An Overview of Four Futures Methodologies

(Delphi, Environmental Scanning, Issues Management and Emerging Issue Analysis)

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Introduction

The aim of futures research is to "help inform perceptions, alternatives and choices about the future" (Amara 1991:646). It assists us to understand alternatives or preferences for the future, probable developments and to articulate and work towards a desired future (Bell 1993). The origin of modern futures research can be found stretching back to the 1950's and 60's. Although in the West it was first associated with the military industrial complex, the benefit of such research was soon realized and the tools spread quickly to the private and government sector. We now have a whole genre of research methodologies which assist us to plan for the future.

This paper addresses four such futures methodologies. The first is the Delphi technique, which could be considered one of the core tools of futures forecasting. The remaining three are interrelated and consist of environmental scanning, issues management and emerging issues analysis. These three have in common the aim of surveying the environment to determine likely issues that are going to impact upon an organization, community or individual. Although, they are similar in this regard, they do differ on the urgency of the issues to be focused on.

This paper first explores the Delphi technique and then discusses the three emerging issues analysis related methodologies. These are covered by giving a description, critique and suggestions for improvements for each. The final section of the paper then provides a comparison and summary of the methodologies in the context of the futures field. This section also raises some of the pertinent considerations such as values and ethics for futurists undertaking such research.

Delphi Technique

Introduction

Named after the Greek oracle at Delphi to whom the Greeks visited for information about their future, the Delphi technique is the best known qualitative, structured and indirect interaction futures method in use today (Woudenberg 1991). Created by Olaf Helmer and Norman Dalkey in 1953 at the RAND corporation to address a future military issue, the technique became popular when it was applied a decade later to large scale technological forecasting and corporate planning (Helmer 1983). From a number of RAND reports (eg. Dalkey & Helmer 1962, Dalkey 1967, Brown 1968, Rescher 1969, Helmer 1967) the technique has gone on to become the subject of numerous books and journal articles (Armstrong 1985). Similarly its use has been broadly based and prolific throughout many parts of the world, but especially in the US, eastern and western Europe and Japan (Masini 1993). It seems few methodologies have captured the imagination of planners and forecasters the way Delphi has.

Essentially, Delphi is the name given to a set of procedures for eliciting and refining the opinions of a group - usually a panel of experts (Dalkey 1967, Brown 1968). It is a way whereby a consensus and position of a group of experts is reached after eliciting their opinions on a defined issue and it relies on the "informed intuitive opinions of specialists" (Helmer 1983:134). This collective judgment of experts, although made up of subjective opinions, is considered to be more reliable than individual statements and is thus more objective in its outcomes (Johnson & King 1988, Helmer cited in Masini 1993). As Linstone and Turoff (1975:3) write, "Delphi may be characterized as a method for structuring a group communication process, so that the process is effective in allowing a group of individuals, as a whole, to deal with a complex problem."

Methodology Development

The development of the Delphi technique had its main genesis in earlier work to overcome the shortcomings of human judgment for planning purposes. Douglas MacGregor, for example, undertook a study in 1936 and formulated what came to be known as the `MacGregor effect'. This refers to his finding that predictions made by a group of people are more likely to be right than predictions made by the same individuals working alone (Loye 1978). It had also been well

established by this time that face-to-face meetings had several problems such as being dominated by one or a few individuals, falling into a rut of pursuing a single train of thought for long periods of time, exerting considerable pressure on participants to conform and regularly becoming overburdened with periphery information (Preble 1983, Riggs 1983).

The formulation of the Delphi technique was a response to these two major findings. The first experiment using a Delphi style technique was carried out in 1948 in the hope of improving betting scores at horse races (Woudenberg 1991, Preble 1983). However, it was Helmer and Dalkey at the RAND corporation in the 1950's, who really advanced the technique to increase the accuracy of forecasts.

From this beginning, the Delphi technique found its way into private corporations, think tanks, government, education and academia. With such proliferation of use, the technique also came to be modified to the point where we now have a family of `Delphi-inspired techniques' in a broad range of applications (Martino 1973, van Dijk 1990). These are: (1) the Conventional Delphi; (2) the Policy Delphi; and (3) the Decision Delphi (Woudenberg 1991, van Dijk 1990).

The Conventional Delphi has two main functions. That is forecasting and estimating unknown parameters and is typical of Delphi as it was originally conceived. It is used to determine consensus on forecasting dates and developments in many areas - but particularly in the area of long term change in the fields of science and technology. By estimating unknown parameters, respondents make their own estimates regarding the expected levels of an activity relative to present levels. The Policy Delphi on the other hand, does not aim for consensus but seeks to generate the strongest possible opposing views on the resolution of an issue and to table as many opinions as possible. The objective is for it to act as a forum for ideas and to expose the range of positions advocated and the pros and cons of each position (Bjil 1992). And finally the Decision Delphi is utilized to reach decisions amongst a diverse group of people with different investments in the solution. The subject of the decision, for which the Delphi is used as a resolution mechanism, is usually harshly contested and complex and thus the structured group communication process is deemed effective. Helmer (1994) has more recently written on the potential for Delphi to also be used to assist in the process of decision making to resolve adversarial situations such as physical planning, budgeting and abortion.

Description

Although there are a range of Delphi techniques now in use and adapted for various needs, it is still possible to talk of a broad procedural outline that they follow. Firstly, the subject of the study is circulated to the participants in an unstructured manner to enable them to comment on the issues in question. This material is then synthesized by the monitoring team (one or more people co-ordinating the study) and distributed to the participants in a questionnaire format. It needs to be mentioned here also that this first round is very often circumvented by the issue being explored comprehensively by the monitoring team which gathers the information and uses it to frame the questions to the respondents. Secondly, a questionnaire is drawn up to ascertain the opinions of the experts and to try and begin to elicit points of convergence and divergence. Thirdly, the questionnaires are distributed repeatedly, each time with the information from previous questionnaires that has been interpreted and reformulated by the coordinating team. The feedback often provides textual and statistical material to participants with the groups response as well as their own and asks them to reconsider their response or if their response is radically different from the group to justify it. The aim is to repeat this process until finally a certain level of consensus or stability is reached. A final report, pulling the responses together, is then prepared by the coordinating team (Masini 1993).

Supplementing this broad outline, the many derivatives of the Delphi technique have developed different processes to suit each application. For example, some studies have interspersed the rounds with personal interviews with panel members, sometimes panel members have been bought together in a meeting format to discuss the results of the Delphi survey and to come to a final conclusion. Others use structured group conferences such the nominal group technique (NGT) and computer conferencing and communication (Amara 1975, Webler et al 1991). The number of rounds can vary from two to ten. And as mentioned above, the first round of questionnaires to the panel can be presented as an inventory or it can can be prepared by the monitoring team (researching, interviewing key people, pretesting the questionnaire etc). (Woudenberg 1991). The use of technology has also found its way into Delphi procedures enabling it to be automated and thus streamlined (Helmer 1983, Cundiff 1988, Cho, Jeong & Kim 1991).

