Scenario Network Mapping

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Abstract

This paper describes a new approach to scenario planning, known as scenario network mapping (SNM for short). The method, developed by the author in his doctoral thesis work, is contrasted with three more standard types of scenario planning. SNM differs from the conventional methods in using many more scenarios, each forming part of a particular pathway of possible events. In SNM, the focus is more on the network-like structure than on the scenarios themselves. The resulting network is easily modified as history unfolds; scenarios can be repositioned in the structure, new scenarios added, and irrelevant ones removed. The method lends itself to a highly participative development approach: the more actor groups participate in the construction of the scenarios, the more comprehensive the structure is likely to be. A case study of the current war in Iraq demonstrates the method in action.

Key words: scenario network mapping, causal layered analysis, cognitive mapping, causal forces

Development of Scenario Planning

Scenario planning was developed as one of the family of "alternative futures" methods by forecasters who were dissatisfied with the accuracy of conventional statistical forecasting over periods of more than a few years. Acknowledging that the future is unpredictable, the principle of alternative futures is to develop a number of possible futures in which an organization or other entity might find itself, for consideration of action if that future should eventuate. The possible futures can be shown thus, with time moving toward the right:

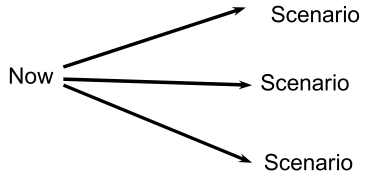

Figure 1. The standard conception of scenarios

Conventional Methods of Scenario Building

Many methods of scenario building exist; a recent article by Bishop, Hines, and Collins (2007) describes 23 of them, though many have rarely been used. This section briefly describes three common approaches to scenario generation – expert scenarios, standardized scenarios, and the critical uncertainties method. These methods are mentioned simply to provide a contrast with scenario network mapping, the main focus of this article.

The method of expert scenarios was made famous in the 1970s by Shell Oil (which anticipated and thus profited from the oil crisis of 1973), as described in detail by Wack (1985a and 1985b). As the title "expert scenarios" implies, these scenarios are generated by experts, either in scenario development, or specialized subject areas.

The second common method is standardized scenarios. These rely on the principle that in scenario work, some sets of scenarios occur over and over again. Thus standardized scenarios (as in Dator, 1998) begin with several end-state scenarios (such as status quo, collapse, and transformation), exploring the antecedents and consequences of each for the entity under study. The focus is not on the end-points of scenarios – which are broadly predetermined – but on the routes to those end-points.

The commonest method for constructing scenarios has become the Critical Uncertainties method, made popular in the book by Schwartz (1991). Its popularity may be due to the fact that simple instructions exist (such as the manual by South Wind Design, 2001), and the scenarios can be constructed without the presence of futurists, who are rare. As with the two above methods, there is a strong emphasis on plausibility. An instructive example of Critical Uncertainties is a study of the future of the Internet in 2000, by Randall (1997). Four scenarios were derived, from two axial variables: (a) interactive vs passive computing, and (b) mass use vs minority use. The short time span of this study provides an opportunity to compare the scenarios with outcomes. The result was that all four scenarios clearly applied simultaneously, to different elements of the internet, and the result is more a taxonomy rather than a useful futures method.

Conventional scenario methods share the following attributes:

- Scenarios are always created in ensembles. There are usually three or four scenarios in an ensemble, with a minimum of two (due to the principle of alternative futures), and a maximum of around seven.
- Each scenario is elaborated in some detail - typically around ten pages.
- Each scenario in an ensemble is quite separate: they are designed to contrast, rather than interlink.
- Scenarios are generally derived as snapshots of future states. Though Kahn (1961) developed some scenarios as chains, and Dator's method develops routes to broad end-states, most scenarios deal mainly with the end-state. Though they sometimes explain how that end-state could eventuate, this is not the main focus.

Though proponents of conventional scenario methods often claim that they are simply an aid to thought, not a means of predicting the future, the underlying purpose of scenario construction is often an attempt to study the range of possible futures. In so far as the envelope of possibilities is not explored, the scenarios are not useful.

Hence this approach has been criticized by writers such as Bood and Postma (1997) and Liebl (2002). Some key criticisms are:

1. That no interconnections between scenarios are considered; each scenario is a completely independent world, often lacking a clear provenance from the present.
2. That the emphasis on plausibility narrows the range of scenarios produced. Though implausible futures may be unlikely, there are so many possibilities that an implausible outcome is highly likely (Coates, 2003).
3. That scenario development is cumbersome and slow. For example, Shell Oil takes more than a year to develop its scenarios (Shell International, 2003). Though this is a very thorough approach, it is also an expensive one, and scenarios developed using any of the above three approaches are not easily modified to match unexpected developments, without beginning completely *ab initio.*

Scenario Network Mapping

Consideration of the above problems led to the development of a radically different approach to scenario planning: scenario network mapping (SNM). Instead of (as with the above conventional methods) developing a few scenarios in detail, a much larger number is developed, each in much less detail. These small components are thus more easily replaced or modified. Instead of each scenario being treated as a standalone entity, they are deliberately linked. There is no implication that only one of the ensuing scenarios will occur.

