

# If The Shoe Fits – Adjusting A Value Engineering Event To The Problem Or Opportunity

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# A Little Background on Shoes



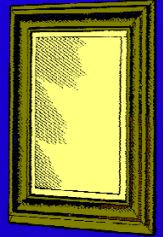
- My dad was spoiled – as a child he had two pairs of shoes
- My shoes:
  - Dancing
  - Walking
  - Dress
    - Brown
    - Black
    - White
  - Casual
  - Work Boot
  - Light hiking
  - Backpacking
  - Bicycling
  - Kayaking
  - Oversized
- And your VE closet?

# Array of Tools and Techniques

	Tools with least rigor	Slightly more Rigor	Modestly More Rigor	Significantly More Rigor	Tools with greatest rigor
Information Phase	○	○	○	○	○
Function Definition	○	○	○	○	○
Analysis of Functions	○	○	○	○	○
Idea Generation Phase	○	○	○	○	○
Evaluation Phase	○	○	○	○	○
Development Phase					



# Array of Tools and Techniques in Information Phase



Tool with least rigor	Slightly more Rigor	Modestly More Rigor	Significantly More Rigor	Tool with greatest rigor
Goal(s)	Problem Statement	Mission Statement	Three Questions  Product Performance Profile  or  Prior Anchoring Method	Three Questions  &  Value Model

# Goal(s)

- Goals:
  - A short list of expected outcomes:

	<u>Current</u>	<u>Goal</u>
Reduce Costs by 30%	\$34.50	\$24.15
Reduce scrap rate by 22%	13.00%	10.14%

# Problem Statement

- The problem statement lists only the problem to be solved.
- It usually lacks the background that gives importance and expected outcome.
- Example:
  - Our customers complain that our projectors require a lot of maintenance and are awkward to transport.

# Mission Statement

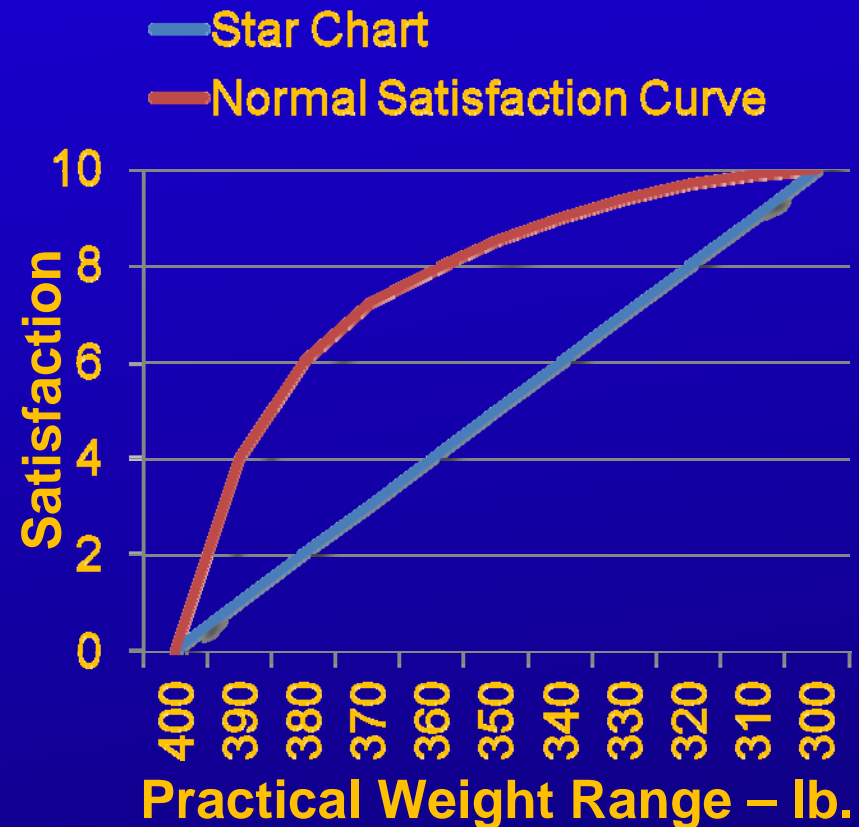
- The team knows what it has to achieve so they know:
  - The problem they are addressing
  - The expected result
  - Reason for the team's existence – why their success is important.
- Example:
  - The mission of this team is to develop a plan that increases cohesion between business units so that, within two years, they are selling a broad but common product range, instead of clustered, competing and unlinked products.

