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THE STUDY OF THE FUTURES: AN OVERVIEW OF FUTURES STUDIES METHODOLOGIES

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Introduction: planning and the future

Urban and regional planning is a sector related by definition to the future dimension. Territorial actions are intended to shape the environment and usually have wider and more long-term effects than planned or expected. Planning decisions are taken in order to improve and transform places by changing their structures, aspects, and meanings. In turn those changes are destined to shape the way we relate to places in the future, thereby influencing our feelings, our activities, our ways of behaving and our ways of being in space.

New planning debates on sustainability require new ways of thinking about the future, and call planners, decision makers and governments for producing a deeper and more explicit knowledge of existing relations between present and future actions. The responsibilities that link us to future generations implicate future thinking to be dealt in more mature, sensible and reliable ways. Sustainability principles require planners to think to scenarios of alternative possible developments for a time span longer than the usual five, ten or even twenty years, to ensure that natural assets are preserved for future generations. The longer-term perspective is essential in ensuring that a concern for inter- and intra-generation equity is built into planning approaches.

Moreover the recognised and shared distrust in the power of the science and the debates on chaos theory, post-modernism and post-normal science (see Funtowicz and Ravetz 1995) suggest that a new approach to the future is required in order to deal with global complexity and uncertainty. This new approach would emphasise the fact that the future is deeply uncertain and options are variable, that the future is not a given dimension, but it is our responsibility to build goals and make choices and actions to reach them.

A new field of social inquiry has been created whose purpose is the systematic study of the future. It is sometimes called futures studies, the futures field, futures research, futuristics, prospective, or prognostics, and its practitioners are known as futurists (Bell 1997). The founding principle is that there is not only one future, but that we now face the need to consider different multiple futures. Futures Studies (FS) accept

uncertainties as an intrinsic component of reality and look for ways to deal with the future as an active protagonist of its changes. In this perceptive futurists aim to discover or invent, propose, examine and evaluate possible, probable, and preferable futures. Another purpose of exploring the future is to evaluate plans or to define the means by which those plans can be implemented, and to identify their likely consequences or outcomes. An exploration of the future will also help people and organisations to identify where their opportunities to influence the future lie, and where they may be so constrained that their only reasonable response is to try and cope with the future as it unfolds (Coates 1996).

The aim of this paper is to explore various methodologies that have been developed in the field of Futures Studies in order to address the difficulties and the needs of a long-term perspective in planning.

Futures studies methodologies

At the outset it is necessary to point out that a wide range of methods have been developed in Futures Studies. In turn these have been applied in empirical work covering many different areas of endeavour). The range of methodological inputs applied in futures analysis is reflected in Wendell Bell's comment that 'the scientific, scholarly, and rhetorical methods of any discipline in humanities, social science, and sciences might be – and sometimes are-used by futurists doing research on some *particular topic'* (Bell 1997: 241). Time Series Analysis, Delphi, Simulation, Global Modelling, Field Anomaly Relaxation, Quick Environmental Scanning Technique, Content Analysis, Cross-Impact Analysis, Visioning, are some of the methods used in the study of the futures. Many of those methods have been imported from various different disciplines (e.g. the environmental scanning technique, in various forms, is used as a research basis in many different areas). However all of the methods acquire a different meaning when applied in the study of the futures, and this owes more to the aims of their utilisation than to their methodological characteristics per se. There are of course some methods that are properly FS techniques, developed specifically for the study of the future, notably the well-known Delphi technique. Anyway all the methods, when applied, need to be adapted and modified in order to be effective. The research environment, the aims of the study, the times allowed, the means available, and the scale of the study, are all factors that influence both the choice of the specific method, or process, and the way in which the procedure is then structured.

Some methods (such as time series analysis, modelling and simulation, gaming and so on) are quite complex and require a high degree of mathematical and statistical knowledge in order to be used confidently. Bell (1997) distinguishes between codified methodologies and those based on the intuition. The former are organised in a series of repeatable operations, they are relatively simple to use and achieve results of an acceptable quality (an example is the sample survey used in futures research to

gain a basic idea of current trends). Learning how to use methods based on intuition, knowledge, judgement, and expertise is more difficult as they require both experience and ability in order to avoid developing banal scenarios. Those processes are difficult to replicate exactly as they might follow different paths each time they are applied. Moreover the results achieved depend very much on the choice of people involved in the study (and thus on the knowledge and experience they contribute) and on those factors (time, means, scale, etc.) that determine the methods and approach used in the study.

During the history of FS (that is not much longer than thirty years) the methods tended to evolve from those more oriented to forecasting and prediction towards more soft and multiple methodologies. Methods such as scenarios aim to explore multiple future possibilities using various forms of knowledge. Even the Delphi method itself has been used less and less in its classical format (in which experts are required to go to the process of forecasting on a specific issues) adapting it to group processes and interactive structured knowledge acquisition processes aimed to improve experts' judgements were through an interactive environments. Methodologies thus became more mature, less visible, more problem-oriented and thus more effective (Amara 1991). Moreover, as Khakee (1999) states about scenarios, with a specific reference to the Swedish experience, the evolution of FS has also been in terms of participation as the methods have tempted and are tending to open up to a wider and wider public. Nonetheless all FS methods are still in use at different levels and with various aims. They are being applied to a wide range of issues and problems, and more and more are merged in new processes and procedures (Coyle, Crawshay, and Sutton 1994, Puglisi 1999).

