

With or Without:

Comparative Study of Preparing Participatory Scenarios for Izmir with Computer-based and Traditional Brainstorming

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Recent development in information technology has led to increased use of computer-based techniques in brainstorming that often forms an essential element in participatory scenario building. This paper compares the preparation of participatory scenarios with and without the use of computer-based methods respectively in certain phases of Future Workshop carried out in Izmir (Turkey).

Keywords: participatory scenario, future workshop, stakeholders, Delphi, software tools

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Journal of Futures Studies, May 2002, 6(4):45~64

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Introduction

Scenario is often regarded as the most essential aspect of future studies. In fact there is often a tendency to equate futures studies with scenarios. This is not entirely correct. However, one cannot but agree with Wendell Bell when he writes that a scenario is the "end product of all methods of futures research", that it gives "methodological unity to futures studies" and that "scenarios can be produced by any and all the specific methods used by futurists" (Bell 1997: 316-317). The latter implies that scenarios can be based on highly quantitative methods with high level of expert or professional input. They can just as well be based on qualitative methods requiring intuitive reflections from the participants. In the case of participatory scenarios a broad range of stakeholders are involved in producing images of future (Khakee 1999). They produce these images from their own experience, with the help of fantasy and imagination and by deliberately combining, rearranging and adapting ideas. This requires divergent as well as convergent thinking (Parnes 1992). Suitable techniques for creating images and enhancing them are brainstorming and brainwriting (May 1996). In participatory scenario writing, it is often the case of combining these two methods - a kind of 'brainstorm-writing'. In this paper we shall use the term 'brainstorming' to imply both activities.

Two essential principles of these methods are to encourage creative thinking and postpone judgmental thinking until a later stage in brainstorming process, and to foster as many ideas as possible. The first principle requires that "criticism and evaluation during the generation of ideas is ruled out" and expression of "wild and wacky ideas" is encouraged. The second principle requires rapid flow of ideas from participants and building on and improving ideas of others in the group are encouraged (May 1996: 191-192). In brainstorming contributions of all participants are recorded and displayed in order to meet these requirements.

Thus brainstorming is a creative process. It stimulates towards interactive learning and mutual appreciation of ideas. At the same time the method allows participants to work in a group as well as individually. To what extent is this creative process affected when computer techniques are used? This is one of the central issues discussed in this paper. It compares the preparation of participatory scenarios with and without using computer technique. It does so in the context of preparing scenarios for the city region of Izmir (Turkey). Future workshop was the approach selected for preparing the scenarios and adapted for the case at hand.

Readers of this journal who are not familiar with this approach are referred to Jungk and Mullert, 1996, Robinson, 1990 and Schultz, 1992.

The Izmir study is part of the Concerted Action's R&D project 'Agriculture and Urbanisation in the Mediterranean Region' financed by the European Union. The general objective is to co-ordinate research efforts on sustainable use of natural resources, in particular land and water in the Mediterranean region. In the case of Izmir the more specific objective was to analyse the impact of tourism on coastal zones and provide strategies for coastal zone management. The major focus of the Concerted Action's work has been participatory scenario building in local/global policy-making involving private and public stakeholders. The basic idea has been to be proactive in order to encourage stakeholders to create their own images of the future and design strategies to realise these images.

The focus of this paper is on comparing brainstorming developed within future workshop using computer-based and conventional approach. However, computer technique was also applied in the preparatory phase of the future workshop when a questionnaire survey was carried out using both approaches. The paper is divided into five sections including this introduction. In the following section, the future workshop model as applied in Izmir is described together with a technical note on the computer programme and its adaptation for the Izmir study. The next two sections present the results of the four phases of Future Workshop including a comparison of the software and traditional procedure. The concluding section discusses the usefulness of computer-based support systems in constructing participatory scenarios.

Methodological and Procedural Issues

As mentioned above, there is no single, ideal method for developing scenarios. An important task for researchers involved in such an activity is to select a suitable 'core method' and to adapt it to the issue and working environment at hand.

The choice of Future Workshop in the case of Izmir depended on several factors:

For the Concerted Action, Future Workshop was particularly suitable because its aims in building scenarios with a strong commitment to action coincides with the essence of the method as developed by Robert Jungk (Jungk and Mullert 1996). The method allows the involvement of non-experts in designing future because it does not require any specialised

knowledge. It provides outlets for participants' creativity and has at the same time a clear orientation towards action and the building of shared visions. It is a collaborative approach with a strong orientation towards interactive learning both from the substantive results and the methodological set-up. It is flexible and easy to adapt in different situations with regard to time, resources and other contextual requirements.

