

VALUE ENGINEERING & THE AUTOMOTIVE INDUSTRY

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The term 'value' supersedes, and encompasses, both cost and quality. Unless a company's product, service or internal process is worth its cost (at the absolute minimum), it does not represent good value and cannot maintain its position in a competitive marketplace.

Given this truth and the huge pressures confronting the Automotive Industry, it provides an excellent arena in which to examine the implications of the Value Method from a cost cutting perspective. Quality is no longer a negotiable requirement, competition is rife, exchange rate fluctuations prolific and inflation well above first world levels. Yet, OEM cost down pressures remain arduous and with rising labour and materials costs, so the focus on improved efficiencies as a method of cost reduction gains momentum.

What is the Value Engineering?

Value Engineering is a powerful tool for reducing costs while at the same time maintaining value. "So what is new?" You may ask. "We exercise this on a daily basis".

The fundamental difference in the Value Engineering approach to cost reduction is that it is function focused.

It is an organised attempt to analyse the functions of a product, system or process in order to achieve these functions at the lowest possible cost.

And this is what makes Value Engineering such a powerful tool.

In analysing the exact functions of a product, system or process, one is able to evaluate a range of cost effective options for achieving these specific functions, and then choose the best solution while still maintaining those crucial elements that comprise value, such as quality, reliability and maintainability.

Therefore, a single idea that results in cost savings is not Value Engineering. It may represent better value, but it fails to determine whether the particular solution represents the best value from a selection of alternatives.

The relationship between value, function and cost is encapsulated in the value equation: Value equals Function divided by Cost. Here, it is evident that increased value is, in essence, dependent on reduced cost.

Granted, increased function at the same cost can result in higher value, however, it is then vital to ensure that this increase in function is in fact a market, or internal, need, rather than a perceived want. Similarly, it is clear that the most desirable relationship is to provide greater function at less cost.

Ultimately, though, this equation makes plain that with both cost and function as the key elements, so the risk of losing functional perspective is eliminated.

At what stage of the decision making process is Value Engineering used?

It is a popular misconception that use of Value Engineering is limited to product design and product re-engineering. It is, in fact, a far more versatile instrument and has seen considerable success as both a strategic and an operational tool that is applied at various stages and levels of the decision making process.

To facilitate the use of Value Engineering in these vastly diverse functions, it is separated into three sub-divisions whereby the methodology remains the same but the applications differ:

- Value Management is used at the conceptual stage of a product or process to optimise cost. As the name implies, this is principally a management tool which provides a logic to decision making, whether it be at an operational or strategic level.
- Value Engineering is used at the design stage of a product or process in order to avoid unnecessary cost. A design is scrutinised using the Value methodology in order to establish whether any function can be fulfilled more cost effectively.
- Value Analysis is used on existing products or processes to reduce cost. Change is a constant and unless products and processes are continually re-evaluated for more cost effective ways of providing the desired function, a firm is likely to be left sorely behind.

Still, despite the bounded nature of each element, they combine to form a successful system, whereby the methodology can be used for cost reduction across all areas of decision making, and at all levels, from inception to continuous improvement.

Where and how is Value Engineering Applied?

Just as Value Engineering can be applied across all stages of the decision making process, so it can be used to reduce costs across a vast range of functions and systems.

For the purpose of this brief, these functions and systems are classified as either product or process focused (often they are both), and use of Value Engineering in these settings is considered below.

Although purchasing falls into either or both of these categories, it is considered pertinent to focus on it separately given that the initial application of Value Engineering was in fact within the purchasing function, and that it remains a key area for cost reduction using the methodology.

Product Focused Value Engineering:

Value Analysis and Value Engineering (VA/VE) can achieve significant cost benefits in terms of both new product design and product re-engineering.

This is best achieved by doing a complete product strip-down and then examining the function(s) of each component in order to identify any potential areas for cost reduction.

In the context of the automotive components industry, however, there is limited scope for VA/VE from a product perspective. OEM's have stringent design requirements and thus any

design changes have to be approved by foreign parent companies before being implemented.

Furthermore, even if approval is granted, it usually takes a significant amount of time and thus, with regular model changes, the time over which the cost saving is realised is often limited thereby significantly reducing the value of the cost benefit.

Purchasing Focused Value Engineering:

A strong emphasis of VA/VE as a method of cost reduction is its use in the purchasing function. Not only does the purchasing department have a specialised knowledge of markets, materials, standard parts, processes and costs but it can also bring the skill and knowledge of specialised suppliers into the firm's domain. For example, supplier representatives might join with a firm's design team and go over a scheme in detail, evaluating changes¹ that can be made to achieve more cost effective manufacture.

Complete understanding of the job and its function often permits the supplier to effect appreciable savings. Unfortunately, although this is a facet of VA/VE which is embraced by OEM's, only few 1st and 2nd tier firms that implement Value Engineering extend the application to their suppliers.

