

## Integration of Value Methodology with Supply Chain - Key for Long Term Sustenance

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DOI: <https://doie.org/10.0215/Aper.2025413620>

### ABSTRACT

The major challenge which the Supply chain managers are facing is to transform the supply chain to customer centric. The major emphasis is on how to ensure the production process so that the products could be delivered cost effectively to the customer. However, with global increase in competition the management should focus more on delivering the products which is most appropriate in the target customer segment.

In today's highly global competitive marketplace, the market favors whichever the supply chain that satisfies them the best. The strategic aim of the supply chain must be on the higher levels of customer responsiveness. Thus, the agility rather than cost becomes the key driver. The supply chain must be designed to get the customer on driving seat. Coordination and operational integration of supply chain members must be significantly strengthened to counterbalance the increased volatility of market behavior.

In this paper author tried to analyze the entire supply chain process using Value methodology tools (JOB Plan) to understand the bottlenecks in the process which is hindering the supply chain in becoming customer centric rather than supplier centric. Using the different phases of Value Study study phases (Information, Function, Creative, Evaluation and Presentation phases). The author has come out with the solution to key challenges being faced by Supply chain in becoming Customer centric to deliver desired value to the customers.

**Keywords:** Value Engineering, Function, Creativity, Innovation, Supply Chain, Agility

### INTRODUCTION

In an era of increased competition for supply chain the followings are the key challenges being faced in delivering improved valued products for better sustenance in the target market segment. These challenges are being faced by both private and public industry for their survival.

1. Customer centricity: Where in the supply chain should be focusing on improving value from customer perspective rather from manufacturer perspectives to produce the product
2. Managing Supply Network: The second challenge is take on the whole supply network and manage it as an integrated entity. Managers see only the legitimate platform for them to exercise control is their own organization, beyond which is the supply chain. Companies will not stand alone in the competition. It will affect the supply chain outside the company boundary. The survival of the supply chain is the survival of the organization.

3. Watch the Dynamics: The third challenge is how to survive the dynamics of the never-ending supply chain evolution. The future of supply chain will face unprecedented dynamics in terms of structural dynamics, technological dynamics and relationship dynamics.

Hence, it is imperative that, the supply chain team to establish the winner ship on the above challenges. Application of VE methodology (JOB plan) may be effectively helpful in identifying the supply chain elements which is not contributing in catering the above challenges. At the same the same tool has helped in exploring the best way to manage the above challenges.

**Applying JOB plan to Proposal development for catering to the above challenges:**

The life cycle of Supply chain development process to win the above challenges closely mirrors the VE JOB plan. It includes eight phases, which are repeated throughout the working relationship.

**Parallels Between the Job Plan (VE Tools) and the Supply Chain Process**

<i>Sl.</i>	<i>VE JOB Plan Phases</i>	<i>Supply Chain Process</i>
1	Prestudy	Get to know about the various nodes of the supply chain and their feedback
2	Information	Learning about the Purpose, Needs, Challenges, and Criteria for success of the Supply chain model
3	Function Analysis	Preparing the proposal-Organizing the document and identifying concepts to convey benefits
4	Creativity	Preparing the Proposal-Brainstorming Innovative ideas to be Conveyed that meet Supply chain process performance and proposal evaluation criteria
5	Evaluation	Preparing the Proposal-Evaluating the Ideas against criteria during proposal draft reviews
6	Recommendation	Preparing the Proposal-Writing and refining the Content Submitting the Proposal and Presenting at the Interview
7	Implementation	Performing as promised
8	Audit	Capturing the benefit accrued

**Table1**

**PRESTUDY: Big Picture Alignment**

The Pre study Phase in the VE Job Plan includes defining study scope and objectives and gathering information about the project-including its scope, designs, reports, estimate, cost models, schedule, risks, and constraints. This is done to develop a clear understanding of study priorities; define VE study scope and expectations; and provide a thorough overview of the whole project.

In similar ways, the Pre study phase of the Supply chain process seeks to develop a big-picture understanding of the organization's needs or project objectives. It also examines the fit between different nodes of the supply chain (like the organization and suppliers)

### **The Big Picture for the Organization:**

In the context of Supply chain development process, it is always a good idea to regularly review the organization's mission, goals, objectives, and marketing plan to verify that the program or project to be pursued fits the plan. In order to understand the bigger picture of the organization, following questions may be asked.