Characteristics

The Delphi was designed to optimize the use of group opinion whilst minimizing the adverse qualities of interacting groups. As such, it has four basic features: structured questioning, iteration, controlled feedback and anonymity of responses. Structured questioning is achieved through the use of questionnaires.

This keeps a clear focus on the study and enables the moderator/s to control the process and channel it into a compact product. Iteration is the process by which the questionnaire is presented over a number of rounds to enable participants to reconsider their responses. Controlled feedback is achieved by feeding back to the panel members the responses of the whole group as well as their own response for their reconsideration. This means that all the responses of the panel are taken into account. Anonymity is achieved through the questionnaires ideally giving group members the freedom to express their opinions without feeling pressured by the wider group. In many Delphi studies, statistical aggregation of the group response is also a common feature. This means that where consensus is required at the end of the process, it is taken to be the median response of the panel and the spread of the interquartile range as the degree of consensus (Rowe, Wright & Bolger 1991). Another version of gaining consensus is for the respondents to make a self appraisal as to their competence in giving their responses. The answers from those who grade their competency level high are then used as the median, rather than the group as a whole. Helmer (1983) explains the rationale for this, arguing that it has been found that these experts achieve a result closer to the actual outcome than the rest of the group.

The respondents and the coordinating team are advised to be inter-disciplinarian with at least one person on the monitoring team having a working knowledge of the issue in question. By having as diverse a panel as possible, biases are able to be minimized (Masini 1993, Webler et al 1991). Where consensus is required, questionnaires need to be designed so that answers are not too long for consensus to be impossible or too short so that the consensus is superficial (Masini 1993). The monitor, in preparing the feedback, also needs to cull superfluous information to keep the group focused.

Rationale

Saaty and Boone (1990) argue that there are four defensible ways of forecasting the future. One is by consensus, the second is by extrapolating on trends, the third is by historical analysis and analogy and the fourth is the systematic generation of alternative paths to the future. Delphi is considered the most prominent of the consensus methodologies (Jones 1980). Quantitative forecasting can be used when there is information about the past, when this information can be expressed as data and when there is an assumption that the future will be a continuation of the past and the present (Bijl 1992). If you don't believe this is how change occurs and data is not available - you need to turn to qualitative methods. Delphi is one of the best known qualitative methods and is one of the four opinion capturing techniques used by planners and futurists

(Nelms and Porter 1985).

Another rationale for the creation and use of this technique is the speed and magnitude of change (Helmer 1983, Preble 1983). If change was not occurring at the pace it is, it would be feasible to make policy and other decisions based on an assessment of past and present failings. However, this is no longer the case and futures methodologies, such as Delphi, provide a mechanism whereby opinions and expectations of the future can be considered. Indeed, the realization that we have no formal theory about the future, necessitates us to consider tools that elicit the opinion of experts and others.

Linstone and Turoff (1975: 4) provide a comprehensive list of situations where it would be best to employ the Delphi technique. These are:

* "The problem does not lend itself to precise analytical techniques but can benefit from subjective judgments on a collective basis.

* The individuals needed to contribute to the examination of a broad or complex problem have no history of adequate communication and may represent diverse backgrounds with respect to experience or expertise

* More individuals are needed than can effectively interact in a face-to-face exchange

* Time and cost make frequent group meetings infeasible

* The efficiency of face to face meeting can be increased by a supplemental groups communication process

* Disagreements among individuals are so severe or politically unpalatable that the communication process must be refereed and/or anonymity assured

* The heterogeneity for the participants must be preserved to assure validity of the results ie. avoidance of domination by quantity or by strength of personality (`bandwagon effect'). "

Similarly, Martino (1973) argues that the technique is best suited to making forecasts in fields that are poorly structured; in fields that are too new to have adequate historical data for the use of other methods; in fields where progress may be more dependent on external social and economic factors than on the technological factors intrinsic to the field; and in fields where ethical or moral considerations may weigh heavily. Using the Delphi to obtain data as part of

environmental scanning or for information to feed into scenario planning, is also valid. Likewise in situations where obtaining the required objective data would prove highly costly, the Delphi method provides a valuable alternative (Masini 1993, Rowe, Wright & Bolger 1991).

Applications

Therefore, the Delphi technique, due to its flexibility, is best suited to the exploration of issues that involve a mixture of scientific evidence and social values (Webler et al 1991:256). Mohapatra, Bora and Sahu (1984:159) suggest that a Delphi study is usually directed to four broad categories of issues. These are:

"1) Normative issues such as `goal setting'

2) narrative issues such as `problem statements',

3) predictive issues such as

a. forecasting occurrence of new events and

b. forecasting point values and trends of key parameters,

4) suggestive issues such as

a. developing causal models and

b. formulating new policies."

Some examples of the subject areas in which Delphi studies have been undertaken include: economic trends and societal change, (Cicarelli 1984, Masser & Foley 1987), issues in the agriculture area (Waissbluth & Gortari 1990, Mohapatra, Bora & Sahu 1984), educational developments (Kruus 1983), regulatory processes (Benaire 1988), medical developments (Smith & Johnson 1976, Adams, Plercy, Jurich & Lewis 1992), determining future issues in grievance arbitration (Adams 1980), developing family therapy models (eg. Fish & Osborn 1992), future need for affirmative action programs (Fry 1980), determining policy options (Sviden 1988, Setty, Padmanabhan & Natarajan 1987) and evaluating budget allocations (Linstone 1978). Similarly, Toffler (as cited in Rieger 1986) envisages computerized, normative Delphi-like exercises on a large scale involving many participants as a normal functioning part of societies of the future - in line with his concept of anticipatory democracy.

Evaluation

It is very difficult to evaluate the accuracy and reliability of a judgment method such as the Delphi, because the technique is based on determining the opinion of panel members and the findings thus become person and situation specific. Therefore, each application of the methodology will be different, preventing comparison and measurement to be carried out. The only way Woudenberg (1991) argues you can evaluate its accuracy is to compare it with other judgment methods in the same situation and many of the previous evaluations of Delphi have not done this. In addition, much of the work undertaken to evaluate the Delphi technique has been done with university students asking almanac-type questions. This raises questions about the applicability and validity of results when trying to evaluate the technique for its effectiveness in generating alternative futures (Amara 1975).

Dalkey wrote two articles in 1968 and 1969 summing up most of the negative aspects of Delphi, including the strong response of the group to conform with the statistical feedback of the panel. However, it was Sackman in 1974 who provided the major critique of the Delphi attacking it on the grounds that it was unscientific and its application was highly questionable. His view was that the method lacked the necessary rigor to be taken seriously as a scientific methodology. Rieger (1986) argues that the Delphi drew this response from Sackman because the creation of the method was an attempt to move beyond the conventional research paradigm of which Sackman was a member. It has also been argued that Sackman's critique was based on studies that had used the technique sloppily, thus causing his evidence to be selective.