# Star Chart vs. Prior Anchoring Method

- Star Charts Assume Linearity

Satisfaction is nearly always non-linear

- Rate of increase in satisfaction usually rapidly diminishes as a measure of merit improves

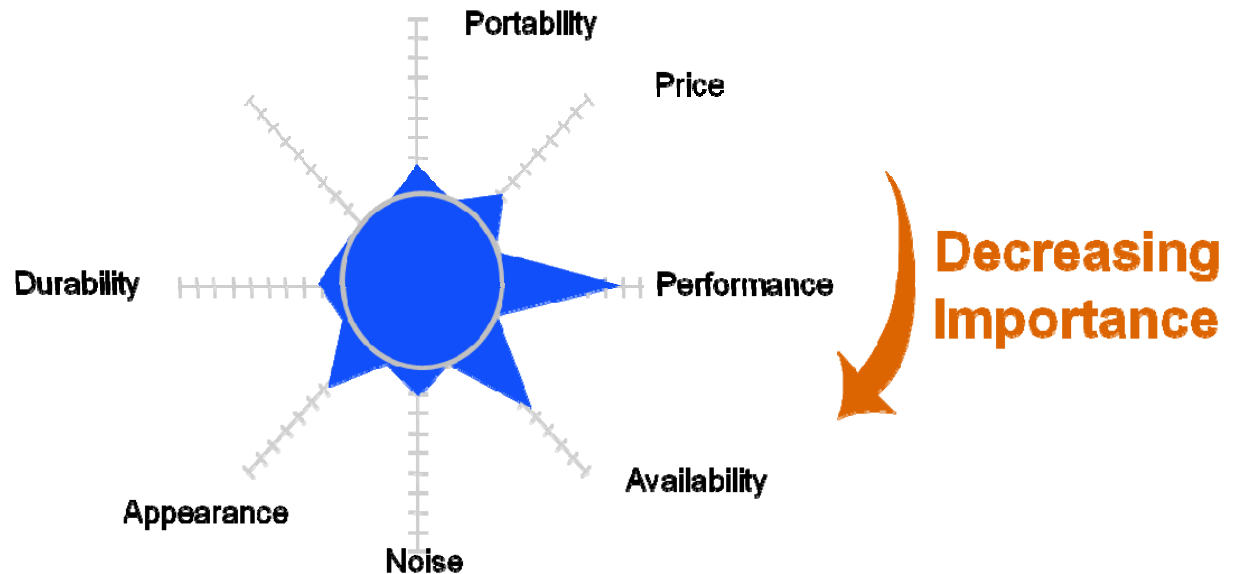


# Product Performance Profile

Shown  
with a  
Star  
Chart

## Example - Projector

Star Chart  
Score: 374  
Target: 700



ATTRIBUTE	Portability	Price	Performance	Availability	Noise	Appearance	Durability	TOTAL
A WEIGHTING FACTOR	25	23	20	14	11	5	2	100
B AVAILABLE POINTS	250	230	200	140	110	50	20	1000
YOUR SCORE (1-10)	2.0	2.4	7.4	5.5	2.2	4.0	1.1	
C YOUR SCORE (Weighted)	50	54	174	77	24	20	2	374
D DELTA (B-C)	200	176	63	63	86	30	18	626

# Prior Anchoring Method

- From Choosing By Advantages:  
  
Minimize subjectivity by anchoring judgment of “better” in objective facts
- Example of non-anchored judgment:
  - Safety is more important than cost
- Example of anchored judgment:
  - State taxpayers believe that saving 20 million dollars on this bridge is more important than reducing the number of serious accidents from 2 in 1 million cars to 1 in 1 million cars.

# Three Questions

Three Questions exercise frames problem or opportunity in the context of related tactical and strategic issues

Value Engineering Event

## 3 Questions:

1) What Is The Problem We Are About To Resolve?

Our customers complain that our projectors require a lot of maintenance and are awkward to transport.

2) Why Do We Consider This a Problem?

This is a problem because recently our projectors have become expensive vs competition and they're not selling well. Previously we were first to market, and had the top of the line product. Competitors have since produced units that are more portable and require less up-keep.

3) Why Is a Solution Necessary?

A solution is necessary because our customer base is eroding, threatening name recognition that may impact future sales of not only projectors, but other products.

# Sample Value Model of Commercial Aircraft:

**Goodness** =  $NPV_p$ (Production Profit) +  
Societal Good - Development Cost

Production Profit = Market Share x Market  
Size x (Price - Manufacturing Cost)

Price =  $NPV_c$ (Customer Profit) + Charm –  
Competition

Customer Profit = Utilization x (Value per  
Flight - Cost per Flight)

# Considerations in Creating Value Model

## ○ **Dependent Variables**

- Market Size
- Utilization
- Value per Flight
- Cost per Flight
- Charm
- Societal Good
- Manufacturing Cost
- Development Cost


## ○ **Independent Variables**

- Manufacturing Cost
- Development Cost
- Gross Weight
- Field Length
- Time to Climb
- Dispatch Reliability
- Boom Noise
- Airport Noise
- Range
- O&M Cost
- Speed
- Cabin Diameter
- Payload Weight


## ○ **Customers/ Stakeholders**

- Flight crew
- Customer corporations
- Passengers
- Leasing company
- Key acquisition decision makers
- Key suppliers
- Fuel suppliers
- Regulatory Agencies
- ITAR
- Etc.