- What do the organization want to be doing in the next few years? On what types of projects?
- How best support the organization provide to the other member of supply chain?
- What are the strengths?
- What kind of return-on-investment management can expect?
- In what better ways the supply chain nodes could be coordinated?

### **The Big Picture of the other member of supply chain:**

In the similar way management also needs to understand the vision, mission, goals and objectives of the suppliers. Collecting the information related to the specific challenges being faced by the suppliers may be helpful in assessing the success. Complete information about the suppliers will be useful in creativity phase for exploring different set of options for success of supply chain process. This may also be useful in finalizing the evaluation criteria during the Evaluation phase.

This will help in assessing whether the suppliers vision, mission are aligned to the bigger picture of the organization.

The most important information that can be gained from such a conversation comes from asking about the challenges that the individual supplier is facing. This includes the following.

What are the project's drivers (purpose and need)?

- Is project funding in place?
- Are there adequate staffing resources suppliers end?
- What interagency and/or internal politics may be at work?
- What stakeholder groups are involved?
- What are the technical challenges?
- Are there other challenges?
- What criteria will define success for the project?
- With which of competitors is the supplier working? How are they performing?

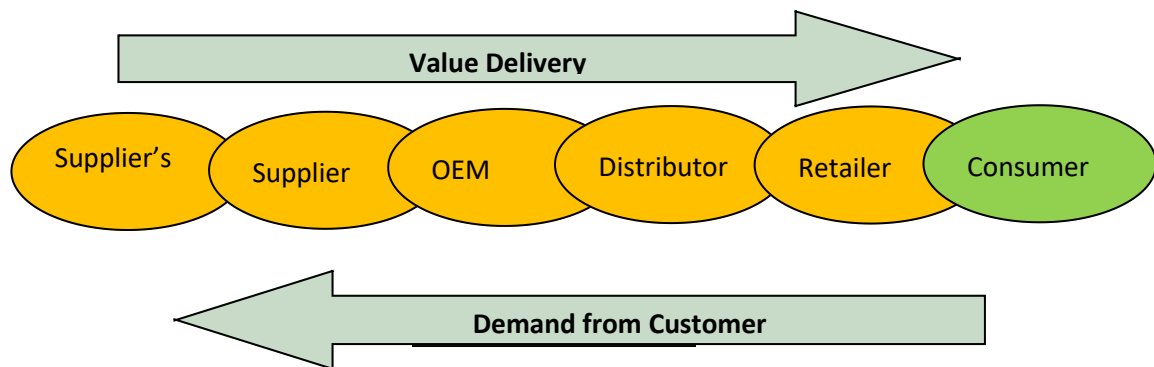
### **Alignment of Company and their Supply Chain Member**

After developing an understanding of organization and suppliers' big picture, this is the time to assess how well these align. Use of a comprehensive, objective "Go/No-Go" decision making tool by the firm is a good way to objectively assess this. If the supplier needs to fit

what the organization can offer, this presents a significant opportunity. If not, it may be a good idea to pursue other option or identification of other supplier. After considering what the organization has learned about the challenges the supplier is facing, what solutions can be offered? The meeting with supplier may give a chance to generate the ideas which will pique their interest. This is a dialogue and should not be confused with a presentation. Listening to the supplier and watching their reactions to the ideas and discussing them further are critical. Ask what he or she thinks. It's okay not to have all the answers at this point. Let the supplier know the plan to explore concepts further or do additional research and get back to him or her. Of course, it is important not to give away too many specifics of innovative solutions or approach, as these may be passed along to competition. Giving enough away to pique interest in how one can solve the supplier problems is the goal at this stage.

### **INFORMATION PHASE**

**Scope of Study:** All the relevant information about the organization and their supply chain are collected. All the key challenges and the boundary conditions are established. It is this phase when the organization can revisit to the supplier and reconfirm their necessary requirements and feedback. The valuable inputs may also be taken out and may used in the function phase. A supply chain is basically a group of independent organizations connected together through products and services that they separately and/ or jointly add value on in order to deliver them to the end customer.



Thus, Supply Chain Process has the following three major components.

1. Sourcing or procurement from External Sources
2. Transformation (Production), Assembly and packaging
3. Distribution or Disposal

The complete information about the above supply chain components are collected and are used in creativity phase for identification of functions.