Linstone (1975) responded to Sackman by agreeing with Coates (as cited in Rowe, Wright and Bolger 1991) that the Delphi method must be considered as one of last resort - to deal with extremely complex problems for which there are no other models. "...one should expect very little of it compared to applicable analytical techniques. One should expect a great deal of it as a technique of last resort in laying bare some crucial issues on a subject for which a last resort technique is required...If one believes that the Delphi is of value not in the search for individual knowledge but in the search for public wisdom; not in the search for individual data but in the search for deliberative judgment, one can only conclude that Sackman missed the point"(quoted in Linstone 1975:573). Hughes (1985) concurs, arguing that the Delphi technique is more about opinion gathering than explanations of causality and thus its use is not a retreat from objectivity. Judgment and informed opinion have always played a crucial role in human enterprises and will continue to be useful so long as the structure of an investigation is made subject to some of the safeguards that are commonly used to assure objectivity in any scientific inquiry (Brown 1968).

Other criticisms that have been leveled at Delphi are:

* it has not been shown consistently that the results this method produces are any better than those achieved through other structured judgmental techniques (Rowe, Wright & Bolger 1991);

* a Delphi study is at the mercy of the world view and biases of the coordinating or monitor team, who choose the respondents, interpret the returned information and structure the questions. There is a great deal of debate therefore over whether this coordinating group should be chosen from within or outside the organization initiating the study and whether they should be be experienced in the subject area of the study in question (Masini 1993);

* The way the process and questionnaire is structured can lead to a bias (like IQ tests), which assume a certain cultural background. People may give responses they think the monitoring group wants to hear, or they may not respond at all. Thus, the cultural background of respondents will impact upon the results (Linstone 1978);

* Simmonds (1977) argues that one of the key weakness in using the Delphi technique is that certain questions do not get asked as they do not seem important when the study begins. However, once it is underway new questions cannot be added, which in turn can weaken the study considerably;

* the process of choosing the panelists is often not considered seriously enough. Yet, it is the calibre of the panelists which determines the quality of the outcomes of the study;

* in the process of achieving consensus, extreme points of views run the risk of being suppressed, when in fact they may provide important new information or insights; and

* the flexibility of the technique means it can be adapted to a whole range of situations which in turn can make it vulnerable to misrepresentation and sloppy execution (Amara 1975).

Masini (1993) argues that these reasons are why developing countries have rarely used the methodology and when they have, it has been on narrow subjects. Reliance on experts in such countries, has made potential users wary of the Delphi technique.

Linstone and Turoff (1975:6) also outline some of the common reasons for failure of the Delphi. These are:

"* Imposing monitor views and preconceptions of a problem upon the respondent group by overspecifying the structure of the Delphi and not allowing for the contribution of other

perspectives related to the problem

* Assuming that Delphi can be a surrogate for all other human communications in a given situation

* Poor techniques of summarizing and presenting the group response and ensuring

common interpretations of the evaluation scales utilized in the exercises

* Ignoring and not exploring disagreements, so that discouraged dissenters drop out and

an artificial consensus is generated

* Underestimating the demanding nature of a Delphi and the fact that the respondents

should be recognized a consultants and properly compensated for their time if the

Delphi is not an integral part of their job function."

In terms of its positive contribution to futures methodologies, Ono & Wedemeyer (1994) argue that the accuracy of the technique in short range-forecasting has been proved fairly conclusively. Similarly, in their own study carried out in 1976 and evaluated in 1994, they show how the technique is also valid in long range forecasting, Ascher & Overholt (1983:259) likewise show from their own experience that Delphi studies have an excellent record of forecasting computer capability advances, nuclear energy expansion, energy demand and population growth. "They offer a very inexpensive means of achieving interdisciplinary interaction." The technique is also said to expose real agreements and disagreements among respondents as well as giving the facilitator simple and direct control over the scope of the study (Amara 1975).

The strong critique of the Delphi in the 1970's, was aimed at the conventional Delphi which focuses on forecasting and estimating unknown parameters. Other Delphi methods that have since evolved such as the Policy and Decision Delphi have drawn less attention in the way of a critique. Evaluation of these types of

Delphi is scarce and it is not known whether the drawbacks of the quantitative Delphi are not also to be found in the Policy and Decision Delphi's.

Suggestions for improvement

The amount of time that has passed since the technique was developed and the increasing uses of the Delphi, means that we no longer use it in the same way we did in the 60's and 70's. This is to be expected, with more prolific use and continual discussion on improvements. As the Delphi was originally conceived, it has proven "...too slow, too expensive, and, most important, too blunt an instrument for most applications" (Amara 1989:43). From the previous discussion of the characteristics and drawbacks of the method, the following suggestions are made to improve the execution of a Delphi study.

1. Considering membership of the panel is perhaps the most critical point in using the Delphi. The effective selection of the panel not only maximizes the quality of responses, but also gives the results of the study a credibility with the wider audience (Bjil 1992). Respondents should be tailored to the issue, having reasonable familiarity with the area but also coming from varied backgrounds within the subject under investigation (Rowe, Wright & Bolger 1991, Masser & Foley 1987). Scheele (1975) has suggested that when formulating the panel, three different groups need to be reflected in the membership. First, there should be the stakeholders, that is those who are or will be directly affected by the issue in question. Second, it should include those with the expert knowledge and third, there should be those who act as facilitators and have the skills to stimulate and clarify those with alternative views.

2. There are times when alternative interviewing techniques should be used in a study. For example, having a face to face meeting may provide a stimulus for discussion that could be beneficial to the study. In addition, individual interviews have been cited as the most effective way of reflecting the participants opinion. Therefore, considering a mix of interview techniques maybe beneficial, as van Dijk (1990:303) argues "...a good combination for a three round Delphi study might be: the technique that best motivates participation for an introductory round (the individual interview), the technique that supports discussion and self confidence (the group interview) for a second round, and the most anonymous individual technique (the mailed questionnaire) for a final voting or decision round".

3. The results from a Delphi study should ideally be part of a comprehensive

futures planning exercise joining with other qualitative and quantitative planning methods (Masini 1993, Rieger 1986, Mohapatra, Bora & Sahu 1984, Yuxiang et al 1990). Already the cross impact analysis has become a common feature of many Delphi studies. Similarly, Day (1975:188) argues that "... Delphi forecasts should be combined with other relevant material (trend extrapolations, multi-client study results, market research data etc) in order to present a comprehensive estimate of the impact of a forthcoming decision. These combinations maybe in the form of cross-impact matrices, scenarios. market analyses etc. The use of the Delphi data with other material helps create confidence in the overall package. It is rare that the Delphi results alone can help resolve an issue when preparing a recommendation". Similarly, futurists or planners are as interested in the connections or impacts of stated developments on each other as they are in the developments themselves (Amara 1989).

4. The questionnaire used in the study should minimize ambiguities and the moderator, when editing the panelists responses for reiteration, must try and keep the intent of the respondents answer in tact and consistent between rounds. It would also be useful to keep track of how sub-groups respond to the questions so as to analyze whether there is a polarization of results based on the respondents background.

5. Close attention needs to be paid to the structure and content of the first round of questions as this will impact on the rest of the study. Ideally, the questionnaire should be pretested prior to distribution to the participants to ensure that all the questions are clearly understood (Thompson 1973).