Classification of methods

FS literature comprehends various classifications of its methodologies. The first important dichotomy is that between qualitative and quantitative methods. Quantitative methods tend to use numerical data, mathematical calculations, measuring instruments and equations. Qualitative methods basically use intuition, invention, hypothesis, and judgement. They may and may not be empirically based, allowing for, on the one hand, detailed empirical facts of the past and present situation and, on the other hand, the inclusion of intuitive, the speculative, and the *hypothetical when probing the respondents' images of the future.* But the quantitative-qualitative distinction is better conceived as a continuum rather than a dichotomy, most methods allowing for some degree of quantification, however limited (Bell 1997: 243).

Another important distinction is that between explorative and normative methods. Explorative studies look at the future from the present whereas normative studies investigate what need to happen in order to realise a specific goal. Normative

forecasting establishes objectives and defines desirable futures and then studies the ways to reach them staying in the sphere of the possible. While explorative forecasts look at the ongoing trends and explore where they might lead us, they study plausible futures (Gordon 1992). Both methods use past and present trends. The definition of an accurate, objective and qualitative picture is at the starting point either if we are looking at the future with an explorative approach (looking at possibilities) or with a normative one (imaging desired or feared and building the chains of events that lead to them).

Another methodological categorisation is that between techniques that study futures for and those that study futures with the final users of the future images. Futurists may do their studies in an independent way from final users of the study results. In this case they have the task of undertaking the study and supplying results. Another, more recent approach to conducting FS is that of involving the study clients, that is to say whoever is the final user of the study or whoever has a stake in those futures (e.g. communities, administrations, decision-makers, companies staff and so on). The hypothesis of participatory futures approaches is that the involvement of final users (or their organisation) in the process is necessary in order to let them fully understand the results and therefore enable them to use the results effectively and efficiently.

Other possible distinctions include hard and soft methods (the first mainly based on data analysis and calculation, the second use data by means of intuition and judgement) and structured and unstructured processes. Unstructured processes are explorations of possible futures in which experts are involved in using their knowledge and following their intuition in order to build and follow the connections that arise. The structured processes instead are built around a "mental path" to be followed using the different methods in moving towards the construction of future images. They aim to build those images through a series of steps thought to deepen the analysis, building connections and exploring possibilities.

A schematic description of the main principles and characteristics of some FS methodologies is given in the following paragraphs starting from the more quantitative methods.

Some futures studies methods

Forecasting methods

Hypothesis and aims

There is a great variety of methods and models aimed to forecast future aspects, and they are the starting point of Futures Studies. The main hypothesis is that the future is an extension of the present, and moreover that it is possible to define routes and laws to describe past, present and future behaviours of the issues studied. The third

hypothesis is that the future does not offer any surprise, that is to say that those laws and routes don't comprise anomalies, discontinuities or deviations and on those bases it is possible to determine, to calculate the aspects of the future. The main aim is thus one of observing behaviours in order to define trends and statistics. Those methods therefore prove to be very useful for those fields in which these hypotheses may be considered real.

Four possible approaches

There are four main approaches to the forecasting methods (see Martino 1993):

1. Explorative: the starting point is the collection of data on which to build the time-series of the object to be studied. Starting from the hypothesis that the time-series includes all the information needed for the forecast, the second step is the definition of the pattern (it can be either a trend or a more complex pattern) of its behaviour to be utilised in the forecast.
2. Comparative: the forecasting hypothesis in this case is that the time-series of the element studied has the same behaviour as the time-series of another element with a time delay. This second time-series is then used to obtain information on the future of the first one.
3. Causal: the starting hypothesis is that the cause-effect relations of the object of study are known and can be described by mathematical terms (or mechanical models) and used to have the forecast.
4. Probabilistic: while previous approaches had sought to define a precise value of the objects of the forecast, probabilistic methods seek a probabilistic distribution of a series of possible values.

Those four approaches are than used combined and adapted to the nature and to the quantity of data available.

Main issues

There are some issues that need to be discussed when using forecasting techniques in a futures study:

- The forecast may be very precise but at the same time inaccurate.
- They cannot be trusted, as forecasts are likely to be wrong. We can easily extend trends, but this procedure will give us a correct result only if the behaviour will continue to follow the precise trend we are considering and if the shape of the future will depend only on the same elements that influenced the past.
- Forecasts are incomplete as events and impacts not considered in the study usually occur.

Despite their various limitations forecasting methods are extremely important in Futures Studies. However in using these methods it is necessary to be aware of the limitations. If so their use can be an integral part of an approach to understanding future possibilities.

Trend Analysis

Hypothesis and aims

Trend Analysis is the best known and most commonly used forecasting technique. The method aims to record and project into the future the past behaviour of a certain factor rather than understand the reasons why that specific behaviour occurred. In seeking to give a prediction this technique may appear to contradict the aims and principles of Futures Studies. However the method is widely used in Futures Studies to analyse some quantitative aspects of the issues under study and its application constitutes only one of the study steps.

Method structure

The first phase of the method is that of past quantitative data gathering on the issue at study. The information is collected, in shape of quantitative data, during a certain length of time and is then analysed in order to identify definite patterns. The simplest approach is that of selecting a 'best-fit' pattern among the collected data in order to minimise errors between the pattern and the data (see May 1996). Makridakis and Wheelwright identify four main possible patterns (Makridakis e Wheelwright 1989):

- horizontal (data values are stable in time, so no trend or change can be identified);
- trend (when an incremental or decremental pattern is identifiable for the variable value);
- cyclical (when variations are observable regularly in time);
- seasonal (when the variations can be connected to different seasons of the year, days of the week and so on).