At this point of time the performance criteria may also be established after consultation with the suppliers.

**Performance Criteria**

- Project success criteria: Through discussion with the suppliers, a good understanding should be developed as to the criteria that will define the supply chain process successful
- Proposal Evaluation Criteria: The supplier may be consulted so that the extensive evaluation criteria could be established for the different set of alternatives generated in the creative phase. It is nothing but establishing the boundary condition for the purpose of evaluation.

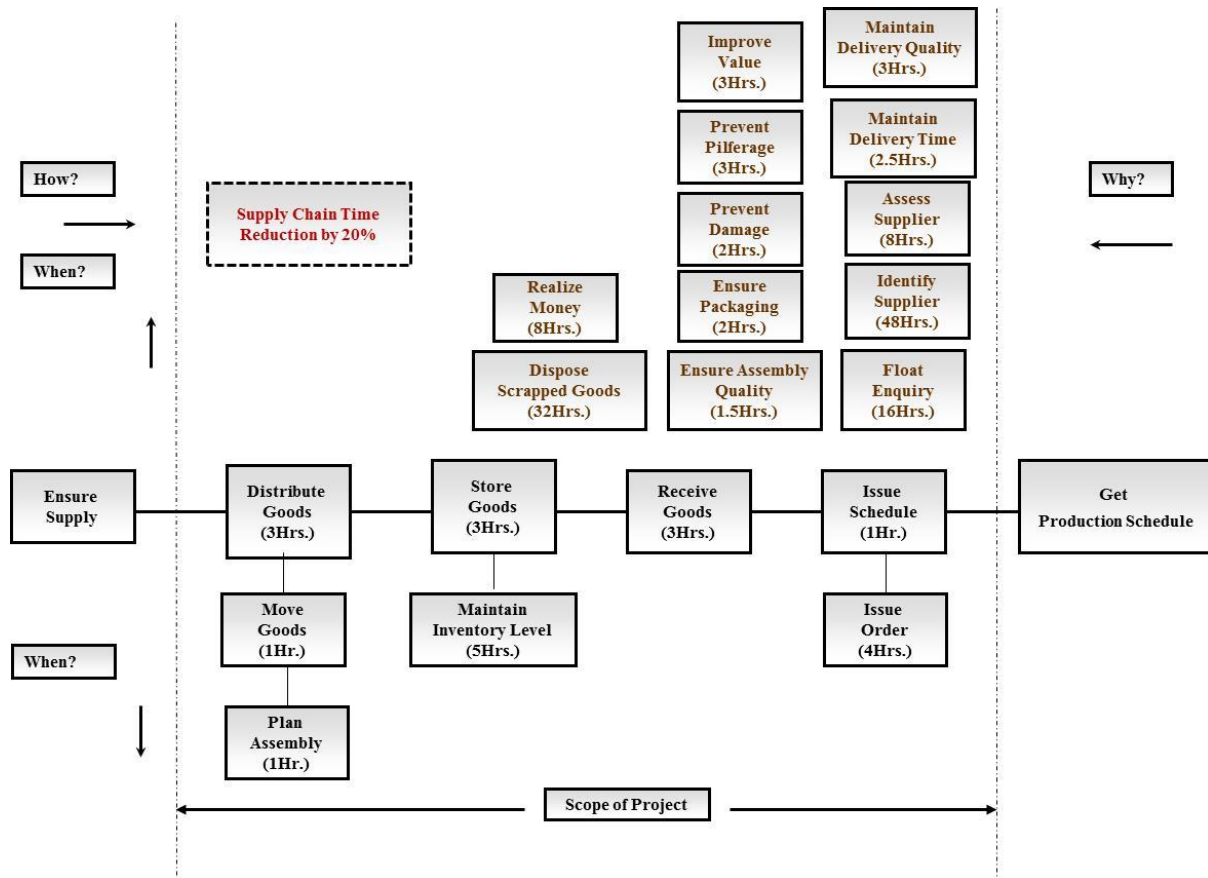
**FUNCTION PHASE:** This phase is utilized for identification and classification of different set of functions being performed by components of the Supply chain process. The following is the list of functions being performed by the individual activity of Supply chain.