6. Similarly, because Delphi studies often have participants from a wide variety of backgrounds, it is important that the questionnaires are expressed in a way that is widely understood (Bjil 1992). A variety of techniques can be explored to ensure this, including the use of visual concepts.

7. At least two people should act as moderator, so that when materials are edited, they can be cross checked for accuracy of interpretation. The moderating group needs to also ideally consist of one person who has familiarity with the subject area but the remainder are better being familiar with the Delphi process which can give them needed experience in formulating questions and feeding back the responses. By having less people knowledgeable in the subject area, a certain amount of objectivity can also be ensured.

8. Some writers have already noted this, but it seems important that if

respondents are participating in a Delphi study that is not considered part of their normal duties, they should be renumerated for their time.

9. Statements used in the questionnaires shouldn't be anymore than 20-25 words. Too many or too few words reduces consensus and weakens the quality of information obtained (Linstone and Turoff 1975). In the case of the policy Delphi, open ended questions are extremely valuable for demonstrating logical reasoning which can be especially important if scenarios are being derived from the results (Bjil 1992).

10. It seems important that respondents be given a brief account of the origin of the research topic that the Delphi study is focusing on, and the investigation procedures to be used. In this way, participants will be better informed about the rationale for the study and the questions.

11. And finally, when aggregating the answers from the questionnaires for a median score, it is important that the study strives for stability rather than consensus. In this way, divergent opinions can be acknowledged and included in the findings.

Environmental Scanning

Environmental scanning is a systemic futures methodology that was developed by Aguilar in 1967 (Preble 1978, Preble et al 1988, Thomas 1980). It is often "used for management issues and usually attempts to link Futures Studies and strategic planning or management as an intermediary step or one that precedes other Futures Studies exercises". (Masini 1993:103) I agree with Marien (1991) who argues that scanning the environment is one of the fundamental tasks of futurists and futures studies.

There is some confusion over what exactly is environmental scanning. Much of the earlier literature talked about scanning with multiple phases. Consider for example, this definition"...monitoring, abstraction, analysis, synthesis and communication of environmental information" (Thomas 1980:23). However, the description of this process is more closely related to issues management or emerging issues analysis whereby after the scan is completed, analysis and communication of the issue is conducted. Environmental scanning as the name implies, and the way it will be defined for this term paper therefore, refers strictly to the process of scanning. That is the systematic review of literature and other modes of communication to determine emerging issues. It is in this context that Masini (1993) makes the point that environmental scanning is a

concept rather than a technique.

Environmental scanning is a tool by which planners and others can obtain information both about the specific topic area in which they are located and their general environment. Masini (1993:102) quotes Renfro and Morrison to describe environmental scanning: "The environmental scanning system can identify important emerging issues that may constitute either obstacles or opportunities. This process helps institutions allocate their resources in a way that anticipates or responds to changes in the external environment." Masini (1993:102) herself describes the process as "an outside in one that substitutes the inside-out perspective of forecasting and planning." Originally used for economic trend purposes, it was broadened to include technological trends, and social and environmental factors in the 1970's.

The main rationale for environmental scanning is the same as for most of the futures methodologies, that is, the world and the operating environment for communities, organizations and individuals is increasingly turbulent and uncertain (Kast 1980, Witham 1991). Change is rapid and can be quite unanticipated unless a structured process is in place that scans for emerging developments. Similarly, social organizations, like living organisms are open systems exchanging information, energy and materials. The boundaries operating in the increasing complexity and interdependence of today, have become extremely permeable and caused organizations to be far more sensitive to external factors than they were previously. Thus, the external environment has become as responsible for shaping an organization as much as internal forces have(Jain 1984, Kast 1980, Terry 1977). For example, the Conference Board of New York in the early 1970's conducted research on American corporate planning practices and found that after `people' problems, the next most pressing problem was accounting for the external environment (Thomas 1980).

Terry (1977) argues that environmental scanning has three foci. The first is the immediate environment (of current and immediate concern to the organization), the second is the probable environment (not of immediate concern to the organization but likely to be in the future) and the third is the possible environment (weaker signals on the radar screen `which might turn our to be a seagull or a super tanker'). These are expressed in the diagram on the next page.

Similarly, in terms of the scanning process, the environment for an organization, or issue in question, has two aspects. The first is the societal or general environment and the second is the task or specific environment. This distinction is not static - aspects of the external environment are regularly breaking through

to the task environment. For example, in the mid 1980's when Royal Dutch Shell was considering new oil exploration sites that would be required, they scanned for information about the immediate oil industry (that is, should they build a new offshore platform) and the broader general environment, which led them to developing a scenario about the collapse of the Soviet Union and possible access to its oil reserves (Schwartz 1991). For Shell, this focus on the general environment, proved to be extremely useful.

Environmental scanning can also be divided into two groups. They are passive and active scanning (Masini 1993, Renfro & Morrison 1984). Passive scanning is ongoing scanning at an almost unconscious level. No specifications are made with regard to resources or criteria for scanning and decisions made on this type of scanning activity are usually ad hoc. Active scanning on the other hand, involves a much higher level of attention with information sources being scanned specifically for their expected contents. The criteria is also different with active scanning in that specific questions are asked by the scanner such as whether this item or issue has relevance to the organization or community and whether its likely effect, justifies following it more closely.

In addition, Terry (1977) speaks of irregular, regular and continuous scanning. Irregular scanning, he says, is an ad hoc environmental study usually caused by an unanticipated occurrence and is normally a knee jerk reaction to a crisis. The focus of this type of scan is on the past and its importance is to understand the implications of the past event. Regular scanning is usually an annual review of the environment and is typically issue orientated. The focus is still on the current situation and extends only to simple extrapolations into the future of the most immediate past. And finally, continuous scanning is the ongoing monitoring of various environmental systems rather than specific events. To be effective, it needs to be organizationally structured and feed into the strategic planning process. The aim of any comprehensive and effective environmental scanning project should ideally be along this continuous model.

In terms of who oversees and carries out the environmental scan, it can be either internal or external members of the organization (or a joint committee of both). For example, in a study of corporations undertaking regular scans, Preble et al (1988) found that executives relied on internal sources (employees, reports) 61% of the time and external sources (bankers, publications, consultants) 39% of the time. The authors of the report claim that the high degree of reliance on internal sources is an acknowledgement of the institutionalization of the environmental scanning process in corporations.

If the scanning process is carried out by a group or a committee, usually one

person acts as the chair and has overall responsibility for the task. An example of a team scanning process is Hawaii's Environmental Scanning project which utilizes volunteers from a number of government agencies to consider and write up significant trends from assigned periodicals for bimonthly meetings. The coordinator of the project then writes the items up in a monthly report which is distributed to private and public sector agencies (Meeker 1993).

The literature used in private sector environmental scanning, is said to focus on five knowledge areas. These are: economics, technology, politics, ecology and social/cultural factors. Economics and technology factors are considered by far the most important in terms of impacting the decisions corporations make (Fahey & King 1977, Jain 1984, O'Connell & Zimmerman 1979, Preble 1978, Preble et al 1988). Corporations scan the subject areas looking about ten years into the future (Thomas 1980). Schwartz (1991) argues that science and technology are the most important drivers of future events and thus are primary areas to be watched, especially the new developments in physics, biotechnology, computer science, ecology, microbiology and engineering.

