth meaning forms the basis for much of the interest of scenarios for education.

There are thus varying definitions of "scenario" but on one point there is consensus: *it is not a prediction* (Van der Heijden *et al.*, 2002). Characteristics inherent in the various definitions include that they are: hypothetical, causally coherent, internally consistent, and/or descriptive. A definition which covers many of the characteristics proposed by others is:

> *Scenarios are consistent and coherent descriptions of alternative hypothetical futures that reflect different perspectives on past, present, and future developments, which can serve as a basis for action. (Van Notten, 2005)*

Scenario development emerged following World War II in US military strategic planning with the RAND Corporation, and in French spatial planning at DATAR. In the 1960s, General Electric and Royal Dutch Shell introduced scenario techniques in their corporate planning procedures and in the 1970s scenarios achieved prominence in speculations about the future of society, the economy and the environment. The 1972 Club of Rome report *The Limits to Growth* is one of the most famous and controversial examples of such a study. Today, scenarios are used in a wide range of contexts: by small and medium-sized enterprises (SMEs), to regional and national foresight studies, to environmental assessments for public policy such as the UN' Environmental Programme *Global Environmental Outlook* or the RIVM Netherlands Institute of Public Health and the Environment.

The variety of contemporary scenario practice is suggested by the wide range of bodies using them, including multinationals, government departments at various levels, and temporary bodies such as national

foresight programmes. A limited number of private organisations like Shell and DaimlerChrysler have institutionalised the use of scenarios. They are developed and applied on an ad hoc basis, however, by many organisations including those oriented to short-term market change, such as the telecom companies KPN, Ericsson, and Vodafone. Scenario development is not common in SMEs, although two documented examples are the mail-order company Smith & Hawken (Schwartz, 1991) and Flight Directors, a broker company between airlines and holiday companies (Fuller et al., 2003). Another form of scenario work developed in the past 15 years has been through inter-company co-operation, facilitated by organisations such as GBN and the World Business Council for Sustainable Development (WBCSD).

A typology of scenario characteristics

There are several scenario typologies available, such as those proposed by Ducot and Lubben (1980), Duncan and Wack (1994), Godet and Roubelat (1996), Postma *et al.* (1995), and Heugens and Van Oosterhout (2001). Each of these identifies fundamental distinctions between scenario types, but as the typologies reflect the state of play at the time, they become outdated as the field evolves. Another problem is that typologies often fail to capture the full range of contemporary scenario development. Heugens and Van Oosterhout's typology is more recent than Ducot and Lubben's but less detailed. Business-oriented classifications such as Duncan and Wack's do not take account of differences between macro-economic and environmental scenarios. Therefore, the existing classifications are a source of inspiration but not detailed enough for an in-depth analysis, nor broad enough to do justice to the variety of today's scenario development approaches.

Given the different limitations, I developed a new typology on the basis of earlier typologies and a comparative review of approximately 100 studies carried out since the mid-1980s. These studies were conducted in different organisational settings, including businesses such as the British Airways and KPMG; "inter-company" co-operative efforts such as the Dutch Management Association (NIVE) and the World Business Council for Sustainable Development (WBCSD); governmental organisations such as the Rotterdam Port Authority; broadly-based participatory futures initiatives such as those carried out in South Africa and Colombia; and academic studies such as the Intergovernmental Panel on Climate Change (IPCC) and the research institutes of the VISIONS project. The studies reviewed covered either a range of sectors (transport, telecom, and nutrition), or national and regional development strategies; or were defined by issues such as gender equality, the labour market, climate change, and leadership.

The typology (Table 4.1) identifies three broad "macro" characteristics which are central aspects of scenarios and their development. The macro characteristics apply both to sets of scenarios and to individual scenarios. They address the "why?" "how?" and "what?" of a scenario study: its goals, the design of the process, and the scenario contents. The project's goals influence the design influencing in turn contents.

A rudimentary comparison of scenario analyses might confine itself to the use of the macro characteristics. A more in-depth comparison demands a greater appreciation of detail, which can be gained with the help of nine micro characteristics that are described in the following paragraphs. They are categorised according to the macro characteristic to which they are closest associated.

Table 4.1. A typology of scenario characteristics

Broad "macro" characteristics	Detailed "micro" characteristics
The goals of scenario studies	*The function of the scenario exercise*
Exploration – Pre-policy research	Process – Product
	The role of values in the scenario process
	Descriptive – Normative
	The subject area covered
	Issue-based – Area based – Institutional based
	The nature of change addressed
	Evolutionary – Discontinuity (Abrupt – Gradual discontinuity)
Design of the scenario process	*Inputs into the scenario process*
Intuitive – Analytical	Qualitative – Quantitative
	Methods employed in the scenario process
	Participatory – Model-based
	Groups involved in the scenario process
	Inclusive – Exclusive
Content of the scenarios	*The role of time in the scenario*
Complex – Simple	Chain – Snapshot
	Issues covered by the scenario
	Heterogeneous – Homogeneous
	Level of integration
	Integration – Fragmented

Source: Author.