<i>Sl.</i>	<i>Components</i>	<i>Functions</i>	<i>Classification</i>
1	Sourcing or procurement from External Sources	Float Enquiry	Secondary
		Identify Supplier	Secondary
		Issue Order	Secondary
		Issue Schedule	Secondary
		Receive Goods	Secondary
		Asses Supplier	Secondary
		Maintain delivery time	Secondary
		Maintain delivery quality	Secondary
		Maintain Inventory level	Secondary
2	Transformation (Production), Assembly and packaging	Move Goods	Secondary
		Plan Assembly	Secondary
		Ensure Assembly quality	Secondary
		Ensure Packaging	Secondary
		Store Goods	Secondary
		Prevent Damage	Secondary
		Prevent Pilferage	Secondary
		Improve Value	Secondary
3	Distribution or Disposal	Distribute Goods	Basic
		Dispose Scrapped Goods	Secondary
		Realise Money	Secondary

**FAST Diagram**

The functions enlisted in functional analysis as a outcome were now placed in the form of FAST diagram to understand the critical functions (series of functions required for achieving higher order function). And hence, this FAST diagram helped in finalizing the function in term of Critical, One time & All time functions. The identification of critical functions as a outcome of FAST diagram was utilized in the creativity phase for idea generation as All time, One time

functions are the consequences of the critical functions. Thus, this helped in improving the focus of VA/VE study to maximize the benefit.