Several studies have explored the relationship between environmental scanning and corporate performance and all have found a positive link between environmental assessment and performance (Preble et al 1988). It has also been noted that environmental scanning has become a widely accepted part of the strategic planning process of many US firms and that the effectiveness of strategic planning in an organization depends greatly on the capacity for environmental scanning (Jain 1984).

Critique

Marien (1991:84) argues that "scanning is and always will be an imperfect activity" because it is impossible for a totally objective approach to be taken to surveying the environment. Instead, the scanner is faced with decisions about what to focus on, what material to include and is influenced by a world view that will favor some signals over others. The scanner also has to decide on whether the information is to be gained by direct observation or by mediated sources; whether we just focus on current material or whether we delve into the past; what form of material to include and what pieces within each of these forms (eg. film, videos, books, journals, reports, electronic services); whether to just focus on English sources or to include non-English ones; whether to look at fiction or non-fiction sources; which disciplines to look at (eg. the predominance of the corporate sector to focus on economics and technology); whether we pay more attention to the opportunities or the threats arising from the scan; and whether we look for trends or events (Marien 1991).

In a study undertaken with corporate executives to ascertain their experiences with environmental scans, the following problems were articulated: (O'Connell & Zimmerman 1979:18)

"* inability to organize for environmental scanning;

* difficulty in matching individual beliefs with detectable trends;

* delay between external developments and our interpretation;

* problems with finding relevance...;

* inhibitions concerning pessimistic discussions;

* conflict between the desire for stability and the reality of constant change;

* missed opportunities because of poor timing; and

* motivation of the management team to discuss the issues."

O'Connell & Zimmerman (1979:19) go on to argue that the misgivings about scanning are not so much about resources but about the way the process is managed. This has to do with human perception. "...the perceiver tends to ignore that which is mildly threatening. Time and time again we have seen executives reject or rationalize data from social, political, and ecological domains; [but} threats emanate from these three."

Issues Management

Issues management, like emerging issues analysis, builds on the work of environmental scanning and is largely the fusion of public relations and futures research. . Once the scanning mechanism is in place, there is a need to analyze the issues at hand and to implement a plan to address them. Once again the confusion over definition reigns. For example, Stroup (1988:24) argues that "environmental scanning is a new evolution of an old discipline. Originally called issue identification it was introduced by Howard Chase in his 1976 publication, *Corporate Public Issue"*. However, reading the issues management literature, it is Chase and his book in 1976 who is credited as the designer of issues management and not environmental scanning (Ewing 1986).

Issues management grew out of the recognition by corporations and other

institutions that they need to take account of and participate in, when appropriate, the public policy process. Renfro (1993:29) argues that a new situation is upon the corporate sector in which the public are playing an increasingly important role in the direction of organizations. "Leaders of organizations simply found that outside participants were having as much impact on the future of their organizations as they were, or more. By the late 1970's, CEO's reported they were spending an average of 50 percent of their time on external issues. By one estimate, this had grown to 70 percent by the mid 1980's."

The focus with this methodology is definitely on the near term and with reasonably established issues. For example, Renfro (1993) defines an issue as a specific question or matter that is already in dispute. An issue must have possible resolutions and "a decision point must be of some relative proximity to the dispute" (Renfro 1993:14). In addition, we can see the focus on the near term when Ewing (1979:15) argues "...issues management is confined to emerging issues whose definition and contending positions are evolving in the public arena and legislation or regulation is likely in a moving time frame of 18 to 36 months out."

In terms of a definition therefore, Chase, who was the chairman of the Issues Management Association (founded in 1982), offered the following descriptor which is widely used in describing this methodology. "Issues management is the capacity to understand, mobilize, coordinate, and direct all strategic and policy planning functions, and all public affairs/public relations skills, toward achievement of one objective: meaningful participation in creation of public policy that affects personal and institutional destiny"(as quoted in Heath & Nelson 1986:20). To indicate the popularity this methodology has experienced, a 1982 survey of the Fortune 500 companies showed that 91% had established issues management programs (Heath & Nelson 1986).

The characteristics of the the model are broken up into three concurrent activities and six components. The concurrent activities include foresight, policy development and advocacy. The six components are: 1) monitoring of the public policy arena to determine likely issues to impact upon the organization; 2) determining which of these identified issues are most important; 3) evaluating these issues for their operational and financial impact on the organization; 4) establishing an organizational position on the issues; 5) formulating the organizations's response; 6) implementing the response. (Heath & Nelson 1986). "All this information is generated for a purpose - to identify strategies and actions to implement before an issue develops into a crisis" (Renfro 1993:68). The following diagram outlines this process.

Critique

Many have argued that there is nothing innovative in issues management that it is in fact what public relations and public affairs branches of organizations have always been doing (Heath & Nelson 1986). In addition, the focus on more immediate issues raises the question whether in fact such a methodology is sufficiently future orientated. Linstone (1987) claims there is still considerable uncertainty about the whole process of issues management. For example, he cites a fuzziness of the issues, a lack of clear understanding of the possible implications of the issues or what the range of responses might be and uncertainty about how the organization can or will respond.

Emerging Issues Analysis

Following the same notion of issues management, emerging issues analysis (EIA) tries to also determine likely issues that are going to develop and require a community or policy response in the future. The major difference between the two is the focus on the stage of development of the issue - or in EIA terms, the point on the S curve. Whereas issues management scans the environment for issues likely to require a legislative response in 18-36 months, EIA aims to identify issues much earlier in the gestation period. For example, Molitor (1977:6) writes that with EIA, "The time-span for a social problem - from first appearance in visionary and artistic literature, to pickup by the mass media, to documentation in academic and historical journals - is anywhere from 35-85 years."

It was through EIA that the concept of issues developing along an S curve pattern was mapped (see Appendix A). The curve is portrayed on a graph with the time dimension along the horizontal axis and the number of events along the perpendicular axis. The S curve starts at the very bottom left hand side with issues that are barely discernible and moves up through the emergence and development of the issue and on to its resolution and subsequent interest decline.

Molitor (1993) has done considerable work on developing his form of EIA in the public policy area. He has developed a model that shows how public policy issues progress, which is broken into three stages of development (Molitor 1993). These are:

1) The Framing of the Issues: In this stage ideas are generated by experts or innovators and appear as unique and odd bits of insight in alternative

communication spaces including the fringe media. These ideas lead to a practical manifestation in the form of innovation which creates certain events and their possible social impacts turn the innovation into an issue.

2) The Advancement of the Issues: Change agents such as victims, crusaders, think tanks, academia, advocates and the like elaborate on the commentary of the issue that in turn gets picked up by the more mainstream media. Groups then form to address the issue that shapes the public discussion and mood and precipitates a ground swell move for change. This is the point of no return for the issue and implementation of a solution is said to be not far behind.

