

Appendix 5

Scenario Network Mapping: A User's Manual

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This is the first edition of this manual, so it is likely to be changed: increasingly at first (over the next few years) but then in more minor ways. Version 2 will be expanded to include some examples.

Part 1. The background to scenario network mapping (SNM)

1.1 Why would you use scenario planning?

Mainly because you want to look further into the future than methods such as forecasting allow. Forecasting often produces accurate results for a year or two ahead. But if you want to look 5 or 10 years ahead, forecasting is often not helpful, because too much is uncertain. Scenario planning takes a different approach to the same need: instead of measuring a few variables, you look at lot of variables and try to assess their likely interactions. Instead of a single forecast, you produce a set of alternative (or multiple) futures.

1.2 How is SNM different from other methods of scenario planning?

SNM is a comprehensive way of anticipating the future. It has its origins in scenario planning, but differs in many ways from standard scenarios. There are many variations of scenario planning, but the commonest method works like this:

- ❖ Emerging trends are noted.
- ❖ Two or three critical uncertainties are found (factors that are both uncertain, and critical for the future being studied).
- ❖ Scenarios are developed around extreme combinations of those critical uncertainties. There are most commonly 3 or 4 scenarios, but seldom more than 7. Each of these is a description of a possible future world (or relevant part of the world). Each scenario describes a future state, usually with at least several pages of

detail. Finally, the way in which that state could be reached is described.

One problem is that all this is very time-consuming. For Shell Oil (the organization best known for using scenarios) it takes more than a year's work to create a set of scenarios, involving both professional futurists and a wide range of senior managers in Shell. That makes sense for a business as large as Shell, but most small organizations can't afford the cost and can't spare the time - and even if enough time was available, the situation might change before the scenarios were finished. So the question arises: is there something that small organizations could do - and that could easily be varied as circumstances changed? To solve this problem, I developed the concept of a scenario network, which has three main differences from standard scenario planning.

The first difference is that a scenario map looks rather like a road map. The "towns" are events and trends. The "roads" show the connections between the events and trends. If the standard type of scenarios were drawn like this (with the present at the left, and the future on the right) ...

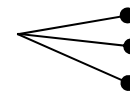


Fig. 1

...a scenario map would look more like this...

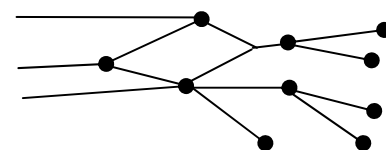


Fig. 2

Compared with the standard method, the scenario map looks more complex, but that's a little misleading: the complexity that's concealed by the standard method is brought out into the open with SNM. Its scenarios are much smaller - instead of filling several pages with description (as with standard scenarios), each of these mini-scenarios could be described in one paragraph. Instead of about 3 big scenarios, there are often about 40 little ones.

The second difference with SNM is that the links between scenarios (the "roads") are as important as the scenarios themselves: the journey is as important as the destination. Though Shell-style scenarios can also include transition paths, less attention is paid to these than with SNM, and the Shell-style paths don't interlink.

The third difference between SNM and standard scenarios is that the latter don't cover decisions that might be made by the organization whose future is being studied. Standard scenarios include only external influences. The implication is "If the world becomes like this scenario, how could we react?" But SNM acknowledges that an entity's future is a mixture of its own intentions and outside forces, so a scenario map includes both kinds of factor. So SNM shows how an organization (or other group of people) could manoeuvre to better reach its goals in a world that's changing around it.

1.3 When would you use SNM?

Some typical questions that could be the starting point of an SNM exercise are:

- "Our membership numbers have been slowly falling for years. What could be done about this? Is it inevitable, or can we turn it around? What could happen if we don't get those numbers

to grow? Do we need to change in some major way?"

- "We are going to be combined with another department. What might result from that, and how can we make the best of the situation?"
- "Our business has expanded about as much as it can – recently we've been finding it harder and harder to grow. What could we do next?"
- "How can we preserve what's most valuable about this community, in the face of encroaching growth from the nearby city?"
- "For many years we've been involved in endless conflict among ourselves. Can there be some way out of this?"

If those are the types of question that concern you, SNM could be a useful exercise. The answers to these questions are never Yes or No, nor can they be converted into numbers: they are sets of possibilities.

1.4 Who are the intended users?

SNM is designed to be used by a *social entity* – a general term that includes businesses, industry groups, government agencies, voluntary organizations and NGOs, communities and local areas, parts of larger organizations, and any other definable social group.

It's also possible to use SNM for the future of a concept or idea – by a diverse group of people, interested enough to explore that future in detail.

The principle is that nobody can determine your own future better than you can - so SNM is a do-it-yourself process. But since people who are fully involved with an organization sometimes can't see it as clearly as outsiders do, you need to include some well-informed outsiders.

1.5 What would you *not* use SNM for?

SNM is not designed for studying the future of an entire country, an industry on a worldwide scale, a multinational business, or some aspect of the entire world, (such as global warming). That's because SNM involves the people whose futures are being anticipated. In those examples, so many people would be involved that the focus would probably be lost.

SNM is a method of perceiving futures, not a method of doing something about them. An action plan is not part of the process, but, using SNM should make it much simpler to later create an action plan or strategic plan.

Though SNM is not designed to solve any specific problem, its use should make you much better informed about that issue and the possibilities that might arise from it. And as plans are often reviewed, you can use SNM at any appropriate time - and then review your plans.

SNM is an appropriate method for studying futures that are mainly influenced by human decisions. In fact, that's most types of future. However SNM is not appropriate for the study of something like an Antarctic penguin colony - because it needs the opinions of those directly involved.

Nor does SNM lead toward a single desirable outcome. It can be used to find a range of possible outcomes. You can then decide which of them are desirable, and make plans to work towards them. Notice that word "them" - one principle of SNM is that there are always multiple ways of achieving a goal. Returning to the roadmap analogy, if you are driving along a road and find it blocked at one point, as

long as you have a roadmap you can find an alternative route to your destination - or the next best place to go.

1.6 What principles underlie SNM?

SNM begins with a number of assumptions. It's not possible to "prove" that these are true, but most of them are fairly obvious. Here are the main assumptions:

- The future of any organization is rooted in its past. Without understanding where it has come from, you can't hope to understand where it will go next.
- Events in the human world are mostly determined by people's motives and intentions. Though the outcomes are often unpredictable, the intentions are more predictable.
- The future of any human group is partly due to the intentions of people in that group, and partly due to others who impact on the group.
- The future of any human group is largely determined by the groups that communicate with it. (If a social trend affects your future, it's because it impacts on you, through some person or group you deal with.)
- The future of any human group depends on the relative power of the other groups it communicates with - and the sustained application of that power.
- Just about every event or situation has more than one cause - and more than one effect.
- There are always multiple ways of achieving a goal. So there is always an alternative (even if you don't like it).
- Specific intentions can change quickly, but the underlying visions, hopes, values, and expectations change

much more slowly.

