

STRATEGIC NEEDS ANALYSIS: PRELIMINARY RESULTS

Jim Smith¹ and Ray Wyatt²

¹*School of Architecture and Building, Deakin University, Geelong 3217, Australia.*

²*Department of Geography and Environmental Studies, University of Melbourne, Parkville 3052, Australia.*

Strategic Needs Analysis is a process designed by the authors for the project initiation (pre-design) stage of a project. It uses a focussed problem-solving approach used in workshops with data mining software to assist in policy decision-making. The workshops generate policy options and the software 'scores' them on ten universal strategic criteria. Subsequently, analyses of group characteristics by data matching informs the second workshop presentations where decisions on which option(s) to choose are made.

Experience from four case studies has informed procedural and organizational arrangements. The software used in these applications has been upgraded to develop better forms of analysis. These developments are reviewed and the latest study (the fifth) using the software is described.

Keywords: data mining, project initiation, stakeholders.

CONTEXT

A characteristic feature of strategic decision-making in organizations is that they involve a range of stakeholders, which naturally increases the level of complexity of decision-making and organizational arrangements. Whilst some organizations may wish to exclude a number, or all of the particular types of stakeholders from the decision-making process, it is commonly accepted that their involvement can greatly benefit the process and the solution.

Cleland (1994) captures the essence of pursuing stakeholder involvement to achieve better results when he quotes NCR's (a large US corporation) mission as,

... to create value for ... stakeholders ... it must first satisfy the legitimate expectations of every person with a stake in the company ... by promoting partnerships in which everyone is a winner (Cleland 1994: 136)

Several approaches and techniques have been employed over many years by organizations and specialists in workshops and their facilitation. The aim of all of them is elicit ideas, possible strategies and to reach a decision on a chosen strategy. White (1991: 9) sees stakeholder involvement as '... like a chemical reaction of several ingredients that must be allowed to run its course before we can know what the final substance is'.

There are a number of techniques specifically designed for creating a series of strategies based upon group activities (commonly with the stakeholders) in a workshop environment where all views and ideas can be considered. Some of the most common ones are described in the extensive literature on this subject (Rosenhead 1989, Saaty 1990, Smith Kenley and Wyatt 1998, McFadzean 1998, Wyatt 1999).

The primary aim of most of these techniques is to generate ideas, which eventually lead to an agreed solution, or solutions. However, the process of decision-making is more problematic. Some of the above techniques may integrate decision-making into the process, possibly through consensus seeking. In others, the decision-making activities may have to use a different, or add-on technique or approach, which leads to a sieving of the possibilities to a number of feasible alternatives. Then a decision on the chosen strategy is made.

Stakeholder identification

Stakeholder analyses vary in their categorization. However, the simple division of client and users does not adequately reflect the complexity of organizations and decision-making environments. Identification of stakeholders for the strategic analysis/decision-making stages is a crucial process requiring skill and sensitivity to the client organization and to the decision-making environment. Politics, expediency, pressure of time or awkwardness may all play a part in *not* achieving the best team.

In most applications the selection of stakeholders is agreed between facilitator and promoter(s) of the project. Given a freedom of choice, workshop facilitators prefer stakeholders who can contribute positively to a well-managed workshop with a goal of creating a solution that improves the situation. It may be tempting to include *tame* participants in preference to the less predictable internal and external stakeholders.

These workshop techniques often assume that all of the important issues are exposed, discussed and decisions made with full and open disclosure. The attitude of the initiator of the process is crucial. This person, or group, may limit representation either innocently or furtively. External stakeholders, and possibly some internal ones, may be excluded for convenience and the result may be a biased representation.

Value management workshops classically are designed on this basis (Dell'Isola 1982, Gage 1967, Green 1992, Kelly and Male 1993, Macedo *et al.* 1978, Norton and McElligott 1995, Zimmerman *et al.* 1982). Strategic Needs Analysis has faced this problem of representation in its four applications to date with varying degrees of success (Wyatt and Smith 1999, Smith *et al.* 1998). Sadly, no simple panacea to its solution is offered.