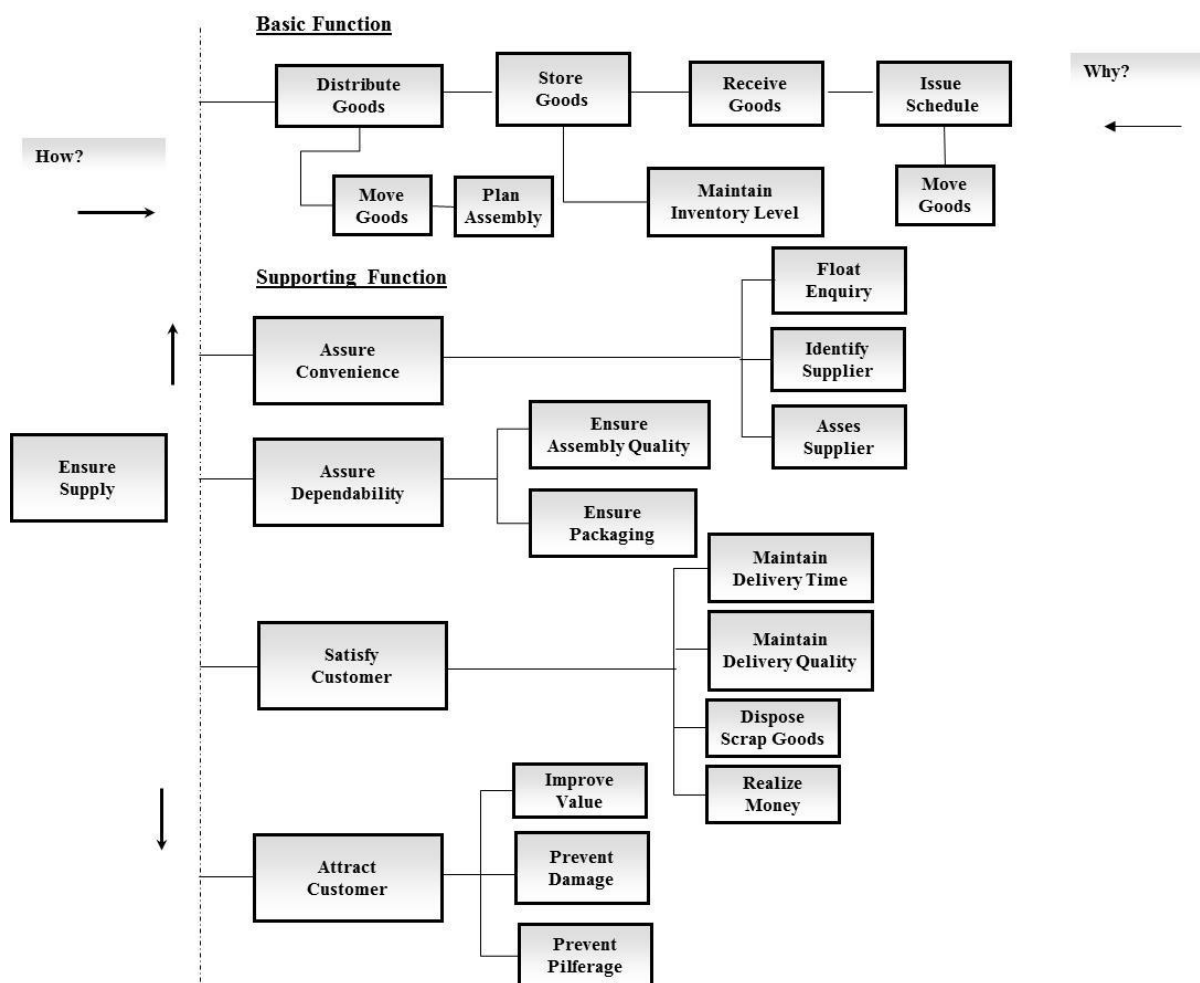


**Ratio Analysis of Functions FAST:** In order to ascertain the contribution of Critical functions in the entire Supply chain process the Ratio of the FAST diagram in term of time spend to each process was calculated. This has been done to compare the impact of the efforts put for improving the value of the entire Supply chain process.

$$\text{Worth of functions of FAST} = \frac{\text{Time spent in Critical functions}}{\text{Sum total of time consumed in all functions}} = 0.06$$

Note: Time considered for each of the function is based on the Author multifunctional experience of Supply chain process

**CUSTOMER FAST DIAGRAM**



To convince the customers (organization and the entire member of the supply chain members), the Customer FAST was drawn which gave then indication of the fact that, the process will not only take care of basic functions but also the other supporting functions like (Assure convenience, Assure Dependability, Satisfy Customer and Attract Customer) by putting the required functions in place.

**CREATIVITY: Where proposal can stand out from the Crowd**

As an outcome of the FAST, the following are the functions lying on the Critical path are the necessary requirement to meet the customer expectation. Rest others are the At the Same time functions, All Time functions or have arisen due to poor process design. Thus, the following critical functions required to be focused on. Thus, the value to these critical functions is the worth of the entire process system.

*Output functions of FAST*

- 1. Distribute Goods
- 2. Store Goods
- 3. Receive Goods
- 4. Issue Schedule

**FUNCTION-TIME-WORTH ANALYSIS**

Using this technique, the team identified the functions to be focused on during the creativity phase for idea generation. For doing so the existing time was allocated and the should be time i.e.; Time-worth was allocated based on certain basis. And the functions were sorted out in

descending order of Value Index to identify the function as per the cut off decided by the team  
 (Cut off limit: Value Index: Up to 3.00)

Sl.	Function	Allocated Time in Hrs. 'T'	Function Time in Hrs. 'W'	Basis for Worth	Value Gap (T-W)	Value Index (T/W)
20	Realise Money	8.00	2.00	Faster realisation through E-Disposal system & Payment through NEFT	6	4.00
8	Maintain Delivery quality	3.00	1.00	Review of Quality system will reduce the effort being made for maintaining the quality	2	3.00
12	Ensure Assembly quality	1.50	0.50	Review of Quality system will reduce the effort being made for maintaining the quality	1	3.00
16	Prevent Pilferage	3.00	1.00	Every material transaction to have linkage with employee code	2	3.00
17	Improve Value	3.00	1.00	Proper review of System to avoid wastage	2	3.00
18	Distribute Goods	3.00	1.00	Online direction as per production scheduling	2	3.00
6	Asses Supplier	8.00	3.00	Assesment system to be stregthened	5	2.67
9	Maintain Inventory level	5.00	2.00	Online linkage with Production scheduling to maintain the required Inventory level	3	2.50
11	Plan Assembly	1.00	0.50	Online linkage with production scheduling	1	2.00
13	Ensure Packaging	2.00	1.00	Optimisation of inner sizes of DA tank and side tanks	1	2.00
15	Prevent Damage	2.00	1.00	Propoer use of 5S concept	1	2.00
2	Identify Supplier	48.00	10.00	Linkage with E-Commerce	38	4.80
1	Float Enquiry	16.00	10.00	Linkage with E-Commerce	6	1.60
19	Dispose Scrapped Goods	32.00	10.00	Propoer use of 5S concept and incorporation of E-Disposal System	22	3.20
5	Receive Goods	3.00	2.00	Barcode system on each part will reduce time in receiving goods	1	1.50
14	Store Goods	3.00	2.00	Propoer use of 5S concept	1	1.50
3	Issue Order	4.00	3.00	Installation Online Ordering System in place of Physical hard copy	1	1.33
4	Issue Schedule	1.00	0.75	Online linkage with Production scheduling	0	1.33
10	Move Goods	1.00	0.75	Milk Run concept to moove goods	0	1.33
7	Maintain Delivery time	2.50	2.00	Online notifications to the supplier regarding the left over supplier time	1	1.25
<b>Total</b>		<b>150</b>	<b>55</b>			<b>95.5</b>

Now the following Functions were identified from above F-T-W Analysis.