- So if you want to know what people are going to do, you need to understand their visions (etc), which will determine their motives and intentions. This can help provide early warning of changes.
- But where do hopes, values, visions, and expectations come from? According to the theory behind SNM, they arise from people's worldviews or cultures. If people seem to react illogically, it can probably be traced back to their worldview.
- So if you can identify groups of people who could affect your organization's future, but have a different culture or worldview, you should involve some of them in the scenario mapping.

Put all those assumptions together, and you'll begin to understand where SNM is coming from.

1.7 What resources are needed?

A quick summary of resources needed: money (not much), people (10 to 20 is best), a suitable space, and a little stationery and equipment. What you need most is a willingness among the people involved to explore the group's future. Without that, the findings won't be comprehensive, and the output probably won't be used - because the main input is people's time.

The ideal duration is four half-day sessions - up to about four hours. Longer sessions tire participants, and are not recommended. As participants take a while to get into a suitable frame of mind for thinking about the future, nor should sessions be too short. If you scheduled, say, 15 one-hour sessions instead of four half-day sessions, a lot of time would be wasted in picking up lost threads, so it

would end up taking more like 30 one-hour sessions – and that's not including any time taken travelling to the venue.

Sessions should be at least several days apart. This allows participants time to think about questions arising from the previous session, and gives the organizers time to analyse the previous results and prepare the next session. A week apart is fine. If it's longer than that, people tend to forget the previous session.

Four workshop sessions, a week apart, will occupy a month, but the entire project will take longer, because:

- ❖ Before the workshop sessions begin, they need to be planned. This usually takes at least two meetings, a few hours each.
- ❖ After the workshops finish, you'll probably want at a follow-up meeting to decide how to use the findings.
- ❖ A report or recording may need to be compiled, to distribute to other people who could not attend.

To be on the safe side, allow two months from start to finish. It *can* all be done in less than one month, if no time is wasted, but the risk is that thoroughness and quality are likely to suffer.

1.8 What steps are involved?

The sequence of an SNM project is:

1. Plan the workshops
2. Hold the workshops
3. Consider the findings.

We now consider these stages in detail.

Part 2. How to do SNM: a step by step guide

The SNM process has three main stages, each subdivided into smaller stages.

1. Plan the workshops, including venue/s and dates
 - Decide the entity and the focus: “the future of what, in what context?”
 - Find resources: money, time, people, space, and equipment.
 - Decide on the facilitation and the agenda
 - Collect background data needed for the workshops
2. Hold the workshops
 - The standard method has four workshops, held about a week apart.
 - The output is a detailed scenario map, which can be used like a road map of the entity’s future.
3. Deal with the findings
 - Disseminate the scenario map
 - Decide what actions to take
 - Evaluate the success of the project.

2.1 Define the entity and the focus

“The future of what?” This is the first question to ask. Even if all participants are clear about the entity as it is now, consider how its boundaries might change over the next 10 or 20 years. Few social entities stay the same. They merge with others, they split, and sometimes they are redefined by an external agency or forces. Usually everybody takes the definition of the social entity for granted, but it’s important to define what’s in and what’s out. Having a large sheet of paper with items under these two headings can

help to ensure that everybody is talking about the same future entity.

Unless the entity is a tiny one, it’s also useful to define a focus or context for the study: the future of the entity “in relation to X.” Even if discussion drifts away from that focus, and even if (as often happens) it’s later broadened, this can help to avoid the discussion drifting aimlessly.

2.2 Find resources

When the entity and focus have been settled, the next stage is to organize the workshops. These need four types of resources: time (and maybe a little money), people (above all), a suitable space, and a little equipment.

Resource 1: Enough time, a little money

SNM costs very little money (unless you pay an external facilitator) but it does take time. If you want to study your organization’s future, and you are a key decision-maker, that means *your* time. It can’t easily be delegated, and will probably take about a week in total, spread over about a month.

Resource 2: People

Participants. There’s no fixed number of participants, but...

- If there are too many people (more than about 25), the whole process takes much longer, and workshops can become somewhat chaotic unless there’s very firm or very skilled facilitation. But if the facilitation is *too* firm, some ideas may not emerge, and highly skilled facilitators are rare.
- With too few people (less than about 10), there won’t be enough diversity.

Balancing between those two extremes, the ideal number of participants is about 15. The more complex the situation, the more participants are needed. Section 2.3 below has more detail on participants.

Facilitator/s. The main roles of the facilitator are to make sure that everybody's voice is heard, and that everything happens more or less on time. If a few people get carried away on one task, everybody else has to wait for them, they feel that their time is being wasted, and they get disgruntled. So the facilitator needs to be fairly firm about timing – but must also be able to see when something interesting is happening, and to let it continue.

Assistant facilitators are useful when there are many participants, or a high level of conflict. Their main role is to visit the break-out groups, trying to make sure that they stay on task, and that all groups finish a session at the same time.

Resource 3: Space

A large enough room. With about 15 participants, a room around 10 metres square (about the size of a school classroom) is usually fine: large enough for four break-out groups, each working in one corner of the room. Too small a room can be chaotic - but if the room is too large, you don't need to use it all.

Just one room. What is *not* a good idea is to have separate rooms for break-out groups. Participants then tend to forget the time limits, keeping everybody else waiting, and slowing the proceedings right down. If everything happens in the same room, participants can see when their group is last to finish.

Furniture. A chair for everybody, a smallish table for each break-out group, and perhaps a long narrow table for storing supplies and assembling components of the scenario map. If the room is on the small side, remove all unnecessary furniture - it gets in people's way when they are working in small groups. In parts of Asia, chairs are not necessary – people prefer to sit on the floor, if it's carpeted. This is much more flexible than using chairs, but for spoiled Westerners not accustomed to sitting on the floor, doing without chairs gets uncomfortable after a few hours.

Plenty of wall space. So that all participants can see and comment on the scenario map as it's being formed, it's best to put it on a wall. The ideal wall space is long (at least 10 metres), without doors and windows in the way. It doesn't need to be a single wall: two adjoining walls are fine. The wall doesn't need to be high, because the most convenient height for writing and reading is between 1 and 2 metres from the floor.

Freedom from interruptions. It's hard to think about the future when phones are ringing, people are coming in and out, and other distractions keep happening. Therefore a venue away from the workplace (if the entity is a business organization) is preferable.

Resource 4: Equipment

The basic supplies for SNM are very simple, and can often be found in an office stationery cupboard:

- Sheets of blank paper, for putting on the wall. A3 (30 x 42 cm) is a good size. Larger sheets are difficult to handle and to modify. If the sheets are too small, it's more work to organize them.

After the workshops: somebody (it could be you!) is going to take them down and transcribe them – that’s when the size of paper matters.