Future Workshop in Izmir

In its classical form, the Future Workshop starts with a preparatory phase followed by three operative phases: critique, fantasy and implementation. The preparatory phase is devoted to the definition of the issue and the practical organization of the brainstorming sessions. An underlying assumption with future envisioning is that there is a general dissatisfaction with something in the present and a strong desire to change the current premises of development (Ziegler 1991). So in the critique phase, participants investigate the issue selected by focusing on problems and negative experiences of the present situation. In the fantasy phase they are then asked to forget current limitations and restrictions and to generate free ideas in the form of desires, dreams, fantasies and opinions concerning the future. In the implementation phase, the participants are invited to go back to the present reality, with its power structures and constraints and analyse the actual feasibility of the ideas put forward in the previous phase and possible ways that seem to be available to overcome them (Jungk and Mullert 1996).

With this frame in mind, the procedure designed for the Izmir case involved some changes in the Future Workshop approach. In particular, the first two phases were prolonged over a period of four months in order to structure the issues relating to the impact of tourism in the coastal areas of Izmir Province. These were wide in scope and were affected by many interrelated factors. They are, according to some authors (e.g. Schnaars 1987; Huss and Honton 1987), not easily amenable to scenario analysis. The need to define Future Workshop closely and the use of computer technique depended on the fact that the European partners who had the methodological experience had not previously applied computer method in scenario building. It was decided to use the computer tool in two phases, namely, in the critique and the implementation phase respectively.

The critique phase started with a questionnaire survey. Stakeholders were asked to describe three major structural changes that have occurred in the Province of Izmir in the last ten years and three major problems

that characterise the present situation. A modified version of Delphi method was applied in order to acquire a common knowledge base on structural changes and current problems for the subsequent phases. The computer software MeetingWorks was used to support the participants' focalisation on the major changes and problems, to speed up the processing of the answers to the questionnaires and to improve the quantity and quality of the knowledge collected.

The fantasy and implementation phases were carried out in the form of brainstorming sessions in two consecutive days. The participants were divided into two groups; one worked entirely in the traditional way whereas the other group was to make use of the software method. The project organisers deemed it inappropriate to use computer facilities in the fantasy phase since this would risk to divert participants' attention from the effort to get rid of the current urgencies and to project themselves in the distant future. The time horizon of the scenarios was 2030. A crucial feature of Future Workshop is interactive learning and it was feared that a computer-mediated interaction might inhibit such a process in a delicate and creative phase of the workshop.

The implementation phase was devoted to transform visions into operational strategies. Thus the participants were solicited to reflect on the obstacles that would impede getting their group's visions being implemented, to single out measures to remove these obstacles and mobilise necessary resources. The process followed two parallel paths, with and without the software facility. One day of intensive work was necessary in order to complete this final phase, although in practice a considerable flexibility was necessary in order to ensure the smooth running of the computer-aided session due to technical difficulties in using the software tool.

Technical Note on the computer programme and its adaptation for Izmir Case

In the light of the participatory orientation of the scenario building activity, the main features of the software tool had to be easy access, adaptability and user-friendliness, especially for people who were not supposed to be familiar with computing. Moreover, there should be no psychological barriers for participants in expressing opinions and visualising future. On the contrary, the technique should enhance flow of ideas and collaborative mood among stakeholders.

Another important feature of the software is related to the fact that typically automated routines lack, when compared to manual, traditional face-to-face interaction namely, the control of process flows. Whereas in

a traditional interaction among stakeholders, issues come out during a continuous process, attended and controlled by the facilitators as well as participants, in an automated routine process this is often not apparent, and there is the risk of hidden steps and false heuristics. Therefore, the software has to be open enough to allow the control of the interaction process. During the preliminary Delphi survey, the software had to make the convergence process transparent and controllable while during the implementation phase in scenario building it had to ease the building up and sharing of collective knowledge, without misunderstandings, errors or misallocated answers.