The process for creating scenario network maps was designed to be suitable for development by inexperienced scenario planners. The network maps are relatively quick and easy to develop, and can be produced in a series of four half-day workshops, typically involving around 20 people, drawn from the widest possible range of stakeholder groups for an entity.

SNM begins with a wide expanse of blank paper, on which time flows from left to right. Near the left edge is the present, and near the right edge is the horizon date. From the present, short term possibilities are listed in a futures wheel – based on that of Glenn (1972), but allowing additional input points. Between the present and the target date, several broad pathways are envisaged, often similar to the standardized scenarios. These pathways, however, are not scenarios, simply a temporary means of initially locating the component scenarios. For example, a study for a group of service clubs (List, 2006b) produced four pathways: one of minimal adjustment, one of rationalization, one of radical transformation, and a "Model 2.75" so called because participants located it about three quarters of the way between the two latter pathways.

Having defined the pathways, backcasting (Robinson, 1988) is then applied to each pathway. Backcasting is normally performed along a single pathway, but in SNM each path is backcast separately.

By now, the process has been like building a bridge, with one end jutting out from the near shore of the present, and the other jutting out from the far shore of the future time horizon - as in the painting by Australian pointillist Grace Cossington Smith,

"The bridge in-curve", depicting the partly completed Sydney Harbour Bridge (Cossington Smith, 1926). To join the futures wheel emanating from the present to the possibilities backcast from the future, a bridge-building simile that applies to SNM is of building piers at intervals across the span to be bridged.

Each of these piers is an event tree: a concept that was adapted from development evaluation, in particular from ZOPP (Ziel-Orienterte Projekt Planung, or "goal-oriented project planning"). ZOPP is an elaboration of the Logical Framework Approach by the German aid agency GTZ (Helming & Gobel, 1997). One element of ZOPP is the problem tree, in which, when a social problem is depicted as the trunk of a tree, the roots can represent a hierarchy of causes, while the branches represent a hierarchy of effects.

In scenario network mapping, the problem tree is converted into an event tree. There is a central event (the trunk), a hierarchy of causes (the roots), and a hierarchy of outcomes (the branches). However the tree is turned on its side, with outcomes to the right, following the convention that time flows horizontally (which enables full-sized scenario maps to be easily readable when placed on a wall in a room of normal height). An axiom of SNM is that nothing ever happens for a single reason, and that an event rarely has only a single outcome. Often a set of prerequisites is necessary, with several conditions all needing to apply before the event can occur - as with the military concept that a successful attack requires opportunity, capability, and motivation (Liddell Hart, 1967).

A basic event tree can be depicted as shown in Figure 2 - again with time moving from left to right:

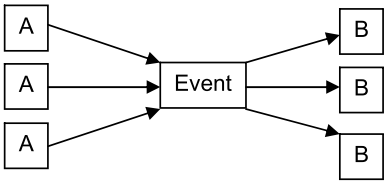

Figure 2. A basic event tree

The term "event" is used for brevity; there is no implication that an event must be instantaneous; events here include tends and situations; the duration can be indicated by shortening or lengthening the "trunk" in Figure 2. Scenario network mapping uses the holonic principle of Arthur Koestler (1967): in other words, any object is simultaneously a component of a larger system, and an assembly of smaller systems. Thus the trunk itself could be decomposed into an event tree, and conversely the entire event tree – seen from a distance – could be regarded as a single event. For example, "World War III" could be seen as either one event, or many.

Most event trees, as constructed in SNM workshops, are more complex than in the above diagram; many event trees include second order influences (as if each A were a separate central event) and second-order outcomes (as if each B were a separate event). By extending event trees in this way, the event trees usually become linked, with the output from one possible event becoming the input to another. The futures wheel and backcasting elements of SNM are also equivalent to event trees.

The creation of event trees (as with the futures wheel and backcasting exercises), is best conducted with small groups. From seven case studies, the author has found that the ideal number of participants in an SNM workshop is about 20, representing as wide as possible a range of actor groups. The most productive sub-group size for creating event trees was found to be three or four people. Individuals and groups of two can run out of ideas very quickly, while if the groups are too large, some members are unable to participate fully in the time available.

Since the time sequence of event trees is indefinite (unlike the futures wheel and backcasting), event trees are placed anywhere in the central space, and moved around as necessary to simplify the resulting diagram. The focus is not on when an event might occur, but on its precursors and its outcomes.

A scenario mapping exercise typically collects several hundred event trees. However this has proved too many for participants to comprehend. It generally turns out to be possible to collapse those several hundred events into around 30-50 larger holons: the SNM equivalent of scenarios. In other words, a scenario in SNM normally consists of an extended event tree. These scenarios can overlap: the output of one can be the input of another, as well as the focus of its own scenario.