- Marker pens, that make a line about 2 mm to 3 mm wide (so people can read the words from the back of the room). Whiteboard markers are fine, but they don’t last long, so you’ll need plenty. Multiple colours are useful, for tracing who wrote what when queries arise.
- Pads of small sticky notes, such as “post-it” notes. These are often 76 mm (3 inches) square. They need to be large enough to write a short sentence on with the marker pens. It’s helpful to have several different colours. SNM uses lots of sticky notes - so allow one pad per person. (The pads often have 100 pages.)
- Ribbon of some sort. This is used to connect the statements on sticky notes, and it’s preferable to have several different colours. (You can manage without ribbon, by drawing arrows, but a lot of re-drawing is often needed, and that makes the connections hard to follow.)
- Sticky tape, to put the large sheets of paper on the wall. It needs to be firm enough to hold the paper in place (in case of strong wind), but not so sticky that you can’t take the sheets down and move them around. Painters’ masking tape is perfect.
- A timer for break-out sessions: anything from a wall clock to a computerized slide show (“X minutes left”). It needs to be large enough that everybody can see it, from anywhere in the room.

That covers the most essential pieces of equipment. Optional extras are...

- Name badges for participants – because they should not all know each other beforehand. (Otherwise, there won’t be enough diversity in the group).
- Coloured sticky dots, about 1 to 2 cm diameter. These come in rolls, and are used for voting by placing them next to written statements. (The technical name for this is “dotmocracy.”)
- Recording equipment: audio recorders, video recorders, and/or cameras can be used to record parts or all of the sessions, perhaps for later transcription.
- An overhead projector, or a data projector with laptop computer. But be very careful about how this is used – it can allow one person to dominate. Paper is more democratic: it’s so cheap that everybody can have equal access.
- *Not* recommended: a computer for each participant, because (a) software often misbehaves, wasting much time, and (b) the shared focus on the big map on the wall is replaced by a lot of individual maps. People do their own thing, and others don’t get to question it - then you have the problem of combining incompatible scenario maps.

2.3 Select participants

How many participants?

About 15 people is a good number. With 25 or more, proceedings can get out of hand and are slower. With less than 10, not enough viewpoints will be represented.

However, if you invite 15 people, and you don't chase them up, it may be that only 5 will come to the first workshop. You can always expect that a few won't be able to make it, but if the majority don't turn up this can disrupt the plan. To make sure that people turn up, these steps are necessary:

- ❖ Invite people personally (or by phone), not in a printed form (mail, email, fax) that doesn't produce an instant reply. Often, about half the people invited will agree to come.
- ❖ Everybody who agrees to come should be sent a confirmation letter, with a map showing how to reach the venue. You can't assume everybody knows that.
- ❖ Have a few people on standby, to replace original participants who can't make it.
- ❖ A day or two before the first workshop, telephone each participant to confirm that they are still coming.
- ❖ For each participant who drops out at that stage (often 10% to 20% of those who originally agreed to come), ask a standby person to come instead.
- ❖ Sometimes a participant will offer to bring a friend. Don't count on that friend coming! Get the friend's name so you can follow up with the confirmation letter and the phone call a day or two before the workshop.

All that encouragement is only needed for the first workshop. The process is interesting, and people who come once are usually keen to continue. It's not essential

for all participants to come to all workshops. If somebody can't make it to a later workshop, they can be asked to send somebody else, as long as that other person is connected in some way with the inquiring entity.

The importance of diversity

It's absolutely vital to have as many different stakeholder groups as possible represented at the workshops. Omitting some groups will mean that some possible futures are not foreseen.

If the futures being studied are of a geographical area, some participants should be residents, some should be people who work in the area, some should be from local government, some could represent community groups, some could represent employers – and so on. Every group likely to have some power to affect the future of the area should have at least a few participants.

If the futures of a business are being studied, participants should include senior management, ordinary staff, suppliers, customers, perhaps the spouses of staff, people from regulatory agencies, subsidiary companies, and even competitors.

Competitors are a problem. They may not come along, and if they do they may find out things that the business doesn't want them to. But if they *don't* come, valuable insights will be lost. One solution to this dilemma is to study the future of an entire industry in an area - as well as (or instead of) just one business. For one industry, in one area, most elements of the future are shared between competitors. This study can then be followed up with a few sessions for only the people involved with that business.

The danger when choosing participants is to not invite some types of people, because you think they won't be interested. So cast the net more broadly than you think should be necessary at first. Consider all the types of stakeholder in Figure 4, on page 13 below.

2.4 Outline of workshops

The standard program for SNM uses four half-day workshops, each focusing on some aspect of the future.

Workshop 1: Influences on the future

Workshop 2: Generating possibilities

Workshop 3: Mapping paths to the future

Workshop 4: The future as layers

The output from each workshop becomes the input for the next, like this:

- ❖ From workshop 1:
 - (a) A time chart of the recent past, showing "unfinished business"
 - (b) A stakeholder map, showing all groups that interact with the entity.
 - (c) A Leaf of Goals for each key stakeholder.
- ❖ From workshop 2: A collection of event groups (mini-scenarios)
- ❖ From workshop 3: The top layer of the scenario map: a linked set of possible events
- ❖ From workshop 4: The lower layers of the scenario map, derived from the top layer.

Each workshop has several sessions, alternating plenary and small-group work:

1. *Plenary – introduction*: the facilitator explains the next task, how many small groups are needed, and who should be in each group. Participants' questions about this task are answered. (About 5-10 minutes)

2. *Small groups*: each works on the current task. Sometimes all groups do the same task; at other times, each group does a slightly different task. (About 20-30 minutes)

3. *Plenary – findings*: Somebody from each group presents the group's findings - either verbally or on a wall chart. (About 10-15 minutes)

Each three-part cycle takes between 40 minutes and an hour, so each half-day workshop can include about five cycles. This use of cycles is deliberately structured to include a lot of opportunities for review, addition, and correction. The first draft of a scenario map is probably going to be incomplete and perhaps ill-considered. The four-workshop format, with multiple cycles in each workshop, allows for corrections and improvements as you go.

To prevent workshops from running well over time, the facilitator needs to ensure that everything finishes on time. As everything produced ends up on the wall, there are always later opportunities for commenting on and correcting the output of each session.

A lot of people think it's not possible to foresee the future at all. The principle behind SNM is that - though exact prediction is obviously impossible - some level of foresight is highly achievable. But think of the future as being like a distant star: to see it clearly needs good conditions, such as no extraneous light, clear weather, and a large telescope. This series of workshops, encouraging multiple viewpoints and minimum distractions, is a futurist's equivalent of an observatory.

Variations

To get through the full agenda in four sessions, workshops need to be well organized and skilfully facilitated. It may take five workshops – or even six, if there are a lot of participants and some unresolved conflict between them.

If there are not many participants, and you are very, very well organized, you might just manage to do it with three workshops. But you couldn't possibly do it all in two workshops: there would be so much rushing that some likely futures would be overlooked.