After an examination of several software tools to assist decision-making, build questionnaires and manage stakeholder meetings, it was decided to choose MeetingWorks® for Windows, by *meetingworks.com*. (In this paper we abbreviate to MeetingWorks).

MeetingWorks is an advanced groupware product that includes tools for electronic brainstorming, idea organisation, ranking, voting, cross impact analysis, and multiple criteria analysis. It also includes advanced features e.g. high quality reports and graphics. A LAN-based system, MeetingWorks provides a Chauffeur station for use by the meeting facilitator in order to create an agenda and run the meeting. The Chauffeur screen is normally projected in the front of the room, for all participants to see. Participants have access to 'participant' stations where they can enter their ideas, votes, comments and other inputs, all done anonymously. The participant information is collected and displayed on the Chauffeur screen, allowing the group to view the collective input as well as other information e.g. the level of agreement within the group.

In the planning of computerised session a list of all the topics and tasks called steps, that will take place in the course of the meeting, is prepared. The steps not only represent the tasks but also the tools necessary to perform those tasks. Steps take place in a specified sequence and the results of one step are automatically passed to the following step that uses the information to complete its task. If one task produces unexpected results, steps can be added to explore the topic before returning to the agenda in order to proceed to the next planned step.

According to the information promoting the use of MeetingWorks the method improves productivity as well as contributes towards high quality results. However, the software was conceived as a tool for executive or staff meetings in firms and agencies, where the main goal is to achieve agreement on projects and issues. In the case of participatory sce-

nario building, the major aim is to enhance interaction and sharing of knowledge among stakeholders in order to develop alternative community scenarios and development strategies.

The work with developing the knowledge base in the critique phase was not easily reachable by the standard MeetingWorks. It required ad-hoc improvement of routines and steps. Given the difficulty in setting up fully automated routines on time, while the schedule of the project was inexorably going on, it was decided to replace such routines with semi-automated or manual steps performed by the chauffeur during the Delphi sessions. A typical example of this work was the re-formatting of stakeholders' response text-files into manageable worksheets as inputs for subsequent steps and external data manipulation.

Of course, such operations using the improvised technical expertise of the chauffeur in brief time-spans of few minutes occurred within each contiguous step that introduced an element of unpredictability. This is not a reliable way of using the software tool because the data collected can be affected by a high rate of human-generated errors. It might also introduce an element of falsity in the interaction among participants and affect the subsequent activities in scenario building (Sillince and Saeedi 1999). Luckily, in the Izmir case, errors were few because the small number of participants minimized data exchanges and manual manipulations. What is needed are a more error-free procedure and some ad-hoc routines that can be implemented either automatically or semi-automatically. This software improvement is necessary for future applications.

Results of Preparatory and Critique Phases

As mentioned above the aims of the first two phases of the Future Workshop in Izmir were constituting the stakeholder group, getting the group aware of the aims, tools and rules of Future Workshop and acquiring a shared knowledge on the problem to be studied.

An important task in the first phase was the selection and involvement of stakeholders. It is not easy to involve a wide range of representatives of local society in envisioning alternative futures in the Mediterranean region because of the dramatic urgency of current problems that often hinder people in exploring distant futures. It is also difficult to keep up the interest of local stakeholders for any longer period of time and stimulate them to continue work with future studies even after the European Union project has ended. Moreover, the selection of stakeholders proved difficult since

a major group of them were absentee secondary-home owners who came to Izmir only for vacation, especially during summer. Despite all efforts, it was not possible to involve this group in scenario building. However, this was compensated by the fact that almost all the municipalities in Izmir region were represented as well as several officials involved in environmental and health care, housing and planning. They were well aware of the problems connected to secondary homes. Moreover, all participating NGOs were committed to environmental issues, enhancing the significance of the group composition.

The group of stakeholders therefore came to be dominated by public officials plus a few NGOs and business representatives. The average number of participants present at each phase of the Future Workshop was about 30: a good number, especially when compared to the Concerted Action's previous futures study in Tunis (Barbanente, Khakee and Puglisi forthcoming). All told as many as 55 stakeholders were involved in one or another stage of the Workshop.

