Abstract

When making a decision, there are many different methods which can be used to come to a conclusion. Many of them, such as Six Thinking Hats and Star bursting rely on more qualitative measures, meaning the decisions which are being made are backed up with different thought processes. On the other side, there are Decision Trees and Plus/Minus/Interesting methods that rely on a scoring system or probability, usually involving mathematics or simple arithmetic.

The aim for this research paper is to analyse a variation of decision making tools by weighing up the advantages and disadvantages, to see which method can be adaptable to most situations. Research on success stories for the methods will also be completed, as well as which tool would be best for certain scenarios.

Introduction

When making a decision, an individual can use many different decision making tools to find a solution. There are several methods of making a decision: using intuition, regular routine, expert suggestions, random choices and rational. What will be focused on in this paper will be rational decision making tools.

To make a rational decision, one must use the collection of facts and information to come up with a structured solution. The first part of this paper will focus on quantitative methods, followed by qualitative and then concluded to which method is most likely to be used when making managerial decisions.

“Quantitative decision making is most useful when there is a rational policy for obtaining the outcomes.” (Goodpasture, 2003). Goodpasture goes on to explain Using quantitative analysis when it comes to decision making makes use of applying a quantity to a decision choice and either comparing the value to others or using pay-off methods to calculate outcomes and probabilities. There are many methods of decision making that use quantities, however the ones that are notable are:

- Grid Analysis (Decision Matrix)
- Cost Benefit Analysis
- Decision Trees
Each of the above mentioned methods use numbers to quantify and justify which decision choice should be chosen.

**Grid Analysis (Decision Matrix)**

The grid analysis method is useful when making a decision that involves many factors. A grid is created with “factors” and the options on either axis. The factors are the outcomes you want when making a decision and options would be the alternatives which can be chosen. The bases of this type of tool are to weight, or score each factor for each option. The weights themselves are weighted in order of importance which is then multiplied by the weights given to the factors, which are then totalled to give a score (www.mindtools.com). The advantage of this approach is that it gives the decision maker a clear indication on the level of importance of each criterion in relation to the options. The visual representation of a grid analysis also makes it easier to see how one option fares against another. However with this approach would be strictly rational, and the alternative may be the least favourable one. A decision matrix was used by the National Fire Academy for its emergency medical services department. The decision matrix was created after they had completed their research (Grill, 1998).

**Cost/Benefit Analysis**

Cost/benefit analysis uses the cost of a decision the benefit of that decision. This method puts a monetary value on the decision in question as well as looking at the advantages it will produce. The main reason for using this method is to see if the benefits out-weigh the costs. A simple method of calculation would be to find all costs associated with the decision, then to find the payoffs the decision will make. The costs are then divided by the benefits which will then produce a payback time. This gives the decision maker the opportunity to estimate how viable the decision will be and can decide to whether to carry forward with the decision or abandon it. There is a lot of controversy for using this method, for example there are often inaccuracies when calculating the costs (Moore, 1995). Flyvbjerg explains that to make a accurate forecast, the optimism bias should be curbed, “Optimism bias and strategic misrepresentation are both deception, but where the latter is intentional, the first is not, optimism bias is self-deception.” (Flyvbjerg, 2006). , in another paper explains the inaccuracies of calculating the benefits. Cost-benefit analysis is an extremely rational tool; however the problem of calculating inaccurate figures can manipulate the whole decision process. The car manufacturer Ford had used cost-benefit analysis to make a decision to either recall a specific model of car or not (http://www.safetyforum.com).

**Decision Trees**
A decision tree is outlines several options or choices, the probability outcomes and also costs. This method is similar to the grid analysis in the sense that it is a visual representation of the decision that needs to be made. The decision tree is made by having a starting node with usually two branches expanding outwards with the main decisions that need to be made, the branches extend out further, breaking the decision down in more detail. Each decision is then allocated a probability; depending on what the decision maker thinks will be fair, along with the payoff. The probability is then multiplied by the payoff. The result will determine if the decision is worth carrying forward with. The advantage of using this method is that it is relatively easy to layout the decisions, and if the probability is fair then the decision can be made. The graphical representation also makes it easier to interpret and view. However with this approach, there is not a lot of hard data and decisions are not explained fully.

The decision tools mentioned above would be classified as purely rational; they use some method of arithmetic to produce a solution to help the decision maker. The problem faced with these tools is the fact that there is not enough information to back up a decision. The methods are scientific, and with the correct variables, a good decision can be made, or one that has adverse effects. To understand why decision should be made, other decision tools should be analysed.