The comparison of scenario analyses can confine itself to the broad macro features. In-depth comparison demands a greater appreciation of detail, for which further micro characteristics are described for each.

The goals of scenario studies

The educational function of scenarios has gained in importance in recent years compared with its function as a planning tool (Ringland, 1998). Scenarios began to be used more for exploratory ends than prediction, as illustrated by Royal Dutch Shell's 1972 scenarios, which raised the possibility of a transformation in the supply chain for oil production. Some leading practitioners (*e.g* Global Business Network [GBN], see Chapter 1) abandoned the planning aspect altogether, choosing instead to use scenarios primarily for learning and communication. Policy planning is still a feature of some approaches such as the French "prospective", which combines the exploratory with the decision-oriented. Even so, the decision orientation has tended to broaden and to resemble pre-policy research rather than classical planning. Scenario planners in general do not start with a narrow focus, doing so increases the chances of missing key determinants of future conditions or events (Duncan and Wack, 1994).

There are thus two poles of the spectrum in relation to goals – exploration and pre-policy research. *Exploration* covers learning, awareness-raising, the stimulation of creative thinking, and investigating the interaction of societal processes (Schwartz, 1991; European Environment Agency and ICIS, 2000; Van der Heijden, 1996). In exploratory scenario exercises, the process may well be as important as the product. The "Which World?: Scenarios for the 21st Century" (Hammond, 1998) is a good example of an exploratory exercise investigating possible paths to alternative futures. In *pre-policy research*, on the other hand, scenarios are used to examine paths to futures that vary according to their desirability. Decision support scenarios may be variously described as desirable, optimistic, high-road, or utopic; conventional or middle-of-the-road; and undesirable, pessimistic, low-road, dystopic, or doom scenarios. High- and low-road scenarios were developed in the Scenarios for Scotland study (McKiernan *et al.*, 2001a, b, c), and they are implied in the Mont Fleur (Kahane, 1998) and the Destino Colombia scenarios (Global Business Network, 1998). Pre-policy research scenarios may propose concrete options for strategic decision-making, such as those reported in Gertner and Knez (2000) and Van Notten (2000). It is more common in pre-policy research scenario exercises to offer implicit policy recommendations. The most desirable Mont Fleur scenario, for example – the Flight of the Flamingos –

describes a South Africa successfully negotiating the post-apartheid transition period, but does so only in general policy terms.

In practice, studies are often hybrids straddling the two poles of exploration and pre-policy research (Van der Heijden, 1996). In a first phase, scenarios may be developed in exploration of a field which will often be too general to serve as the basis for decision-making. Therefore, new scenarios may then be developed using the exploration of the first phase to zoom in on aspects relevant to strategy development. For example, at Royal Dutch Shell, global scenarios are developed on a corporate level which are then used to help develop the second set of scenarios focused on the strategic issues most relevant to individual Shell operating companies (*ibid.*).

The function of the scenario exercise

Process-oriented scenario development functions to promote: learning, communication, and improving observational skills. The learning/educative function is about informing people (Van der Heijden *et al.*, 2002) by deciphering the often confusing overload of information (Duncan and Wack, 1994), and integrating possible future events and developments into consistent pictures of the future. Making sense of the future in this way can challenge mental models and prevailing mind-sets (Wack, 1985; Schoemaker, 1995), and can involve learning from the past and investigating fundamental uncertainties about the future. The educational aspect of scenario development may well serve to improve participants' intellectual and creative skills (Van der Heijden, 1996). Ultimately, scenarios might serve as a vehicle to instil a consciousness of the future in society (Van Steenbergen, 2003). Scenarios may also have a communicative function (Van der Heijden *et al.*, 2002; Masini and Vasquez, 2000). The process of scenario development provides a language to cross disciplinary boundaries. In organisations, it may provide a basis for "strategic conversations", to discuss perceptions on strategy, opportunities, and threats. Social interaction in a scenario process arguably helps an organisation to improve its perceptive ability to anticipate both difficult times and upcoming opportunities (Schwartz, 1991).

Product-oriented scenario studies are more concerned with the nature and quality of the output than with how it was arrived at. Their functions are: the identification of driving forces and signs of emerging trends, policy development, and to test policy. Scenarios can be used to identify and prioritise the dangers and opportunities in emerging events and processes (Masini and Vasquez, 2000), signs of which are sometimes referred to as "weak signals", "early warnings", "seeds" or "traces". Scenarios may also

be a tool for evaluating decisions and testing policy options by doing "practice runs" of possible future situations which indicate the possible effects of decisions (Van der Heijden *et al.*, 2002; Wilson, 2000).