After constituting the stakeholder group and explaining the premises and requirements of Future Workshop, the stakeholders were asked to write down three major structural changes that had occurred in Izmir Province in the past 10 years. They were also asked to name major environmental problems related to the coastal zone. Participants were encouraged to present personal concerns and opinions about the impact of changes. The analysis of this first round of questionnaire showed however that the participants described changes mainly in negative terms i.e. as problems. Moreover, as environment was the theme of the futures study, respondents tended to focus on the problematic issues related to the coastal zone management. In the second part of this exercise the participants were asked to rank the importance and dynamics of the problems. Ranking the problems in terms of the number of times stakeholders mentioned them and the importance attached to them the following picture emerges:

1. Uncontrolled development of the coastal zone, 2. Irregular and unplanned urban housing expansion, 3. Irregular and unplanned industrial development, 4. Uncontrolled immigration from the countryside, 5. Traffic congestion in the metropolitan area, 6. Increasing water and sea pollution 7. Air and soil pollution, 8. Depletion of agriculture lands, 9. Wasteful use of natural resources, and 10. Weakness of existing land use and environmental planning and regulation.

In order to develop the common knowledge base, the subsequent two rounds of questionnaire were carried out with the help of MeetingWorks. This meant that the questionnaires had to be clearly structured in order

to avoid confusion and misinterpretation. Besides making the participants familiar with the software, this part of the work also focused on getting a convergence in stakeholders' judgements on the importance of the changes identified. The participants were asked to judge development trends in terms of importance for the future of Izmir and also suggest their own ideas about how various trends would develop. This phase led to the completion of the knowledge base and provide a "scenario logic" (Huss and Honton 1987) for the subsequent scenario building activities.

The first reaction of stakeholders to the new tool was not uniform. It partially followed the pattern usually depicted by literature on computer-aided routine work: i.e., initial attraction for a simplified task, and belief in a user-friendly interaction (Pervan 1998). This attitude was also shown by a large number of questions on the use of the new tool before the beginning of the session. However, after the initial enthusiasm, the reaction was different within the group. The reliance on computer-aided work, especially in public boards, is reported as being low in Turkey, as compared to other European countries (UNESCO 1999). This was observable in the mood of many stakeholders, particularly - but not only - the senior ones, who showed great difficulty in actually getting started and required significant amount of technical assistance. On the other hand, many young stakeholders required little help.

The work in this phase can be characterised by what has been termed as *digital divide* (McLean 2001 who used this term in the case of developing countries). While the majority of the group seemed burdened with technical and conceptual tasks, the younger participants used the new tool both effectively and creatively. On the whole image the group appeared to be interested and well disposed towards the new tool.

The use of the software made it possible to carry out the two rounds of Delphi fairly quickly. Responses to questions were made available almost immediately and the subsequent views and judgement of the respondents could be taken into consideration. The results of this work were then summarised into common knowledge base that could be used by stakeholders for latter activities.

Brainstorming for Visions and Implementation Strategies

The Fantasy Phase: a Common Approach

A month after the completion of the first two phases of the Future Workshop the stakeholders were invited to participate in two days of brain-

storming for the fantasy and the implementation phases respectively. The participants were divided into two groups - both were to work in the fantasy phase using the traditional brainstorming approach but in the implementation phase, one of the two groups worked with the help of the MeetingWorks software. Care was taken to have similar composition of the two groups with regards to age, gender, education and organisational affiliation.

The whole process was therefore designed carefully so that participants in the two groups could follow the same steps in the fantasy phase. The first day was devoted to developing alternative scenarios, alternating individual and collective brainstorming and consisted of the following steps: 1. Generation of ideas for the future of Izmir. 2. Identification of policy areas and regrouping of ideas according to these areas. 3. Identification of *possible and desired* scenarios of Izmir by sorting out ideas in terms of time horizon, environmental and political considerations. 4. Developing relationships and linkages among the different images sorted out according to policy areas. 5. Identification of possible consequences of the scenarios.

Thus the two groups managed to develop two scenarios each, *desired* and *possible* with the time horizon of 2030. In both groups planning played an important role in the *possible scenario* in order to solve the province's main problems. For example, the visions depicted the following: Land use and environmental plans cover all districts in the province. Family planning and immigration regulation control population growth. Air and water pollution is under control. Socio-economic conditions have improved. People are more sensitive to the environment. Recycling reduces the use of resources and there is an effective monitoring and control of environmental policies.