Moreover there are the fluctuating and casual behaviours for which no regular pattern can be identified. There can be also combinations of those patterns. The patterns are prolonged, and stretched out following their behaviours, in order to determine the forecast.

Main issues

There are a series of aspects to be considered in each of the various phases. First of all it is very important to collect a significant number of data for a certain length of time in order to have a reliable pattern as the time of the data collection process and the number of data used may affect the result considerably. Statistical methodologies can be applied in order to better recognise the pattern of the trend to be projected (see May 1996).

The model, as with the other forecasting techniques, explicitly claims that the pattern can be identified on the base of historic data. This approach may prove useful to decision-makers in helping to understand the ways in which the decision environment works and to know how it could evolve. However the method doesn't allow any analysis of the possible impact of different decisions on the decision environment itself. This is because the forecast doesn't consider possible decisions, but only those based on data about the

past. They are thus useful for the analysis of the decision environment "external" to the decision itself, that is to say that environment, or the aspects of the decision environment, which can't be affected by the decision itself.

Environmental scanning

Hypothesis and aims

Environmental scanning is a basic Futures Studies technique. The aim is that of generating the background information from which to forecast or develop scenarios. The first aim is therefore that of providing the knowledge necessary to define the main survey areas and select the relevant issues. The process allows the necessary data collection (and the identification of past and present trends more relevant for the survey) and the estimation of the potential values of indicators related to the occurrence or non occurrence of specific events. It establishes organisationally relevant criteria to allow prepared human minds to discern information, knowledge *and insight from the multitude of 'signals' that occur daily* (Slaughter 1999: 442).

Method structure

Information from forecasts and speculations on trends, and their implications for possible events related to the issue to be studied, has to be collected and analysed. This information can derive from very different sources: newspapers, magazines, internet, television, conferences, reports, and also fiction and science fiction. This is useful to understand the ways in which things are changing and the tools and means used depend greatly on the specific issue. It is very important that the information is constantly updated in order to identify the early warnings of the ongoing changes. Neufeld (1985) suggests that four type of indicators should be examined:

- Lone signals (single elements that might be signals of change);
- Landmark events (in science and technology, in society and in politics);
- Forecasts of experts;
- Statistical descriptions (to describe the development of elements of the issue at study).

Main issues and considerations

Environmental scanning is a relatively long and hard process of study that needs to be continuously updated in order to identify the seeds of change. The utility of this method depends greatly on the thoroughness of measurement in the issue elements (Bell 1997), and thus on the existence of adequate instruments for the study of that issue and the wideness of the scanning survey. It might seem to be a very long and complex procedure, but its usefulness is unquestionable. In order to make this method more critical (and therefore to move it in the sphere of what he defines as critical Futures Studies) Slaughter (1999) suggests a broader approach to ES, using other ways of knowing and seeing, and looking at the 'out there'.

Cross-Impact Analysis

Hypothesis and aims

The main limit of forecasting methods lies in their attempt to arrive at single forecasts. Thus trends and events are projected one at the time without any analysis of their possible mutual influence. Actually most of the events and development in the 'real world' do interact with each other and are connected one to the other (Stover and Gordon 1978, Martino 1993). In addressing this issue in 1996 Hamler and Gordon developed the Cross-Impact Matrix method for use in the Kaiser Corporation, with the aim of studying the effects of events potential mutual interactions on their probabilities. The matrix is used to analyse the chains of events that might occur in order to determine the total effect on the occurrence probability of each event.

Method structure

If we want to study the future of a certain issue, the first step is that of the defining the time span for the study. It is important then to understand which are the events that have a reasonable probability of occurring in the time span considered and which might affect the future of the issue being studied. The events that are totally under our control (as for example planning implementation actions) should not be considered, as they will be used further on in the study. (Helmer 1989). Similarly those events whose occurrence can be considered virtually certain or virtually impossible should not be included (Blamming e Reinig 1999).

The events and trends selection process is very important as the choices made affect the rest of the process (Storer e Gordon 1978, May 1996). Any event excluded at this stage is totally excluded from the study as the inclusion of not relevant events can complicate the study needlessly. As the number of events couples to be considered is m^2-m, for any m events, the number of interactions grows considerably when m grows. Moreover the analysis can be carried out using both events and trends.

The process may be summarised as follows:

Phase	Contents	Advice
Events/trends selection	Selection of Events and Trends with implication for the issue	Choose the right number of events
Probability definition	Probability of each event to occur first, and criteria to define future trends' courses.	The probabilities should be assessed considering each event singularly
Qualitative matrix	Qualitative analysis of mutual interaction among events and trends.	Row by row considering the effect on each event on the others and on trends.
Quantitative matrix	Translate the qualitative judgements into numerical parameters.	Indication of the value of the influence of any development (event or trend) on any other.

The techniques to implement Cross-Impact Analysis have widened and improved from its basic structure described above, (developing processes that include statistical aids, different possibilities and modalities of using the results of the matrix, Delphi exercises at different phases, etc.) producing different possibilities to build, use and evaluate the Cross-Impact Matrix.