STRATEGIC NEEDS ANALYSIS

Strategic Needs Analysis (SNA) follows the pattern of a focussed problem-solving or management science approach centred upon three basic stages:

- Information Collection and dissemination: collect and distribute information to give everyone a common basis for understanding the problem.
- Create and consider alternatives: involve a broad group of participants/stakeholders in reviewing this basic material in a workshop. This setting draws upon their combined and overlapping knowledge and expertise, to maximize the benefits of group dynamics (using some of the techniques noted earlier) and thereby develop innovative solutions to the problem considered.
- Decide: makes a decision that is acceptable to the workshop participants.

The stages of SNA are shown in Figure 1.

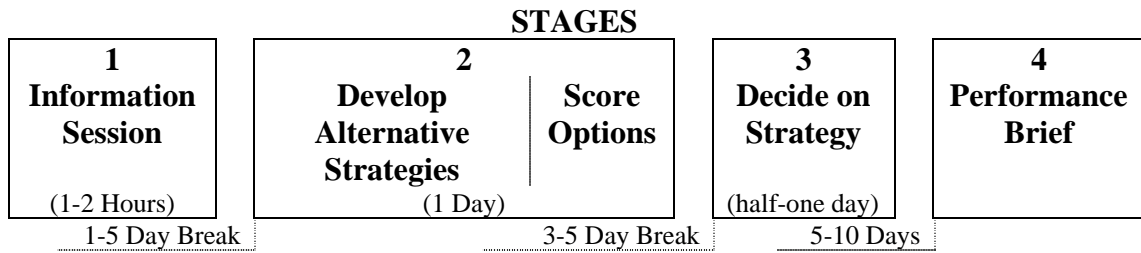


Figure 1: Stages of Strategic Needs Analysis

The facilitator(s) play a crucial role in the development of the alternative strategies during the SNA workshops. Specifically, the SNA facilitator has to encourage participation and make suggestions that focus on alternative strategies. One of the sensitive roles the facilitator must play is to act as an ‘outsider’ challenging cosy assumptions whilst also being aware of the constraints applying to any strategy.

Ideally most facilitators would prefer a wide cross-section of views from a representative group drawn from present and potential users, customers, tenants, owners, and selected members of the community affected by the proposals. The prime aim is to include participants who can contribute to the identification of strategies and who are prepared to suspend their present roles in pursuit of a better solution. The workshop activities are enriched when participants are committed to the process and are prepared to challenge assumptions and provoke new ways of analysing the problem. Sadly, many organizations may simplify the problem by limiting participation to members with the same approach, view or organizational culture. In addition, the strategic ‘vision’ may also be rendered myopic through administrative timidity.

This has been our experience in SNA in four studies to date. The facilitators have been forced to play the role of *provocateur* when the group appears to be taking the easy way of suggesting the known and comfortable alternatives. Needless to say, because they are the paymaster for the process the client can override the facilitators desire to include a wide range of stakeholders. The fact that possibly better, more inclusive, well supported and comprehensive decisions can be made with a more representative group may not persuade the capital works or other groups funding the process to change their attitude or expand their horizons.

Stakeholder analysis

A stakeholder analysis of the participants in the four SNA applications to date is given in Table 1.

Examination of Table 1 shows a deficiency of external stakeholders who may be termed *customers*, of the existing and proposed facility or strategies. Three of the studies were concerned with educational facilities and no students or their representatives were invited to the workshops by the capital works group. In the fourth case, a correctional facility, no inmate representative body was approached.

Whilst the facilitators regretted this skewed group profile the reasons have to be recognized in these and other applications:

- Time constraints were used as an excuse for not broadening the participant base despite the facilitators’ requests for broad representation.