- |                            |                              |
|----------------------------|------------------------------|
| 1. Realize Money           | 2. Maintain Delivery Quality |
| 3. Ensure Assembly Quality | 4. Prevent Pilferage         |
| 5. Improve Value           | 6. Distribute Goods          |



### Output Functions from FAST Diagram

Sl.	Source	Functions
1	FAST Diagram	Distribute Goods
2		Store Goods
3		Receive Goods
4		Issue Schedule

### Output Functions from F-C-W Analysis

Sl.	Source	Functions
1	Function-Time-Worth Analysis	Realise Money
2		Maintain Delivery Quality
3		Ensure Assembly Quality
4		Prevent Pilferage
5		Improve Value
6		Distribute Goods

Sl.	Source	Functions
1	FAST Diagram & F-C-W Analysis	Distribute Goods
2		Store Goods
3		Receive Goods
4		Issue Schedule
5		Realise Money
6		Maintain Delivery Quality
7		Ensure Assembly Quality
8		Prevent Pilferage
9		Improve Value

### Alternate Ways to perform Functions

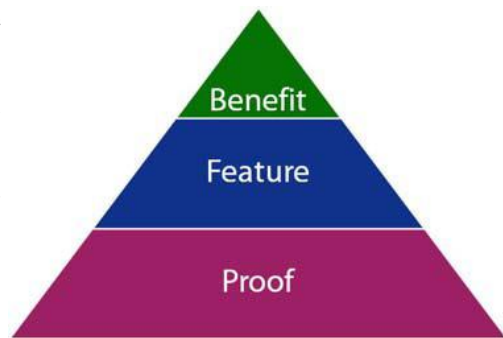
Alternate ways to perform the above functions identified from FAST & F-C-W Analysis have been explored and shown below.

**Table 3**

Sl.	Functions	Component	Ideas
1	Distribute Goods	Distribution or Disposal	1. Direct Supply to Assembly Line 2. Organise Assembly at the Suppliers end and arrange for distribution to the end customer from the Supplier only
2	Store Goods	Sourcing or procurement from External Sources	1. Create Separate Space for storing the goods 2. Create required space at the assembly line only to feed the line 3. Maintain Just in Time concept to avoid separate space for Storing the goods
3	Receive Goods	Sourcing or procurement from External Sources	1. Direct supply to Assembly Line from the supplier and payment to the supplier to be made as production booking. Hence, No receiving mechanism to be established
4	Issue Schedule	Sourcing or procurement from External Sources	1. Link the Regular or Adhoc Purchase orders with the Production scheduling so that, material supply schedule should automatically reach to the supplier.
5	Realise Money	Distribution or Disposal	1. Use of E-Disposal System and money realisation through NEFT
6	Maintain Delivery Quality	Sourcing or procurement from External Sources	1. Robust review of Quality System
7	Ensure Assembly Quality	Transformation(Production), Assembly and Packaging	1. Robust review of Quality System
8	Prevent Pilferage		1. Installation of Digital System to have linkage with employee and material transaction
9	Improve Value		1. Proper review of System to avoid wastages

### Benefits, Features and Proof

In a VE report, a workbook for a given VE alternative usually includes a description of the alternative (its features), the benefits and risks of the alternative, and an in-depth discussion that gives specifics of how the alternative will perform relative to project performance criteria and study goals (proof). Proposal components must do the same. If the key functions (like Distribute Goods, Store Goods, Receive Goods and Issue Schedule etc.) are overlooked in the proposal, the proposal would hardly convey any benefits, features and proof. These concepts can easily be conveyed when using the structure of Table 3 above to develop proposal components.