Main issues

Gordon himself underlines that this method might be rather uncomfortable because achieving conditional probability judgements can be tedious when the number of events studied is more than a dozen. Moreover, states May, this method suffers the same disadvantages as other methods that rely on judgement and rapidly becomes very complex as it moves into mathematics of probability and interpreting the results of computer-based calculations (May 1996: 155).

Used as described the matrix becomes a model of interaction between events and therefore a tool for the analysis of the effects of chains of events deriving from political actions. This method is a powerful planning tool as it offers the possibility to examine alternative options (political actions and planning decisions) not only in terms of desired developments but also in terms of impact (desired or undesired) on related issues. Therefore it allows a new structured analysis to support decisions. Being flexible (it can be applied to a great variety of problems) and becoming more user-friendly thanks to the developed computer aids for probability assessments (Stover and Gordon 1978, Martino 1993), this method is widely used in various forms and processes.

Simulation and modelling

Hypothesis and aims

Increasingly complex and sophisticated studies are being undertaken in the modelling field especially in connection to the use of the territory (Batty and Barr 1994, Batty 1997, Landis and Zhang 1998, Landis 1995). Models are tools constructed to represent reality. There are different kinds of models and they can vary from tales to sophisticated mathematical laws or graphical schemes. They are widely used to test behaviours and understand processes. The use of models, has made forecasting more comprehensive and complete, mainly thanks to the quantity of data and information they are able to process. Rather than simply extend trends, models allow the representation of past changes, as well as the examination of different changes and their effects on each other and on other parameters that are considered. Therefore they can help in clarify and understand which are the factors that cause particular events and to study their dynamics. The use of this kind of knowledge results in more sophisticated forecasts of future behaviours.

Bell (1997: 272) defines simulation as the process by which the structure and change of some system, organism, or set of interrelated variables is represented by another, usually manipulable, system or model designed to be similar to the original in some specified and relevant way. The aim is that of studying how the system would behaved under certain circumstances. Computer models allow the simulation of different possible situations and are therefore able to put various hypotheses, choices and policies to the test in virtual reality. Therefore simulations are a way of trying, of making mistakes, and correcting errors, in order to learn from them before implementing choices to the actual reality. They allow quick analyses that can be less expensive and less risky than the real application on actual situations.

Physical and static models have increasingly been substituted by computer generated approaches. Since these are more dynamic (allowing quick and multiple simulations for instance), the simulations are more precise and explicit and are can used to reproduce system behaviour as close to reality as possible (May 1996, Bell 1997). Moreover the availability of more and more powerful computers has lead to great progress in the use of models for economic, transport and global forecasting. Global models (Van Steenbergen 1994) are developed everyday to study changes that are taking place at global scale.

Main issues

The main limits of simulation and modelling are:

- simulation represents a simplification of the system analysed and therefore the results they give present limits and have to be considered carefully.
- the models are still developing and need to be, more and more complex in order to give an accurate description of actual behaviours. Therefore they may become more difficult to be understood and used;
- their complexity entails problems in using and controlling the results;
- they may exclude important factors leading to mistakes that are difficult to be determined and quantified;
- that said the use of models has without doubt several benefits:
- models (and especially computer models) allow to operate on many variables;
- they are rigorous and precise;
- they are logically coherent;
- they are explicit and therefore open to criticism and modifications;
- they are accessible and can be tested and modified quickly.

Back-view mirror analysis

Hypothesis and aims

The main hypothesis of this method is that any future oriented group process has to deal with people's difficulties in thinking to the future. These difficulties are caused

both by the fears (Future phobias, Gelatt 1993) and the lack of familiarity related to explicit future thinking. Back-view mirror analysis seeks to overcome the fears related to the future perspective providing a new perspective that instead of starting in the present looks to the past. Moreover the aim is to generate tools that are useful in the futures thinking process. The method provides an opportunity to examine past and current biases and enables one to recognise important links between past, present and future (Khakee 1986: 391).

Back-view mirror analysis is used to carry out a qualitative analysis of the past, and this is its main difference from trend analysis and environmental scanning. The analysis is carried out using both quantitative and qualitative data.

Method structure

The first step is that of choosing the variables to be studied (in Västerås study, see Khakee 1986) the variables were: goals, resources, personnel, structure, technology, and environment). The trend analysis is than carried out on the variables to understand their course. The analysis has three steps:

- Trend analysis of key issues of the organisation;
- Selection of discontinuity and contingencies of the past time span at study and research on the discontinuities;
- Workshop to understand the ways in which the organisation has faced discontinuities and analyse the organisation level of preparation to deal with them.

Main issues

Back-view mirror analysis provides a useful method to extend past into the future and increase staff involvement in futures-oriented planning (Khakee 1986). Even if this method is not very widespread in this specific form there is a growing recognition of the importance of the past dimension in Futures Studies (Bell 1997, May 1996) and processes and methods constructed in order to integrate past and future dimensions are under study.

Delphi

Hypothesis and aims

Quantitative forecasts can be used when there is enough information on the past, when this information can be expressed in quantitative terms and when the future is thought to have the same behaviours as the past. But if those hypotheses are not plausible then the study of the future has to be done in a more qualitative way with methods that make an explicit use of subjective judgements. The Delphi method is the most important of the judgmental Futures Studies methods. It aims to substitute quantitative knowledge with qualitative experts' knowledge. The Delphi method, whose name is taken from the

Delphic Oracle who was questioned by ancient Greeks on their futures, is the best known of Futures Studies methods that use a qualitative approach based on structured indirect interaction (Woundenberg 1991, Helmer 1983).