Table 1: Stakeholders in Four SNA studies

Stakeholder Type	Study One	Study Two	Study Three	Study Four	Strategizer Categories
Capital Works Group	3	5	1	1	Bystanders
Consultants	-	-	3	-	
Staff running the facility	3	54	10	12-13	Problem Solvers
Staff in organization	2				
External customers	-	-	-	-	Bystanders
External research/ industry community	4-8	-	-	-	
Totals	10-14	59	13	13-14	

- A perceived difficulty of identifying whom is the *customer* and gaining their views.
- When customers can be identified it is best to include those persons or groups equipped with the necessary skills and questioning approach to contribute to a process which may shake some basic assumptions and approaches.
- There was an unstated fear of customers' views obstructing the *professionals'* approach to reviewing the problem and determining needs and solutions.

ANALYSIS OF STAKEHOLDER DATA

In SNA, after a range of alternative strategies has been refined into a series of options towards the end of stage two (Figure 1), participants score the options on ten criteria. These criteria have been developed from the urban planning literature and the authors believe that they have relevance in the early, decision-making environment; the strategic stage of any project. The criteria have been described in several publications, for example, Smith and Wyatt (1998). They are a consistent means by which *Strategizer99* is able to evaluate each strategy irrespective of its content or problem domain. The interactive software permits each option to be scored by methodically addressing each criterion in turn. Moreover, users can interact with the software by continually clicking on the option-scoring buttons until they are satisfied with their relative ratings for each option.

Now, at the start of the program, the user is requested to provide some background data about their personal characteristics and their relationship to the problem. Such information allowed us to categorize the participant and to analyse results as they applied to several subgroups of participants. Questions asked are shown in Table 2. The information is confidential and no personal data or opinions are released to the group or published elsewhere.

Analyses of results used simple scoring and statistical techniques. Generally, the results are presented for discussion and decision at stage three. They mainly centre upon identifying statistical trends amongst people of the various backgrounds such as age groups, male/female, favourite subject and relationship to problem (solver/bystander). Correlations between criteria scores and options' overall scores are useful for identifying strengths of feeling among the group for specific criteria. Also, we are able to call upon various groups to provide recommendations, taking account of all the previous users in that group, no matter what other problems they have addressed, using the trained neural networks developed by the software.

Table 2: Participant personal attributes categories

PRELIMINARY DATA	AGE	SEX	CHILDREN	QUALIFICATION	OCCUPATION
First three letters of name	0-9 10-19	Male Female	None 1	Primary School Secondary	Professional Academic
Favourite subject at school	20-29 30-39		2 3	Tertiary	Managerial Administrative
Relationship to problem:	40-49 50-59		4 5		Clerical Sales
- Bystander	60-69		6		Trades
- Solver	70-79		6+		Unskilled
- Other	80-89 90+				Home Duties Unemployed Other

However, in the four studies to date the analytical and predictive power of the neural net has not been fully harnessed, or utilized by the facilitators to guide decision-making in stage three workshops (decide on strategy). Correlations between criteria scores and overall option scores have provided useful information to guide the decision-making workshop, yet disappointingly, in none of the applications were the highly correlated criteria discussed, embraced and preserved for guiding the workshop's final outcome. In part, this may be the fault of the facilitators, who did not emphasize the criteria sufficiently in workshop discussions.

That is, in practice, the discussion to choose the best option tends to dominate. The more bluntly expressed, overall group view of what the best option is tends to provide the focus for the discussion. It propels the workshop to make an agreed group choice for implementation. In fact, in all of the studies, the group majority view prevailed. That is, let us make a decision! Consequently, the potential of the neural net-based software has not been realized.

After reviewing the practice in these studies, Wyatt redesigned the software. *Strategizer '99* is the result and it retains the basic structure of the analysis of the previous version of the software, but removes the 'black box' effect of the neural net. Thus, the ten criteria are preserved along with the users' personal attributes as these are critical for maintaining and conducting analyses of user data. The attributes are important in that they form the basis of analysing stakeholder patterns when it comes to scoring criteria and judging decision-making styles.

The software has now introduced the subtlety of data matching or data mining into its approach. This is an alternative, but much more transparent approach to detecting patterns and trends in the user supplied data. Stakeholder attributes of male, female, age group, number of children, qualifications, occupation and relationship to the problem can be analysed and grouped when patterns emerge.