# Array of Tools and Techniques for Function Definition

Tool with least rigor				Tool with greatest rigor
Simple Query: What is the function?	Random Function Determination	Technical FAST employing WHEN axis	Comprehensive Customer FAST	Technical FAST employing etiological axis

# Array of Tools and Techniques in Idea Generation Phase

Tool with least rigor				Tool with greatest rigor
Conventional Osborne brainstorming technique	Conventional and Reverse Brainstorming	Sketching brainstorming	Sketching brainstorming plus similar techniques for "invention required"	Employ at least six different brainstorming methods

# Conventional Osborne Technique

- It is a good technique, but...
- By itself:
  - will not yield large quantity of ideas
  - will not yield variety of ideas
  - will bore team, thereby reducing its energy



# Conventional and Reverse Brainstorming

Old Memory



New Mind

Most groups generate 17 ideas before hitting a mental roadblock. Push through to get ideas with the most impact.

Reverse  
Brainstorming

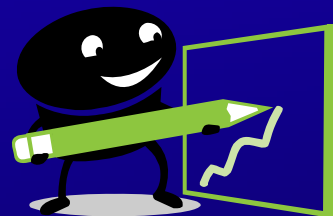
Conventional  
Brainstorming



# Sketching Brainstorming + For “Invention Required” Problem

## Sketching Brainstorming

- Step 1: Each participant sketches their ideas
- Step 2: Each idea is placed on the idea wall
- Step 3: Sketches clustered
  - Where it relates to similar ideas.
  - Where it enhances an idea




## Under the Table


- Team lays down under a table
- Brainstorms while under table



# Array of Tools and Techniques for Evaluation Phase

<p><b>Tool with least rigor</b></p>				<p><b>Tool with greatest rigor</b></p>
<p>Individuals pick ideas they want to advance</p>	<p>Nominal Group Technique</p>	<p>Gut Feel Index without discussion</p>	<p>Cursory estimate of cost savings</p>	<p>Brief Discussion &amp; ROM assessment followed by Gut Feel Index</p>

# Array of Tools and Techniques in Development Phase

Greatest Rigor				Least Rigor
<p>full non-recurring expense spreadsheets and attribute impact sheets for each scenario plus a Choosing By Advantages table for comparing proposals</p>	<p>full non-recurring expense spreadsheets and attribute impact sheets for each scenario plus a rank and rate sheet for evaluating them</p>	<p>one scenario creation menu for evaluating all scenarios.</p>	<p>one simple spreadsheet that assumes only one proposal.</p>	<p>No spreadsheet used during event. Ideas are reviewed as a team, but initiative impacts are rolled up later.</p>

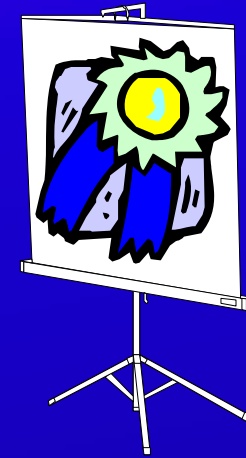
# Times for Tools and Techniques

Note: Times in hours except as noted	Least Rigor				Greatest Rigor
Info Phase - Survey					4-8 weeks
Info Phase - Event	.2-.4	.25-.75	0.5-1.0	6-8	8-12
Function Definition	.5-1.0	.5-1.0	4-6	4-8	4-10
Analysis of Functions	.20	.25	1-2	2-3	8-16
Idea Generation Phase	2-4	3-6	2-4	3-6	6-10
Evaluation Phase	.5-1.0	3-4	4-8	6-12	6-10
Development Phase	3-5	4-6	8-11	12-16	14-18
Reporting Phase	1	1-2	1.5-2.5	2-3	2-3
<b>Totals except Walk-the-Process</b>	<b>7.5-12.5</b>	<b>11-19</b>	<b>21-34.5</b>	<b>35-56</b>	<b>48-79</b>
Pre-function Def. – Walk-the-Process	1-1.5	2-3	2-3	3-4	3-4
<b>Totals:</b>	<b>8.5-14</b>	<b>13-22</b>	<b>38-60</b>	<b>23-38</b>	<b>51-83</b>

**QUESTIONS?**

...Then Conclusions

# Cautions



- Managers like **simplicity** – one size fits all
- Full blown event is **not best answer** all the time
- Using all of the least rigorous tools is probably **never** the answer
- At least **4 days** needed for Forming, Storming, Norming & Performing