The Delphi method starts from the assumption that judgement constructed within a group of experts (even on subjective opinions) is more accurate and reliable than single statements and more objective in its results (Helmer quoted in Masini 1993). It this aims constructively and systematically to organise and use the opinions of groups of experts. The process is structured in order to structure expert opinions, to single out opinion convergence, and to make explicit existing consensus on specific issues, all through the use of a series of questionnaires.

The main contribution of the method lies in its searching for a way of facilitating interaction in an expert group. The aim is to generate consensus in the group while trying to avoid or reduce problems that commonly arise during open debates due to inevitable differences in opinion. Open debates generate practical problems at a psychological level (such as the difficulty of changing mind in public, the captivating effect of the majority opinion, the strength in conducing discussion of some subjects), and these may deeply affect the interaction results and make it difficult to reach agreed outputs. Therefore this method has been structured in order to minimise the effects of those problems and to maximise the advantages of group interaction. The goal is that of constructing forecasting and values for unknown parameters. Two important elements characterise Delphi processes: anonymity and feedback.

- Feedback of expert opinion to the whole group at different stages in order to stimulate new ideas and challenge opinions;
- Anonymity of the responses and of the results is guaranteed during the process in order to make the experts free to express their views and change their minds freely.

Method structure

The procedure is structured in multiple rounds of questionnaires to be answered by the experts. The first questions are asked during the first round. The opinions are then collected and organised so that, before the second round starts, the participants can study, analyse them and re-examine their previous opinions. If certain answers stand out of the range of answers then respondents are asked to explain the reasons of their position accurately.

In the following round the answers are summarised again and the feedback to the participants will as well include the justifications to the extreme positions. They are asked to analyse the results of the second round taking into account the justifications. Those who do not agree with the average of responses have to explain why. The process is then iterated till a consensus starts to appear and in each round the participants receive the feedback of the previous one. In the last round the experts

have their last chance to change their opinions. The result of this round is considered as the group opinion on the issue studied (Helmer 1983).

Main issues and considerations

The process of opinion convergence has been observed in most of Delphi applications. Sometimes it happens than there is no convergence towards a small range of values, and opinions start to polarise around two different values, showing two different schools of thought. This might mean that the two different interpretations are based on different data sets or on different interpretation of the same data set.

Variations in the method

The method has had many variations since it was first applied in the Rand Corporation in the sixties. In part this has been in order to adjust it to different circumstances and needs but also to use it with different aims that, given its potentialities, could be addressed with the process. A Round 0 has been often used as an introductory step during which the problem is explained and the experts choose the study areas to analyse. In the same way a final round of discussion of results has been used. Another change in the process has been the introduction of structured group conferences, using techniques like the nominal group technique (NGT) and computer aids. An interesting version of Delphi is the EFTE (Estimate, Feedback, Talk, Estimate)[1]. This method is also known as interactive Delphi as the process includes open debate phases (Talk) among the different rounds.

A modified Delphi that is commonly used is to substitute questionnaires with interviews in order to overcome the usual problems associated with questionnaire surveys. Interviews would seem to be more effective in the opinion collection phase and more reliable in the information interpretation and synthesis phase. The experts are guaranteed that their answers will not be related to their names even if the process works through in-depth interviews.

Other modified Delphi processes include the Mini-Delphi, knowledge acquisition through Delphi and computer software developed for conferencing and communications.

Main problems and critics to the method

Even if the value of this method is undeniable and its versatility has been widely demonstrated, there are some limits of the method that need to be underlined. The two main problems that had to be faced in the various past Delphi exercises are:

[1] Nelms and Porter (1985) include EFTE among the research and opinion construction methods. Considering the tthree main steps in group processes (Talk-open interaction-, Feedback-indirectinteraction through information feedbak, and Estimate –decision/judgement process), the opinion construction thecniques can be divided into three groups: Talk-Estimate (group interaction process), Estimate-Feedbak-Estimate (Delphi), Estimate-Talk-Estimate (Nominal Group Technique).

(1) conventional Delphi studies are difficult to implement with great precision and the questionnaires have to be prepared carefully and tested to avoid ambiguities; and (2) the need for various rounds of studies require a relatively long timescale and large resources.

Some relevant criticisms of the Delphi method include:

- Interactions among the different hypotheses studied are not considered in the process;
- The way in which the process is structured might lead the participants to respond to the questioners on the bases of preconceived ideas on the results the co-ordinators of the process expect (Linstone 1978);
- Some authors claim that the way in which it operates the method brings through a strained consensus. Participants are asked to justify their positions when their judgements deviate from the average of answers and this process is seen as forcing them to express less extreme opinions.

Main advantages

In addition to the advantages singled out previously the Delphi method can be an extremely useful Futures Studies tool when:

- futures analysis is carried out in an environment characterised by strong conflicts. Its main strength in this context is the way in which anonymity is pursued and ensured;
- the objects of the study are issues for which there are no data available to build the basis of the analysis. The knowledge and judgements of the experts then become the new resource for the analysis;
- the study requires the involvement of many participants, which often makes it extremely difficult to achieve a real interaction among all of them.