### EVALUATION: Comprehensive Criteria

#### Proposal Evaluation Criteria

In exactly the same way that project performance criteria should be reviewed with value engineering team members prior to their evaluation of ideas/proposed alternatives, the same should be done when a proposal team evaluates ideas for alternative ways to perform the functions of a proposal. The question should be asked, “Will this idea/proposed alternative help to convey how the proposed project team will meet expectations for project performance?” The stated evaluation criteria and sometimes the unstated criteria i.e.; understanding the key issues gained during the Pre study phase of the VE JOB Plan must be met in the proposal. It is critical that any stated criteria is reflected in each proposal component to which it is applicable. It can be stated within the body of the proposal or in “call-out” text boxes in the proposal margins.

#### Internal Evaluation Criteria

##### Performance Achievability

When a proposal is written with the degree of specificity and information described here, a serious “reality check” is needed to address the following questions: **What promises are being made that may become part of the contract documents? Could the team back all this up if faced with mediation or arbitration? Can the proposed project team achieve all of this? Has the team successfully done this before?**

If the answers are yes, then move ahead. If not, things may need to be scaled back.

##### The Investment

Proposals involve the commitment of a significant expenditure of resources that could be directed elsewhere within company operations. As proposed alternatives are reviewed, they need to be ranked based on the value gained by devoting the time and energy needed to develop and write about the concept.

The following questions must be asked: **What will it take for our team to be shortlisted for the interview or selected directly from the proposal? Is this overkill?** Understanding the competitive landscape and complexity of the project is central to answering this question. One thing is pretty certain in today’s highly competitive environment: the proposal needs to stand out, so aim high within reason.

Another consideration in evaluating ideas/alternatives is whether the proposal content can be used as a basis for future proposals. If it can easily be customized to meet the specifics for future proposals the organization is likely to pursue, the investment is often worthwhile.

### **RECOMMENDATION: Proposal Submittal and Interview**

#### **Submittal**

Similar to a VE report, after writing, reviewing, and refining the proposal, it is at last submitted. The main difference is that while VE reports have deadlines, proposal deadlines are mandatory and down-to-the-minute. If the proposal does a good job of performing all of the functions listed in the scope of the Technical FAST Diagram (Figure 1), it should certainly make the shortlist. And management may want interview to understand the benefits.

#### **Interview**

This is where all the work in developing a theme and carrying it through the components of a proposal, using benefits, features, and proof, pays off! The management would be highly curious in knowing the fact that whether the identified proposal would qualify or not? The emphasis of an interview should be on continuity of the theme and benefits of team's approach to the project. Enthusiasm must ring through. At this point, the interview panel is really trying to determine what it will be like to work with team. They want to know:

- Does the proposed team tell a compelling story that applies to how it will manage the issues on this contract?
- Does the proposed team's approach clearly benefit us?
- Is the proposed team cohesive and organized in their presentation?
- Does the proposed team have a good rapport and chemistry among one another and the interview panel?

#### **Debrief-Knowing Where the organization Stood Among the Competition**

Whether the pursuit is a win or loss, it is always a good idea to debrief. Through writing over 1,000 proposals and statements of qualification over two decades, the author of this paper has honed the techniques described above. By debriefing on proposals, the author has refined these techniques, based on a comparison of scoring relative to the various teams competing for projects. It's a good idea to take a good look at the highest scoring proposals to see the techniques being used. Knowing why the proposal won is just as important as knowing why it lost.

### **IMPLEMENTATION PHASE: Delivering on Promises**

If team has won the project or program, now is the time to set up the contract for success. Remember all of the statements made in the proposal and interview in terms of how things will get done, the benefits to be realized, and the results to be delivered? Assuming a thorough "reality check" was performed during the Evaluation Phase, the team should be able to deliver on its promises. **Delivering on promises has legal ramifications.** Even when a proposal is not included as part of the formal contract documents, it can be used to illustrate how a firm portrayed its knowledge and expertise related to the project.

