

**QUALITY AND VALUE  
CONFLICT OR COMPLEMENT**

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**ABSTRACT**

Quality and value are interrelated and one cannot be considered without the other. But what is their relationship? This paper will explain the relationships in three categories:

1. Definitions of value and quality.
2. Relationships of value and quality.
3. Differences between quality engineering and value engineering (VE).

**INTRODUCTION**

One year ago, I talked to Mr. Dick Park, a well known expert in VE, about the relationships of value and quality. After many discussions, Dick encouraged me to make a presentation to the annual meeting, and let the customers (users) make their own conclusions.

Because of my quality background, I may be biased. I

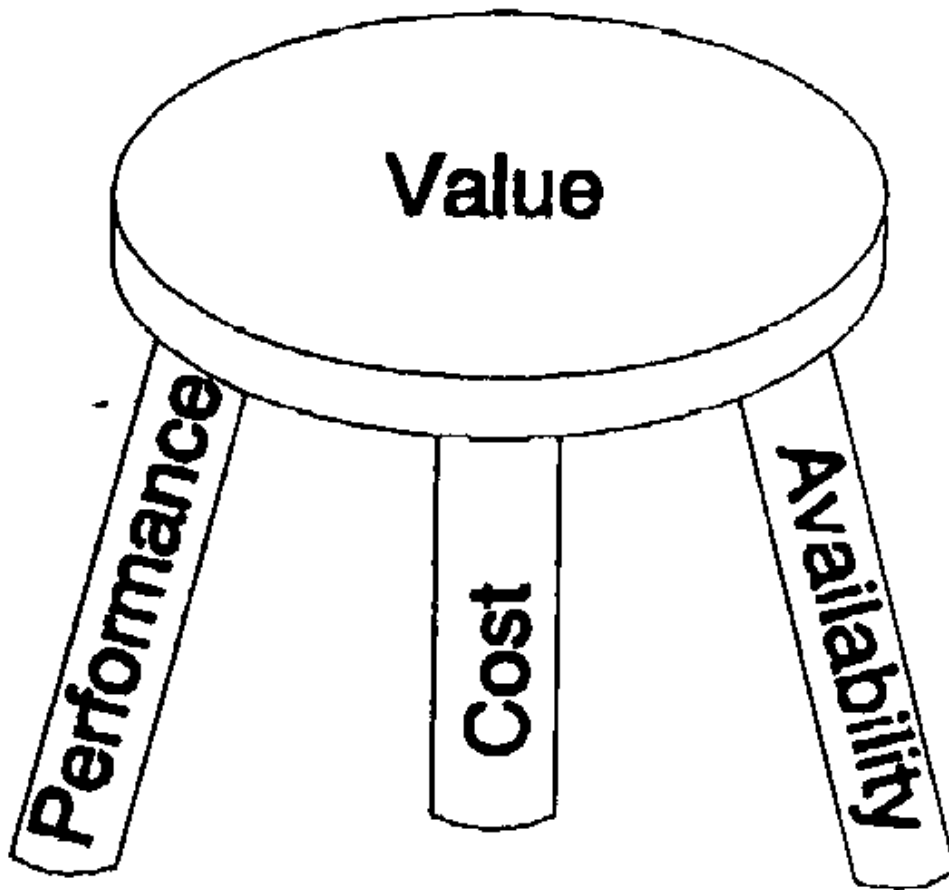
consider that quality is the foundation of everything we do, while value is a measurement of what we have done. Quality produces value. Value does not produce quality. Quality is the "Queen Mother": value is the "Beautiful Princess".

**DEFINITIONS OF VALUE AND QUALITY**

**DEFINITION OF VALUE:**

Mr. R. J. Park, CVS, said; *A highly desirable product must do what the customer expects it to do. It must also be available when wanted and for an acceptable price.* In the VE world, this is what we call VALUE, the best combination of performance, availability and cost.

In the eyes of the customer, value is often expressed symbolically by the three legged stool. Like the stool, value's foundation is the balanced combination of the three.