Starting from those considerations many applications of Delphi were carried out with the aim of using and developing its potentialities in different contexts. An interesting distinction among the new techniques inspired to Delphi, considering the different aims they are used for, is between Conventional Delphi, Policy Delphi, and Decision Delphi (Woudenberg 1991, Van Dijk 1990). Conventional Delphi has two main purposes, namely the forecasting and estimation of unknown parameters. It is used to reach consensus on dates or developments forecasting especially in the field of technological and scientific long-term changes. Policy Delphi is instead structured in order to single out explicitly opposite views and opinions on different possible problem solutions trying to collect as many different opinions as possible. Decision Delphi is used to reach a decision amongst a group of people with different financial stakes. Therefore Delphi has been used in strongly contrasting group situations in order to facilitate interaction and reach consensus.

Scenarios

Hypothesis and aims

As the foresight principle lies in its acceptance of future uncertainties, one of the main aims of FS is that of exploring possible alternative futures. Scenarios are an extraordinary means for meeting this challenge. A scenario is a detailed exploration of a future possibility. There are, however, many different definitions of the term scenario as a result of a variety of concepts, approaches, meanings and contents underlying the different uses of scenario methods.

A particularly comprehensive definition is that of Shoemaker who describes the scenarios as a script-like characterisation of a possible future presented in considerable detail, with special emphasis on causal connections, internal consistency, and concretenes (Shoemaker 1991: 550). Moreover scenarios are: more than just the output of a complex simulation model. They attempt to interpret such output by identifying patterns and clusters among millions of possible outcomes a computer simulation might generate. They often include elements that were not or cannot be formally modelled, such as new regulations, value shifts, or innovations. Hence scenari*os go beyond objective analysis to include subjective interpretations. (...)* They attempt to capture the richness and range of possibilities, stimulating decision-makers to consider changes they would otherwise ignore (Shoemaker 1995: 27).

The first, and maybe the most important, characteristic of scenarios is that they are hypothetical. The future is by nature intrinsically unknown and therefore none of the scenarios we can develop will unfold as imagined. There will always be unexpected events and moreover it is improbable that the exact combination of events used for the work will unfold. The existence of this limit does not deny the validity of the study and of the scenarios themselves as they have an important role in forecasting and planning.

Scenarios are not meant to represent anything other than a draft, a sketch of a hypothetical future. The aim is that of singling out and underlining the "ramification points" of the future and to underline which are the factors that determine one direction rather than another. Scenarios are perhaps most useful when they provide alternative images of different possible futures. As images that have to be fundamentally different one from the other in order to have a significant and effective tool scenarios aim to be multiple and diverse.

Larry Hirschhorn (1980) suggests a distinction of scenarios into two main groups: state scenarios and process scenarios. State scenarios are those that simply describe characteristics of a situation some years ahead in the future, but without describing how that future unfolded from the present. Process scenarios describe concatenations of events that lead to a specific future state, telling a whole story that includes possible and probable political actions and their perceived results and consequences.

Than process scenarios can be distinguished in “final state” or “initial state” ones. The former imagine a specific future and study the ways in which it can unfold, while the latter start from the present and explore a possible future course.

Method structure

There are many methods and models of scenario analysis with a range that goes from the more simple to the more sophisticated. Moreover most of Futures Studies methods can become part of a process of scenario development and analysis. There are various models developed in different fields, for different aims, and they combine different techniques and procedures. Some of the possible steps of the scenario development process may include:

- Issue and time span definition;
- Key factors and main forces analysis;
- Sectors forecasting;
- Cross-impact analysis;
- Scenario logics development;
- Scenario selection;
- Scenario writing.

Main issues

Scenarios were designed to expand planners’ visions by providing them with alternative futures images as a base for their decisions and as a tool for the assessment of planning actions in relation with the different conditions presented in the scenarios. They help in dealing with the future by accepting its uncertainties and the multiplicity of possibilities. Therefore they seek to enhance the capability to be ready to deal with uncertainties and to help in making more flexible and resilient decisions. They may also help us to face contingencies that could be conceived unthinkable. Scenarios explore the impact of different uncertainties and study different variables (both singularly and combined) and possible changes in their values. They start from a certain level and they explore different possible levels in which the different variables have different values.

Most of all scenarios attempt to challenge inured mental attitudes. Both their development, their diffusion and their employment in decision making (at any level) aim to provide new tools to think to the future, to contemplate other possible alternatives, to face risks and uncertainties which we usually avoid until they become an emergency. The aim of scenarios is to help in giving a broader view of our reality, gaining a perspective that allows us to comprehend not only what it is now, but also what it might be in the future. This is not an easy aim as changing the mindsets of planners and decision-makers can be a difficult task.

Visioning

Hypothesis and aims

The main hypothesis of visioning processes is that images of the future lead our present behaviours, guide our choices, and affect our decisions, or, using Wendell Bell words help to shape the historical actions that people take (Bell 1997: 82). A Future Studies approach that uses visions and imagining is basically an approach that studies desired futures rather than probable and possible ones, and, more than any other Futures Studies approach, gives emphasis to values (Masini 1999). The study of visions might have two different approaches. The first is that of the futurist who will study the ways in which images of the future influence human behaviour and how that behaviour in turns contribute toward making the future. To carry out this *task the content of images of the future themselves must be analysed (...)* investigating suing a variety of sources and data (Bell 1997:81-86).