The role of values in the scenario process

Some might say that all scenarios are normative in that they reflect interpretations, values, and the interests of those involved in the scenario exercise. It is nevertheless useful to distinguish between *descriptive* scenarios and those which are explicitly *normative.* Royal Dutch Shell's 2001 global scenarios entitled Business Class and Prism, for example, outline two possible futures without indications of desirability (Shell International, 2002). In contrast we can refer to the "Balanced Growth" scenario in The Netherlands in Triplicate study (CPB Netherlands Bureau for Economic Policy Analysis, 1992), as normative because the explicit aim is to show, given certain conditions, that economic growth can go hand in hand with environmental protection.

Whether a scenario looks forwards from the present situation to the future or back to the present from a particular future end point can have a bearing on whether it is normative or not. For instance, the backward-looking "back-casting" scenario (Robinson, 1990) is explicitly normative in its analysis of the measures and developments needed to reach a particular point in the future judged to be desirable. An example of back-casting is the POSSUM project (Banister *et al.*, 2000) which formulated sustainable transport targets for the year 2020. However, not all backward-looking scenarios are explicitly normative as the descriptions in the literature on anticipatory scenarios demonstrate (Ducot and Lubben, 1980).

The subject area covered

The subject covered provides the focus to scenarios. The time scale adopted is one way in which focus is determined, though the perception of time is dependent on context. Ten years is considered as the long term in the fashion industry whereas it is relatively short term for many environmental issues. Broadly 25 years or more may be considered long term scale for a scenario exercise as with the World Business Council for Sustainable Development's (WBCSD) global scenarios until the year 2050 (1998). A time scale of 3 to 10 years may be thought of as short term for scenario work, illustrated by the study of the food and beverage market by a Dutch nutrition company (Van Notten, 2000). Due to its dependency on context, time is not here proposed as a characteristic of the typology in its own right. Yet, time scale is certainly relevant for establishing focus with regards to the *issue,* the geographical *area* and the *institution* the scenarios address.

Issue-based scenarios take societal questions as the subject of study, such as the future of television (Digital Thinking Network, 2000), or the future of women (McCorduck and Ramsey, 1996). Area-based scenarios explore futures for a particular continental region, country, region or city. There are also examples which address the global scale – the OECD scenarios in the world in 2020 (OECD, 1997) and the IPCC scenarios (Intergovernmental Panel on Climate Change, 2000). There is also a large number of examples addressing the national level such as Japan (Nakamae, 1998), Destino Colombia (Global Business Network, 1998), and the Netherlands in 2030 study, which developed spatial planning futures. An example of regional scenarios is provided by a case study that is part of the Netherlands in 2030 study on scenarios for agriculture and land-use in the Dutch province of Noord Brabant (Stuurgroep Toekomstonderzoek en Strategisch Omgevingsbeleid, 2000).

Institution-based scenarios address the spheres of interest of an organisation, group of organisations, or sector. They can be broadly sub-divided into macro or contextual scenarios, on the one hand, and focused or transactional scenarios, on the other (Van der Heijden, 1996). (Related terms for macro scenarios are "global", "archetypal", "framework" and "external"; for meso scenarios, they are "decision" and "internal".) The "contextual scenario" is about the institution's environment and the issues that they do not directly influence themselves. Contextual analyses can explore unfamiliar terrain as was the case in Shell's global scenarios. A "transactional scenario" refers to the institution's meso-environment and focuses on the interactions between variables and dynamics within a particular field. However, the distinction between the contextual and transactional environments may not always be clearcut. The different institution-based spheres are shown in Figure 4.1.

A study can combine scenarios based on issues, areas, and institutions to create systemic scenarios cutting across all these dimensions. For example, the VISIONS scenarios (Rotmans et al., 2000) are both area- and issue-based in their exploration of equity, employment, and consumption in a European context; the drinks company United Distillers' scenarios of India and South Africa are both institution- and area-based (Ringland, 1998).

