Using Value Methodology Tools to Enhance Competitive Bid Proposals: A Secret Weapon

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BIOGRAPHY

Fred Kolano, CVS-Life, holds a B.S. in Industrial Engineering and a Masters in Business Administration, West Virginia University, with 25 years of experience in engineering, manufacturing, and value management. This base is a valuable source of hands-on experience that is very useful in leading Value Engineering Studies. He has led Value Engineering Studies and training for government and industrial clients, and he has facilitated many Value Engineering improvement studies of technical facilities and processes. Mr. Kolano's value engineering assignments have included facility upgrades and process improvements in the chemical and aerospace industries, environmental restoration, waste management project design, transportation facilities, and management processes.

BIOGRAPHY

Mr. Manjiv S. Vohra is the President and CEO of ECC, a diversified worldwide environmental, construction, and UXO firm focusing on providing services and construction to the U.S. Federal government. He has a Bachelors Degree (Panjab University, India) and Masters (Tulane University, New Orleans) degree in Chemical Engineering, as well as an MBA from the University of San Francisco. Mr. Vohra is a Registered Professional Engineer in Civil Engineering. He is the corporate sponsor for value engineering efforts within the firm. Mr. Vohra has successfully applied the VE concept since 1993 on projects ranging from captured enemy ammunition in Iraq to nuclear facility decontamination and demolition for the Department of Energy.

ABSTRACT
This paper describes several modifications to the traditional Value Methodology that proved helpful in enhancing proposals for competitive bids. The modifications helped to accomplish a thorough evaluation and understanding of the bid under consideration by using function analysis, performance measures, and strengths and weaknesses analysis. A shortened method to perform evaluation is also provided, which can save considerable time during the conduct of a study.

BACKGROUND
ECC, Inc. is a small business that manages numerous government contracts. Key to obtaining these contracts is developing and submitting a bid proposal that becomes the winner. Over the past several years, ECC has used the Value Methodology to enhance the development of winning bids. This paper will describe and discuss the application of the methods that were used to develop winning bids and will guide the reader in applying them to enhance bid proposals.

Over the past several years, the contracts that form the core of ECC's business have become increasingly more sophisticated and have tended toward cost-plus contracts rather than fixed-price bids. As the complexity of projects has increased, clients have tended toward greater requirements for proposals, and the following trends have been observed:

1. **Greater Use of "Best Value" Procurements:** Simpler projects are typically fixed-price bids, where the only criterion for winning is to provide the lowest bid. As complexity increases, the government tends toward "technically acceptable/lowest bid" scenarios, where all bidders must meet a technical threshold before their costs are evaluated. For more complex projects/programs, the government tends to use "best value" selection, where the technical and management proposals are "traded-off" against cost, hopefully resulting in the best combination of price and qualifications for the project/program under consideration.
2. **Target Cost/Schedule Contracts:** Simpler projects are typically fixed-price; projects with simple execution but unknown level of effort are fixed unit price or time and materials; and those with increasing complexity are either cost-plus-fixed-fee or cost-plus-award-fee. For technically complex projects where the government intends to incentivize the contractor to complete within budget or schedule, it tends to use "target cost/target schedule" cost-reimbursable contracts.

The first request for proposal that ECC pursued was for a decontamination and demolition (D&D) proposal. To develop a proposal that adequately addresses the customer's needs and shows evaluators why ECC should be selected, a draft proposal was written based on technical, cost, and management approaches. This document would typically be reviewed, polished, and then submitted as the final proposal to the government. In this case, this draft document was used as the base case, or original concept, on which to apply the Value Methodology.

VALUE ENGINEERING APPROACH TO PROPOSAL ENHANCEMENT
To apply the VE methodology, a multi-disciplined team was selected. This team of knowledgeable individuals represented the critical program disciplines needed to understand the structure of the competitive bid that was under consideration. An experienced VE facilitator led the team through the VE Job Plan to bring about changes and enhancements to the proposal.

These sequential phases—Information, Function, Creativity, Evaluation, Development, and Presentation—were conducted.

