Value Engineering (VE^{DMAIC})

Value Engineering with the application of DMAIC (Define – Measure – Analyze – Improve – Control) Methodology

Traditional VE methodology as it's taught and applied lacks a prescriptive cook book approach. The traditional approach merely re-engineers the product for material saving and invariably lands up in material complain. To improvise on the traditional VE approach SSA produced the thought leadership by fitting the VE methodology into the DMAIC phase to ensure SSA 's new e results are achieved. Unlike the traditional model SSA's new model is quite comprehensive and prescriptive and helps design departments to institutionalize these practices. SSA will also include Key Task Scheduler as part of its VE model . KTS is a project management tool which guides the project team members throughout the journey stage wise.
SSA is also developing VE/VE software which helps in the application of DMAIC methodology in the organization

Background:

- **The origin of VE**
  Value engineering began at General Electric Co. during World War II. Because of the war, there were shortages of skilled labour, raw materials, and component parts. Lawrence Miles and Harry Erlicher at G.E. looked for acceptable substitutes. They noticed that these substitutions often reduced costs, improved the product, or both. What started out as an accident of necessity was turned into a systematic process. They called their technique "value analysis".

- **Application of VE**
  - Manufacturing
  - Construction
  - Defense
  - Environment
  - Healthcare
  - Transportation

- **Benefits so far**
  Value Engineering is a tool that will improve your ability to manage projects, solve problems, innovate, and communicate. A VE program in your organization will provide your staff with a definitive tool to improve value in any product, project or process.

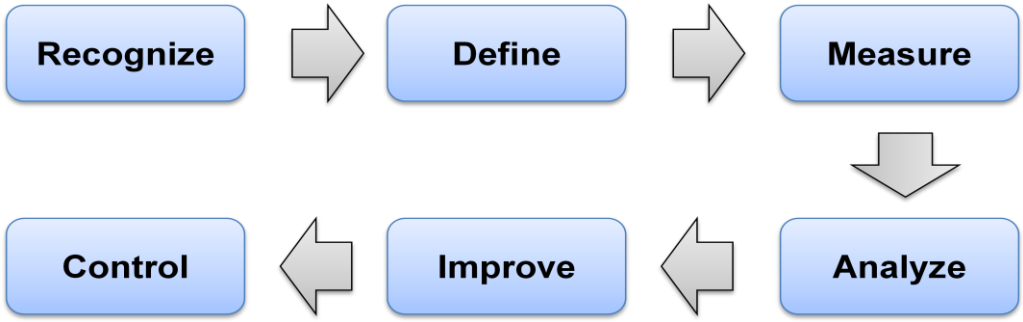
- **Scope of VE for cost effectiveness**
  - Value Engineering reduces on an average of 20% from the overall cost of the product

Drawbacks in Traditional VE approach:

- Loosely wired approach
- Limited tools to apply
- No customer perspective
- Mostly driven for cost savings in short cuts
- Assessment of worth is un-clear
- More complex steps
- No cook book approach

SSA's Thought Leadership:

- VE with DMAIC step



- Cook book approach to VE
  - **Recognize** - Select the product
  - **Define** - Identify the customer needs and state parts cost estimation
  - **Measure** - Identify parts functions and prioritize them and state functional cost.
  - **Analyze** - Identify the root cause for underlying functions
  - **Improve** - Generate and select better concepts for the functions and estimate their cost.
  - **Control** - Propose the solutions in the required functions to the top management for Implementation and Monitoring the changes.

- Tools and techniques

Phase	Tools / Technique
Recognize Phase	1) Value Mountain 2) Bubble Diagram
Define Phase	1) Collection of VOC 2) VOC-CTQ Table 3) Parts-Cost Table 4) Project Charter 5) RACI Matrix
Measure Phase	1) FAST 2) FBD 3) Customer- Function Cost Analysis
Analyze Phase	1) Why-Why Analysis 2) P-R Table

Improve Phase	1) TRIZ 2) Brainstorm 3) 6 Thinking hats 4) SCAMPER 5) P-R-S Table 6) Pugh Matrix 7) AHP 8) Decision Matrix
Control Phase	1) Presentation 2) Implementation 3) Audit

- Customer interface for worth / values assessment
- Clear measurement of as-is state
- More idea generation tools including TRIZ
- KTS - Key Task scheduler with Templates for application of DMAIC
- Suitable for institutionalizing process in any design field

What is this VE course is all about?

Value engineering (VE) is a systematic Investigation stroke analysis of a product or service to establish the function and worth of each component with an aim to optimize the worth to cost ratio.