If there is any sign that a team is not delivering on its promises, it must be addressed immediately among the team-preferably before the issues become painfully apparent to the

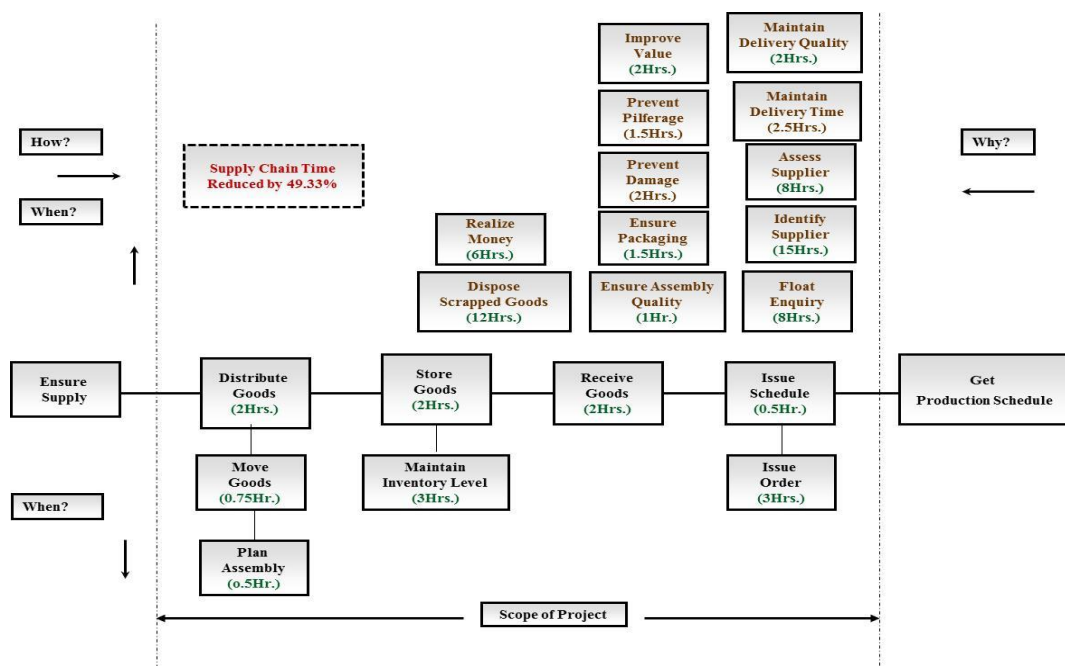
organization. Causes need to be identified, then solutions and a plan of action must be developed. Usually, the organization sees the symptoms of a problem, so a meeting with the organization and supplier that acknowledges the problem, gets feedback, and offers solutions can be an opportunity to continue developing a relationship.

Though one may believe that the team is doing a great job, maintaining a positive dialogue with the organizations and the suppliers is the only way to know for sure that he or she feels you are delivering on the promises. The use of a partnering process at the onset of the project can be a useful tool in setting the contract-and working relationships-up for success.

**AUDIT PHASE:** The management would highly be interested in capturing the benefits both tangible and intangible. The followings may be expected as the benefits from effective usages of JOB plan in the Supply chain.

- **Profitable Growth:** During Function to Evaluation phase, the focus has been made on the critical functions and functions identified in F-T-W Analysis. Rest other functions have been considered either as its byproduct or poor process design. Working on the critical functions will have direct or indirect favorable impact on other functions and hence, worth of the functions of FAST will improve after implementation of best alternative identified in Evaluation phase. Thus, the input cost of the process will improve and at the same time output will improve significantly. Hence, it will lead to a profitable growth.
- **Improved Customer service:** The use of functions identified as a output function of FAST and using this identification of the best alternative will help in improving the customer service with minimum set of functions (ie; to meet higher order function) at optimized cost.
- **Most effective Asset utilization:** In addition to the above , the utilization of the assets will further improve because asset allocation will be optimized as the critical functions .

**Technical FAST after Value Study**



Now, Worth of the Functions of FAST Diagram after Value Study will improved to **0.09** against **0.06** before Value Study. As a result of Value study the time consumption in other functions (All Time, At the Same time function) has also reduced (Mentioned in Green Color)

### **Conclusion**

VE methodology has a broad array of applications. The use of the VE Job Plan as a framework for the proposal development process can greatly improve the value of the entire Supply chain process through proper implementation of ideas recommended based on Evaluation as per Evaluation phase. By implementation of the ideas, the team has expected the benefit in time saving by 74 Hrs(49.33% reduction in time). In today's competitive climate, this can help to perform the higher-order functions of the process. As a consequence, the VE integration with the Supply chain will reap the above benefits mentioned in the audit phase. These benefits will lead the organization together with the supply chain towards long term sustenance as the required functions are completely optimized at lowest possible time (~Cost).