Proposal Enhancement VE Studies performed by ECC have typically been conducted in three days. Generally, the individuals that would attend the VA Proposal Enhancement Study are senior program and project personnel, as well as at least one senior executive. Time is important to them, particularly with a proposal deadline looming; thus, the study agenda must be tailored to provide the maximum possible benefit within a three-day session. The goal of the studies was to identify strengths that set us above the competition. Ideas generated during the study would find ways to achieve this goal. See Attachment A for a detailed agenda.

The Information and Evaluation phases were found to be critical in finding potential changes to successfully enhance the draft of the bid proposal. The activities of each of these two important phases will be discussed below.

Due to the trends discussed above, it is becoming more and more important that the proposal be very compelling in its justification of "best value" for the client. At the same time, it is very important to ensure that the financial (and other) risks being taken by the firm are properly understood and quantified.

Since the various people working on a proposal have widely differing educational and experience backgrounds, it is important for the entire team to understand the various aspects of the proposed approach that is being considered, and to help them identify and focus on important considerations to winning the contract and manage the risk during execution. The rigorous use of functional analysis is key to breaking through the "techno-speak" of the various technical disciplines, and it allows the entire team to develop a shared vision of the actual function being performed in each part of the project.

During the proposal enhancement studies, the Value Methodology Job Plan was followed, but it was modified to accommodate the time constraints of the participants. The Job Plan consists of Information, Function, Creative, Evaluation, and Development phases. The modifications to the plan are discussed below.

One key feature is to determine how much the value of the proposal has been improved because of the study. The value of the proposal is determined at the start and at the conclusion of the study. The change is the value improvement that was a result of the study. This concept is further explained in Development Phase Techniques later in this paper.

INFORMATION PHASE TECHNIQUES

SWOT Analysis

All proposals are inherently competitive—there can be only one winner, and we typically have a very good idea of the competitive field. In order to keep the Information Phase discussions focused on the win, and to fairly evaluate our chances (with the base case) of winning the contract, we used a TOWS matrix. This matrix allows us to independently review the team's Internal Strengths and Weakness, as well as External Opportunities and Threats, and then use

combinations of internal and external characteristics to design strategies to improve the chance of winning the proposal and/or reducing the risk of performance. The diagram shows the four standard types of strategies that can come from TOWS analysis.

Internal Factors / External Factors	**Strengths (S)** Strengths in management, operations, finance, marketing, R&D, engineering	**Weaknesses (W)** Weaknesses in areas shown in the box of "strengths"
Opportunities (O) Current and future economic conditions, political and social changes, new products, services and technology	**SO Strategy** Maxi-Maxi Potentially most successful strategy, use strengths to take advantage of opportunities	**WO Strategy** Mini-Maxi e.g., overcome weaknesses in order to take advantage of opportunities
Threats (T) Lack of energy, competition, and areas similar to those shown in the "opportunities" box above	**ST Strategy** Maxi-Mini e.g., use of strengths to cope with threats or to avoid threats	**WT Strategy** Mini-Mini e.g., retrenchmnet, liquidation, or joint venture

STRENGTHS: A *strength* is a resource advantage relative to competitors and the needs of the client; it is a *distinctive competence* that gives the firm a comparative advantage in the marketplace. Here the VE Study Team will identify what makes them better than the other organizations seeking to win the bid. Questions to ask the team would include: What are the strengths of the existing bidding team? How do they stack up against the competition? Why would the selection committee want to pick the ECC Team? Desired Outcome: A comprehensive understanding of where the ECC team excels, and to use this as a foundation from which to enhance the proposal.

WEAKNESSES: A *weaknesss* is a limitation or deficiency in one or more resources or competencies relative to competitors that may impede the ability of the firm to win the contract. Knowing where improvement is needed is rooted in understanding which areas are weaker than the competition's. Questions to ask might include: What are the weak areas of the existing bidding team? Whose expertise does not meet or exceed the competition's? How do our methods, procedures, and business model stack up against the competition? Why would the selection committee identify these as characteristics that would lead to the rejection of the ECC Team?

OPPORTUNITIES: An *opportunity* is a major favorable situation in the firm's environment. What are the external opportunities that may impact this contract? Typical opportunities may arise from a change in regulations or a new technology that may come online in the near future. What areas of expertise and experience can the team use to enhance the bid? How can we exceed the expectations of the customer?