When the network of event trees (including those produced by the futures wheel, and backcasting) has been completed, graphical reordered, and holonically reduced, it can be explored using layering. This process is effectively a variant of Causal Layered Analysis (Inayatullah, 1998 & 2004). With each event represented as a box, each link between events is an arrow. The links are now analysed in detail, bearing in mind the principle that: the human future is driven by humans. For each link, the participants consider "How exactly would event A lead to event B? What actor group could make it happen? What means could they use? And why would they do it?" This process strengthens the narrative element: not asking simply "What could happen?" (as with the top layer of the network, as just described) but "Who would make it happen?" This element of SNM is strongly influence by the thinking of realist evaluation (e.g. Pawson & Tilley, 1997), with its emphasis on contexts, mechanisms, and outcomes.

By asking such questions of each link between events, a layer underlying the events is derived: it consists of the motives, intentions, and strategies of actor groups. Usually it turns out that there are fewer actor groups than there are links between events, with each actor group's motives applying to a number of possible events. Though most actors are grouped, some key actors (such as large organizations in an industry) may be identified in their own right. Actor groups are role, not individuals: one person may have multiple motives, to match her or his multiple social roles.

At the third layer, each actor group's visions for relevant theatres of action are considered, while at the fourth layer (when this can be constructed) the actor group's worldviews are delineated. The principle of the layers in SNM is that each successively deeper layer drives the one above it: in other words, worldviews drive visions, which drive motives, which drive events.

In summary, the sequence of questioning that reveals the multiple layers is:

Layer 1: Events (scenarios) A, B, etc.

Question: What makes A lead to B?

Answer (Layer 2): The motives and intentions of the actor groups involved, and

the determination and power of each group.

Question: What drives those motives and intentions?

Answer (Layer 3): The visions of the actor groups.

Question: What drives those visions?

Answer (Layer 4): The worldviews of the actor groups.

Having collected the range of motives, visions, and worldviews, by applying these to the event trees, it is often possible to foresee further possible events and estimate their probability - though not to forecast their timing.

An important principle of SNM is that the deeper the layer, the slower the change. Events happen quickly, human intentions change more slowly, visions more slowly still, and the worldviews that drive those visions normally change only with a new generation. By working upwards through the set of layers it become possible to anticipate futures that would otherwise be difficult to imagine.

Development of Scenario Network Mapping

The author developed SNM using action research with a series of case studies, as follows.

1. The possible war in Iraq: this case study was carried out at the beginning of 2003, before the US-led invasion in March 2003.
2. The future of the Indonesian government radio network in the province of Riau.
3. The future of a small engineering company in Australia, which had invented a radically new type of electric motor, and was seeking ways of handling its invention.
4. The future of a credit union, one of Australia's largest, which had been growing rapidly and was now wanting to take stock of the growth and examine its directions.
5. The future of a legal assistance program for indigenous people in Australia: specifically, how its constitution could be rewritten in order to meet government-imposed rules for continued funding.
6. The future of a group of service clubs, membership of which had been slowly declining.
7. The future of the Barossa Valley, a winemaking area in South Australia, subject to a range of pressures relating to growth and urban development.

Six of the case studies involved primary research, while the other (the Iraq war study - created as a demonstration) used only secondary data. A wide range of criteria were used in selecting a set of cases that would be likely to reveal any problems that occurred during the SNM process. The desired time horizons for the case studies ranged from six months (for the legal assistance program) to around 20 years (the Barossa Valley). Most were around ten years, though time horizons (except for the legal assistance program, which had a deadline to meet) were not firmly fixed, and did not need to be.

Case Study: The War In Iraq Since 2003

To help readers understand how SNM works, a case study is now presented in some detail. The author originally developed this case study in February 2003, when a possible invasion of Iraq by the US and NATO was being widely discussed. At that time it was not yet clear whether an invasion would go ahead. Please bear in mind that this case study is purely a demonstration of the SNM method: it is superficial, and based only on secondary sources. It is presented here only because the subject matter will be familiar to many readers, thus making it clear how the findings of SNM are presented.

Futures wheel

The futures wheel, following the principle of SNM that the future is rooted in the past, began not from the starting point of the Iraq war (February 2003) but from the September 2001 attacks on New York and Washington. This is not the shape of a conventional futures wheel (which radiates out from a central event), due to (a) incorporating linked inputs (the 1991 Gulf War) and (b) converging outputs (e.g. "US threatens Iraq").

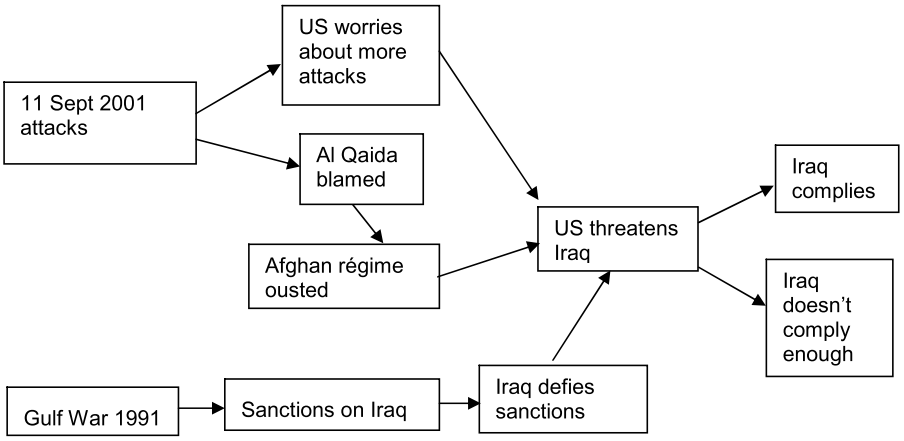

Figure 3. A futures wheel for the war in Iraq

The next point on the futures wheel (which would be shown to the right, unlike the conventional futures wheel, which radiates out from a central point, though topologically identical) would trace the consequences of Iraq not complying - or not complying enough.