The differences in the desired scenario by the two groups are noticeable. The *desired scenario* by Group 1 depicts a *Democratic City* in which political, ethical, social and cultural issues have a crucial importance. For example, people's opinions are taken into consideration in public policy making, politicians are cultured and honest, money and votes are no longer the impelling forces in municipal politics. In physical terms Izmir is envisioned a "friendly city by the sea", where the coastal line is a green park with recreational facilities. The urban environment is characterised by low-rise buildings with plenty of open spaces. Adequate social services and transport facilities, cycling tracks, and a clean and quiet atmosphere are available for the entire population.

In the *desired scenario* from Group 2, Izmir is visioned as a *World City*. Information Technology plays a crucial role in solving urban and ecological problems quickly. Environmental indicators are measured and evaluated and information is quickly distributed to the public. Immigration from the countryside is under control. Environmental policy has reduced noise and air pollution. Traffic congestion is drastically reduced. Green spaces, cultural centres and the discovery of Izmir's historical past enhance cultural and social life. The economic situation has improved radically, providing equal opportunities and eliminating social differences. Men and women are more equal thanks to services provided by IT. Izmir has a democratic system where the elected managers and the people work together in harmony.

The Implementation Phase: Traditional versus Computer Session

In the implementation phase the participants were asked to get back to the real world and to creatively think of how all those wishes and desires they had collectively developed could be realised. Each group was asked to focus on three main questions:

1. What were the main restrictions and obstacles that could make it difficult to realise the desired and possible scenarios respectively?
2. What were possible measures that could be adopted in order to overcome those obstacles?
3. Which possible resources could be mobilised in order to overcome obstacles and implement measures?

From this work participants could then develop desirable strategies in order to achieve the scenarios.

While Group 1 continued working in the traditional interactive fashion; Group 2 participants were given a workstation each. A team of facilitators determined time for each step, put forward questions and managed feedback and at the same time explained the contents of each step.

The procedure for Group 1 can be summarised as follows: Individual generation of ideas with regard to restrictions, measures and resources, each of which was followed by a collective discussion during which new ideas were added and earlier ones modified. Obstacles, measures and resources were rearranged into several 'issue categories' and participants were asked to rank the suggestions by voting. The session was concluded by a discussion on the outcome of the Future Workshop problems and opportunities related to participatory and bottom-up approach with its open and iterative character and the possibility to adopt the method in other contexts.

For Group 2 the session was organised in such a way as to minimise the drawbacks caused by the software-based interaction. The room was provided with an overhead projector that showed all operational routines as well as all the results in form of text and graphs. This followed the so-called “*same-time-same-place*” feature of the tool. The workstations, however, were connected not on a local-network basis, but on an Internet basis, creating the impression that the session was carried out by people living remotely from one another. This feature is called by the software manufacturer “*same time, different place*”. But since the stakeholders were in the same place they could enjoy the advantage of following on the overhead the monitoring of various phases that hopefully provided better understanding of the procedure. In short, the tool support tried to combine efficiency in knowledge creation and participants’ perceptions of knowledge-raising process (Talen 2000).

However, despite precautions, technical difficulties and the small size of the session room drove stakeholders to interact and help each other during the session. This may have affected participants’ input and needs to be taken into account when drawing conclusions. A first issue to be taken care of in the implementation stage was the reduction of all the ideas expressed by stakeholders in order to allow the software to manage a limited number of issues. In a traditional session some form of agreement could be attained on this but in the computer session the facilitators had to make a selection of five issue categories prior to the session. These were *Political/institutional*, *Physical/environmental*, *Social-cultural*, *Economic* and *Miscellaneous*. The stakeholders suggested the last category in order to allow a free identification of issues. A canvas was created in order to present an *Agenda* (MeetingWorks glossary). In this agenda, questions and issues were transposed and sometimes fragmented into different steps, then translated into Turkish. All participants processed each step and as soon as the last participant completed his step, the agenda automatically passed on to the next step.

It must be borne in mind that the software is not devised as a tool for scenario building. It therefore needed to be adapted to the evolving process of the session. This meant a frequent reliance on manual steps carried out by the *chauffeur* on his own in order to organise intermediate outputs into a format recognisable and usable as input for subsequent steps. It slowed down the process and the increased error probability. Luckily, the effectiveness of the process was not affected negatively in this case. The apparently subdued atmosphere in the computer session

had to do with the desire on the part of participants to become efficient with the use of computers as well as be creative in presenting ideas. Moreover, some of the participants complained about the uneven pace of work because some could finish the work in each step faster than others could. Some of those who were ready with their task tried to assist their fellow participants. It is difficult to assess the impact of this in the form of output from the 'slow' workers.