Figure 4.1. The levels and focus of institution-based scenarios
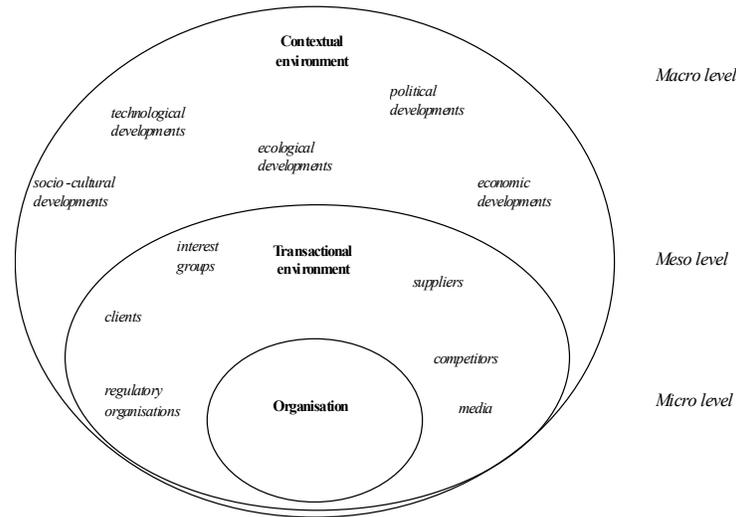
Source: Author.

The nature of change addressed

In the *nature of change* addressed in the scenarios, one can distinguish between evolutionary developments and discontinuities. Evolutionary scenarios are consistent with the notion of a gradual, incremental unfolding of a world pattern or system through time and space; Brooks (1986) and Morgan (2002) argue that this is the dominant scenario paradigm within which it is difficult, if not impossible, even to imagine discontinuity, let alone incorporate it into scenarios. The 1996 British Airways study (Moyer, 1996) is a noteworthy illustration of one which assumed that the future would not significantly vary from the past. Airline regulation changes and IT developments are considered, but judged to be driving forces powerful enough to cause a significant deviation of current trends.

The sudden nature of change is the distinguishing feature of abrupt discontinuities. They give society a jolt, though possibly only a temporary and reversible one. Abrupt discontinuity manifests itself through events but these tend to be connected to underlying processes. Gradual discontinuity, on the other hand, is a self-reinforcing process of societal transformation

where a diverse set of developments – socio-cultural, technological, economic, environmental, and political – converges. The distinction between abrupt and gradual discontinuity is not always clear, however, as what constitutes a discontinuity depends on the time scale and the disciplinary perspective from which it is regarded.

The biotechnology scenarios developed by the World Business Council for Sustainable Development (2000) include examples of both forms of discontinuity. In "The Domino Effect" Scenario, biotechnology continues to make steady progress until 2010, when an abrupt discontinuity occurs following the deaths of 25 patients undergoing gene therapy which are given enormous media attention resulting in the collapse of the biotechnology business. The other two scenarios portray worlds of gradual discontinuity over a 50-year period. The "Hare and the Tortoise" Scenario describes societal transformation towards traditional farming techniques and holistic health remedies, and away from biotechnology. The Biotrust Scenario describes a transition to a world where biotechnology is a trusted and integral part of the human fabric with many applications in health care, food production, and life sciences.

Design of the scenario process

The second broad macro dimension of the typology addresses the methodological aspects of scenario development. Numerous scenario communities have developed over the years, each with its own approaches. A basic distinction is between analytical and intuitive designs. On *analytical* approaches, for example, the European environmental scenario community, which includes the Stockholm Environment Institute (SEI), the Austria-based International Institute for Applied Systems Analysis (IIASA), and the Dutch National Institute of Public Health and the Environment (RIVM), often uses computer simulations. The security and defence sectors draw *inter alia* on the RAND Corporation's scenario work. The business community is drawn strongly to the Anglo-American approaches of Royal Dutch Shell and GBN, while the French "prospective" approach leans more strongly than they do on computer software. German scenario work is known for its analytical rigour, as demonstrated by DaimlerChrysler's Society and Technology Research Group and Scenario Management International (ScMI).

Model-based techniques as analytical approaches were among the earliest methods for scenario development, involving the quantification of identified uncertainties. The models used may be conceptual as well as arithmetic or computer-based. Computer simulations are more rigorous and less flexible than the intuitive approaches reviewed next. For instance, it is

difficult to repeat certain steps taken in "prospectives"; relevant causal relationships often cannot be addressed in the model-based designs. Computer simulation models applied in contemporary scenario work include TARGETS and Threshold 21, which perform integrated assessments of sustainability, and WORLDSCAN, a macro-economic model applied to economic, energy, transport, trade, and environmental policy. (These are acronyms for Tool to Assess Regional and Global Environmental and Health Targets for Sustainability and WORLD model for SCenario ANalysis.)

Another analytical approach to building scenarios is desk research, developing them through document analysis or archival research. This is less formalised and systematic than the model-based forms but may be just as rigorous. Examples of scenario studies based on desk research include Bobbitt's *The Shield of Achilles* (2002), Schwartz *et al.*'s "The Long Boom" (1999), and McRae's global scenario for 2020 (1995). But desk research is not confined to any one method or scientific tradition, and covers the range from pursuit of hunches through research to the more structured procedures of data collection and analysis.