Though it's possible to do the workshops in a more concentrated way (two full days, instead of four half-days) this is not recommended. Participants need thinking time between workshops, and organizers need time to distribute the output of each workshop to participants before the next workshop. One week between workshops is fine. Two workshops per week would be pushing it, and more than that would be too much for most participants.

It's possible to vary the agenda a little. As participants cover the same ground in several different ways, cutting out a session or two is not going to make a huge difference, specially if a session is replaced with a relevant new activity.

The detailed program below is designed for Westerners, who are used to working at a rapid pace. In developing countries, and for some cultures in Western countries, the pace will need to be calmed, by having fewer sessions in each workshop, and spending more time on each session.

3. Details of the workshops

3.1 Workshop 1: Influences on the future

1a. Introduction

Plenary, about 15 minutes

Everybody is introduced to everybody else, and the purpose of the workshops is explained again. The facilitator introduces the venue, explains what will happen during the workshops, checks that everybody has any background documents that were sent out, and gives spare copies to anybody who hasn't received them. It's also necessary to explain that this is scenario work, and does not automatically culminate in an action plan.

If some key stakeholder groups aren't represented among the participants, assign some participants the role (for all workshops) of representing that group. For example, if no competitors are present when the future of a business is being studied, several participants who have worked for competitors could be assigned to represent competitors.

1b. Unfinished business

About 45 minutes

Participants are divided into stakeholder groups. Each group is asked to produce a time line of major events over the last few decades, that are relevant to the entity's future. Events that almost happened (but didn't, and still might) are also shown. This is done by writing a label for each event on a sticky note.

Plenary: A large piece of paper - about 1 metre high and 3 metres wide, is put on the wall - laid out as in the following diagram, but varying the years and

stakeholder groups in the diagram as appropriate.

	1985	1990	1995	2000	2005
Staff					
Management					
Customers					
Suppliers					
Others					

Members of each group are asked to place on this chart sticky notes for the events that were important for them in relation to the entity. The exact year isn't vital: the sequence is more important. This exercise helps build understanding between the different categories of participant: each group can see what each other thinks is important.

1c. Scenarios of the recent past

About 45 minutes

The next step is to link those important events together. Which events influenced which others, and how did they link together? Participants are introduced to the event tree: the basis of a scenario in SNM. In session 1C, these are scenarios of the past, but the principle is identical for scenarios of the future.

An event tree looks like this (with time flowing from left to right - the standard convention in SNM):

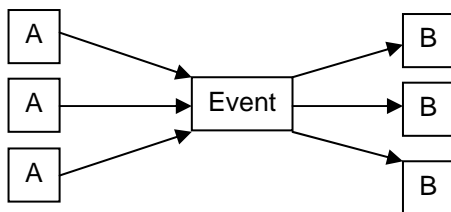


Figure 3. An event tree

(If you don't understand why it's called an event tree, turn your head to the left, then you can see it as roots, trunk, and branches.)

The word "event" is used broadly in SNM - it includes situations and processes. (For example, was World War II an event, a situation, or a process? Answer, all three, depending on your viewpoint. From 2005, it seems like an event. In 1942 it would have been a situation for those involved in it, and a process for military planners.)

The A boxes are influences that led up to the event. The B boxes are effects - what followed from the event. There can be any number of A and B boxes, but it's rare to have only one, and there are seldom more than about 10 direct links. By viewing each A or B as the trunk of its own event tree, the diagram can be extended. Conversely, each A or B can be seen as a whole event tree in itself.

It's also possible to have other events flowing into the A boxes, and still others flowing out of the B boxes, extending the event tree. This will happen later, when all the event trees are linked up.

Because this particular exercise is about recent events, the B boxes may not have happened yet. But because the whole project is about futures, it's acceptable to show consequences that have not yet happened, but are expected. To help distinguish the past from the future, use sticky notes of a different colour - or put a question mark (or other symbol) on items that have not yet happened.

To create these event trees, participants are divided into small groups, based on their knowledge of the issues involved. The best group size for generating ideas is usually about three or four people. Each small group is given a sheet of paper about A3 size and a pad or two of blank sticky notes. Each box (in the above diagram) is a sticky note, and these are laid out as in the above diagram

on the sheet of A3 (or similar sized) paper. The wording on each sticky note should be a clear explanation. Don't let participants write just one or two words - even they know exactly what's meant, others won't. Misinterpretation becomes a problem if labels are too short. So write a whole sentence - 5 or 6 words, in newspaper headline style, is often enough.

When each group has produced a few event trees, these are put up on the main display wall. Everybody reads everybody else's event trees, and comments on them. This often leads to a few more causes and effects being added to some event trees. The causes (the A boxes above) in some event trees may be the effects in others - enabling the trees to be linked together. There will be a lot more of this linking in later workshops.

1c. Stakeholder map

About 45 minutes

The facilitator now displays a generic stakeholder map, for any entity:

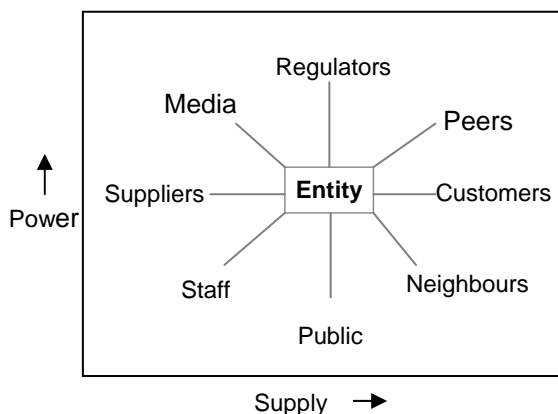


Figure 4. Generic stakeholder map

The task now is to list all the stakeholders who communicate with the entity, mostly as groups with shared characteristics. The most important stakeholders are shown as individuals - either people or organizations. Any customers or suppliers accounting for more than about 10% of the

business should be listed individually - specially if that proportion is growing, or the stakeholder would be difficult to replace. Each of the above stakeholder categories can be subdivided further. All the terms should be interpreted very broadly. For example, "peers" includes competitors, and "neighbours" can be close in other ways than geographically.

In this task, participants are divided into small groups, of three or four people each. These groups can be formed partly on the basis of expertise. For example, if one of the participants is in the purchasing department of the entity, that person is well placed to list the suppliers. Each group is given the task of listing all the stakeholders in several of the nine types. Some stakeholders, with multiple roles, may be listed by several different groups, but that doesn't matter, because the focus is on roles, not people or organizations. This process typically produces a list of 20 to 50 main stakeholders, but of that number, usually fewer than 10 are of crucial importance.

This process produces a ring of stakeholders around the entity (as in Figure 4). As the entity's future will be largely determined by the future of its stakeholders, by examining the influences stakeholders are likely to exert, the entity's future should become clearer. Therefore the meaning of the lines between the group and the entity should be explored. A line means communication: how frequent is it? What form does it take? How might the mutual demands of the entity and the stakeholder interact?