Target Companies:

- Automotive
- Aerospace
- Auto ancillary
- Consumer durable goods
- White goods
- Healthcare
- Constructions
- Environment

Key Decision maker:

Target community:

- Designers
- Engineers
- Quality
- Maintenance
- Process Planning and Control

Target Audience:

- Chief Designers
- Industrial Designers

- Product Designers
- Design engineers
- Tool designers
- Quality engineers
- Process engineers

Course Details:

1. Training Outcome
2. Objectives
3. Contents
4. Tools & Techniques
5. Duration
    a. 2 day Course.

S.NO	Phase	Module	Content	Tools / Technique	Learning Objectives
1	Introduction	Introduction to NPD	Comparison of Old and New concept of Product Development		To create the context for Re-engineering process and to achieve robust product which gives value for money
2		Introduction to Value Engineering	1)Applications and Impact of VE in Product Development 2)Job flow of Value Engineering		
3	Recognize Phase	Product Selection	1)Team Selection 2)Training of Team 3)Market Value of Product 4)Competitor Analysis	1) Value Mountain 2) Bubble Diagram	To Identify the product to be developed and Analyze products Market Value
4	Define Phase	Product Characteristics	1)Customer Need Identification 2)Record Bill of Material 3)Evaluate Material Cost Estimation 4)Set the Target Cost for Product 5)Project Charter	1) Collection of VOC 2) VOC-CTQ Table 3) Parts-Cost Table 4) Project Charter 5) RACI Matrix	To discuss the Methodology and to understand tools and techniques to develop product from customers Stated and Latent Needs and evaluate its Cost
5	Measure Phase	Function Prioritization	1)Identify CTQ 2)Identify Functions of Parts 3) Function Analysis 4)Function-Cost ratio	1) FAST 2) FBD 3) Customer-Function Cost Analysis	To Identify and select the appropriate functions which achieve technical requirements and Analyze the Cost Factor for each
6	Analyze Phase	Root Cause Identification	1)Identify causes for non-value adding functions 2)Plot the Causes for the Problems recorded	1) Why -Why Analysis 2) P-R Table	To Identify the Root Cause for the Needed Functions
7	Improve Phase	Concept Generation	1)Different tools utilized in generating alternative concept for the Functional requirements 2)Cost Estimation for different Concepts generated	1) TRIZ 2) Brainstorm 3) Lateral Thinking 4) SCAMPER 5) P-R-S Table	To generate alternative concepts for the required Functions with respective to Cost

		Concept Selection	1)Prioritizing and Selecting the appropriate concept for the Functional requirements 2)Plotting the Solutions with respective to the Problems stated	1) Pugh Matrix 2) AHP 3) Decision Matrix	To evaluate the Robust Concept which adds Value to the product
8	Control Phase	Project Closure	1)Presentation of the proposed Solutions with Target Cost 2)Plan of Implementation 3)Monitor the changes in the Market Value of product due to new Solutions	1) Presentation 2) Implementation 3) Audit	To represent the proposed Solutions and compute the reliability of the product and Validate its performance with respective to the limitations

FAQ's:

1. What is VE / VA?

Value Analysis/Engineering is a systematic and organized procedural decision-making process. It has been used in almost any kind of application.
It helps people creatively generate alternatives to secure essential functions at the greatest worth as opposed to costs. This is referred to as value. It is also known as Value Analysis, Value Management, Value Planning, and a host of other names.

2. What is the difference between VE and VA?

Value analysis is "A Systematic and objective evaluation of the value of a goods or service, focusing on analysis of function relative to the cost of manufacturing or providing the items or service".
value analysis provides insight into the inherent worth of final goods or service, possibly altering specifications and quality requirements that could reduce costs without impairing functional suitability.
Value engineering is "Value analysis conducted at the design engineering stage of the product development process."
In summary value analysis refers to the analysis of an existing product, service or administrative process while Value engineering refers to the same analysis applied to the product ,services or administrative processes that are under design and have not been finalized.

3. How VE / VA methodology is applied?

a. Select the product
b. Identify the customer needs and state parts cost estimation
c. Identify parts functions and prioritize them and state functional cost.
d. Identify the root cause for underlying functions
e. Generate and select better concepts for the functions and estimate their cost.
f. Propose the solutions in the required functions to the top management for Implementation and Monitoring the changes.

4. Is VA/VE applied for existing or new products?

Value analysis is applied for new products.
Value engineering is applied to existing products.

5. Can VE /VA applied for a totally a new products?

Value analysis is applied for products after prototype or which are existing.
Value engineering is applied to new products in design stage.