Comparing the Soft Ware with the Traditional Procedure

In the session based on traditional interaction the participants identified 50 obstacles, grouped in 7 issue categories, that possibly could hamper the realisation of the future images. They also identified 63 measures and 60 resources, grouped into 8 categories. Moreover, there was considerable amount of agreement among stakeholders about obstacles, measures and resources and their classification under different categories despite different formulations of proposals.

Table 1 Obstacles, measures and resources by issue areas

Obstacles	Education	Planning	Politics	Ethics	Population	Economy	Management	TOTAL
Number of ideas	12	9	8	6	6	5	4	50

Measures	Education	Politics	Economy	Environment	Planning	Participation	Ethics	Law	TOTAL
Number of ideas	12	10	10	9	7	6	4	4	62

Resources	Planning	Economy	Environment	Ethics	Education	Participation	Politics	Law	TOTAL
Number of ideas	11	10	8	8	7	7	5	4	60

It is interesting to note that economy plays a minor role. Many of the obstacles were attributed to the educational, planning and political spheres. The first set of obstacles can be explained by the fact that many of the participants mentioned public "unconsciousness" about environmental problems and ecological practices. The second by the attitudes of elected local managers (mainly corruption and self-interest). The third one because of the lack of democracy (lack of transparency, absence of public expression of ideas, etc).

But in the case of measures and resources economy becomes important. The weakness of economy was linked to the problems arising as a result of population growth and illegal immigration. Many of the formulations also emphasise how corruption could be stopped once economic condi-

tions got better. The overall ideas about overcoming obstacles were about increasing the quality of education, especially in the environmental field; for people as well as politicians, changing the election and the law system, introducing sanctions, penalties and controls systems especially in the domain of environmental protection. It is worth noting politics emerges once again as important. In particular measures to increase people's participation in the decision-making process were voted as the second most important measure after improvement of education.

The resources were identified in less general terms. Specific suggestions were put forward in order to improve environmental management, organise networks among municipalities supporting each other with technical information and sharing infrastructure, recover agricultural land using national and international grants; make investments in renewable sources of energy, locate industrial zones away from agricultural areas; change inheritance law in order to stop land parcelling, give reward in order to encourage people to produce ideas and projects for protecting the environment; involve volunteers in environmental campaigns in order to increase people's awareness and invest income coming from environmental penalties in environmental education. The connection to the vision of a *Democratic Izmir* as well as measures associated to planning in the possible scenario are evident in proposals related to measures as well as resources.

The outcome of the computer-based session is shown in table 2:

Table 2 Obstacles, measures and resources by issue areas in the computer session

	Political/ Institutional	Physical/ Environmental	Socio-cultural	Economic	Miscellaneous	TOTAL
Obstacles	24	0	8	5	0	37
Measures	17	15	12	16	0	60
Resources	20	19	16	17	0	72

The participants identified only 37 obstacles because several were regarded as fuzzy or redundant. When asked to group obstacles into the five predefined policy areas, a majority was identified as political/institutional. Not one was regarded as physical/environmental obstacle. The same applied to the fifth issue category 'miscellaneous'. In fact this category was disregarded even in the following steps. This suggests that perhaps the strict interaction with the help of the computer does not give participants ample opportunity to discuss the relevance of the categories provided in advance.

In the subsequent step, the participants identified 60 measures, mainly under the captions political/institutional, economy and physical/environmental. It is worth noting that, unlike the traditional session, the number of measures and proposals for resources is much higher than the number of obstacles. This might be due to the fact that as the session proceeded the participants became more confident with the computer tool. However when it comes to the formulation of measures they do not differ from those from the traditional session. The same observation can be applied to some 70 proposals about resource, which were evenly divided between the four issue categories. What is different is the way in which the measures and resource proposals were related to the obstacles, as if the computer induced the participants to remind themselves of obstacles for which measures were proposed. Stakeholders identified resources to implement the pre-selected measures. The following table illustrates an example of the relationship between obstacles, measures and resources as provided by participants in the computer session.