More exactly, a score on a criterion (range from +10 to -10) is matched with the overall score of the desirability of an option on the same scale. Naturally, a strong correlation between the scoring of a criterion with its overall desirability (positive or negative) indicates a strong criterion importance. A lack of correlation indicates a lack of criterion importance.

Case study 5

Strategizer '99 was tested by Wyatt recently on undergraduate and graduate students who addressed a series of strategic problems. Results, in terms of consistent patterns

Table 3: Options for the yacht club

Option	Description
<i>Ferry</i>	Create an attractive water transport link by developing a ferry terminal and by improving Yacht Club facilities to a nationally recognized standard.
<i>Club Quay</i>	Develop the yacht club into a commercial, resort style attraction with shops, restaurants, accommodation, boating and other income-generating facilities.
<i>Environmental</i>	Emphasize education about the environment by building an environmentally sensitive maritime centre comprising an aquarium, sensitively treated natural areas and other exhibits.
<i>Integration</i>	Convert the Yacht Club into a new hub of redevelopment along the waterfront which becomes integrated and connected to other attractions, and to the CBD, to make it part of the life of the city.
<i>Upgrade</i>	Retain and improve the existing Yacht Club facilities by modernizing and upgrading existing ones - a “steady as she goes” approach.

being found, were encouraging, and the upgraded version of the software was well received by the users.

Our direct ‘client’ was a yacht club, at a prime location on bayside land within a city of around 200,000 people. Students at the local university had been working on a project with the yacht club to consider the possibilities for redevelopment. The authors organized a workshop with about 60 students involved in the project with the aim of developing a series of strategies (options) to present to representatives of the yacht club. That is, a creative problem-solving workshop developed five distinctive options that were specifically designed to elicit strengths of preference for the strategic direction captured within the option. The five options are summarized in Table 3.

Five student representatives from the whole group presented these options to eight club members. Each presentation took about five minutes with the main features of each strategy presented on an overhead transparency. Sketch plans and designs were excluded from the presentation as at his strategic stage because they were considered not to be relevant. Each option was summarized on two pages of text and copies were distributed to all members. *Strategizer* ‘99 was briefly described and details of the ten criteria were also printed and handed out to all members. Eight laptop computers were set up to run the software for the individual use of each member. Thus, with details of the options and criteria now easily available to them, the members were left to score the criteria and the overall desirability of each option. Six members managed to use the software successfully.

One week later the authors organized the students to score the options but this time on a paper based version of the software. Whilst this exercise was not directly comparable to the software based version, the authors believed it was useful to analyse student preferences. Forty-two responses were analysed.

Results: Criteria

Figure 2 shows that when the software was used to get six yacht club members to rate their club’s five options, both on the ten criteria and overall, some patterns were found despite the smallness of the sample. Specifically, there was a hint of a relationship between options’ overall desirability levels and their scores for “Likelihood” and for