**Figure 1**

In the end, value is simply giving customers what they want at a price they consider fair. Each buyer assesses value individually,

based upon one's background and experience. That is why it is tough to consistently meet customer expectations.

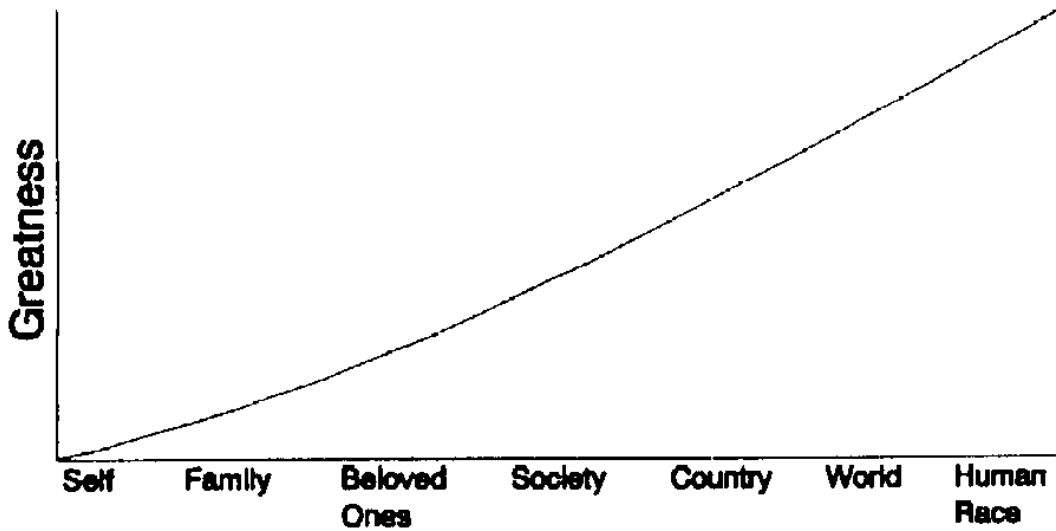


Figure 2

Using this value definition of life, many kings, generals, and politicians through history would not be considered as great as they used to be. A small common person, like Mother Teresa, becomes greater than many historical figures.

Now, let us use the famous equation to calculate the value of life:

Equation: Value = Function / Cost

The above definition defines the value of a hard product quite well. Less easily definable are social values. What is the value of life? What are family values? This recently was a campaign issue with each party claiming to have the correct definition.

We use the word "GREATNESS" or "CONTRIBUTION" to describe the value of a person's life. What is GREATNESS? One definition could be that the GREATNESS of a person's life is in direct proportion to the number of people who are benefitted by that person's effort. It can be expressed by the following diagram:

Example 1: An engineer's life

Function = support his family (4 members) to have a comfortable life  
 Cost = \$60,000.00 per year  
 Value = 4/60000 = 0.000067 person per dollar

Example 2: Mother Teresa's life (the Albanian Nun) in India

Function = support 500000 poor people  
 Cost = assume \$2,000.00 per year  
 Value = 500000/2000000 = 0.25 person per dollar  
 Teresa's value = 0.25/0.000067 = 3731 times the value of an engineer

I guess all of you are familiar with this famous equation that has been used for 50 years. This equation can be written in many ways:

Value = Function / Cost = Performance / Price = Benefits / Resources...

No matter what the names (function, performance, cost or price) are used, the value can be increased in three ways:

1. Increase numerator but keep the denominator the same.
2. Decrease denominator but keep the numerator the same.
3. Increase numerator and decrease denominator the same time.

This equation applies very well to the hard products or

services, but is not always clear while applied to the aesthetic values. Let us take "painting" as an example to examine the validity of this equation. A Japanese banker paid 17 million for a Van Gogh painting. If we use the above equation to calculate the value of this painting, we'll have difficulty to justify the value.

Value = Function (or Desire) / \$17,000,000 = ?