Table 3 Relationship between obstacles, measures and resources

Physical/ environment	Environmental management is short-sighted and ineffective. Environmental laws should be revised considering future generations' needs. The scope of planning studies should be strengthened and broadened. Training resources for qualified personnel should be given priority.
Political/ institutional	Government policies are arbitrary and unmodern. National policies harmonising with EU norms should be promulgated. Local governments should be restructured and made more active. Resources provided for policy experts.
Economic	Inefficient system of public revenues and use of resources. A tax reform is necessary in order to encourage the propensity to pay taxes. Informal economy should be investigated regularly and registered in order to increase tax revenues. Training and material resources for improving public economy.
Socio-cultural	Lack of cultural and environmental awareness among the people. School education needs considerable improvement to increase awareness. Public authorities should appraise all new proposals and ideas. Resources for monitoring the educational programme.

The last step requiring the proposal of a series of strategies for the realisation of the scenarios was easily achieved in the computer session because of the ease with which resource proposals were matched to appropriate measures. The strategies dealt mainly with economic development, followed by educational and IT strategies. In the entire process, not one single reference was made to the coastal zone that was

the major topic of Future Workshop. This is an important point, since it may depend on the fact that the change from the traditional to the computer based procedure, interrupted to some extent the "mental chain" linking the fantasy and the implementation phase. Moreover, the last step in preparing strategies became overloaded with repetitions and redundancies and the need to reduce them imposed restrictions in relating scenarios with strategies. In the traditional session the last step proved to be valuable. Proposals for action were fairly specific and concrete and related to the scenarios.

Usefulness of Computer-based Brainstorming in Participatory Scenarios

Despite the limited use of software method in the Izmir Future Workshop, a number of general observations can nevertheless be made about the procedure and outcomes of the workshop, focusing on the differences between the traditional and the computer session.

The use of the software MeetingWorks proved to be effective in the critique phase of scenario building. It supported the stakeholders' focalisation on major problems and made it easier and quicker to process the answers to the questionnaires. But in the brainstorming the computer session showed a number of limitations when compared with the traditional one.

First, the software slowed down the idea generation process because it needed frequent resorts to manual operations by the *chauffeur* in order to arrange intermediate outputs into a format recognisable and usable as input in the subsequent steps. Moreover, the computer session seemed to be more 'wasteful' than the traditional one because a reduction of proposals was necessary so that the software could manage a limited number of issues and avoid possible "combinatorial explosions", both in the transition from the fantasy to the implementation phase, when the ideas were grouped in issue categories, and when the stakeholders were asked to select the most important measures and resources to match the obstacles.

It may be that the above-mentioned shortcoming has to do with stakeholders' unfamiliarity with the software. That was evident in the steps devoted to the generation of ideas about measures and resources. Here the amount of knowledge produced in the computer session was greater than the traditional one. This is important since a primary aim of Future Workshop is to stimulate creative thinking and to raise as many ideas as possible.

Anyway, an in-depth analysis of the proposal texts shows the repetitive nature in the greater number of ideas generated in the computer session. However, the traditional procedure was not free from this problem either. But in the latter only a certain number of ideas produced in each step were really taken up in the subsequent steps. Moreover repetitions were avoided by the free interaction during collective brainstorming.

Some of the problems referred above have to do with the intrinsic rigidity of the computerised procedure. For example, in the traditional session the organisation of the knowledge according to issue categories is quite flexible, all one has to do is to move post-it slips from one place to do is to another. In the computer session, the same procedure is quite time-consuming and cumbersome because the five issue areas appear on the screen for each and every idea even though the ideas are only assigned to one of the issue areas. Of course, the outcomes can be rearranged in a more compact way. But such an operation jeopardises one of the advantages of the computer use, namely the speed with which the workshop outcomes are made available in an electronic format.

It seemed that the computer session could not fully make use of the iterative aspect of the Future Workshop. While the participants in the traditional session could go back to charts displaying the results from the fantasy phase as well as all the previous steps in the implementation phase, this opportunity was not available to the participants in the computer session. In the words of one of the participants of the computer session "We are not as aware of the complexity in the links and interrelationships between future visions and our work in proposing measures and resources to implement these visions."

The intensity of interaction between the participants in the traditional brainstorming session reflected in a way the cultural and social interaction that the Turks are normally accustomed to. The requirement to work in front of one's own keyboard created a sense of isolation. Moreover it discouraged sharing of ideas between participants. One of the participants in the computer session complained that "the enthusiasm and social interaction of working together was missing while working with the software."