**Qualitative Decision Making Tools**

Whereas decision tools analysed above, there would still be a degree of uncertainty because of the lack of evidence backing it up. "We can often expect users to present information in a qualitative manner, including qualitative preferences over outcomes (one outcome or proposition is preferred to another) and qualitative probabilities (describing the relative likelihood of propositions or outcomes)." (Boutilier, 1994). Boutilier comments on how reasoning strategies can be used with mathematical decision making tools to make a more structured decision. Out of the many qualitative decision making tools that can be used, the ones that will be focused on will be:

- Six Thinking Hats
- Star Bursting
- Stepladder

The three decision methods that have been listed above can be categorised as descriptive as they which looks at the reasons why decisions are made based on the behaviour of people.

**Six Thinking Hats**
This method for decision making was created by a physician named Dr. Edward De Bono. Six Thinking Hats (STH) gives the decision maker the chance to look at making decisions from more than one perspective. This method is used by the decision maker metaphorically wearing a coloured hat (white, red, black, blue, green and yellow) which coincides with a different perspective (factual, emotional, pessimistic, process control, creativity and optimistic, respectively). This gives the decision maker to make a decision which “allows users to objectively approach a situation and thoroughly explore the possible weaknesses and dangers of that situation.” (Dymer, 2004).

Thompson and Brooks have labelled STH as creative approach to strategic planning, “The weak link in so many strategic planning models is the lack of innovation... the ability to be “creative” has become a critical component of business acumen.” (Thompson and Brooks, 1997).

**Star Bursting**

This tool is similar to a mind map or spider diagram. This process involves asking questions as to why the decision should be made. The questions compromise of when, why, who, what, where and how. It is similar to brainstorming, in a sense that all aspects of the decision are accounted for, and alternatives can also be found if the correct questions are asked. However this method is time consuming if it is being used within a group. Briggs and Reinig have written a paper titled Bounded *Ideation Theory*, where they have said “Recent findings, however, call into question Osborn’s conjecture. Baruah and Paulus [6] found that training participants before a brainstorming activity increased the number of ideas groups produced but did not increase their quality. Reinig et al. [57] showed that a commonly used brainstorming technique increased idea quantity but did not significantly increase the number of good ideas produced.” (Briggs and Reinig, 2010). This shows that even though there is a quantity of ideas, there is a lack of quality. However star bursting is different to brainstorming in a sense that there already is an idea or decision and the decision maker is looking for reasons to go forward with it.

**Step Ladder technique**

The last method that will be analysed under this section is mostly used when groups make a decision. The authors at [www.mindtools.com](http://www.mindtools.com) have simplified the process for the stepladder technique:

“Step 1: Before getting together as a group, present the task or problem to all members. Give everyone sufficient time to think about what needs to be done and to form their own opinions on how to best accomplish the task or solve the problem.
Step 2: Form a core group of two members. Have them discuss the problem.

Step 3: Add a third group member to the core group. The third member presents ideas to the first two members BEFORE hearing the ideas that have already been discussed. After all three members have laid out their solutions and ideas, they discuss their options together.

Step 4: Repeat the same process by adding a fourth member, and so on, to the group. Allow time for discussion after each additional member has presented his or her ideas.

Step 5: Reach a final decision only after all members have been brought in and presented their ideas.” (www.mindtools.com).

The reason why the step ladder technique is popular is the fact that all members in the group have a chance to voice their opinions. The more contributions that are given, the more likely the solution will be favourable. Rogelberg and O’Connor have stated “Specifically, the stepladder structure creates an environment where individuals, to some extent, are ‘forced’ to participate (a communication mandate).” (Rogelberg and O’Connor, 1998). The authors also outlined that there was some disadvantages, including time constraints and best member influence, “A strong relationship between individual performance and group performance would be another indication that the individual positively influenced the group with regard to decision quality.” (Rogelberg and O’Connor, 1998).

The tools mentioned above are quasi-rational. They all rely on factual information, but also have the decision makers out opinions. These methods would be best used in situations where monetary payoffs are not the primary problem.

**Conclusion**

After looking at the different types of decisions making tools, which one would most likely be used? Both methods have their merits and downfalls, and for a decision maker to make an informed decision. Brousseau et al have written a paper about decision making styles for executives. Below is a matrix to which a decision maker can use to see which style would be best for a decision:
The matrix uses the availability of information to the options available to the decision maker. Depending on how they fare in the matrix, they can choose the following decision tools mentioned above or perhaps something similar. However a good decision maker should be able to adapt to different situations and should be familiar to various tools and be able to utilise them to make a decision that omits the maximum payoff and satisfaction.

### References