Like a fault-tree diagram (Andrews & Moss, 1993), a futures wheel can attempt to cover all possibilities in an expanding hierarchy. For example, either the invasion would occur, or it would not. If it occurred, its form would be no mystery (given a knowledge of recent US military activities) and its success would be almost a foregone conclusion.

Backcasting

The backcasting process essentially consisted of futures wheels in reverse. Using the principle of alternative futures, instead of backcasting from a single point (as is normally the case, using the method of Robinson, 1988), backcasting in SNM begins with several future milestones. These are not end-state scenarios in the normal sense, but can be arbitrary starting points, selected to be different enough to provide clearly distinguishable pathways on which to place the event trees. In SNM, it is the pathways that are the most important, not the milestones – which were given that name to emphasize that the situation does not become static at the right-hand side of the map.

In the Iraq war study, three milestones were used

Milestone 1: Divided Iraq (multiple nation states)

Milestone 2: Armed conflict

Milestone 3: Democratically elected government

These milestones express futures in terms of governance, in line with the geopolitical theme of this case study. However, had this case study been focused on, say, world energy supplies, the milestones could have been based on outcomes related to Iraq's oil supplies following the invasion. The important point here is that the chosen milestones are simply pegs on which to hang the network, rather than the basis of conventional scenarios.

Here, as an example, only the pathway to the first milestone is present, showing one aspect of how Iraq could become divided. Early in the analysis, it became obvious that two potential separations were involved: Kurdistan from the rest of Iraq, and the south of Iraq (centred on Basra) from Baghdad and the central area. The following backcast (Figure 4) shows major factors in the possible independence of Kurdistan.

Though this was intended to be a backcast, several factors – at lower right – would follow independence, so form a partial futures wheel. They are included in the backcast because they would have been foreshadowed in Turkey's withdrawing its threat to invade. This backcast is interesting because of the large number of prerequisites: it is clear that Kurdistan could become independent (and not even fully independent) only if many other countries agreed.

Note that this exercise was carried out early in 2003, and none of those contributing to it were experts on Iraq, or had lived there; thus it is likely that some complicating factors have been overlooked.

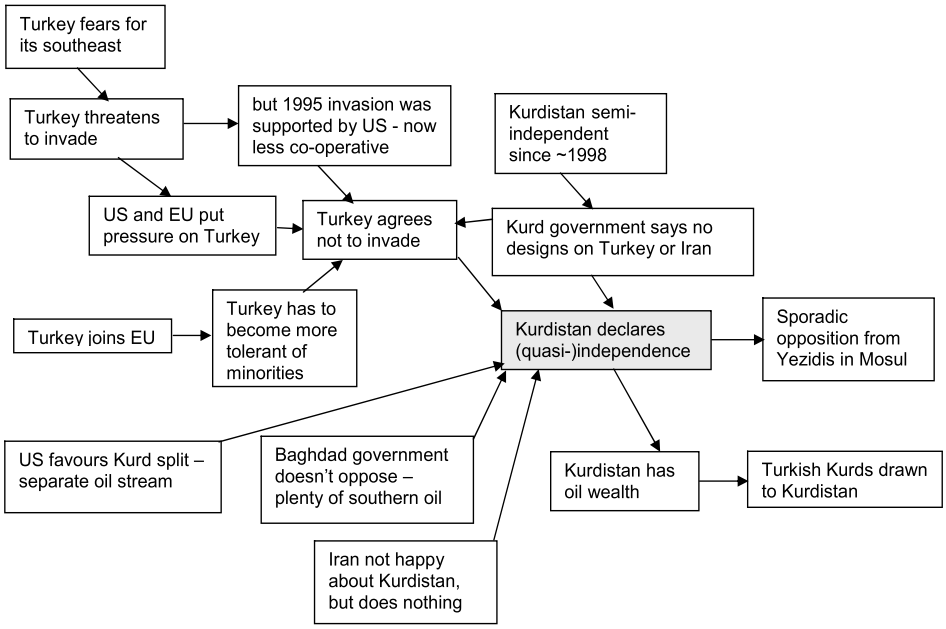

Figure 4. Backcasting for the strand on Kurdish independence

Event trees

In the Iraq war case study, the gap between the futures wheel and the backcasting was small, and few event trees were needed to bridge it.

Figure 5 is an event tree, labelled "Iraq becomes a troublesome US colony". This event tree, more complex than most, was chosen because it was the closest of the scenarios to the current (2007) outcome. The "trunk" of the event tree is the statement "Hostility to new government and occupying forces". The node "Internal conflict flares up..." could have been a separate event tree, tightly linked.