Within each category, possible new stakeholders should be considered. For a business entity, questions arise relating to suppliers, customers, regulators, and competitors. For example, what if the two

largest suppliers merge? Will this increase the price of inputs to the entity? What if the largest customer goes out of business? What if a new government agency was set up, regulating some aspect of the entity's activity? Finally, what if a new kind of competitor were to emerge? (Michael Porter's well-known "five forces" model can be used here.) After considering relationships with direct stakeholders of the entity, this can be repeated for an outer ring of secondary stakeholders

Stakeholders who mediate between the entity and other stakeholders are best shown inside the inner ring. For example, an industry-wide association can be shown between the entity and its competitors, and a trade union between the entity and its staff.

For a large entity it's also worthwhile to list internal stakeholders, such as divisions and area offices. Again, what needs to be considered is the pressures they put on each other, and the communication

channels through which they do this.

1d. Leaf of Goals

About 45 minutes

A Leaf of Goals shows all a group's goals in a leaf-shaped hierarchy. At the far extreme (on the right) is usually a single long-term goal, such as "to survive well." That may be accomplished in a number of ways. Each of these in turn can be done in a number of ways, and so on. At some point the number of possible actions will begin to fall. Right now (the left point of the leaf) only a few actions are feasible. A detailed Leaf of Goals can be drawn for the entity under study - at the present time. Goals on the right change slowly, those on the left much more often.

If there's enough time, it's also useful to try to create a Leaf of Goals for each of the entity's main stakeholders - either as individuals (people or organizations) or as groups. Some of these goals will be known well, but others can only be guessed at.

3.2 Workshop 2: Generating possibilities

This workshop has four main components. Participants first produce a futures wheel, then morphological paths, then backcasting, and finally midcasting. Each of these will shortly be explained. In terms of time scale, the four methods fit together like this...

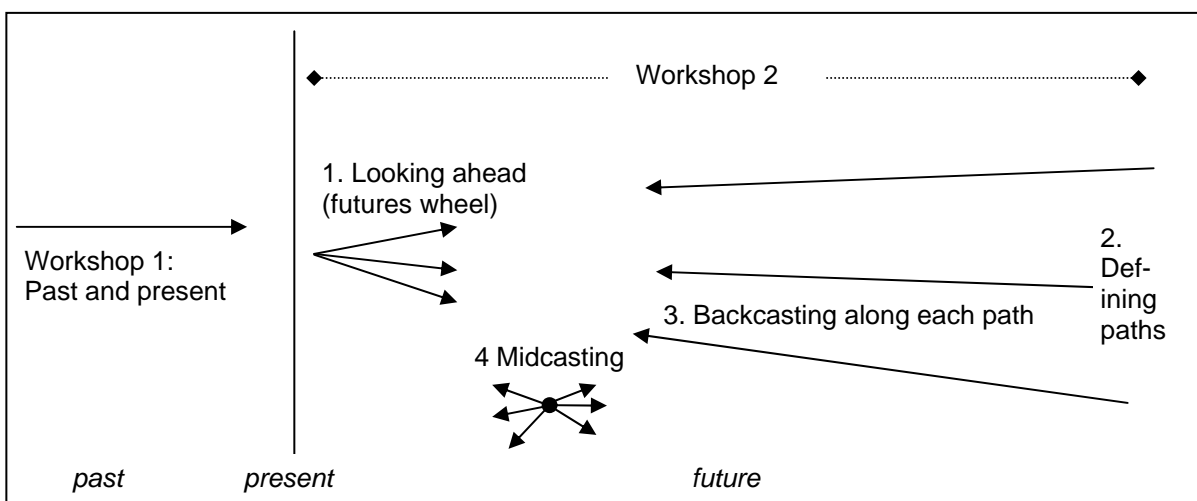


Figure 5. Format of the events layer

2a. Futures wheel

About 45 minutes

The futures wheel is a way of considering things that could happen in the entity's future - starting now. The principle is to create some event trees, all beginning at the present time. Some of these trees should be obvious, and others should be far-fetched and unlikely. The idea is not to look for what you expect to happen, but what *could* happen. Predictions are probably going to be wrong anyway, so instead of predicting whatever you think is most likely, try to cover the range of possibilities. Having done one set of event trees, take each of those and build a few more trees growing from its branches. If the present is at the centre, before long you have a wheel-shaped diagram - hence the name.

For this exercise, participants are again divided into small groups of three or four people each. These can be based on people's relationships with the inquiring entity. If it's a business, there might be groups of customers, suppliers, management, and general staff. Individuals in each group are then asked to think of a few things that could happen in the near future that would affect the inquiring organization. Having thought of those things, they write them on sticky notes, then (after about 5 minutes' writing) the group reviews each of them. Any duplicated events (mentioned by more than one participant) can be combined.

The whole group then considers each event in turn, and builds a small event tree around it. What would have to lead up to it? What would follow from it? If there's enough time, try to extend each tree into the future, by again asking "What would follow from that?"

If there's time, two questions can be asked about each event: (1) How likely is this to happen (assuming everything that came before it occurs)? and (2) How much difference would this make to the entity if it did happen? Such estimates cannot be very accurate, so they're best shown by writing symbols on the relevant sticky notes, with a key like this:

(1) How likely is this to happen to us?

Not very likely at all	%
Moderately likely	%%
Very likely indeed	%%%

(2) How much would it affect us?

Not much at all	!
A moderate effect	!!
A very large effect	!!!

If one person thinks something would make a large difference and another thinks it would make only a small difference, the chances are that they are assuming different preconditions. As SNM works by comparing a wide range of ideas, not averaging them out, the solution to this is to use a range, e.g. !-!!! If the issue seems important, and if there's enough time, you can try to define the meaning more closely. This usually helps to tighten the range of estimates.

2b. Defining paths

All plenary, about 30 minutes

For the entity's future 20 years ahead, the possibilities are almost infinite. There are so many choices that participants find it difficult to think of anything. It's as if you had a road map with no roads. Because you can go anywhere at all, you don't know where to go.

Therefore, drawing a few broad paths makes it easier to fill in the spaces. These paths can be defined in several different ways: based on the Leaf of Goals, on a

set of activities, or using morphological method, considering all logical possibilities. The choice depends on the entity's situation.

Paths based on the Leaf of Goals

Following the Leaf of Goals developed in workshop 1, each route to the final goal can be chosen as a path. Each path will represent a different strategic goal as a route to the permanent goal. This is easy, because the paths have already been identified.

As well as your own goals, you may need to consider the goals of more powerful actors that affect your entity. Every organization and community is embedded in a context. For example, if your entity is a small business, your future probably will not be very different from the futures of others in the same industry, in the same area, because you will be subject to the same influences and industry changes. To allow for these possibilities, you should include a few paths that you may not want, but that more powerful entities may impose on you - unless your Leaf of Goals already covers such possibilities.