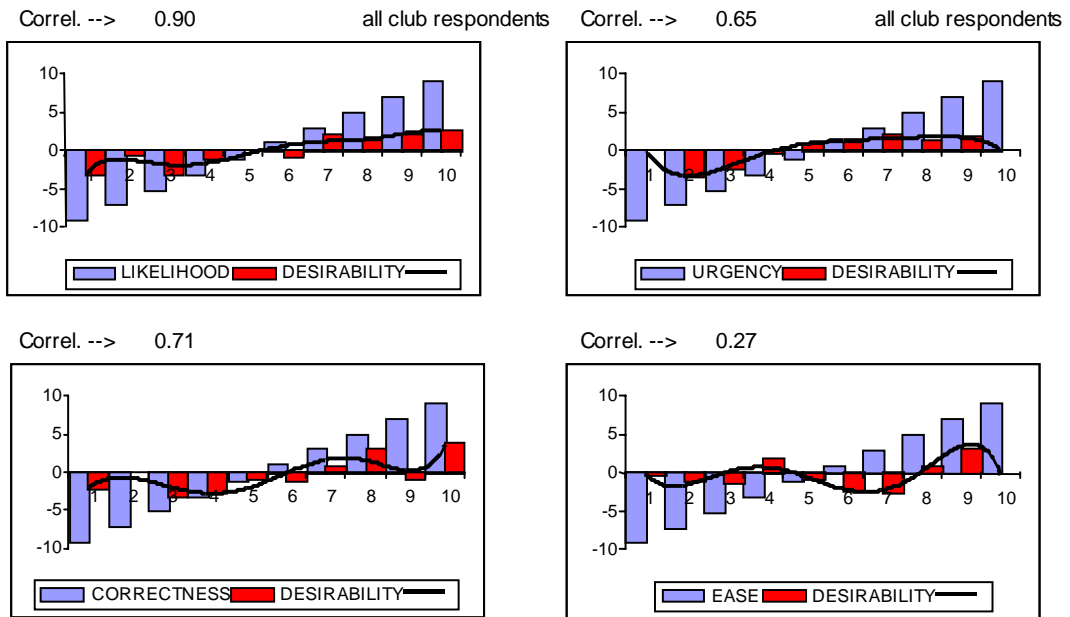


Figure 2: Members' criteria preferences

Option	Ferry	Club quay	Environ.	Integrat	Upgrade
Member 1	3.0	5.0	-4.0	7.0	-6.0
Member 2	-6.0	4.0	-9.0	8.0	1.0
Member 3	-5.0	5.0	5.0	5.0	-5.0
Member 4	-5.0	-5.0	-5.0	-5.0	5.0
Member 5	-9.0	-5.0	-3.0	7.0	8.0
Member 6	-5.0	-5.0	-5.0	8.0	5.0
Average	-4.5	-0.2	-3.5	5.0	1.3

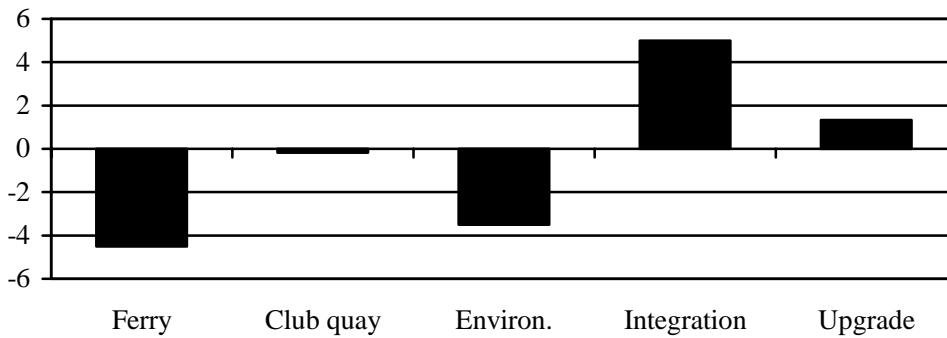


Figure 3: Members' option preferences

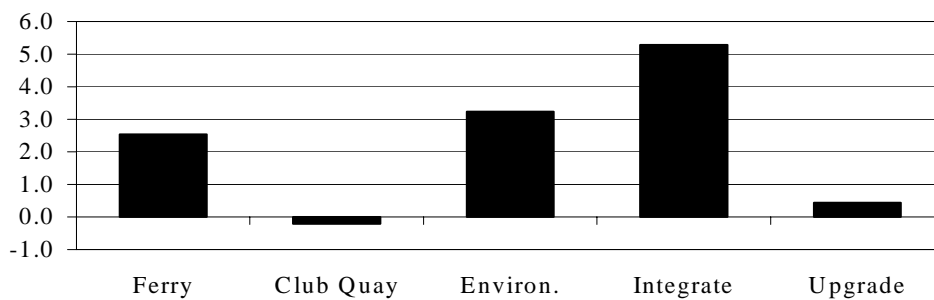


Figure 4: Students' option preferences

“Urgency”. Correspondences between options’ overall desirability levels and options’ scores for the other criteria were smaller, with the two criteria shown, “Correctness” and “Ease” being typical examples. Such knowledge enabled us to better satisfy our client -we decided to develop design solutions that were both “likely” (feasible) and “urgently required”.