THREATS: A *threat* is a major unfavorable situation in the firm's environment. Typical threats are the entry of new competitors, the formation of more competitive teams with multiple competitors, or negative changes in technology. What can the competition do to show the bid evaluators that they should be selected?

The desired outcome of this exercise is to come up with risk mitigation or value enhancement strategies that leverage the team's strengths to take advantage of opportunities or to overcome threats.

Performance Measures

To define value, non-monetary success factors are important. These factors are the somewhat intangible factors that can be key to winning a bid. They are sometimes called performance measures or attributes.[1, 2]

Usually in a proposal enhancement activity there are many non-monetary success factors related to the proposal. Examples of performance measures could be customer acceptance of a technical approach, regulatory acceptance of the technical approach, perceived risk of the management approach on cost and schedule, aggressiveness and reasonableness of production rates, thoughtfulness and completeness of the schedule, environmental impacts, etc. Some examples are shown below.

These performance measures (non-monetary success factors) help the team understand what is important to the success of their bid proposal. By using these measures as a standard for measurement, the team can help to evaluate the ideas. Then, near the completion of the VE Proposal Enhancement Study, the team can make an overall evaluation of how the new ideas that will be incorporated into the proposal will improve overall value.

Measure	Definition	Rating Scale	Unit of Measure/Quantification
Environmental Impacts	An approximation of the concept's overall effect on the surrounding environment. Include habitat impacts.	10 9 8 7 6 5 4 3 2 1	Minor improvement upon existing environmental conditions No environmental impacts Negligible degradation Minor degradation (**Original Proposal Rating)** Moderate degradation Major degradation
Maintainability	A measure of how well the concept will reduce the frequency and duration of maintenance activities.	10 9 8 7 6 5 4 3 2 1	Very Well Moderately Well Well **Original Concept Rating** Poor Very Poorly

To capture the effect of performance factors on ideas generated during creativity, performance measures are identified, defined, weighted, and scaled. The draft proposal that the team has brought with them to the VE Study is then ranked on the scales for each performance measure.

EVALUATION PHASE TECHNIQUES

This phase of the Job Plan is tailored to accommodate the time limitations of the individuals participating in the study. To evaluate the numerous ideas that w generated during the Creativity Phase of the VE Job Plan, a quick evaluation method is needed. ECC has used a modification of the Nominal Group Technique developed by Delbecq, Van de Ven and Gustafson[3] in 1971.

In the nominal group technique, participants are brought together for a discussion session led by a moderator. After the topic has been presented to session participants and they have had an opportunity to ask questions or briefly discuss the scope of the topic, they are asked to take a few minutes to think about and write down their responses. The session moderator will then ask each participant to read, and elaborate on, one of their responses. These are noted on a flipchart. Once everyone has given a response, participants will be asked for a second or third response, until all of their answers have been noted on flipcharts sheets posted around the room.

The modification was to allow team members to have six dots to place on each function that was brainstormed during the creativity phase. The facilitator distributes packets of self-adhesive colored dots. Each team member gets six dots for each function. Then the team members go to each function and they place three of the six dots next to what they consider as the top idea for that function; two on the second-best idea; and one on the third best idea. Thirty minutes was allowed for this activity.

Sometimes team members don't like the 3-dot, 2-dot, 1-dot requirement. If this is the case, ask them to put their dots—again on each function—where they choose. Except: They cannot place more than three dots on any one idea. Also, the color of the dots usually does not have meaning; but sometimes individuals like to use a color that identifies them, or they write their initials in the dots.

Once the voting is complete, the team incorporates the ideas that received the most dots into the proposal. They work their way through all of the ideas. Some ideas may be "implement immediately," while others may require further development.

Caution: This method does have at least two pitfalls. First, there is virtually no time for the study team to discuss of the merits of the idea. Team members have little time to discuss and clarify ideas. The team usually works around this by using non-formal sidebar discussion. Before the placing of the dots starts, the facilitator should ask the team to alert him/her of any duplications or clarifications noted when they read through the ideas. If duplicate ideas are noted, the facilitator will bring this to the attention of the team.