The underlying layers

With the event map completed, the next stage is to reveal the lower layers that make up the full scenario map. The top layer consists of the events – gathered as outlined above. The second layer is the human motives that drive those events, the third layer is the visions that impel the motives, and the fourth layer is the worldviews from which those visions spring.

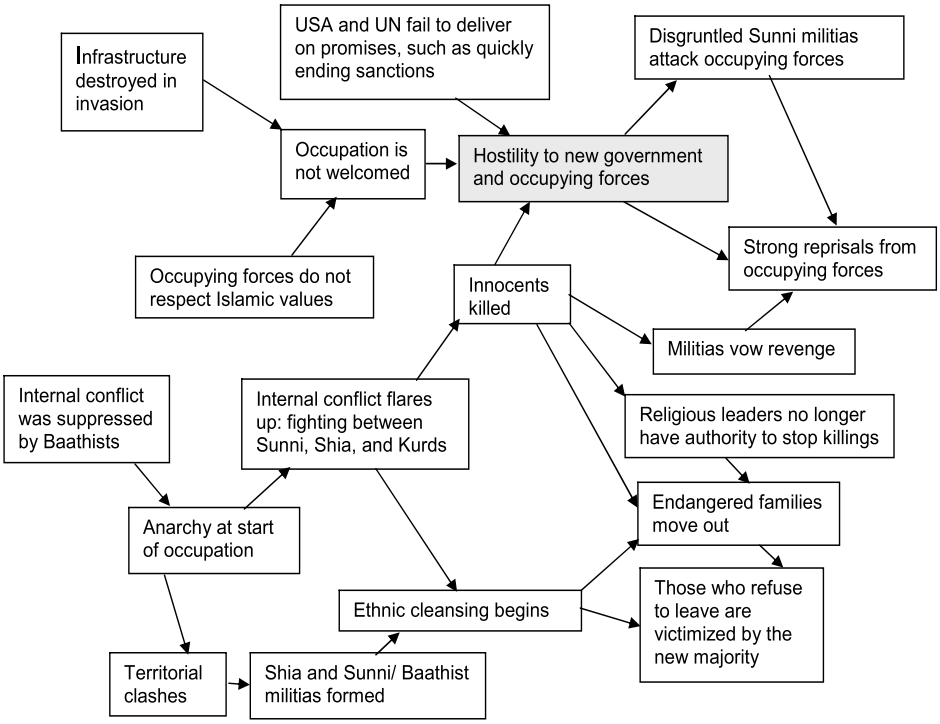

Figure 5. Event tree for "Iraq becomes a troublesome US colony"

Layer 1: Events

Figure 6 shows the top level, with events as holons. A key issue was how much detail should be included on the scenario map. Each of the holons could have been divided indefinitely: the challenge was to present few enough that the map could be clearly understood as a whole, but many enough that no major possibility was excluded. Accordingly, a practical decision was made to restrict the map to a single page: A3 size when displayed on a wall, and A4 when included in a report. This accommodated an upper limit of about 40 holons. Figure 6 has 29 holons, of which 9 lie in the past and 20 in the then-future. Given the constraint of fitting the diagram onto a single page, the Past section of the map was much abbreviated. This enabled more focus on the future. (at the time of first preparation, in February 2003)

Layer 2: Motives

The focus in a scenario map is more on the links between events than on the events themselves. As noted by William James (1909/1996, p. 236) "The stages into which you analyze a change are states; the change itself goes on between them." Thus the second layer of the hemisphere shows the underlying reasons for each transition between two events. The 29 events in Layer 1 were connected by 34 links between pairs of events. These links are essentially hypotheses that the occurrence of the first event in a pair would "cause" or lead to the second event. The relevant question to ask

about each link is "What would make the first event lead to the second?" Because this is a study of human futures, those reasons would entail human agency, labelled here as "motives" in the broadest sense.

As an example of a key transition, the following are possible explanations for question 1 on transition B in Figure 6. A question frequently asked at the time was "Why is the USA picking on Iraq?" when there was little evidence that Iraq had supported anti-US terrorism. One answer is that the multi-cause axiom applies: though there was no single overwhelming reason (unless the US government genuinely believed that Iraq possessed and was ready to use weapons of mass destruction), there were many minor reasons, as shown in Table 1.

All the above reasons could be combined to form a scenario map just as complex as the main map in Figure 6. Note that not all components can be described as strictly "motives": that term is simply a label covering the reasons why human events occur. However, hindsight is perhaps more fruitful than foresight in supplying such motives.

Table 1
Linkages for Transition B in Figure 6

B. US worries about more terrorist attacks --> US threatens Iraq

Internationally oriented reasons

- Iraq is rumoured to have weapons of mass destruction, including rockets capable of attacking (US client state) Israel.
- Iraq government is no longer co-operating with weapons inspectors.
- Hussein/Baathist regime is tyrannical, probably unpopular with most Iraqis.
- As régime is territorially aggressive (having attacked Iran and Kuwait), its removal should please neighbouring countries.
- A more moderate régime in Iraq might help resolve the Israel/Palestine question.
- Educated/moderate population compared with others in region, so Iraq could quickly become a modern developed state, an example to others such as Saudi Arabia.
- Outstanding UN resolution from 1991 can be used to justify intervention.
- Of all six "rogue states" identified by US, Iraq would be the most acceptable target to the UN, for the above reasons.