Paths based on a set of activities

Social entities often engage in a number of different activities: a path can be set out for each activity. For example, a teenager contemplating his or her personal future could define the activities as education, employment, marriage, and parenthood.

Morphological paths

To make sure that nothing is missed, the paths can be created morphologically - defining all logically possible combinations. For example, if you're looking 20 years ahead, you can begin by asking whether or not this organization will exist in 20 years time. This produces two sets of

paths: existence and non-existence.

- The non-existence path could be split into whether or not the entity's functions will still exist, but be done by some other entity. Might the entity be split into several components [1], or merged with another [2], or would its functions no longer be performed [3]?
- The existence path could be split in terms of size. Will the entity be much larger than now [4], much smaller [5], or about the same size [6]?

So 6 mutually exclusive paths have been defined, on the basis of the entity's form and existence. For a business, that type of division might be important, but for a government department (where it can be taken for granted that the work will be done anyway, and departments are often reshuffled) that type of division may not be relevant - specially if the reason for doing the scenario mapping is to look at activities and service delivery, not organizational form.

There are other ways of dividing paths morphologically: for example, in terms of change, such as...

1. Much the same activities as now
2. Continuing to change at the rate experienced during the last 20 years
3. Radically different activities from now
4. Very different activities in some aspects, but much the same in others

Another set of morphological paths looks beyond the entity, considering its context.

How many paths?

The most useful number of paths is 4 to 8. Less than 4 is often too few for clear separation of alternatives. With more than 8, it becomes hard to distinguish between them.

Think of these paths as temporary ways of organizing a lot of small scenarios, to help participants place event trees on the scenario map. Paths should ease the process, not control it. If they turn out to be awkward, they can easily be changed.

2c. Backcasting

About 45 minutes

This is the opposite of the futures wheel worked on in the first part of this workshop. But instead of starting at the present, you start at a "milestone" well into the future, and work back to find out how the entity might have arrived at that point - working back along the paths decided in the previous session. Participants again write possible events on sticky notes, one event per note, then work in a small group to create a backward event tree.

Milestones should be defined clearly enough that there will be no doubt if and when the organization reaches it. A milestone is not the ultimate future – just a clear indicator that the entity is on a certain path. It is an event, rather than a situation.

A practical limitation of backcasting is that you need one small group to work on each path, and groups of 3 or 4 are best. Groups of two are often less creative - either they agree too readily, or they don't agree at all. So if you have say 15 participants, that would be 4 or 5 groups. If you come up with 6 main paths, you have to juggle the group size, perhaps giving each group two sets of paths to backcast along.

2d. Midcasting

About 45 minutes

Some events flow forward from the present. The futures wheel helps to identify those. Other events are steps

towards some outcome. Backcasting covers those. But there's also a third type of event: those that come out of the blue - seemingly, totally unpredictable.

Certainly, whether or not one of these unlikely events will happen is unpredictable, and when it will happen is even more unpredictable. But what would follow from such events is more predictable. These events are often bad news, disasters of one kind or another - financial collapses, or climatic destruction. Others are good news (winning a major award), and still others are neither bad nor good in themselves, but are likely to affect the entity.

Midcasting is a method for anticipating these fairly unpredictable events. It aids imagination by creating a structure in which you can imagine possibilities. The anagram FARTHINGS covers nine types of events and situations:

F = financial, economic

A = artistic, cultural, imaginative

R = religious, moral, ethical

T = technological, mechanical, electronic

H = health, biological

I = information, communication, media

N = natural, macro-environmental

G = governmental, political, legal

S = social - anything to do with people in groups.

Those are general categories: they are only a starting point, and can be divided, combined, or supplemented as necessary. Try to think of an example of each, in the context of the entity being studied. Bear in mind that within each of the FARTHINGS categories, an event could occur on any scale. There can be local events, national events, and world-scale events.

Avoid ignoring some FARTHINGS categories in the belief that they won't apply. Try to come up with at least one plausible item in each category. For example, in a study with a credit union, it seemed at first that the religious category was irrelevant - until one participant thought of Islamic banking. That example illustrates the purpose of using the FARTHINGS categories: to aid imagination.

After conceiving of an event in each FARTHINGS group, consider how it would affect this entity if it happened - through which stakeholders would change occur?

At the end of Workshop 2

The components of the scenario map will now be done in rough form, but there will be a lot of disconnected event trees. There will probably be some duplication and overlapping. And some major possibilities are very likely to have been overlooked. So participants can be given homework: before the next workshop, try and think of something that's been missed. This will be much easier for them if they can get a copy of all the event trees created so far.

Therefore, straight after this workshop, somebody should either photocopy all the pages done so far (if A3 pages are reduced to A4, they should be quite readable, because of the thick pens used), or transcribe them into a computer file and email them to all participants before the next session. See the Appendix for software that can be used for transcribing the diagrams.

Each of these small event trees becomes a small scenario. But don't stop there! The main focus in SNM is not so much on what might happen, but more on how events are linked together.

3.3 Workshop 3: Mapping paths to the future

At this stage there will be a lot of mini-scenarios, in the form of event trees. To recap, these trees were produced in four sessions in the two previous workshops:

- ❖ Unfinished business (workshop 1): Sequences of past and current events - things that have already happened, or are happening now.
- ❖ Futures wheel (workshop 2): trees of possibilities, starting from the present.
- ❖ Midcasting (workshop 2): event trees constructed around unexpected events.
- ❖ Backcasting (workshop 2): trees of possibilities, working back from the future.

These possibilities can never be complete; events that nobody thought of are likely to happen. So this exercise will never produce all possible scenarios, but because of the combined thought that's gone into it, it has a good chance of identifying most major possibilities. Most of the event trees will have been produced by now, but a few more are likely to surface from now onwards.

3a. Facilitator's introduction and review of last week

Plenary, about 10 minutes

The focus of today's workshop is to assemble the event trees together. Some of these events logically must happen before specific other events. Some other events can happen at any point. Each event tree is written on some sticky notes, which are placed on a sheet of paper about A3 size (large enough for about 10 small sticky notes - trees are seldom bigger than that). Figure 6 below shows how event trees can look at this stage.



Figure 6. Event trees, not yet linked

3b. Grouping the event trees

Plenary, about 40 minutes

This session is best done in a plenary session. The facilitator describes each event tree in turn, and gets participants to vote on how soon that main event could begin. Divide the sheets into three rough groups: (a) event trees that can happen soon (b) trees that can't happen soon, and (c) all the rest.

As this is done, stick the sheets on the wall. Group (a) goes on the left, (b) on the right, and (c) in the centre (high up, to get them out of the way).