The second approach looks at the construction of shared images in a group or in a community. They are methods that aim to set the fantasy free, to enhance the imagination, and to build images of ideal worlds. The study and construction of visions therefore requires the use of techniques that aim to generate as many ideas as possible and helps in selecting the relevant ones to be used in the study combining creative thinking with critical thinking, integrating creative and judgmental thinking (Fobes 1996). Moreover, in order to make the future exercise effective and useful it is also important to understand the level in which the imaged and/or desired futures are translatable into reality. This involves the study of possible actions, the definition of strategies, and the realisation of plans.

Method structure

Generally the task of building visions for an issue or an area the work is organised in six main steps:

1. Identification of present problems
2. Recognition of past successes;
3. Exploration of the wishes for the future
4. Definition of the goals for the future;
5. Identification of the resources available and of key actors to be addressed in order to reach the goals.
6. Vision and action plan construction.

Visioning methods are increasingly based on processes that include computer and electronic and media to enhance and widen participation and communication in the communities. The best known of them is the ETMs (Electronic Town Meetings). This process uses local television, radio and press to reach the whole community and involve it in the definition and evaluation of shared visions on specific issues. This

method allows the involvement of a great number of people in the planning process, working in separate groups at different tasks being at the same time connected one with the other. The citizens' focus groups are also carried out in co-operation with the planning department and are co-ordinated by a central steering group. The results of the different steps are published and everybody in the community has the opportunity and the freedom to intervene in the process and to express opinions and proposals.

Main issues

Whereas scenarios and forecasts are futures for the mind (with the potential to give information, identify risks and opportunities, and develop imaginations) visions are futures for the heart (Bezold 1996). People's aspirations and hopes are merged into the vision therefore they offer the opportunity to make wishes for the future explicit. Visioning is a process aimed to make communities work at the imagination and delineation of the future that they want and, most of all, to find out and construct the ways to achieve it.

Nonetheless visioning processes shouldn't be looked at as making wish-list. It is a craft and a discipline. It invites and requires hard inner work-deep questioning, deep *listening and deep learning, each of which has its own practicum. (…) participants* learn to form themselves into a community of learners, that is, persons who are prepared to listen to, nurture, clarify and critique each other in the search of a shared vision (Ziegler 1991: 521).

Futures Biographies

Hypothesis and aims

Images of desired futures constitute an important reference for FS. They help in understanding people's expectations, their wishes and desires, their fears and hopes. Those images are usually developed on the base of the memory of the past and the experience of the present, using fantasy. Each of us everyday builds his or her own image of the future and those pictures guide our decisions and we use them to evaluate alternative and to plan actions in the present.

Futures biographies, or futures imaging, is a method that aims to develop individual imaginaries, to collect people's images, and to study people's views on their future in order to use them in the study of the collective future. People's expectations and views are seen as an important input in the study both as an indication of possible goals to perceive and as possible directions that the future can take due in response to their actions.

Method structure

The individuals selected to write the futures biographies are usually asked to write their own stories of the future. Future biographies are essays in which the story of the

future stars from the present and extends into a pre-determined future time. The images are build starting from the imagination of a specific day in their future and thinking about the details of that day and the various aspects that characterise it. A list of events, and decisions, of different scale, that made that ideal state of the future possible are then identified and organised chronologically. The structure of the biography is than ready to be developed.

Main issues

The use of this method in the study of the future is useful in order to build knowledge of individual aspirations. This can become part of the knowledge base to be used in the study. One problem that can be faced is that it is an informal kind of knowledge that can be difficult to analyse and précis. Nonetheless the process can constitute an important stage in the future study as it represents an entrée, or first step, into a study of the future, which can be very useful in overcoming the fears related to future thinking. Moreover if this process is carried out before the start of a group process it might be helpful in starting to build a future thinking capacity amongst the individuals to be involved.

Futures workshops

Hypothesis and aims

There is an immense, practically untapped source of energy available: the unfulfilled wishes of millions of people, running to waste or being diverted from above into the wrong channels (Jungk and Mullert 1996: 15). Developed by Robert Jungk, Future Workshops are intended to allow anybody to become involved in creating their own preferred future rather than being simply subject to the decision of experts (May 1996: 196). The main contribution of this future images construction method is its clear and strong commitment toward action. Its aim is explicitly that of involving people in first imagining, and then in the planning of their future. As part of the process interests are discussed and developed and creativity flourish through working together. This of course does not mean that individual points of view or politics are eliminated from the process, they are conveyed together in order to contribute to the action plan (Jungk and Mullert 1996).

Method structure

Future Workshops process starts with a preparatory phase and than follows three operative phases as shown in the following table. The ideal process length is of three days, even if each phase can be reduced or expanded to longer or shorter timescales.

Future Workshops		
PHASE	CONTENTS	EXPECTED RESULTS
1. Preparation	The issue to be analysed is decided and the structure and environment of sessions are prepared.	Summary of contributions.
2. Critique	Clarification, on the issue selected, of dissatisfactions and negative experiences of the present situation.	Problematic areas for the following discussion definition.
3. Fantasy	Free idea generation (as an answer to the problems) and of desires, dreams, fantasies, opinions concerning the future. The participants are asked to forget practical limitation and obstacles of the present reality.	Indication of a collection of ideas and choice of some solutions and planning guide lines..
4. Implementation	Going back to the present reality, to its power structures and to its real limits to analyse the actual feasibility of the previous phase solutions and ideas. Obstacles and limits to the plan implementation identification and definition of possible ways to overcome them.	Creation of strategic lines to be followed in order to fulfil the traced goals. Action plan and implementation proposal drawing.