About this equation, I'll stop here for you to think about it. Next, I'll ask what are family values? "Family values" is one kind of social value. Values have to be expressed by numbers. Family includes a husband and a wife, which means 1 + 1. But 1 + 1 = ?

If they don't have any children, then 1 + 1 = 2. Everybody knows how to calculate. If they have one child like Mr. Clinton's family, then 1 + 1 = 3. Dan Quayle has three children, then 1 + 1 = 5. Like Mr. Bush's family, then 1 + 1 = 34.

Can we say a larger number equals higher value? No, I don't think so. The number alone is not a proper indicator. What is a proper indicator of family values? Does a millionaire's family have more family value than a poor family? Does a royal family have more family value than a commoner's? No, I don't think so. I saw the nude picture of the Duchess of York in magazines and newspapers. We cannot call this family values. This is not what I mean. I am not talking about head count; I am talking about spiritual values.

Let's talk about spiritual values. If this is the case, 1 + 1 = 1. Two people, one man and onewoman, get married. They live under one roof, in the same bed, one savings account, one checking account, one mind, and one thinking. This is why I say 1 + 1 = 1, which doesn't mean 50% + 50% = 1. I mean 100% + 100% = 1. Each partner of the couple should devote 100% effort to their family not 50%.

If this couple, after marriage, still live separately, as some Hollywood couples do; they have two checking accounts, two savings accounts, each one has his or her children, two minds, and two ways of thinking. This kind of marriage cannot last long. If this is the case, 1 + 1 = 2.

The above is about spiritual values in one family. My next question is about their contribution to the society, and to the community. This couple has used two shares of food, energy, water, education, and spaces on Earth. What are their contributions to the society? How much have they paid back their debts to the community? If this is the case, 1 + 1 should be at least larger than one (1 + 1 > 1). 1 + 1 > 2 is better. Larger than one is marginal; it should be as large as possible.

For example, President Franklin Roosevelt initiated the social security program in the 1930's. Today many millions of senior people can live a decent life because of his effort. His wife

Eleanor devoted her whole life for the welfare of children. Today many millions of children in America, Asia, and Africa are benefitted by her work. For this wonderful couple, 1 + 1 = infinity. These are true "FAMILY VALUES". I give them a better name "HUMAN VALUES".

Social values vary with the times and also vary on an individual's philosophy of life. Tradition and emotion usually control and direct social values, even though they are not always right. That was why we had so many tragedies in history, and we will have more to come. It is inevitable.

As social values change, our lifestyle changes accordingly. This is a chicken and egg problem, and it is very difficult to say which one goes first. As lifestyle changes, we have different criteria about quality. If so, what is quality?

DEFINITION OF QUALITY

Ford Motor Co. defined quality as: *Quality is defined by the customer; the customer wants productsand services that, throughout their life, meet his or her needs and expectations at a cost that represents value.*

Mr. Dorian Shainin, a very famous quality expert, said in his 1992 seminar that we go one step further than "satisfaction". He said, "Quality is customer enthusiasm." If it is "satisfied" only, the customer may try your competitor's product to see if it may be more satisfied. You can call this a value comparison.

Quality also varies with time. The dramatic improvement in the quality of most products over the past decade have helped create the new psychology of customers, who take quality for granted. What used to be an extra is now considered standard. The definition of "reasonable" is shifting upward with time and competition. One thing is crystal clear in the quality field: "tougher and tougher demands will be a way of life in the future."

For example: Anti-lock brake system and air bag were considered luxury options a couple of years ago, but today we consider them a safety necessity

Car buyers expect their new cars trouble free with excellent fit and finish, no matter how much they pay. Price alone cannot satisfy a customer any more.