3c. Linking the event trees

Plenary, about 40 minutes

At this point, it's useful to number the event trees, by writing a number on each sheet - as in Figure 6, which shows sheets 23 to 31. Numbers are arbitrary - just a quick way to refer to a problem used later for quick reference.

Now take each of the three groups of event trees, one at a time, and look for inter-connections within the group - and from the previous group. Is any group a prerequisite for another? Taking each sheet in turn, the facilitator asks "What

would have to come before this one?" (Participants might call out "Number 23".) When most people agree on a prerequisite, put that sheet to the left of the other. If that's not possible, join the sheets with a piece of coloured ribbon. If an event tree can go in several places, place it so as to minimize the total length of links

In this way, the scenario map is built. Following later thought, the arrangement is likely to be improved a little.

3d. Reviewing the scenario map

Plenary, about 30 minutes

Everybody should now stand back and study this preliminary scenario map. Look for problems, inconsistencies, omissions, and duplication. Some new event trees will probably be added, and probably some connecting lines will be moved. (At this point, be thankful for using ribbon!) Resist any temptation that comes from somebody saying "That one will never happen - why not take it down and save some space." Some rewording may also be useful at this point. (Be thankful for sticky notes - easily replaced!)

It may be useful to reorder some event trees, so that the sequence makes more sense. (Using a standard paper size makes this easier - be thankful for A3 paper.) Keep arguing either till everybody is satisfied, or you run out of time. You now have a scenario map of events.

If some of the midcast event trees can not be logically connected to any part of the map, try inserting them between critical links on the map - wherever they could cause most trouble. How would the entity deal with that type of disaster, at that critical time? Are there alternative paths at that point?

Transferring the map from the wall to a computer file

At the end, the organizers number every event tree and replace each ribbon by writing at each end of the ribbon the numbers of the other event trees that it leads to. Everything can now be taken down from the wall, entered on a computer file, and circulated to all participants before the next session. If they receive it on paper, it doesn't matter what software you use, but if you circulate the maps as email attachments, you need to use software that everybody has. Of commonly available software types, spreadsheets (such as Excel and Lotus) are the best able to handle scenario maps. Concept-mapping software (such as Inspiration) is better still, but most computers don't have it. (The Appendix below covers this.)

Optional extras

1. You can try to estimate the time lags between successive points within event trees. How soon could A lead to B? This is easy to underestimate. While some people estimate times, others should be skeptical. ("So soon? Really? What stages have you left out?") After such questioning, you often need to add more links between events in the sequence.
2. Estimates of probabilities - how likely each event tree is likely to occur. A suitable scale to use here is %, %% , and %%%, as described above. More detailed figures would be misleading.
3. Estimates of how much difference that event would make to the entity - again using a three-point scale of !, !!, and !!!, as above.

3.4 Workshop 4: The future as layers

Reducing gigantic maps

During the earlier workshops, the whole map will have been gradually assembled, usually on a long wall: a mosaic with many sheets of paper. Before going any further, the scenario map may need to be grouped. Workshop 2 probably generated several hundred mini-scenarios (in the form of event trees), but it's very difficult to make sense of all of these at once.

To be comprehensible, the map of events needs to be reduced to no more than about 40 to 50 scenarios, which can be printed on a single page for normal reading, or blown up for wall display.

4a. From event trees to scenarios

Plenary, 30 minutes

By now some overlapping of event trees will probably be obvious, so the numbers are reduced by combining related event trees. These grouped trees become SNM's scenarios. Begin by finding the two most similar trees, and combine them by joining their large sheets of paper. Keep going till there are no more than about 50 of these scenarios. Each should be given a label, in the style of a newspaper headline. Combined event trees will have one number for each original sheet of paper. It's best to use the first sheet number for each scenario. If they are renumbered at this point, great confusion can arise!

4b. Finding the influences

Small groups, about 45 minutes

A scenario map usually has about twice as many linking arrows as scenarios. Each link can be labelled with the numbers of the two scenarios it links - for example, 15-23 would be the label of the link between scenarios 15 and 23.

Now work through each of the links. List the main stakeholders involved (including possible new groups that do not yet exist), and the reasons why the second scenario would flow from the first. This is best done in small groups, of about three people, with everybody focusing on one link at a time, thinking of reasons that apply to various stakeholders, briefly discussing them, and one person writing them down.

For each link, use a separate piece of paper for each stakeholder group. Larger sticky notes are fine for this. A completed one could look like this

<p>Link 15-23 Group: suppliers Intention: continue to do business with us</p>

4c. Grouping the stakeholders

Plenary, 15 minutes

After combining all the intentions that underlie the links, you will have lots of intentions - probably at least 200. Because motives tend to be stable for each stakeholder, sort all the sticky notes produced in the previous session into one heap for each stakeholder. The easiest way to do this is to allocate some wall space for each stakeholder group, on which the output from the next three sessions can be posted.

Small groups, 30 minutes

Each group gets the list of intentions for one or more stakeholders (depending on how many there are, and how many small groups) and looks for consistencies. The same intentions tend to come up again and again, often with several

stakeholders sharing intentions. Sort these into more practical/immediate and longer-term intentions, and you'll begin to see each stakeholder's Leaf of Goals emerge.

4d. Finding the visions

About 45 minutes

Again, each small group takes the sheets for one stakeholder, but this time tries to re-create that stakeholder's visions for the others involved. To get more diverse viewpoints, small groups for this session should consider different stakeholders from the previous session.

Think of these visions as broad hopes: situations or events that the stakeholders would like to see in the future. Visions (as usually defined in management) are situations that the organizations want to be in - but visions are not only self-oriented. So instead of having one big vision for each group, this vision-finding method looks for a lot of smaller visions. Each group can have a vision for its relationship with the inquiring entity, and vice versa. Some of these visions may be merely vague hopes, with no reason for action by the stakeholder involved, so needn't be investigated in detail.

If some stakeholder groups aren't represented at the workshop, it's not easy to determine their hopes and visions. Some follow-up work may need to be done.

The output of this session is one sheet of paper for each stakeholder, summarizing its vision (in the above sense) for each of the other relevant stakeholders. In doing this, consider the relative power of the stakeholders to each other, and their relevance to the inquiring entity. Less attention should be paid to stakeholders likely to be neither relevant nor influential.

4e. Finding the worldviews

About 45 minutes

This is more difficult, because worldviews are hard to see - specially your own. Again, one small group considers each group: what is it about that stakeholder that is almost impossible to change? For example, a business will always be seeking profit. At a deeper level, it will just be trying to survive. If you consider the Leaf of Goals for that stakeholder, you may get a clearer idea of its worldview. The reason for being interested in stakeholders' worldviews is that a change in worldview will drive a change in visions, which in turn will drive a change in motives, which may impact on the events that could affect your group's future.

Each group of three or four people focuses on one main stakeholder type, so it helps if some people in each group have often dealt with that type - they'll have a better chance of identifying its worldviews. If the stakeholder is an organization, consider how it may change in 5 or 10 years, with different managers, or new technologies.