In conclusion, it should be remembered that in the Izmir case all the advantages of the software were not fully exploited. Moreover, the selected software package had its own limitations. Anyway, the use of computer software for scenario building should be assessed in the light of the fast growth of technology support in a broad range of activities and pro-

cesses throughout the society. At present a large number of initiatives are being promoted internationally and nationally in order to enhance trust and confidence in computer technologies and to develop tools required by individuals and groups in order to operate in new and different environments. According to the constructivist conception of technology, computer technology is socially shaped, rather than autonomously determined by scientific and technological forces. This approach stresses the malleability of technology and the possibility for choice (Bijker, Hughes, and Pinch 1992). Thus, the answer to the question "should futurists use the computer software?" should be based on the vision of future relations between individuals, society and technology, in which technology shapes people's knowledge but at the same time is itself shaped by people's knowledge. The experiment in Izmir points out the potentialities of the computer software in futures studies, provided limitations and other side effects are duly considered.

Acknowledgement: This paper is prepared as part of the Concerted Action on "Agriculture and urbanisation in the Mediterranean region: Enabling policies for sustainable use of soil and water" and financed by the European Commission. The authors are thankful to Dino Borri, the director of the Concerted Action, for facilitating the work with this paper, two anonymous referees of this journal for their helpful comments and Umit Erdem and his colleagues at the Ege University for providing all possible help to carry out the future workshop in Izmir.

References

- Barbanente, A., A. Khakee and M. Puglisi. (forthcoming) "Scenario Building for Metropolitan Tunis." *Futures*.
- Bell, W. 1997. *Foundations of Futures Studies, Human Science for a New Era*. New Brunswick: Transaction Publishers (vol. 1).
- Bijker, W. E., T.P. Hughes and T. Pinch. 1992. *The Social Construction of Technological Systems*. Cambridge, MA: The MIT Press.
- Huss, W. R. and E. J. Honton. 1987. "Scenario Planning - What Style Should You Use?" *Long Range Planning* 20(4): 21-29.
- Jungk R. and N. Mullert. 1996. *Future Workshops. How to Create Desirable Futures*. London: Institute for Social Inventions.
- Khakee, A. 1999. "Participatory Scenarios for Sustainable Development." *Fore-sight* 1(3):229-40.

- May, G. H. 1996. *The Future is Ours. Foreseeing, Managing and Creating the Future*. Westport, Connecticut: Praeger.
- McLean, S. 2001. "Distance Education and Distance Learning: A Framework for the Food and Agriculture Organization of the United Nations." *SD Dimensions*. Rome: FAO. <http://www.fao.org/WAICENT/FAOINFO/SUSTDEV/2001/KN0901a_en.htm>
- Parnes, S. J. 1992. *Visionizing: State-of-the-Art Processes for Encouraging Innovative Excellence*. Buffalo, N.Y.: Creative Education Foundation Press.
- Pervan, G.P. 1998. "A Review of Research in Group Support Systems: Leaders, Approaches and Directions." *Decision Support Systems* 23(2): 149-159.
- Robinson, J. B. 1990. "Futures under Glass: A Recipe for People Who Hate to Predict" *Futures* 22(8): 820-42.
- Schnaars, S.P. 1987. "How to Develop and Use Scenarios." *Long Range Planning* 20(1): 105-14.
- Schultz, W. 1992. "Words, Dreams and Actions: Sharing the Future Experience" in *Advancing Democracy and Participation: Challenges for the Future*. (Eds. B. Van Steenberg, R. Nakarada, F. Marti and J. Dator), Barcelona: Centre UNESCO de Catalunya.
- Sillince, J. A. A. and M. H. Saeedi. 1999. "Computer-mediated Communication; Problems and Potentials of Argumentation structures." *Decision Support Systems* 26(4): 287-306.
- Talen, E. 2000. "Bottom-up GIS: A New Tool for Individual and Group Expression in Participatory Planning." *Journal of the American Planning Association* 66(3): 279-294.
- UNESCO. 1999. *World Communication and Information Report*, Paris.
- Ziegler, W. 1991. "Envisioning the Future." *Futures* 23(6): 516-527.