Compared with the analytical designs are the *intuitive* approaches. These importantly depend on qualitative knowledge and insights as sources from which scenarios are developed. Creative techniques such as the development of stories or storylines in workshops are good examples. The intuitive approach takes scenario development as an art form, as underlined by such titles as "The Art of the Long View" (Schwartz, 1991) and "The Art of Strategic Conversation" (Van der Heijden, 1996).

There are a number of basic steps in an intuitive scenario process: a) identification of subject or problem area; b) description of relevant factors; c) prioritisation and selection of relevant factors; d) the creation of scenarios. A subsequent step might be scenario evaluation as pre-policy research.
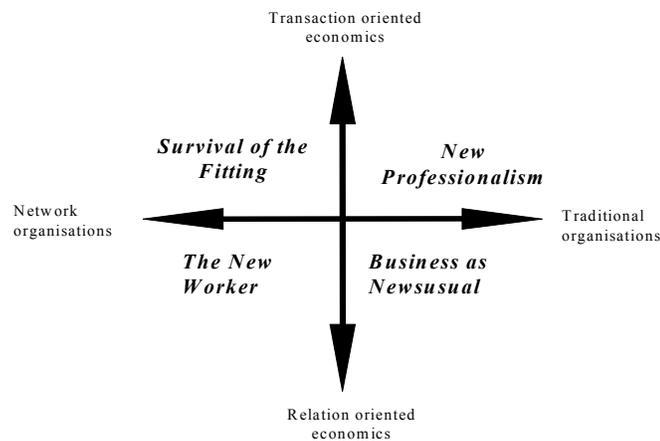
The above steps may be performed deductively or inductively (Van der Heijden, 1996). The deductive approach creates a framework early in the process with which to structure the rest of the scenario exercise. A two-dimensional matrix is a common method, as illustrated below, which is created by identifying the two factors considered the most influential for the topic of concern. Other relevant factors can then be arranged around this framework. Van't Klooster and Van Asselt (2006) distinguish between four ways of creating and using the matrix:

- The *backbone approach* starts from a particular theory about relationships between the factors being addressed in the scenarios, as compared with the others below which rely on pragmatic choice to provide structure to scenario development.

- The *foundation approach*, as mentioned above, reasons from two factors considered particularly important to the future of the issue in question, with which to structure the scenario development process and their interpretation.

The scenarios on the future of the Dutch job market developed by KPMG Ebbinge (now called Ebbinge & company) were developed with the help of such a matrix, as illustrated in Figure 4.2 (de Jong, 1998). The dominant factors for the future were identified as economic relationships and organisation types, giving transaction- and relation-oriented economic relationships, on the one hand, and network and traditional organisations, on the other.

Figure 4.2. The KPMG Ebbinge scenarios

Transaction oriented
economics

Survival of the Fitting   *New Professionalism*

Network   Traditional
organisations   organisations

The New Worker   *Business as Newsusual*

Relation oriented
economics

Source: Author.

- By contrast, in the *scaffolding approach* the structure is abandoned as the scenarios become more elaborated.

- The *shop window approach* imposes a structure at the end of a scenario development process in order to clearly present distinctions between the scenarios.

Inductive methods, however, do not use such frameworks to impose a structure on the scenario process. Instead, they rely on a freer process, with coherent stories generated from associations, inferred causal patterns, etc.

When workshops use inductive approaches, the ideas generated are often represented in a series of post-it notes arranged sequentially to form storylines. The VISIONS (Rotmans *et al.*, 2000) scenarios were developed in such a manner, although some use was made of what was called the "factor, actor, sector" framework, providing additional structure for thinking about the future.

Intuitive and analytical approaches may be used in combination. Desk research often forms part of more extensive intuitive scenario exercises, using workshops to generate creative ideas, backed up by research from the core scenario team elaborating the workshop ideas. The VISIONS project (Rotmans *et al.*, 2000) spent much time elaborating material from workshops and making it consistent and coherent. There have also been attempts to combine the two in the opposite direction. The IPCC emissions scenario (Intergovernmental Panel on Climate Change, 2000) is one where intuitive techniques support a mainly analytical approach, with narratives as a first step in the development of quantified, model-based scenarios which were then central to a global consultation with experts. However, combining intuitive approaches with model-based techniques is still experimental.

Intuitive designs are commonly used for exploratory purposes and analytical designs for pre-policy research exercises. The NIVE study (Breunesse *et al.*, 2000) on the future of leadership is an example of a purely intuitive exploratory exercise. Good examples of analytical techniques developed for pre-policy research are the Battelle Institute's BASICS and MICMAC "prospective" approach (Ringland, 1998; Godet, 1997). (The acronyms are for Battelle Scenario Inputs to Corporate Strategy and Matrice d'Impacts Croisés Multiplication Appliquée à un Classement [Cross-Impact Matrix Multiplication Applied to Classification].) Both are probabilistic computer-based models for identifying cross-impacts between variables. Further detailed distinctions to scenario processes, beyond the analytic/intuitive and deductive/inductive are provided by attention to inputs to scenario exercises, methods used, and groups involved.