US domestic reasons

- Proposals for Iraq régime change had circulated within the US government since at least 1991.
- US desire to preserve flow of oil from Middle East (with US oil supplies running out).
- Unfinished "son's business" (President Bush Sr allowed Hussein régime to stay).
- Iraq trading oil in euros, not US dollars, threatening stability of the US currency.
- Divert US public from ailing US economy.
- If US wanted to dominate world oil, Iraq is an ideal country to control.

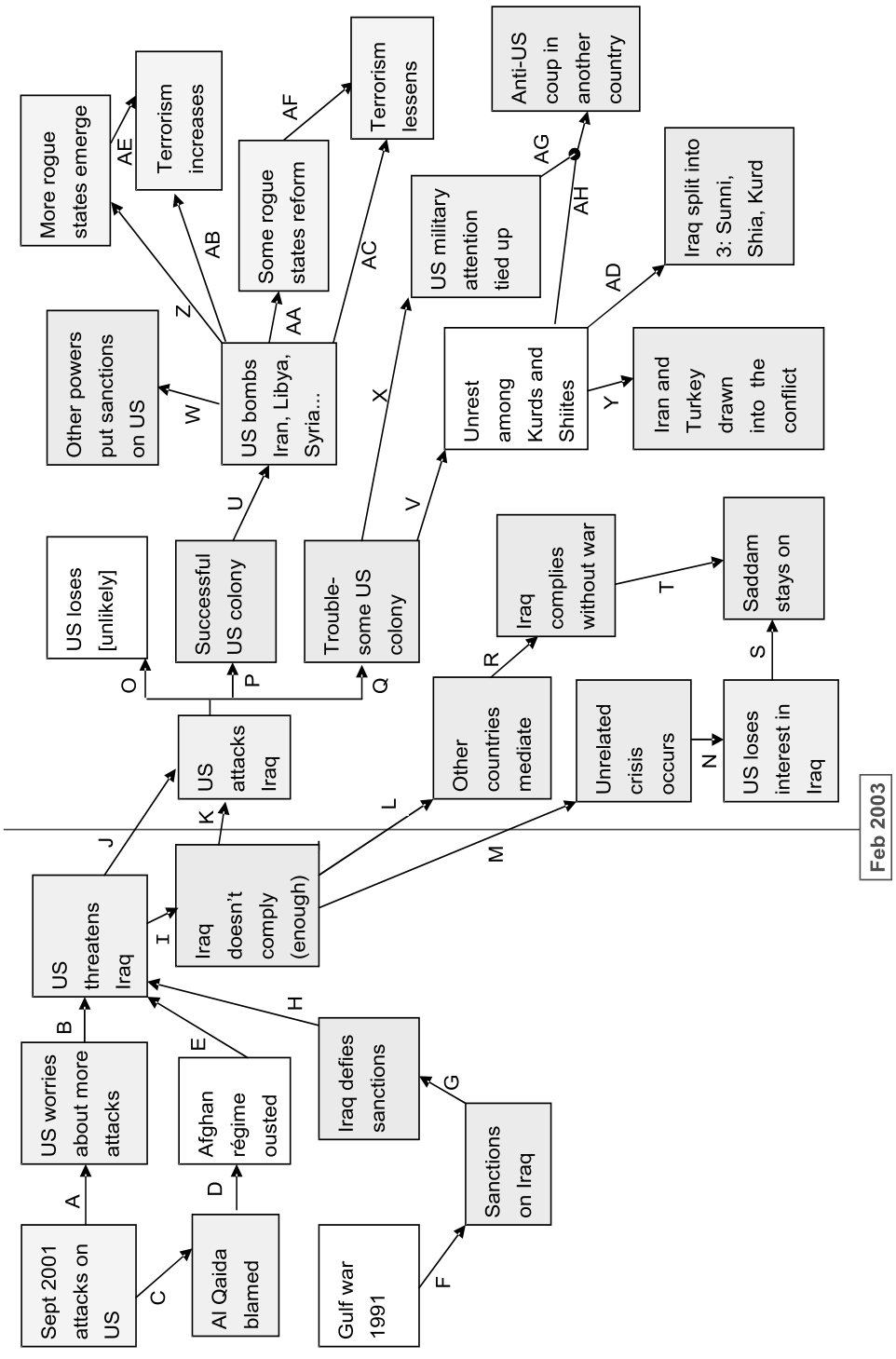

Figure 6. Scenario network map for Iraq war

Table 2
Linkages for Transition Q in Figure 6

Q. US attacks Iraq --> Iraq becomes a troublesome US colony

- US occupation is not welcomed, with Iraqi perceptions that US (and its occupying army) does not respect Islamic values.
- USA and UN fail to deliver on promises, such as quickly ending sanctions. This creates hostility to the new government and US occupying forces.
- Widespread destruction of infrastructure during US attacks creates public hostility.
- Internal conflict, previously suppressed by Hussein government, flares up, with inter-ethnic fighting in Iraq between Sunni, Shia, and Kurdish groups.