The second concern focuses on the fact that two ideas may be very similar, and the votes may be split. The facilitator will have to see how extensive this issue may be and develop an approach to fairly resolve this concern.

Another evaluation timesaving technique is to use the RED/GREEN DOTS method for voting. Here team members are given only red and green dots, to place next to each function. Each color or dot is recorded and displayed in a list. An example is provided below. (See Attachment B for more detail.)

Example: RED/GREEN DOT Creative Idea List

Red Votes	Green Votes	Idea Rating	Idea No.	Idea Title
0	9	4	A-1	Alternative layout – square plan
4	1	4	A-2	Reduce wall clearance to 10 feet
4	0	4	A-3	Provide paint inserts 4 areas
0	3	4	A-4	Eliminate the air shower
2	0	1	A-12	Eliminate emergency generator in Phase 1
0	5	4	A-14	Change roof from pitched to flat
0	0	4	A-29	Reduce clearances to 15 feet and 10 feet on each side

Legend: **Red Dots—Do Not Develop (Rate 2)** **Green Dots—Develop (Rate 4 or 5)**
Both Colors—Discuss and Assign Rating

DEVELOPMENT PHASE TECHNIQUES

Development is performed at a level that captures the key information of each idea that is highly rated. Each idea that is developed into an alternative to the original bid proposal concept covers the following key information: A description of the original bid concept, the proposed concept, advantages and disadvantages, a discussion of the benefits of including the alternative in the proposal, and a brief discussion of cost impacts.

Value Improvement

When the team has had an opportunity to document the alternatives, the value improvement for the study is determined. This is done by determining how the performance measures have changed because of the new alternatives and how costs have been affected. This is performed using the following relationship:

$$\text{Value} = \text{Performance} / \text{Cost}$$

Performance is equal to the sum of performance points. Points are calculated by taking the measure's rank on a scale of 1 (poor) to 10 (best), and multiplying it by the weight (in percent) of the measure. The sum of the points for all the performance measures equals the performance score. This calculation is performed at the start and at the conclusion of the study.

The cost is a measure of capital cost to implement, or operating cost for the key parameters of the proposal. This, too, is estimated at the start and at the end of the study.

The change between value at the start and at the conclusion determines the value improvement as a result of the study. A visual display of the improvement is shown below.

PERFORMANCE RATING MATRIX
ECC Proposal Enhancement

Criteria	Criteria Weight	Concept	Performance Rating 1	2	3	4	5	6	7	8	9	10	Total Performance
Schedule	33	Base Case								8			264
		Include 7 Alts.									9		297
System Performance	23	Base Case								8			184
		Include 7 Alts.								8			184
Technical Attractiveness	23	Base Case							7				161
		Include 7 Alts.									9		207
Regulator Saleability	14	Base Case								8			112
		Include 7 Alts.								8			112
Safety	7	Base Case					5						35
		Include 7 Alts.							7				49

OVERALL PERFORMANCE	Total Performance	% Perf. Improve.	Total Cost	Value Index (Performance / Cost)	% Value Improvement
Original Design Concept	756		18.0	42.00	
Proposed VA Alternatives	849	12%	15.1	56.23	34%
Savings			-2.9		

CONCLUSIONS

A modified Value Methodology Job Plan can be very useful in generating a competitive bid that wins. Assembling the key individuals who will manage the contract so they can fully understand what they are bidding on, and how they can structure the bid to win the contract, will help win bids. Using the above outlined modifications to the Value Methodology Job Plan can help in developing a winning bid.

The use of value engineering in preparing competitive proposals is particularly useful when dealing with a “best value” procurement. The use of functional analysis provides a common language to specialists from different disciplines and allows for meaningful discussion of not only the functions being performed at each step, but also of the cost, schedule, regulatory and

safety risk of each task. Finally, using a TOWS matrix in conjunction with the VE process allowed for synergistic strategies that substantially strengthened the proposal to the client.