Inputs into the scenario process

I have distinguished in the typology between *qualitative* and *quantitative* inputs used to construct and apply scenarios. Qualitative inputs are appropriate for the analysis of complex situations characterised by high levels of uncertainty, when relevant information cannot be well quantified. This might include opinions about human values and behaviour. Quantitative input is used in computer models which explore and develop energy, technology, macro-economic, and environmental forecasts. Combining qualitative and quantitative inputs can make scenarios more

consistent and robust. A quantitative scenario may be enriched and its communicability enhanced through qualitative information; a qualitative scenario may be tested for plausibility through the quantified information. Yet, the fusion of quantitative and qualitative data remains a methodological challenge.

Methods employed in the scenario process

The poles of development methods are *participatory* approaches, on the one hand, and *model-based* approaches, on the other. Participation is a way of collecting ideas for the scenarios such as through workshops of different stakeholders with activities adapted to the needs emerging from earlier steps in the scenario development process. Other participatory techniques include focus groups, citizens' juries and envisioning workshops. Participatory approaches are suitable for the generation of creative ideas but they will often need processing in order to enrich detail and make them coherent.

The analytical methods may use conceptual or computational models to examine possible future interactions between a selected set of variables. The computational modelling approach works mainly with quantified data, through sets of well-defined, predetermined steps. Conceptual modelling refers to the structured intellectual procedures of cross-impact and morphological analyses of "la prospective", and the techniques applied by DaimlerChrysler and ScMI. The structured approach is an especially strong feature of computational models such as the TARGETS (Rotmans and de Vries, 1997), Threshold 21 (Rorsch and de Hart, 1993) and WORLDSCAN (CPB Netherlands Bureau for Economic Policy Analysis, 1999).

Desk research is an analytical approach positioned between the participatory and the model-based methods. It usually is dependent on a single individual or small team of researchers, drawing on literature analysis or archive research. An example of such a desk study is Bobbitt's *The Shield of Achilles* (2002), which explores the history and possible futures of the "market state" based on extensive research on warfare, international relations, and international and constitutional law.

Groups involved in the scenario process

Group composition refers to the people involved in a scenario development process. Schoemaker (1995) among others stresses the need for management to be involved in scenario exercises if they are to have an effect on decision-making. Schwartz (1991) and Van der Heijden (1996) stress the value of "remarkable people" or imaginative individuals, whose role in scenario processes is to open the eyes of other participants to novel

ideas. Civic scenarios studies such as Mont Fleur and Destino Colombia are examples where a leading principle was to have a wide cross-section of South African and Colombian society engaged in the scenario exercises.

My typology distinguishes between *inclusive* and *exclusive* groups. "Inclusive" groups bring together different types of participants in order to canvass many points of view and perspectives. The VISIONS study (Rotmans *et al.*, 2000), is a good example where the participants in the European and regional scenario development included representatives from governmental institutions, NGOs, companies, and science as well as citizens and artists from different EU member states. "Exclusive" groups have a limited variety of membership, perhaps through conscious decision. Commercial organisations, for example, mostly exclude outsiders from their scenario studies for fear of informing the competition. An outsider involved in the Telecom study (Rorsch and de Hart, 1993), for instance, had to sign a confidentiality statement.

Content of the scenarios

The third broad macro characteristic of scenarios in the typology is their content. One can here distinguish between *complex* and *simple* scenarios. A complex scenario is composed of an intricate web of causally-related events and processes. Simple scenarios, as their name suggests, are more limited in scope; they might focus on a particular niche such as chipmaker AMD's efforts to anticipate the reactions of its competitor Intel (Gertner and Knez, 2000). Alternatively, simple scenarios may be limited to the extrapolation of a small set of isolated trends *e.g.* the European Environment Agency's baseline scenario on Europe's environment (1999). The term "simple" in this context does not imply poor quality. Indeed, scenario processes can often be criticised for excessive complexity – a simple scenario may be both more effective and less demanding of resources.

The role of time in the scenario

Two forms of scenario can be distinguished in terms of its temporal nature: the developmental or *chain* variety on the one hand, and the end-state or *snapshot*, on the other. Chains, as in the Scenarios Europe 2010 study (Bertrand, 1999) describe the trajectory or chain of developments to a particular end-state. In this sense, they are rather like a film. Snapshot scenarios in contrast are like photos. They describe the end-state of a development path and only implicitly address the processes that resulted in that end-state. Examples of the latter are found in the NIVE scenarios on leadership in the 21st century (Breunesse *et al.*, 2000).