3) Resolving the Issues: The resolution of an issue is now considered imminent and can take a variety of forms. They range from informal settlements (and this is where issues management is said to be of assistance), to litigation, to voluntary accommodation to quasi government settlements to a legislative response and then to implementation and enforcement. By the time the issue is resolved, the public has reached saturation point and therefore interest wanes.

It is argued that any public policy issue culminating in public action, especially in legislation, can be plotted on this S curve. The importance of this is that a reasonably reliable forecasting tool exists to enable organizations to anticipate future public policy issues and possible responses (Molitor 1993). This is certainly one of the main reasons for issues management gaining popularity in corporations. However, unlike issues management, EIA sets out to monitor and detect likely emerging issues as early on in their gestation as possible. Thus, we can see that exceptional environmental scanning techniques and applications are necessary in the process of carrying out emerging issues analysis . In doing the scanning, the emerging issue must also be judged to have the potential to develop a constituency - otherwise it cannot be regarded as an issue. Therefore, one of the tests to ascertain whether an issue is likely to develop, is to test it against the likelihood of a constituency forming.

If we are to focus on the very left hand corner of the graph, or the bottom of the S curve (the `framing of the issue' section of Molitor's process of public policy change) we are able to ascertain useful indicators for investigating and monitoring emerging issues. As Molitor (1977, 1994) demonstrates:

Leading Ideas - these start as unstructured, random thoughts that are nurtured and slowly turn into ideas. Concepts and hypothesis are also developed and

preliminary testing is conducted. Usually at this stage there is a period of disbelief and orthodox rejection by most people aware of it (supporting Dator's hypothesis that the more improbable an idea sounds, the more likely it will develop into an issue). Slowly, with more testing, hard evidence begins to emerge which in turn challenges the status quo and eventually leads to integration into mainstream society.

Leading Events - in the beginning there are isolated events that seem bizarre, unique, unusual and deviant, that have correspondingly new, far out experiments. None of this is noteworthy on a casual glance. But slowly the events cluster until a "data wall" occurs that describes an issue so problematic, that the need for action is realized. The key tracking point for events is the "data wall" which accumulates to a"critical mass" at which point the issue takes off and change from it is virtually unstoppable. Molitor (1994) argues that it is the amassing of events which really discerns a trend.

Leading Authorities/Advocates - innovative and leading experts articulate the issue in terms of the challenge it proposes, which is often taken up by victims who form an emotional symbol of the need for change. Others then become involved such as crusaders, academia, think tanks, forecasters and the like. "Usually less than 12 innate innovators can be pinpointed on any issue; by monitoring these early vanguards whose ideas ultimately are diffused widely, early indications of change can be forecast" (Molitor 1993:E-11).

Leading Literature - the issue usually first emerges in art or related works such as science fiction. It then moves into the fringe media and in the unpublished notes of a few speakers. Following the S curve, it begins to appear in more technical journals and statistical documents and then slowly the issue moves out into abstracting journals and into the more intellectual magazines and journals. From here, the issue moves further into the mainstream media such as books, culminating in newspapers, TV news and current affairs programs. The key tracking point here is to watch the issue and if it broadly follows this literature progression, it is most likely that the issue will indeed develop.

Leading Organizations - the initial stage of the idea or issue is not organized but is characterized more by individual loners and informal groups. There are some amateur advocates who begin to precipitate interest in the issue, facilitating the development of more organized groups to advance the issue. Slowly, more professional advocates become involved and the cause becomes institutionalized. The key tracking point is the "growth of institutional backing for a cause - whether measured by number of organizations, person's involved or resources committed - follows exponential increases which tend to force serious

consideration of the issue by public policy makers" (Molitor 1993:E16).

Leading Political Jurisdictions - issues can be dealt with in other countries that then raise the issue in home countries and provide a model of resolution. Such leading countries include Sweden, Denmark, Germany followed by the US and Canada. Similarly, in state and local jurisdictions there are leaders who are usually signified by being highly urban, densely populated, super affluent, highly educated, youthful and progressive. The key tracking point then is to watch these innovators in the type of issues they deal with and the policies they implement.

Economic Activity of Society - industrialized countries have moved through different production stages such as the agricultural stage, the industrial phase, the services economy and now the knowledge/information/education base society, which in turn determines the perception of important issues. Each type of production, causes different excesses and shapes people's views towards these. Thus, by paying close attention to the mode of production in a society and the subsequent employment patterns, you can develop a context in which to ascertain the likely rise of issues.

What this discussion of leading factors for EIA demonstrates, is the importance of scanning and paying attention to the fringes. New knowledge develops at the fringes, as Schwartz (1991:73) writes: "People and organizations often organize knowledge concentrically, with the most cherished, vital beliefs at the projected center. At the outer edge are the ideas which the majority rejects. A little closer to the center are the fringes - areas not yet legitimized but not utterly rejected by the center either. Innovation is the center's weakness. The structure, the power and the institutional inertia all tend to inhibit innovative thinkers and drive them to the fringes. At the social and intellectual fringes, thinkers are freer to let their imaginations roam, but are still constrained by a sense of current reality. The great innovators start at the fringes: Albert Einstein...Ho Chi Minh...the two "Steves" who founded Apple Computer...To see the direction that future Einsteins, Hos Jobses and Wozniaks might take fifteen years from now, you must pursue the fringes today". Recognizing the importance of the fringe, a list of written resources for EIA has been compiled in class and is included as Appendix B.

What other mechanisms exist to let us know whether an emerging development

is going to develop into an issue? Schwartz (1991) in his book `The Art of the Long View' suggests a few mechanisms. Firstly, he argues you should seek out those facts and perceptions which challenge your assumptions about an interest area. Through this process you need to look for disconfirming evidence and to actively seek out information which challenges the conventional wisdom. It then needs to be followed to see whether it resonates with other findings. Secondly, he suggests, try standing in several people's shoes to see an issue from their perspective and to understand what information they would be on the look out for and how they might interpret the information you have come across. Thirdly, it is far better to educate yourself through scanning for emerging issues than keeping an elaborate filing system on developments. "...I concentrate on educating myself; on passing information through my mind so it affects my outlook; on tuning my attention as if it were an instrument...Don't worry about your files; worry about your perceptions" (Schwartz 1991:66). Fourth, he says it is important to pay particular attention to new technologies that could change lives and spur businesses such as the growth hormone, virtual reality and nanotechnology. Fifth, develop a data bank of credible sources. Over time, he has cultivated key insightful people that help him gain fresh insights into developments. Sixth, talk to people about your perceptions, what you are scanning and watching and sound them out about an issue's likely emergence. Seventh, the more you investigate the fringes, the more you will develop a sense about which people are intellectual pathfinders and which are crackpots. Schwartz (1991) suggests that the pathfinders are sometimes recognized by their energy and humor. And finally, when you are scanning the fringes, don't let your preconceived notions keep you from looking at all information.

