ROBUST DECISIONS

Comparison of Time required to Perform AHP and BTS Decision Analysis

The AHP process is embodied in the Expert Choice software www.expertchoice.com and other products.

The BTS process is embodied in *Accord* software, www.robustdecisions.com

Comparing two methods for the time they take is to only compare one measure of their capabilities. AHP and BTS are founded on two different sets of assumptions about supporting decision making and so the input information and results differ. Where AHP is based on pair wise comparisons as a mechanism determine the relative importance of the criteria (referred to as "objectives" in AHP)) and for evaluating the alternatives relative to them, BTS bases its input of information on graphical maps and number lines to capture both evaluation and uncertainty information.

In this brief report, three comparisons are made:

1. The number of steps needed to input a problem. The number of steps is assumed to be proportional to the time it will take to input a problem. For some information input is easier in one program and vise versa.
2. The number of steps needed to change a problem. It is assumed that most problems are evolving and that the alternative courses of action or the criteria will change as more is learned about the issue.
3. Number of steps needed to change a criterion. It is assumed that the number of criteria stays the same; just that one of them has been changed to some other measure.

For comparison, a problem with 5 alternative courses of action and 10 criteria will be compared. In the AHP methodology, often criteria are broken into a hierarchy, reducing the number of steps. Thus, the AHP will be compared as if all the criteria are at the same level, AHP1, and a second with two sets of criteria, one with three children and the other with seven children, AHP2.

To make this comparison fair, it was assumed that all *Accord* evaluations were completed using the Belief Map as the Number Line input allows for detailed uncertainty information to be captured, a feature which AHP does not support.

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1. Number of steps to input a 5 alternative, 10 criteria problem

Task	Number of Steps or Input Actions		
	Accord	AHP1	AHP2
Input of the Issue, Criteria and Alternative names	Same		
Weight Criteria	10	44	23
Set Criteria Utility Curves	20	20	20
Evaluate Alternatives versus Criteria	50	100	100
Total	80	164	143

2. Number of steps to add an alternative

Task	Number of Steps or Input Actions		
	Accord	AHP1	AHP2
Add name	Same		
Add evaluation information	10	50	50
Total	10	50	50

3. Number of steps to change a criterion

Task	Number of Steps or Input Actions		
	Accord	AHP1	AHP2
Change Criteria name	Same		
Weight new Criteria	1	9	2 or 6
Set Criteria Utility Curves	2	2	2
Evaluate Alternatives versus Criteria	5	10	10
Total	8	21	14 -18

In general, *Accord* takes less then half the steps or input actions to define or change a problem. The number of steps is proportional to the time needed.