Issues covered by the scenario

One classification of the issues covered by the scenarios distinguishes between socio-cultural, economic, and environmental factors; an institutional dimension may be included as well. Another classification is covered by the acronym STEEP which differentiates between socio-cultural, technological, economic, ecological, and political developments. The issues may refer to *heterogeneous* or *homogenous* sets of factors. UNEP's GEO-3 scenarios (2002) are scenarios which address a heterogeneous set of variables. The variables include demography, economic integration and liberalisation, social inequality, consumer culture, ICT, biotech, environmental degradation, and political decentralisation. In contrast, the KPMG scenarios (de Jong, 1998) consider only five relatively homogenous factors: employers, employees, "intermediaries", ICT, and the job market.

Level of integration

An *integrated* scenario study is an interdisciplinary integration of relevant variables, issues and spatial scales. Examples of scenarios with a high level of cross-disciplinary synthesis are the Destino Colombia and Mont Fleur scenarios. The integration of multiple geographical scales was a key objective in VISIONS (Rotmans *et al.*, 2000) and the GEO-3 (UNEP, 2002): both scenario studies integrate global, supranational, and regional information. The alternative to the integrated approach is one where the factors are treated in relatively *isolation* one from another. An example is the sustained risk study (1994) carried out by the Netherlands Scientific Council for Government Policy (WRR). Different sectors like water, food and energy have been addressed but with little interconnection between them.

Successful scenarios: cultures of curiosity

The typology demonstrates the diversity of contemporary scenario approaches. It also underscores the flexibility of scenario approaches in terms of the ways and contexts in which they are used, as well as the output that they produce. The flexibility in particular has its pitfalls, however, especially when, as Masini and Vasquez observe can happen, scenario development becomes "a Swiss pocket knife of multiple uses, or a magic wand"; no more than a cosmetic exercise that add a superficial legitimacy to policy-making exercises. The resulting scenarios are hollow diamonds: attractive to look at but lacking in content. One contributing factor to cosmetic scenarios is the tendency of the community of scenario practitioners to bang its own drum, where too often potential scenario pitfalls are ignored, referred to in passing or are used merely to underscore

the strength to overcome them of the approach being peddled. The "what scenarios can do for you" popularisations overshadow serious discussion about pitfalls, such as those identified by Schoemaker (1998).

Another set of factors that can diminish the value of scenario exercises in practice are the stubborn effects of a particular socio-cultural or organisational environment. The "theatre" model proposed by Goffman (1959) helps to shed light on the socio-cultural dynamics that can be in play during a scenario study. The socio-cultural contexts in organisations can be divided into three areas of social reality, like the three sides of a theatre stage: front stage, backstage, and the area under the stage. The front stage is the area where the public performances are made and formal roles are played out. The backstage is the informal behind-the-scenes area of professional interaction where front stage activities are prepared and reflected on. The area under the stage is where people feel most secure and confide in one another feelings or opinions that are not expressed in the other stage areas.

"Front stage" a group may proclaim scenario work as an important tool for the facilitation of learning in organisations preparing for an uncertain future; "backstage", however, the same people implicitly, and even explicitly, may lack interest. "Front stage", uncertainty may be proclaimed as critical but in the day-to-day routines it may well not figure as an issue and career opportunism is much more important. A "front stage" official attitude may be of an uncontrollable world; "backstage", however, the "engineering attitude" prevails in the conviction that the environment can be crafted according to human needs. Publicly, a project team may be given a great deal of freedom to develop scenarios as it sees best, but "backstage" tight reins might be kept on the study. Indeed, the project team may prefer to work under the guidance of the management and the dominant mode of thinking in the organisation.

It is thus useful to look at the cultures of organisations undertaking scenario work. A precondition for any scenario development is a genuine interest in the unknowable future and challenging assumptions about it. Many scenario studies do not venture beyond the boundaries of what is known and assumed, and challenging those boundaries may even be discouraged. No matter how good a "toolbox" of methodologies and approaches might be, a scenario study is likely to fail if the interest is lacking. It is therefore inadvisable to focus on tools alone but also to invest in nurturing a "culture of curiosity".

Cultures of curiosity are environments driven by inquisitiveness and imaginative thinking, involving the interaction between epistemological, analytical, procedural, and contextual factors. Epistemologically, they

reason from a desire to explore the future – for instance, few certainties about societal development are presumed so challenging the evolutionary paradigm that reasons from gradual, incremental change. At an analytical level, discontinuity is a source of interest rather than of discomfort – terms, metaphors and examples denoting change are common as compared with those conveying continuity. Cultures of curiosity rely on loosely-structured processes to ensure inquisitiveness and imaginative thinking so that the inspiring factors such as group variety and team work are mobilised and the impairing ones diminished. Creating, and fostering cultures of curiosity makes demands on a scenario process design. At the epistemological level, interest in the future needs to be stimulated. Analytically, those involved should keep an open mind throughout and avoid a dogmatic adherence to favoured concepts and ideas.