Results: Options

Figure 3 conveys results that reinforce our suspicion about the most important criteria, for yacht club members, being likelihood and urgency. The yacht club members’ average ratings for the desirability of each of their five options are shown. Members very much preferred the feasible and urgent options to the less feasible and less urgent ones. By contrast, the 42 students who rated the same five options were keener to actually do something whether it was feasible/urgent or not, as shown in Figure 4.

CONCLUSION

This paper presents a description of the evolution of a methodology that attempts to structure the early stages, or the strategic development of a project. In four applications to date stakeholder complexity has been identified as a major obstacle to be confronted. *Strategizer '99* is an integral part of this methodology as it allows stakeholder characteristics to be analysed. Of more importance is the fact that the software permits all stakeholders’ to have the ability to be involved and to influence the decision-making process. The data mining characteristics of the software have shown the potential of this approach. However, further applications will be necessary to provide a larger data base of users before any firm conclusions about the approach’s general viability can be reached.

REFERENCES

- Cleland, D.I. (1994) *Project management: strategic design and implementation*. (2ed.) New York: McGraw-Hill
- Dell’Isola, A.J. (1982) *Value engineering in the construction industry*. (3ed.) New York: Van Nostrand Reinhold.
- Gage, W.L. (1967) *Value analysis*. London: McGraw-Hill.
- Green, S.D. (1992) *A SMART methodology for value management*. Occasional Paper No. 53. Ascot: Chartered Institute of Building.
- Kelly, J.R. and Male, S.P.(1993) *Value management in design and construction: the economic management of projects*. London: Spon.
- Macedo, M.C., Dobrow, P.V. and O’Rourke, J.J. (1978) *Value management for construction*. New York: McGraw-Hill.
- MacFazdean, E. (1998) Enhancing creative thinking within organizations. *Management Decision*. **36**(5), 309–315.
- Norton, B.R. and McElligott, W.C. (1995) *Value management in construction: a practical guide*. London: Macmillan Press.
- Rosenhead, J. (1989) *Rational analysis for a problematic world*. Chichester: Wiley.
- Saaty, T.L. (1990) Multi criteria decision-making: the analytic hierarchy process. In: Saaty, T.L. (ed) *The analytic hierarchy process series*. Pittsburgh: RWS Publications. **1**.

- Smith, J., Jackson, N. and Wyatt, R. (1998) Strategic needs analysis: searching for viable solutions. Plenary Paper. In: Smyth, H (ed) *Procs of the COBRA Construction and Building Research Conference 1998*, 2-3 September 1998, Oxford Brookes University. London: The Royal Institute of Chartered Surveyors. **1**: 60–66.
- Smith, J., Kenley, R. and Wyatt, R. (1998) Client briefing: an exploratory study. *Engineering, Construction and Architectural Management*. **5**(4), 387–396.
- Smith, J. and Wyatt, R. (1998) Criteria for strategic decision-making at the pre-briefing stage. In: Hughes, W. (ed.) *Procs. 14th annual ARCOM conference*. University of Reading, 9-11 September. Reading: ARCOM. **1**: 300–309.
- White, E.T. (1991) *Facility programming and the corporate architect*. Tucson, Arizona: Architectural Media Ltd.
- Wyatt, R. and Smith, J. (1999) Misuse of planning software by building designers: a missed opportunity? *Sixth International Conference on Computers in Urban Planning and Management*, Venice (forthcoming).
- Wyatt, R. (1999) *Computer aided policy making*. London: Spon. (forthcoming).
- Zimmerman, L.W. and Hart, G.D. (1982) *Value engineering: a practical approach for owners, designers and contractors*. New York: Van Nostrand Reinhold.