Main issues

Jungk and Mullert underline some positive effects that they claim could be noticed in those who participated in Future Workshops exercises:

- A shift from feelings of isolation and "singleness" to the development of group belonging;
- Evidence of a rise in commitment;
- The extent to which thoughts are guided by desires decreases;
- The group's enthusiasm becomes captivating;
- The action plan definition experience within the group is felt as very inspiring and stimulating;
- Repressed abilities and capabilities emerge;
- Surprising solutions are generated.

When carrying out a Future Workshops process it is important to follow some guidelines in order to make it effective:

- Define the knowledge base on the issue, to be shared by the participants, as a starting point for the analysis;
- Think, especially in the final phase, in terms of real and concrete forecasts and dates;
- The judgements on values given by the group have to be explicit and tested in the group;
- But most of all it is important to underline that Future Workshops cannot lead to any change if they are not oriented to an effective action (Bell 1997).

Causal Layered Analysis

Hypothesis and aims

This method, developed by Sohail Inayatullah, is one of the newest Futures Studies methods and it is an attempt to use poststructuralist principles in a Futures Studies method. The aim is not prediction and forecasting but one of creating transformative spaces for the creation of alternative futures (Inayatullah 1998). Drawing on poststructuralism the key principle is to use and integrate different ways of knowing. It proposes that the world of reference that interests us in Futures Studies is not *monolithic but layered and that different "layers" reveal different phenomena* (Slaughter 1999). This method has been developed in order to explore the world of the alternative futures that are investigated looking at the present and the past with a multidimensional approach. This analysis offers a broad insight into the different discourses and therefore it is best used prior to scenario building as it allows a vertical space for scenarios of different categories (Inayatullah 1998). Causal Layered Analysis uses various forms of knowledge and it incorporates analysis of *not textual and poetic/artistic expression (…) and categories of knowledge from other civilisations (…) in the futures pr*ocesses. The assumption is that not only the visions of the future shape our actions but also, and most of all, the ways in which those visions are shaped, the ways in which problems are framed

Method structure

Causal Layered Analysis has three main levels of analysis. The litany: a study of the trends and issues of the future, primarily in terms of elements that are usually disconnected. This is the level where futures researchers usually operate offering their results. The level that Slaughter calls "pop futurism" (Slaughter 1999) that offers visions of the future to be accepted. The second level of Causal Layered Analysis is social causes: analysis that gives and interpretation to qualitative data (social/economical/ cultural/political). It is a technical level of analysis easy to find in journals or newspapers. The third level is discourses/worldview, which is a deeper level connected with discourses and debates (e.g. globalisation processes, population/consumption debates, and so on). At this level one can explore how different discourses do more than cause or mediate the issue but constitute it, how the discourse we use to understand is complicit in our framing of the issue. Myth/metaphor: These are the deep stories the unconscious dimensions of the problem and overcome the data and discourses to go deeper in the level of knowledge (Inayatullah 1998).

Main issues

CLA doesn't deny any of the levels but uses them all. Knowledge can then expand and cover those four dimensions leading to scenarios that incorporate different ways of knowing, different levels of understanding, and different analysis related to them.

The benefits of the application of this method, according to Inayatullah, are in:

- Expanding the richness of scenarios
- Moving the debate/discussion beyond the superficial and obvious to the deeper and marginal
- Leading to policy actions that can be informed by alternative layers of analysis

Moreover Causal Layered Analysis can categorise the many different perceptions of realities while remaining sensitive to horizontal and vertical spaces (Inayatullah 1998). The method is particularly useful when used in conjunction with other Futures Studies methods. It helps in reaching a deeper understanding and in broadening the possibilities of actions as a result of the different analysis levels.

Conclusions

Various FS methods have been schematically described in the paper in terms of their main characteristics and aims. There are many other methods that could be considered as Futures Studies methods as well as many more methods of different disciplines that may be used or adapted to carry out a futures study. Most foresight processes usually include and integrate some of the approaches described above using different methods at different stages and for different purposes. The construction of a process and the choice of methods to include in it depend very much on the context, the issue studied, the budget, time available, actors involved, output needed and so on. There are many examples of futures oriented processes developed in the history of Futures Studies, QUEST (Quick environmental scanning techniques) and FAR (Field Anomaly relaxation, -Coyle et al. 1994), are two of the best known examples.

The methods described, and Futures Studies methods in general, are methods that have mainly been constructed and used in America and Northern Europe. There is therefore an open debate on various issues such as: the ways in which those methods can be adapted and used in the rest of the world; the necessity of studying new procedures and mechanism to study the futures in different environments; and the validity of the basic theories and epistemologies of Futures Study field in “other” realities (Sardar 1999).

In recent years many of the methods described have been developed and deployed using computer and communication aids allowing the use oaf a great number of variables and data. Many interactions are now carried out through internet and email and new software is continuously being built to expand the possibilities. This seems to be the future of Futures methods as these tools allow the methods to be more user friendly and to be used more quickly and easily. It should be noted that there are some difficulties in the use of new technologies in FS, particularly in terms of cost

and the dangers of excluding certain social groups. Nevertheless their validity is unquestionable and their great potentialities are still to be fully explored.

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