Turning now to a sample transition between future events, consider link Q, in which only four motives were identified:

Having found many motives (95 in total, for the 34 links), it proved not feasible to show them all on one diagram; some method of data reduction became necessary. Because each major actor's more tactical motives hardly varied through this period, the obvious solution was to group motives by actors. The result was shorn in Table 3.

Though Table 3 is concise, it is difficult to relate the motives to the links in Figure 6 graphically, except with a tangled mess of lines – which would be equally as difficult to interpret as the Table 3, but more prone to error. However, the use of such a table simplifies the construction of the next layer of the hemisphere.

Layer 3: Visions

Desired futures (visions, hopes, wishes, and the like) in SNM are treated as drivers of intentions. Though standard methods for eliciting corporate visions (such as that of Nanus, 1992) tend to produce one comprehensive vision for the entity, SNM explores far more specific visions. Each actor has one vision for each relevant theatre - where a theatre is defined as either a group of other actors, a place, or a situation. Table 4 classifies visions by theatres.

This is a total of 41 theatres/visions and 62 hopes. This number is somewhat unwieldy, but for a world-scale case like this, perhaps necessary. The column headed "Since" serves as a check that the visions are in fact older than the intentions dealt with in the previous layer, confirming that with each successive layer, change becomes slower, and thus each layer can serve as an (unfocused) early warning about the layer above it. Note that each row in Table 4 is contestable: there could be a final column labelled "evidence that this vision exists and dates from the time shown," and such evidence could be collected from documentary sources.

Layer 4: Worldviews

A worldview can be regarded as an assumption buried so deeply in the subconscious that it is not open to inspection by the person who holds it. But when one attempts to detect the worldviews of others, one's own worldviews frame and filter

Table 3
Motives of Actors underlying Events in Figure 6

Actor	Ascribed motives	Relevant links
US president and cabinet	Be re-elected	I J K O P Q U W Z aa-ac ae-ah
	Reduce risk of terrorism in US	Z aa-ac ae-ah
	Increase US power in the world (political, military, and corporate)	O P Q N S T W X ag ah
	Make Iraq more like USA	P Q
US public	No foreign terrorist attacks in US [a]	-
	Continued supply of oil [a]	-
US military	Maintain influence on US cabinet	J K O P Q U X
	Increase fighting skills	K U X
	Increase equipment levels	K U X
	Avoid casualties	K U V X
US industry	Continued supply of cheap oil [a]	-
	Corporate growth [a]	-
European powers (Germany, France, Russia)	Continue influence over Middle East	L P W Y
	Keep US power in check	K-N R S U X
	Reduce Islamic terrorist threat locally	Z aa-ac ae af
	Continued supply of cheap oil from Iraq	L P R S
UN	Appear to be strong, so enforce resolutions	G K
	Reduce conflict within Security Council	K P Q U
Iraqi government (1) Baathist	Be source of all power in Iraq	I K
	Escape UN sanctions, no-fly zones, etc.	G I R S
	Dominate region by military threat	K-N R S
Iraqi government (2) under US occupation	Do not offend USA	P Q V X ad
	Rebuild Iraq's economy following sanctions	P Q V ad
	Resist partition of Iraq	V Y
Iraqi public	Recover lost standard of living [a]	P Q V
	Freedom from arbitrary power [a]	P
	Not to be affected by violent conflict [a]	P V ad
Iraqi resistance	Retain privileges from Baathist regime	Q
	Guard Islamic heritage	PQ
Iraq's Islamic neighbours	Keep US power in check	L N R S
	Guard Islamic heritage	L N P Q R S
	Good relations with new Iraq government	P Q V Y ad
	No independence for Kurdistan [on the part of Turkey, Iran, Syria]	V Y ad

Note: [a] For the various publics, stakeholders rather than actors, these are wishes rather than intentions.