As with product design, this is chiefly due to the design constraints imposed by OEM's. This being said there remains scope in terms of sourcing products and materials other than those intended as part of a manufactured component, with particular opportunity for cost savings through the use of vendors standards and the rationalising of materials, parts and hardware.

Process Focused Value Engineering:

The structured methodology of Value Engineering provides a firm framework from which to make strategic and operational decisions from a cost cutting perspective, in that it brings order to the often-haphazard approach to cutting costs.

Closely examining the desired function of a strategic or operational concept provides a valuable base from which to develop a cost effective strategy and plan for implementation.

When fed through an organisation, this not only provides a common ground for decision-making, but also ensures that all participants understand the principles by which decisions are made.

Furthermore, and perhaps most significantly, the structured nature facilitates the assigning of costs to the process such that the cost inputs can be evaluated against the potential savings (as part of the decision making process) and ultimately, against the actual savings (subsequent to implementation).

Despite the potential for significant savings, Value Engineering has seen only limited use in its role as a strategic and operational tool within the automotive components industry.

This is most likely due to the traditional view that the methodology is solely product focused, and here it is hoped that this brief will change the reader's perception.

Value Engineering in Play:

Thus far, Value Engineering has been discussed solely from a theoretical perspective. The next question, then, is clearly how this is translated into the hands-on environment. Therefore, we now turn to some of the practical requirements necessary to support Value Engineering in any organisation.

Value Teams:

For Value Engineering to be used successfully as a cost cutting tool, it is vital that it be integrated into the culture of a company.

This requires complete buy-in and commitment from senior management so that the philosophy may be accepted and given priority at all levels.

It is often the case that externally focused operations take precedence over those focused internally, however, in order for Value Engineering to be effective in reducing costs internally, employees at all levels must understand its worth and be committed to using it.

Clearly such a programme is not going to maintain its momentum unless it has a dedicated champion who drives it.

In a large company setting this usually means having a member of senior management who takes responsibility for a value team, which is a group of trained employees whose sole job is to derive cost benefits through the use of Value Engineering.

The size and structure of this team will vary considerably depending on the firm. In terms of size, it is obvious that the cost benefits achieved by the team must be in excess of the cost of employing them. With regards to structure, the permutations are endless and it is necessary to form a team that best suits the firm's requirements.

In some firms, for example, the value team is comprised of a group of specialists that work almost in a consulting role within the company. In others, certain departments might have their own value specialist who focuses solely on reducing costs within that business function or environment.

Employing specialised individuals in the role of value analysts is clearly not an option for smaller firms.

This does not, however, mean that Value Engineering cannot be practiced within such organisations although, as with the larger firms, buy-in from senior management is a must.

Here, Value Engineering is usually championed by a knowledgeable individual who meets with representatives from different department, on a regular basis, to discuss and brainstorm Value Engineering initiatives.

The great advantage of this team structure is that it facilitates Value Engineering knowledge sharing and thus, as representatives become more skilled in using the methodology, so they can take on increased responsibility for using it to reduce costs within their own domains.

Furthermore, the greater the proportion of individuals who understand the principles of Value Engineering, the increased likelihood of it becoming part of a firm's culture and thus filtering through to all levels of the organisation.

Identifying targets for opportunity:

Before Value Engineering can be utilised, it is necessary to identify targets for effective cost cutting opportunities. Due to the constantly changing nature of business, the breadth and scope of these opportunities is boundless and it is therefore helpful to have a system in place, which helps to identify those areas where significant cost reduction can be achieved.

At a strategic level, scoping is used to great effect. Here, senior management identifies potential areas for cost reduction, in line with the firm's cost down goals, and Pareto analysis can be a useful tool in helping to establish which change areas are likely to yield the greatest benefits.

The organisational and user requirements and objectives are then established for the study, and generally acceptable outcomes framed.

The project is then passed vertically down to the business functions concerned, where individuals have the specialised knowledge (be it product, or process oriented) to effect cost reduction through the use of Value Engineering.

Similarly, at an operational level, value studies are generally focused on those areas where significant cost benefits can be realised:

- High value products and processes
- High waste (be it time or materials) products and processes
- High volume products and processes

These opportunities can be identified during brain-storming sessions, through customer feedback or, as is most often the case, by individuals who recognise a potential opportunity for reducing costs within the scope of their own work environment.

Most firms do however cite that Value Engineering is particularly effective at the beginning of the product or process life cycle, as here the ability to influence value is high and the cost to change generally low.

As the product or process matures the ability to influence value decreases exponentially while the cost to change increases. Still, according to value specialists, this does not mean that the method is restricted to the beginnings of new projects.

Parts, materials, technology and environmental factors constantly change and develop, and in order to remain competitive it is imperative that products, systems and processes are continually updated.

In fact, particularly significant savings have been achieved through applying Value Engineering to long established products and processes.

In this regard, the application is considered a successful tool within the Kaizen principle in that it provides a systematic approach to continuous improvement.

In identifying targets for opportunity, though, it is vital that goals, time plans and accurate cost estimates be applied to the study before it is undertaken.