For the D&D proposal described here, the VE process resulted in the following value enhancements:

Summary of Impacts of Highly Rated VE Ideas on the Proposal's Original Concept		
Criteria	**Baseline Proposal**	**Improvement from VE Study**
Schedule	30 months proposed / 36 months in RFP	Some potential schedule reduction Eight of the 41 highly rated ideas could result in some reduction in the 30-month original concept schedule.
Cost	Measure as an estimated variation from the baseline proposal.	Significant potential for cost reduction Twenty-one of the 41 highly rated ideas could result in cost savings to the original concept.
Safety	Measure as an estimated variation from the baseline proposal.	Significant potential for safety incident reduction Fourteen of the 41 highly rated ideas could result in a significant reduction in safety incidents.
Regulatory Compliance	Measure as variation from no notices of violations or violations of waste acceptance criteria	Significant potential for compliance violation reduction Eleven of the 41 highly rated ideas could result in less chance of notices of violation or violations of waste acceptance criteria to the original concept.

The cost of the project was submitted to the client at approx. 55% of the client's budget, and the schedule was 33% shorter than the client's "deadline" schedule. The proposal was successful, and the contract was awarded to ECC. Though the full competitive range was not disclosed by the client, it is our understanding that there were lower-priced offeror(s) that were un-successful, apparently due to a higher perceived performance risk or a lower "value." Similarly, there were higher-priced offeror(s) that were unsuccessful.

The use of the VE process allowed ECC to successfully present the "best value" proposal to the client.

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[1] Stewart, Robert B., *Fundamentals of Value Methodology*, Xlibris, 2005, p. 153.
[2] Kaufman, J. Jerry; *Value Management*, Crisp Publications, Inc., 1998, p. 77.
[3] A. L. Delbecq and A. H Van de Ven, "A Group Process Model for Problem Identification and Program Planning," *Journal Of Applied Behavioral Science* VII (July/August, 1971), pp. 466-91 and A. L. Delbecq, A. H. Van deVen, and D. H. Gustafson, *Group Techniques for Program Planners* (Glenview, Illinois, Scott Foresman and Company, 1975).

ATTACHMENT A

Value Engineering Study Agenda
Baghdad Program Office Enhancement
February 7-10, 2006, Marlborough, MA

TUESDAY, FEBRUARY 7

INTRODUCTIONS AND OPENING REMARKS **8:00**
- ✓ Your name, organization, expertise
- ✓ An interesting fact about yourself, your family, and/or your hobby
- ✓ Your expectations of the meeting
- ✓ Your WOW factor

PURPOSE OF VALUE ENGINEERING WORKSHOP **8:30**
- ✓ Learn about VE and Function Analysis Technique Diagrams
- ✓ Identify and develop multiple ideas for implementation in our technical and cost proposal

BRIEF OVERVIEW OF VALUE ENGINEERING PROCESS **8:45**

INFORMATION PHASE **9:00**
- ✓ Overview of the Baghdad Program Office Operations
- ✓ Discussion of program requirements and deliverables
- ✓ Key issues and concerns
- ✓ Discussion of the team structure
  - ♦ Strengths
    - ▪ Personnel and experience
    - ▪ Past experience in similar situations
    - ▪ Organization of the team
  - ♦ Weaknesses:
    - ▪ What areas of our proposal need to be shored up or improved?
  - ♦ Opportunities
    - ▪ How can we exceed expectations?
    - ▪ How can we show a competitive edge over our competitors?
  - ♦ Threats
    - ▪ What problems stand in the way?

BREAK **10:00**

FUNCTION ANALYSIS PHASE **10:15**
- ✓ Definition of a Function
  - ♦ Use and active verb and measurable noun (e.g., characterize waste, remove contamination, demolish structure)

LUNCH **12:00**

FUNCTION ANALYSIS PHASE CONTINUED **1:00**
- ✓ FAST Diagramming conventions: HOW, WHY, WHEN, AND, OR
- ✓ Adding Performance and Cost dimensions to the FAST Model
- ✓ Other applications of Function Analysis
  - ♦ Products
  - ♦ Designs
  - ♦ Processes

BREAK **2:00**

CREATIVE PHASE **2:15**
- ✓ Select several Functions that need improvement for brainstorming
- ✓ Use team creativity techniques and exercises
- ✓ Brainstorm key functions to identify ideas to develop the "best approach" to improve the program