Critique

The main criticism leveled at EIA, is the difficulty at discerning which issues are likely to develop, especially as we are dealing with long lead times. It can take a lot of time to follow an issue to see whether it is going to develop and then there are still no guarantees. For example, Schwartz (1991) spoke of how he had followed the UFO sightings and groups to see whether they were going to provide some illumination of issues, but in the end they didn't. In addition, it not only takes time to monitor the issues, but it also takes skill and a thorough approach to the scanning process so that you can track the development of an emerging issue. Finally, what is also experienced is the difficulty of separating relevant information from the irrelevant and having some knowledge about what causes certain issues to emerge over others.

The other important factor with EIA, is to make sure that once an emerging issue is identified, it is fed into an effective strategic planning process. Jain (1984) cites the Trend Analysis Program (TAP) of the American Council of Life

Insurance which uses a large group of executives to regularly monitor, abstract and circulate a wide range of publications determining patterns of change in society. However, because the strategic planning process in many of these companies who received the information had not yet been formalized, the outcomes of the scan had no context in which to be used (Fahey & King 1977, Witham 1991).

Suggestions for improvement for these three related methods

The following suggestions are made for these three related methodologies:

1. It is beneficial if the scanning team is as multi-disciplinary as possible. This will enable a variety of perspectives to filter the material and through discussion, a synthesis on the emerging issue can be developed.

2. As in the case of most planning exercises and futures studies or research, it is best if top management is involved and committed to the project (Jain 1984, O'Connell & Zimmerman 1979).

3. A concerted effort needs to be made to broaden the concept of scanning and emerging issues analysis, so that it becomes a more commonplace exercise for individuals, communities and organizations. Once scanning is practiced in a broader way, the susceptibility to bias can be minimized (Marien 1991).

4. In implementing any of the three methodologies, it appears that it is best for an organization to learn from others but to develop and structure a process that is unique to the organization and meets its specific needs. This was borne out in a study undertaken by Jain (1984) who found that scanning improves with time and a project cannot be transplanted or copied from one organization to another.

5. As a way of increasing the coverage of materials for a scan and to minimize the bias inherent in the process, an arrangement could be made with another organization to exchange their written reports each month. In this way, the information from each organization could be compared and maybe new findings would emerge even from the same data.

6. I think it is important that sources and values be clearly stated in the scanning or emerging issues analysis process. As we have already seen, this process is inherently biased. There seems no other way to acknowledge this, than to be up front about the components of the process.

7. And finally, I would reiterate many of the suggestions that Schwartz (1991)

has made. Especially, the idea of seeking disconfirming evidence; trying to see an issue from a number of different people's perspectives; letting yourself be `educated' by the process so that it challenges your perceptions; paying attention to new technologies; and finally developing a key group of insightful people to sound your perceptions out with.

Summary and Comparison

As we have seen, the Delphi technique is mostly used to elicit the opinions of experts to determine the timing and possible occurrence of future events. It is a method that is best used where there is little past data available applicable to extrapolate from, and where social, economic, ethical and moral considerations are preeminent. The obvious fact that we have no formal theory about the future, necessitates us to consider tools such as the Delphi technique to assist in planning for the future. And judgment and informed opinion have always played a crucial role in human enterprises and will continue to be useful so long as they are made subject to established methodological safeguards.

Environmental scanning is the concept of surveying the immediate task environment and the general external environment of an organization, community or individual. It involves ongoing structured monitoring of various environmental systems to determine likely issues that could impact upon the scanner. The outcomes of the environmental scan can then be made subject to the analytical processes as outlined in issues management and EIA . As already noted, issues management is more concerned with immediate problems whilst EIA is focused on discerning issues as early in their gestation, or as low on the S curve as possible. EIA is a far more proactive method from a futurists perspective and combined with environmental scanning could play a significant role in the issue identification stage of issues management. Issues management, on the other hand, has considerable strength in identifying a good strategic response model to the issues raised. Combined, the three methods provide a comprehensive model for discerning emerging issues and strategically planning a response to them.

Although, the Delphi technique is successful in gaining a consensus from a group to ascertain a certain value, it is weaker on allowing maverick, independent voices to be heard. As the nature of the technique is to determine group stability and a median value, individual voices can get drowned out. In this regard, EIA provides a more insightful look at individuals in the vanguard, who conventionality has not yet acknowledged. As we have discussed, it is exactly these exceptional individuals at the fringes who are likely to be the ones perceiving or developing those issues we are most interested in. As such, EIA provides a methodology that is more sensitive to the maverick's and thus more

future orientated. EIA and scanning have always captured my imagination because I have found them to be powerful ways of understanding changes in society that are not yet totally clear, but can be sensed, and if they can't be sensed, they still offer a fascinating perspective. This is what first interested me in futures studies and continues to be important to me, especially in terms of the comment made by Dator in one of our 672 classes, that this skill and the knowledge and information it generates, is perhaps the most important added value component a futurist can contribute to future orientated planning exercises.

So how do the Delphi technique and the related methodologies of EIA relate to each other? Masini (1993) provides the best answer to this when she describes environmental scanning as an outside in methodology, as compared to the inside-out perspective of forecasting techniques, such as the Delphi. Thus, the scan gathers information on the external environment to see how it impacts upon the subject in question. The Delphi technique on the other hand looks from the subject out and tries to articulate that knowledge for the external environment. But the distinction is not always so clear, because the results of a Delphi study can become part of the external environment that is then subject to scanning, issues management and EIA analysis. So, whilst there are basic differences, all of the methodologies we have spoken about can be inter- related.

Amara (1989:43), when speaking of the Institute for the Future (IF) planning techniques, has made this point clear by stating that the Institute is becoming far more eclectic in using tools to ascertain opinions. "Indeed, some of the most exciting methodological developments in forecasting may increasingly emerge from the marriage of tools that have previously been used separately." We have begun to see this happen more and more. In much of the literature related to issues management and environmental scanning, the results of a Delphi technique were often cited as a scanning source. Indeed, some organizations undertook specific Delphi studies on a certain subject area, as a specific environmental scanning tool. Similarly, the outcomes of Delphi studies are often subject to cross impact matrices to develop a more integrated picture of forecasted developments. Results derived from Delphi and EIA related methods are also often used as core information in the creation of scenarios. So it is evident, that the range of futures methodologies are likely to be used in a far more integrated way in the future.

Where do we go from here in terms of improvements for futures methodology and research? Amara (1991) cites four improvements we need to consider. First,

is setting agenda's clearly (ie, determining what is most relevant and describing succinctly how we represent or describe a situation). Second, is detecting and describing structural changes. He argues, that as researchers we still don't have good theories or tools for understanding how structural change occurs and how it can be detected. Third, is developing closer ties between planning and implementation so that they become inseparable. He believes that the advent of computer simulation will assist towards this end and could radically impact upon the way futures research is currently done. And four, is developing criteria for judging the quality of the products of futures studies.