This eliminates the risk of embarking on a project whereby the efforts put into it are in excess of the cost benefits derived, and it also establishes a means by which to quantify the success of the interventions agreed upon and implemented.

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The Value Methodology:*

With the study target, resources, people and objectives established, the value study can kick-off. This is best undertaken, particularly in the scheme's infancy within a firm, with the aid of a job plan, which provides a framework for the value methodology and ensures that the individual phases and techniques of Value Engineering are consistently applied.

The job plan below provides a guideline to the value study phases, as well as the actions and considerations of the preparation and implementation phases, which are imperative but fall outside the sphere of the actual value study.

It should, however, be noted that this job plan is intended only as a general guide line, and it is necessary that firms tweak the framework in order to best suit their own requirements.

As is usually the case, once employees understand and become accustomed to using the methodology documented in the job plan, so they modify it to best suit individual project requirements. Such independence generally results in all cost cutting opportunities and problems being analysed using Value Engineering.

Feedback is then given via the post job plan 'implementation phase'. This is of principle importance in that it provides an opportunity to evaluate the actual cost benefits of the value study and ultimately the efficacy of the firm's value programme.

Value Engineering Job Plan:

- Information Phase
- Gather, compile and review information
- Finalise scope
- Function Analysis Phase
- Identify functions
- Classify functions
- Function models
- Establish function worth
- Cost functions
- Establish functional rating system
- Functional Analysis System Technique (FAST) Diagram
- Select functions for study
- Evaluation Phase
- Evaluate ideas for adequacy & feasibility (rating and ranking)
- Select ideas with best potential

- Determine advantages and disadvantages
- Evaluate costs
- Development Phase
- Benefit analysis
- Insure functionality, adequacy, compatibility and feasibility
- Identify impacts, risks and barriers to adoption
- Implementation plan
- Presentation Phase
- Present proposals to decision makers
- Overcome resistance to adoption
- Obtain commitments for implementation
- Implementation
- Complete changes
- Implement changes
- Monitor status
- Feedback

The Reality:

Clearly, with cost cutting being the principle focus of Value Engineering throughout this article, and a driver of the principle in general, cost reduction is considered an objective rather than an advantage.

Still, the methodology can result in significant peripheral advantages which are not to be overlooked, and some of the most apparent benefits are considered below:

· **Adaptability.** As has been illustrated, use of Value Engineering is not constrained to any specific application, problem type or business function. Rather, it is a tool that significantly enhances efforts to reduce costs and increase value at all organisational levels and in any environment.

· **Maintains/improves quality, maintainability, performance and reliability.** With function at the heart of the Value Methodology, crucial functional criteria become a focus. And therefore, in the search for increased value these conditions are not neglected but instead considered imperative, to the extent that failing to satisfy them would mean failing to fulfil the principle of Value Engineering.

· **Team building and development.** Value Engineering is team focused and uses the skills and knowledge of individuals at all levels and across all business functions to determine the best value method of creating a product or fulfilling a service. This requires commitment, cooperation and team work, not only within the study team but also amongst secondary participants, which if achieved successfully results in group development and improved inter-personal relationships.

Like any good principle, in order to realise the full benefits of Value Engineering, there are number of challenges that need to be overcome. Some of these are as follows:

- Full internal buy-in. This is, perhaps, the most significant challenge and is vital to establish in order for Value Engineering to be effective, to its full capacity, as a method of cost reduction. Here, senior management plays a vital role. Unless there is a sound knowledge and commitment at this level, then the scheme has no chance of being embraced at a more junior level, thus significantly limiting potential benefits.

- Management time/capacity. Small and large firms alike are under substantial pressure to use their management resources to their full advantage. This means limited time to dedicate to non-urgent activities. With the necessity of senior level commitment, Value Engineering clearly usurps valuable management time. However, it is considered that unless this responsibility is undertaken now, then firms are likely to grapple with significantly greater concerns in the future.

- Resistance to change. Value Engineering is a sound methodology that has seen continued success since its inception at General Electric in 1947. Yet, it is a methodology that requires the breaking of old habits in an effort to analyse products and processes from a functional perspective.

- OEM design constraints. In the context of the automotive components industry, OEM design constraints limit the scope of cost reduction from a product perspective.

Adapt or die:

With significant cost down pressures in the global automotive industry, and the additional environmental factors confronting local components manufacturers, so the need to continually change and reduce costs in order to remain competitive remains an imperative. Increasingly, an “it works, why change it” attitude is the best way to go out of business.

Any cost is too high if it can be reduced. And to evaluate correctly, it is necessary to find the lowest-cost means of accomplishing a function.

This takes competent, high calibre people, commitment and time. Yet, these investments are vital, and in order to achieve, let alone exceed, cost down targets, so a formalised cost cutting programme is critical.

The challenge, then, is for manufacturers to proactively establish and sustain a programme that yields results. Value Engineering is clearly one such tool that can be used to accomplish this.