6. What is the principal difference between Traditional VA/VE and DFMA? Which is better and why?

Design For Manufacture and Assembly	Traditional Value Engineering
1) Simplifying the part/product structure by minimizing the part count 2)Decreasing the amount of labour required for the product assembly 3)Redesign the part/product with better design efficiency and assembly score 4)Optimum manufacturing processes and material selection to suit LEAN manufacturing system 5) Procedure: 1.DFM:Part Count Reduction 2.DFA:Good assembly features. 3.DFM:Guidelines for ease of manufacture	1)Systematic review of the cost of producing a part/product 2)Evaluation of Design alternatives that could produce desired results & desired "VALUE" at the lowest cost 3) Emphasis on identifying needed functions Value suitability 4) Optimum functional value of the Product. 5) Procedure: 1.Information Phase 2.Speculative/Creative Phase 3.Evaluation/Analytical Phase 4.Development/Recommendation Phase 5.Report Phase

7. Give examples of VE application?

Automobile, Construction, Manufacturing, Aerospace, Consumer goods, Electronics , Healthcare , etc.

8. What is the certification process of SSA?

The participant's attendance for the Training should be 100% and there will be a written test post the training program.

9. Do we need to do a project?

Yes

10. Will SSA assist in project hand-holding?

Yes

11. What are the certification criteria?

The participant's attendance for the Training program should be 100% and should score more than 70% in the Test.

12. What way SSA course is unique?

a. We customize the training program
b. Most of the programs we take are live projects resembling

13. Are you covering a software along with this course? If yes what software?

Yes. The software is in developing phase.

14. Can SSA completely handle any VE project?

Yes

15. Can I independently conduct VE on my project after this course?

Yes

16. What is RDMAIC stands for and how it is different from the traditional phases of VE?

SSA Value Engineering		Traditional VE	
Phases	Objective	Phases	Objective
Recognize Phase	To Identify the product to be developed and Analyze products Market Value	Selection Phase	To select the project and train the Value Engineering Team
Define Phase	To discuss the Methodology and to understand tools and techniques to develop product from customers Stated and Latent Needs and evaluate its Cost	Information Phase	To collect all the information of the product which undergoes Value Study
Measure Phase	To Identify and select the appropriate functions which achieve technical requirements and Analyze the Cost Factor for each	Function Phase	To generate functional analysis on the part and understand the vital parts
Analyze Phase	To Identify the Root Cause for the Needed Functions	Creativity Phase	To generate better ideas for the required functions
Improve Phase	To generate and select alternative and robust concepts for the required Functions with respective to Cost	Evaluation Phase	To select appropriate idea for the parts functions
Control Phase	To represent the proposed Solutions and compute the reliability of the product and Validate its performance with respective to the limitations	Presentation Phase	To propose the selected idea to the top management for their decisions
		Implementation Phase	To implement the developments suggested by the top management
		Audit Phase	To monitor the developments made in the product

17. How much average savings are potentially identified upon conducting a VE workshop?

Value Engineering reduces on an average of 20% from the overall cost of the product

18. What other courses does SSA offer?

SSA-Techknowlogies Offerings -

Our Training Programs

	SDDP (Senior Designer's Development Program)
1	NPI^{Lean} (Lean in New Product Introduction)
2	DFSS (Design For Six Sigma)
3	VOC Benchmarking
4	QFD (Quality Function Deployment)
5	TRIZ (Theory of Problem Solving)
6	DFMA (Design For Manufacture & Assembly)
7	DFMEA (Design Failure Mode & Effect Analysis)
8	PFMEA (Process Failure Mode & Effects Analysis)
9	GD&T (Geometric Dimensioning and Tolerancing)
10	DOE (Design of Experiments)
11	VA/VE (Value Analysis/Engineering)
12	Tolerance Design
13	Reliability Analysis
	PDDP (Product Designer's Development Program)
1	Bearing Selection
2	Plastic Selection & Part Design
3	Sheetmetal Selection & Part Design
4	Casting Process/Material Selection & Part Design
5	Elastomer Process/Material Selection & Part Design
6	Fasteners Design
7	Heat Treatment processes & selection
8	Springs Material selection & Design
9	Power Transmission methods
	TS-16949 (Core Tools)
1	APQP (Advanced Product Quality Planning)
2	FMEA (Design/Process Failure Mode and Effects Analysis)
3	MSA (Measurement System Analysis)
4	PPAP (Production Part Approval Process)
5	SPC (Statistical Process Control)
6	Control Planning
	Software Training
1	Process Mapping & Simulation (Igrafx)
2	Statistical Analysis (Minitab/SigmaXL)
3	DFMA (Design For Manufacture & Assembly)