ADJOURN **5:00**

WEDNESDAY, FEBRUARY 8

EVALUATION PHASE **8:00**

- ✓ Evaluate ideas to advance into the "best approach" to win the contract.
  - ♦ Process to rank the ideas (suggestion)
    - 5 Must do
    - 4 Would like to do
    - 3 Nice to have
    - 2 Minimal value improvement
    - 1 Not worth considering further
  - ♦ Process to evaluate each idea
    1. Clarify the concept/idea
    2. Discuss advantages and disadvantages
    3. Discuss impact on SWOB
    4. Determine overall rating for the idea 1 to 5
  - ♦ Assign a champion to develop the idea
- ✓ Discussion of other Evaluation Techniques use in VE
  - ♦ Nominal Group Technique using Dots
  - ♦ Gut Feel Index
  - ♦ Pass and Fail
  - ♦ Cross Through Method

BREAK **10:00**

EVALUATION CONTINUED **10:15**

LUNCH **12:00**

DEVELOPMENT PHASE **1:00**

- ✓ Determine how each highly rated idea will be incorporated into the proposal
- ✓ Develop each highly rated idea on VE Alternatives Documentation forms
- ✓ Information needed
  - ♦ Original concept
  - ♦ Proposed changes
  - ♦ Advantages and disadvantages
  - ♦ Sketches and/or flow charts
  - ♦ Cost savings documentation
  - ♦ Implementation considerations
- ✓ Collaborate with other team members to develop the highly rated alternatives

BREAK **2:00**

DEVELOPMENT CONTINUED **2:15**

ADJOURN **5:00**

THURSDAY, FEBRUARY 9

DEVELOPMENT CONTINUED **8:00**

BREAK **10:00**

ACTION PLAN DEVELOPMENT **10:15**

- ✓ Develop an action plan to incorporate the highly rated ideas into an action plan to improve the program.

LUNCH **12:00**

ACTION PLAN DEVELOPMENT CONTINUED **1:00**

VE STUDY SUMMARY **1:30**

DETERMINE VE STUDY VALUE IMPROVEMENT

- ✓ Confirmation of action plan responsibilities
- ✓ Information needed for the VE Study Report
- ✓ Other concerns and/or assignments to implement the program changes

VE STUDY CRITIQUE **2:30**

ADJOURN **3:00**

ATTACHMENT B

A COLORED DOT EVALUATION PROCESS

Step 1 Briefly discuss each item on the list to facilitate a clear understanding of the idea. Based on this preliminary discussion, the following actions should be taken:

1. Identify ideas that are already in the baseline proposal.
2. Identify ideas that are infeasible or out of scope.
3. Identify ideas that do not satisfy the required proposal function(s).
4. Identify and mark ideas that may/should be combined.
5. Identify the obvious "must-do" ideas (e.g., user-requested changes).
6. Ideas that do not meet the conditions described in sub-steps 1 through 3, inclusive, are then prioritized by the team using the steps below.

Step 2 Use a colored dot system to vote on the remaining ideas:

GREEN = PASS = HIGH POTENTIAL RED = FAIL = LOW POTENTIAL

Team Members are provided with the following number of green adhesive dots:

X = sum of the remaining creative ideas multiplied by 10%

Example: If X is <3, provide 3 green dots; otherwise, provide X number of green dots

- Team members are provided with an unlimited number of red dots.
- **With discussion limited to only what is necessary to clarify the idea**, each team member votes by placing his/her dots on the ideas. Team members may not place all their green dots on any single idea.
  - Ideas without votes will be considered low potential ideas.
  - Ideas are ordered in relation to the number of green dots received.

Step 3

- Ideas with both green and red dots trigger a discussion
  - The group discusses and reaches consensus on whether to develop the idea. If it will be developed, the idea is ranked according to the number of green dots received.

Step 4

- Ideas are grouped into similar areas of expertise needed for a successful bid.

Step 5

- The top ranked ideas will be prioritized for development, and the work shall be distributed equitably among all team members. Those individuals without specific technical expertise may be assigned to assist other team members with research, sketches, etc.
- Remaining ideas will be developed as time permits.