RELATIONSHIPS OF VALUE AND QUALITY

There is a constant argument about which one is primary (or foundation): quality or value. To determine which one is primary, we have to study the functions/processes, each is required to perform. Let us take a good look at the following list:

FUNCTION/PROCESS	QUALITY	VALUE
Design	yes	yes
Developing		yes
Manufacturing	yes	yes
Performance	yes	yes
Appearance	yes	yes
Low Cost	yes	yes
Availability	yes	yes
Serviceability	yes	yes
Maintainability	yes	yes
Delivery in time	yes	yes
Durability	yes	no
		(Life does not last forever, that is why it is so valuable)
Energy efficient	yes	it depends
Recyclability	yes	it depends
Environment protection	yes	it depends
		(It applies to hard products, not soft products.)
Small variability	yes	does not matter
		(Consistency is not a criterion.)
Few things gone wrong	yes	does not matter
		Beauty is in the eye of the beholder.)
Objective and quantitative evaluation	yes	no
		(subjective)

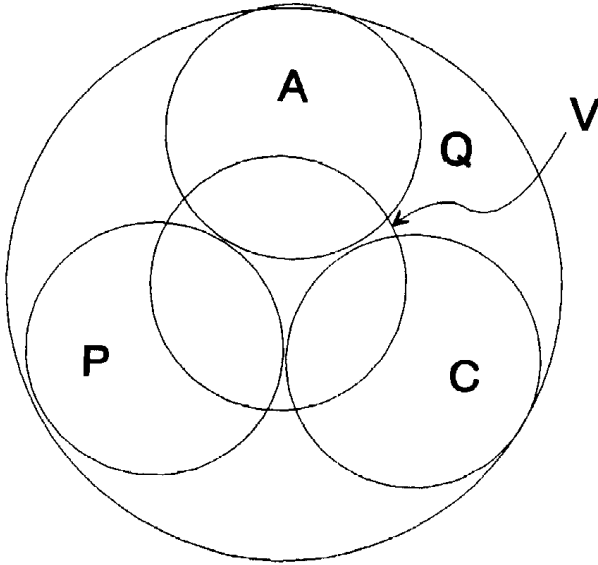
From this functional analysis, we can see quality has all the "YES" answers. We conclude that:

- VALUE IS IN THE ENVELOPE OF QUALITY. VALUE IS THE RESULT OF QUALITY (Q>V).
- QUALITY PRODUCES VALUE. VALUE DOES NOT PRODUCE QUALITY (V>Q).

Q = Quality

P = Performance

VALUE DOES NOT PRODUCE QUALITY (V>Q).



Q=Quality

P=Performance

A=Availability

C=Cost

V=Value

Figure 3

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A = Availability

C = Cost

V = Value

#### DIFFERENCES BETWEEN QUALITY ENGINEERING AND VE

I am a certified quality control engineer, and have been a SAVE member for many years. Based upon my personal experience, I will say these two engineerings are quite different:

##### QUALITY ENGINEERING:

- Deal with variable and distribution.
- Dynamic process. (Characteristic changes with time.)
- Variation must be controlled to consistency
- Stochastic approach (random), (Sampling is random)
- Process improvement tool.
- Define voice of customers (VOC)
- Define voice of process (VOP)
- Use mathematics and statistics.
- Need theoretical knowledge.

##### VE:

- Deal with constant number
- Static process. (Value is a fixed number, after design is finalized.)
- Variation does not matter maintain uniqueness increases value
- Deterministic Approach (not random) (FAST diagram used)
- Cost reduction tool. (Cost reduction is only part of process improvement)
- Define (VOC)
- Only reveal part of VOP, (only mean of process is considered).
- Only use basic arithmetic.
- Need functional knowledge.

- Need lots of test data.
- Determine process capability  
(Cp and Cpk)
- QUALITY, which includes Value, is the whole.
- Needs lots of creativity.
- Cp and Cpk are not applicable to VE.  
VE is not a process improvement tool.
- VALUE is under the umbrella of QUALITY

CREATIVITY IS THE MOST IMPORTANT WEAPON A VALUE ENGINEER HAS, VE SHOULD USE IT FULLY

#### CONCLUSION

Quality is the foundation of everything we do, and value is a measurement of what we have done. Value is intangible and subjective; quality is tangible and objective. Quality produces value. Value does not produce quality. Quality is the "Queen Mother"; value is the "Beautiful Princess". VALUE IS THE RESULT OF QUALITY.