Procedurally, it is important to remember that tools only play a supportive role. If a group is resistant to exploring the future with an open mind, it is unlikely that a tool will make the difference between a good and a bad scenario study. At a contextual level, it is important to nurture those environments that foster independent curiosity-driven research but these appear to be diminishing at present. Curiosity-driven research has traditionally been the province of universities but today they are pressured to work in a more market-oriented manner with fewer opportunities for research that deviates from established paradigms. Cultures of curiosity are not usually found in client-based research because the type of output is often constrained by the desires of the client. Nor are they usual in regulatory institutions whose interest is the optimal functioning of the existing system.

Some reflections: scenarios for the very long term

To probe beneath the surface of social life to examine deeper processes, it is necessary to investigate the interaction between historical events and the processes which have shaped present-day society and their implications for the future. The classification of time of the 20th century French historian Fernand Braudel (1902-1985) provides a valuable heuristic framework for investigating the interaction of societal events and underlying processes. He (1980) criticised historians and social scientists for their limited appreciation of time in general and long-term developments in particular. Similarly, Slaughter (2002) distinguishes three different levels of operation in future studies: "pop", problem-oriented, and critical and epistemological futures studies. He argues that the first corresponds to the familiar "litany" in the media – population explosion, resources running out, choking pollution, the crime wave. Problem-oriented futures studies involve the more serious exploration of how societies and organisations respond, or should respond,

to the near-term future. Critical and epistemological futures studies can probe beneath the surface of social life to examine deeper processes at work. Braudel and Slaughter both argue that their respective disciplines should be looking at more deep-seated societal patterns.

Braudel (1972) offers categorisations of time which distinguish "geographical time" or the *longue durée,* social time, and an individual time or *l'histoire événementielle* (after the economist, Francois Simiand). The *longue durée* refers to fundamental geographic and climatic processes that influence the human race over centuries, even millennia. The long-term processes and cycles of the *longue durée* exert a dominant and stabilising influence over the other levels, providing the context in which other social developments occur. Social time, which includes socio-economic trends such as the Industrial revolution, spans decades or hundreds of years. *L'histoire événementielle* is the traditional approach – the history of events such as battles and elections which span days, weeks, and a number of months. Braudel argued that it is the task of the historian to move beyond the history of events towards a focus on civilisation as a whole. Only then can the meaning of events be fully understood.

A classification such as Braudel's is a useful heuristic or "tool" for the development of meaningful scenarios. His classification might help develop a rigorous theory of why specific changes occur and why they lead to particular outcomes, whereby a bridge is developed between policy choices and outcomes. A comparable categorisation for scenario development is proposed by Van der Heijden's iceberg analysis (1996) which distinguishes between events, trends and patterns, and systemic structure. The top of the iceberg is the level of observable events, while immediately below the water line are trends and patterns. The base of the iceberg is systemic structure, which shapes the levels above it. The iceberg is a whole; the three levels are thus strongly interconnected.

Conclusion

There are many types of scenario approaches in use at the moment ranging from the highly exploratory to the decision-oriented, and intuitive to analytical. The scenarios that they produce demonstrate varying degrees of complexity. There is no single "correct" approach and different contexts require different scenario approaches. The typology helps to organise the diversity of studies to cut a path through the thicket of possibilities. It helps create an overview of contemporary scenario practice, which might be used to help determine the design of a scenario process. The OECD "Schooling for Tomorrow" project might benefit from the typology by using it to learn from scenario experiences in sectors beyond education. These range from

the computer model-oriented approaches used in the environmental community to the brainstorm-type approaches taken in many commercial organisations.

The diversity in scenario approaches makes working with scenarios a flexible approach to exploring the future, which can be shaped to fit different tasks. In the benefits of this flexibility, however, lurks the danger of abuse. Braudel's classification of time might be a useful tool to avoid cosmetic scenarios. However, it is unlikely that a tool can be effective without a genuine interest in considering the future and being prepared to confront flawed assumptions about it. Therefore, beyond focusing on tools, a scenario team would be wise to make efforts to create cultures of curiosity: environments driven by inquisitiveness and imaginative thinking about the future. Such curiosity-driven research, free of vested interests and organisational impediments are likely to do more for free-thinking scenario development than any so-called scenario "tool". Creating and nurturing these cultures ensures that scenario developers are well equipped to embark on Proust's voyages of discovery.

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