This last aspect of futures research has been highly undervalued. Although such questions from prospective clients as "What is your record on accuracy in predicting events?" often arise, this should obviously not be the criteria we are striving to establish. Amara (1991:647) argues this is the wrong criteria because "...our purpose is not to predict - our primary purpose is to generate images and to analyze and understand them so that we can act to increase the probability of producing futures that we prefer." Instead, he argues, we should be looking at criteria based on notions such as plausibility, internal consistency, reasonability, reproducibility and `value explicitness and impact explicitness'. Ronald Higgins (1991), commenting on his scenario's of 17 years earlier, poses some additional insights. He shows how one of the major problems with futures research is the inescapability of values and therefore there is prejudice in what is chosen to be studied and how it is to be studied. He believes we should be concerned with the majority's needs and try and minimize our biases that skew our view towards focusing on a minority. As he writes (1991:654) "How far are we concerned first, not just as well, with the outlook for the vast human majority? At least we should be fully conscious of these subjective distortions."

Using futures methodologies and conducting futures research, also raises ethical dilemma's that as yet, have not been seriously considered by futurists. I unfortunately neither have the time or the energy in this paper to give this issue the consideration it deserves. All I can do here is raise it as a critical subject. What is the responsibility for example, of the futures researcher who gives advice to an agency which in turn results in policies and actions being implemented that affect a significant number of people? We have already seen the strong subjective bias in futures research, so how a researcher defines a problem and proposes a solution can have an enormous impact. Because the future has not yet happened, our mere participation in proposals to act upon it, means we are consciously participating in its formation. The power of this implication can be shown in a comment made by Linstone & Turoff (1975:231) when they state: "The most accurate forecast is not necessarily the most useful one. Forecasts are at times most effective if they are self-fulfilling or self-defeating." If we are impacting upon the future in such an active way, then we need to develop very quickly a set ethics or agreed principles that guide us in

our work.

Wendell Bell (1993) has started to address this issue of futurists and ethics and offers some preliminary advice. He begins with the premise that the role of futurists is to make the world a better place to live and therefore a set of ethics should flow from this. For example, when futurists are fulfilling contracts they obviously need to meet the client's goals, but they should also be explicitly stating that the actions they recommend, must be examined for consequences to society at large. In addition, he says, consulting futurists need to have key assumptions and values of what is being asked of them, explicitly defined. As it can be seen, these are very broad suggestions and there is an obvious need for a great deal more work to be done in this area.

Conclusion

This paper has explored the four futures methodologies of the Delphi technique, environmental scanning, issues management and emerging issues analysis. Although, the differences are clear between the Delphi and the other related three methods, we have seen how they can be used in an integrated way. Results from Delphi studies are regularly being included in the scanning process of, for example, an issues management structure. The outcomes from Delphi studies are also often subject to cross impact matrices and other tools to validate and establish their plausibility. Emerging issues analysis, is perhaps the most future orientated of the methods and offers the most interesting trend analysis tool. Although there are identified shortfalls in each of these methods, each is still considered central to futures research. I think it is important, when we are discussing futures methodologies, that we heed Ascher & Overholt's (as cited in Linstone 1987) comment, to not get caught up in a fetish for methods, whereby the method dominates the substance. On a final note, I briefly raised the issue of ethics, which needs considerable more attention than this paper has had the opportunity to give it, and one which must become central to futures research work.

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APPENDIX A

Emerging Issues Analysis Sources

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Here is the list that has accumulated on Caucus about written sources for investigating emerging issues. Thank you to all those that contributed. I hope it is of use and interest to everyone.

1. **The Economist** (good news source of happenings in the world)

2. **Electric Word** (deals with language and syntax)

3. **Foreign Affairs** (mainstream journal on IR)

4. **Future Survey** (newsletter of futures abstracts)

5. **Granta** (London based publication on a range of issues)

6. **Harper's** (mainstream magazine with good coverage of the fringes)

7. **The Manchester Guardian Weekly** (news from three newspapers in the US, the UK and France)

8. **Mondo 2000** (fringe journal on'mind-altering' electronics)

9. **The New Yorker**

10. **New Options** (newsletter on grass roots political activity in the US)

11. **NewScientist** (science news 'navigating its way out of the fringes')

12. **New York Times** (Tuesday Science section)

13. **Omni** (a mainstream Mondo 2000)

14. **Release 1.0** (computer news)

15. **Scientific American** (ideas moving to the mainstream)

16. **Science** ('authoritative science magazine')

17. **Technology Review** (social consequences of new technology)

18. **Utne Reader** (digest of information scanned from alternative magazines)

19. **Washington Spectator**

20. **Whole Earth Review** (range of futures issues dealt with perceptively)

21. **Nature** (latest in the biological sciences - readable to a wide audience)

22. **Cell** (latest in molecular and genetic research - but these **Gene** two are pretty technical

and hard reading)

23. **Analog** (science articles usually dealing with space, space flight etc)

24. **The Magazine of Fantasy and Science Fiction** (science articles good)

25. **Science Fiction Age** (has a science forum where leading scientists discuss science-fiction ideas that are rapidly gaining science truth).

26. **IEEE Spectrum** (cutting edge material on electronics)

Datamation

27. **In Context** (culture/community planning magazine that is eco-oriented)

28. **Futuresco** (Unesco publication - a more world orientated "future survey")

29. **The Journal of Alternative Economics** (as it says!)

30. **Environment Hawaii** (environmental concerns and issues affecting Hawai'i)

31. **Wired** (tech-oriented, but also with broad social and cultural interests)

32. **New Media** (focuses on multimedia applications)

33. **Future Sex** (explores the changing boundaries of sex- heavy into cybersex)

34. **American Demographics** (resource for population trends)

35. **bOING bOING** (irreverent cyberculture magazine)

36. **Cybervision** (magazine about the cyberpunk generation)

37. **The Nation** and **The Atlantic Monthly** (often explore futurist themes)

38. **Columbia Journalism Review** (non-scholarly, mainstream publications

Washington Journalism Review exploring the future of the news media,

Presstime especially newspapers)

NewsInc.

Editor & Publisher

39. **Rolling Stone (culture and music - can be forward looking - see Jon Katz's column)**

40. The Ecologist (environmental futures)

Garbage

Green Line

Mother Jones

Nature

Quarterly Review of Biology

The Urban Ecologist

41. **Asiaweek** (global outlook)

Look Japan

Multinational Monitor

World Press Review

World Watch

42. Transition (general magazines dealing with futures issues)

In These Times

The Progressive

The Village Voice

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An Overview of four Futures Methodologies (Delphi, Environmental Scanning, Issues Management and emerging Issue Analysis). by Trudi Lang Introduction The aim of Futures research is to "help inform perceptions, alternatives and choices about the future " (Amara 1991:646). It assists us to understand alternatives or preferences for the future , probable developments and to articulate and work towards a desired future (Bell 1993). The origin of modern Futures research can be found stretching back to the 1950's and 60's. Page: 1 An Overview of Four Futures Methodologie... This paper addresses four such futures methodologies. The first is the Delphi technique, which could be considered one of the core tools of futures forecasting. The remaining three are interrelated and consist of environmental scanning, issues management and emerging issues analysis. These three have in common the aim of surveying the environment to determine likely issues that are going to impact upon an organization, community or individual. Although, they are similar in this regard, they do differ on the urgency of the issues to be focused on. This paper first explores the Delphi technique