Table 4
Actors' Visions by Theatres

Actor	Theatre	Since	Vision
US president and cabinet	Actors themselves	always	Be acclaimed, re-elected, and remembered historically
	US lifeworld	always	Wealthy, peaceful, satisfying the public
	US industry	always	Stay in technological forefront of world industry
		always	Not to cause major problems for government
	US military	always	Meet actor's needs quickly and efficiently
	Government of Iraq	1940s	Obey US wishes
	Life in Iraq	1991	More like life in USA
	Other Middle Eastern countries	1940s	Accede more to US wishes
	Islamic terrorists	1990s	Not to affect the US, its bases, etc.
	Main European powers	1940s	Fall more into line with US thinking
US public	Selves =US lifeworld	1941	Feel secure against foreign attack
		1970s	Low fuel prices
	US federal government	always	Minimal control over US public
US military	Actors themselves	always	"To conduct prompt and sustained operations on land throughout the entire spectrum of crisis, AND to do what needs to be done as part of the joint warfighting team" (US Army, 2004)
	Iraq	2003	Create minimal trouble; enable early exit
	US government	always	Receive praise, and access to more resources
	Potential recruits	1980s	High standard of applicants
US industry	Actors themselves	1990s	Market capitalization (supposedly) but in practice other factors also (cf. rising popularity of Triple Bottom Line and Balanced Scorecard)
	Resource availability	always	Uninterrupted supply of cheap oil
European powers (Germany, France, Russia - UK is irrelevant here)	Actors themselves	always	Uninterrupted supply of cheap oil
		1990s	Minimize tensions among Muslim population
	Their electorates	1980s	Uninterrupted supply of cheap oil
		1976	No Islamic terrorism in Europe
			Maintain cultural integrity while allowing slow change (e.g. Middle Eastern immigrants)
	European industry	new	Uninterrupted supply of cheap oil, & traded in Euros rather than USD
		1991	Resumption of pre-1991 level of exports to Iraq
	Government of Iraq	new	Accept more European exports
		new	Supply plenty of cheap oil
	Other Middle Eastern powers	new	Earn revenue through uninterrupted supply of oil, without being undercut by Iraq
		1940s	Resolve Palestine/Israel conflict
		2000	Encourage Turkey (as large EC aspirant) to become more "European"
	US government	2001	Become easier to deal with
		2001	Better appreciation of Europe

(Continuing)

Table 4
Actors' Visions by Theatres (Continued)

UN	Actors themselves	2003	Regain acceptance in Iraq, after sanctions
	(New) government of Iraq	c2000	Smooth the path for renewed UN presence after post-1991 bitterness related to sanctions
	US government	1980s	Appreciate UN more, interfere less
		old	Pay outstanding dues
Iraqi government (1) Baathist	Actors themselves	always	Ability to govern without restraint
		1991	Not to be attacked by US, UK, or UN
		c1995	Abolition of Kurdish and southern no-fly zones
	Life in Iraq	1970s	An obedient population. In return for knowing their place, they will be well provided for with social services
	Neighbouring countries	1980s	To either co-operate with Baathist government (e.g. Syria, Jordan), or fear it (e.g. Iran, Kuwait)
Iraqi government (2) under US occupation	Actors themselves	2003	Respect, acclaim, re-election, internal harmony between Shias, Sunnis, Kurds
		2003	Rapid removal of UN sanctions
	Life in Iraq	2003	Rapid return to normal pre-1991 state of public services, e.g. health, internal mobility
	US government	2003	Minimal control and harassment
		2003	Maximum financial assistance
Iraqi public	Selves = Life in Iraq	1970s	End of discrimination against some Shias, and Kurds
		1991	End of international sanctions
		2003	Daily life free from violent conflict
	Government of Iraq	always	Government should enhance social fabric, help more, harass less
Iraqi resistance	Actors themselves	1990s	Be respected and honoured, either in this life or the next
		1990s	Reduce infidel influence
	Life in Iraq		Freedom from air attack
		2003	No US influence
		1920s	Independence of Iraq (or their part, e.g. Kurdistan)
	Other governments	always	Donate money, but exert no influence
		new	Recognize their part of Iraq ?
Other Middle Eastern governments	Actors themselves	always	Maintain domestic power and privileges
	Political situation in Iraq	2003	Stable: avoid unrest and unwanted change in Iraq spreading to their own countries
	Their own countries	always	Well behaved population
		always	Increase in wealth
	Relationship with new Iraq government	2003	Cordial, with mutual help; maintain best of Arab traditions

that perception. Thus any description of worldviews is a mixture of those of the perceived and those of the perceiver. Therefore, to assess an actor group's worldviews thoroughly, it is best to use a wide range of stakeholders as perceivers. For the Iraq war case study, which was treated as secondary research, only a narrow group of perceivers was used: the author and some colleagues, who share similar worldviews. Because of this homogeneity, and the fact that the original study was done four years ago (making it now too late to catch up), Layer 4 was not described in this study.

The purpose of delving down into these lower layers - this detailed analysis of motives, visions, and worldviews - is to explore the motivations of actors in a situation, to help anticipate their further actions. Though SNM cannot tell us what will happen next, it should assist in envisaging the range of possibilities. The Iraq war case study was chosen because it is well known - but it is also complex. A more typical SNM study, of one organization, one industry, or one community, produces a much smaller volume of material, and takes less time to complete.

Conclusion

This paper has provided a brief overview of scenario network mapping (SNM), a method for delineating and examining possible futures. Earlier papers on the method are List (2004a) and List (2004b). Theoretical considerations are dealt with in chapter 4 of my thesis (List, 2005). Unlike most other scenario methods, the focus with SNM is not so much on what could happen but on how it could happen. At the top layer of the event tree, the "boxes" (possible events or situations) are less important than the "arrows" – the reasons why one event or situation would lead to another. A key principle of SNM, without which it makes little sense, is the holonic principle: that any event or situation can be endlessly divided into smaller events or situations, or combined into larger events or situations. In practical terms, SNM can usually be completed in four half-day sessions, with groups of around 20 people representing the widest possible range of stakeholders. For those who might be interested in trying the method, a practical manual is available (List, 2006a).

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