A worldview can't be summarized in a few words. The focus here is "What is likely to drive any long-term changes in visions for this stakeholder?" For each stakeholder type, this session should produce a short list of such driving factors.

The output from this session is a list of assumptions and worldviews: one sheet of paper for each stakeholder type.

4f. Review

Plenary, 15 minutes

With each stakeholder group given a space on the wall, the intentions, visions, and worldviews of each stakeholder are now reviewed, in relation to the scenario map produced earlier.

For each link between scenarios, there will now be a lot of data about the stakeholders involved and their motives, visions, and worldviews. This will help in assessing how one scenario might flow from another.

Now that the scenario map is finished, it's a good time for participants to stand back and take a look at it as a whole. Are some corrections needed, in view of the sessions in this workshop? Do any obvious implications flow from it?

At this stage, participants are usually feeling full of energy, and pleased with what they've accomplished - but wondering what will happen next. They are likely to have a clear idea of where their entity might go, but maybe not such a clear idea of how to reach that situation.

Often, they want action - but that's another story. Scenario maps are not action plans or strategic plans. It takes time to create a workable action plan, so the end of a half-day workshop is not a good time to begin. So instead of rushing into action, a useful option for finishing the final workshop is to hold a brief plenary discussion about what to do next.

Though SNM finishes at this point, the participants generally don't feel that they've finished. Now they want something to happen. Follow-up actions can include...

- Disseminating the scenario map
- Deciding what actions to take
- Evaluating the success of the project
- Producing an action plan.

If most participants want to continue, the best option at this point is to set a date for the a follow-up planning meeting - not too far in the future that impetus is lost, but not so soon that people don't get time

to think. A week or two is fine, and different participants may be needed. External stakeholders probably won't be willing to spend time on action planning for an entity, and if the entity is a business, it may not want to include outsiders.

3.5 What happens next?

Dissemination of the scenario map

With only around 15 to 20 people at a set of scenario workshops, there will often be a lot of others who are interested in the outcome. So it's usually necessary to copy and distribute the scenario map.

After the final workshop, all the sheets of paper can be taken down from the wall, and each sheet can become a separate small map. Commonly available software (a spreadsheet, for example: see the Appendix) can then be used to transcribe the map, sheet by sheet, into a more portable format.

If the entity is a workplace - or an organization with several workplaces - a good use of the scenario map is to print out a final copy, and put it on a wall in a place where people will often see it. Over a year or two, the path that the organization is on will become clear. Ideally, people can point out a scenario or two and say "This is where we are now." After that time, some possible paths will now be clearly irrelevant. And probably some new paths will have become obvious. If much has changed, it's time to renew the scenario map, by holding a supplementary workshop or two, with some of the same people.

If the entity doesn't have a central location, one alternative to putting the map on a wall where everybody can see it is to put the map on the organization's website. However, it's even harder to see

a whole scenario map on a computer screen than it is on a small sheet of paper. So instead of putting the map on a normal web page, using some variant of HTML, it's better to produce a multi-sheet map to be printed out on a number of separate pages.

A different style of action planning

SNM can be a partial substitute for strategic planning, which normally answers three broad questions:

1. Where are we now?
2. Where do we want to be?
3. How can we get there from here?

All of these are covered in SNM workshops, but in a different way from normal strategic planning. To answer question 3, strategic planning derives a single path, but SNM produces multiple paths: often more realistic.

A strategic plan normally concludes in an action plan: specific actions to be taken, by particular groups, with specified budgets, by specified dates. This follows logically from SNM, but is not part of it, so must be done as a follow-up exercise - beyond the scope of this manual.

The type of action plan that arises out of SNM is different from the usual type. A normal action plan says "We'll do A, then we'll do B, then we'll do C." Instead of producing one big action plan, SNM generally produces a linked set of contingency plans - one for each broad path, and one for each scenario on the path, to be swung into action if that scenario occurs. When a contingency approaches, its action plan can be fleshed out in more detail.

Appendix: Software for scenario maps

Scenario maps can be distributed in three ways (a) on paper - in which one person prints copies of the maps and sends them to other participants. If you are going to distribute scenario maps electronically, you need to either (b) use software that everybody will have access to, or (c) provide the maps in a standard format that a wide range of software can read.

With option (b), participants will be able to read the maps, but not change them. With either option, there can be problems if participants want to print the maps, because they're often too large to print legibly, on most desktop printers (usually no larger than A4 or US letter size). So people need either an extra-large printer, or software that can produce multiple-sheet printouts.

A practical solution is to use software that can break one large map down into a number of smaller ones - which can be printed separately, then joined back together to see the entire map.

A wide range of software can be used to create scenario maps, including:

- ❖ Word processing software
- ❖ Spreadsheets
- ❖ Software for business presentations
- ❖ Graphics software for drawing
- ❖ Project management software
- ❖ Concept mapping software – including Inspiration, CMap, Omnigraffle, Visio, and Decision Explorer.

...but none of the above was designed specifically for this purpose, so none is perfect. If you expect to use SNM often, Inspiration (www.inspiration.com) has much to recommend it (easily learned, quick to use, versatile, low cost), but for one-off projects, spreadsheets are more

convenient, because they are so widely available and well-known.

Spreadsheets for scenario mapping

Though spreadsheets were designed for calculation, they are surprisingly good at scenario mapping. The secret is to set up a grid of alternating large and small cells, like this...

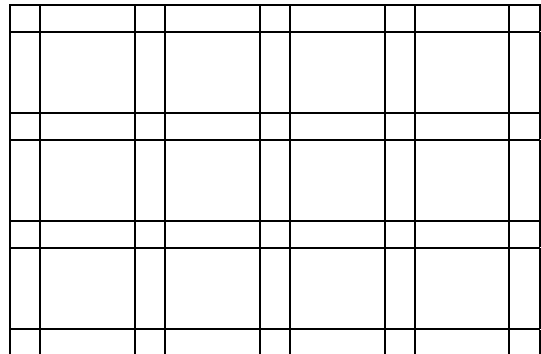


Figure 7. Grid shape for use in spreadsheets

The large squares are used for boxes, and the narrow rectangles for the connecting links. When an event tree is being transcribed from paper, the words on each sticky note are copied into a large square, and the connecting arrows go in the adjacent rectangles. When the worksheet is printed out, the gridlines are not shown, but the boxes are given borders. The small square cells can be used at the heads or tails of arrows to hyperlink to an upper or lower layer (which can be a separate workbook in the same directory).

Each event tree is shown on a separate worksheet, and hyperlinks can be set up to connect relevant worksheets. In fact, the first worksheet can be a map of all the other worksheets, and clicking on a labelled cell on it can take the user to the relevant worksheet. Most worksheets, (with a single event tree) can be printed on one A4 or US-letter-size page, in landscape format. ■