

QUALITY FUNCTION DEPLOYMENT AND VALUE ANALYSIS

THE MOST POWERFUL PRODUCT/SERVICE DEVELOPMENT TECHNIQUES AVAILABLE TODAY

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ABSTRACT

This article describes how two function oriented techniques compliment each other in Product/Service Development. It shows how they interact to assure you that you are developing the right product/service for your customer in the most efficient manner. In essence providing the customer with maximum value.

The most critical dimension in product development today - and even more so tomorrow - is to develop the products your customers want. What does the customer want - they want value - and value is defined as QUALITY/COST. How can you have the highest probability of providing your customer with more value than your competitors? The answer is to integrate Quality Function Deployment (QFD) and Value Analysis (VA) into your product development process. (Please note that my definition of product is a physical product/process or a service). QFD and VA are as applicable to the service sector as to the more commonly used definition.

I've been around Product Development for many years now - and seen many programs, techniques and disciplines come and go. The alphabet soup "Program of the Month" routine. Except for VA/VE none of them has excited me - until QFD. The major reason for this is that QFD is an "honest" discipline - it truly gives you significant benefits. It does something that no other technique can - it provides a specific graphic descriptive method to convert customer expectations (the voice of the customer) into quantified technical design characteristics (the voice of the designer) and for development of the product plan. Past methods of this conversion process were 70% subjective and 30% objective, in my opinion, QFD/VA reverses this percentage to 30% subjective and 70% objective. This adds a powerful new dimension to the product development process. It greatly increases the probability you will develop the right product for your customer from the very beginning. This greatly reduces downstream changes and prevents doing it right the second time.

You may look at these two processes (QFD and VA) as parts of a complete process to achieve "Value" in a product. QFD assures you are developing the "right product" and VA assures you are developing it in the best way. I believe they are an integrated process which develop the best product/service. Separately they are good techniques. When you integrate them they are extremely powerful and yet easy to use.

VA was developed in the U.S. in the late 40's and early 50's. It then migrated to Japan where it was recognized as the truly powerful problem solving technique it really is. VA then migrated back to the U.S. and its use was enhanced by the perception that it was a great "New Japanese Management Technique". QFD was developed in Japan in the seventies to address the need of a better discipline for translating the customer's expectations into design characteristics. I believe it was an off shoot of the VA process due to its "function" orientation and even its background which included cost deployment in addition to functions.

It only makes sense then, that integration of these two

"function oriented" techniques should occur and that this combination should make them even more powerful.

QFD and VA have several features which provide a very sound basis for their integration:

- 1) A mixed discipline team for maximum effectiveness.
- 2) Specific objectives are a key element.
- 3) A product/service definition is required to scope the project.
- 4) Both are based on "Function".
- 5) A job plan guides the work - they add discipline.
- 6) Concentrate on the important few rather than the insignificant many. (Pareto's Law).
- 7) Customer focused.

In addition QFD is problem/opportunity identification; VA is problem/opportunity solving - so they are complimentary from this standpoint. In most cases, QFD gives you the "what" and VA gives you the "how". This completes the essence of their complimentary natures.

I'd like to present a broad overview on integration of these techniques. It is possible to have QFD kick off a VA process or VA kick off a QFD process. However, in this case, I shall use the most common process where QFD initiates the VA process.

MARKET RESEARCH

For this article, we shall assume that appropriate market research has been completed and the "customer expectations" have been properly identified in the customer's words. In most cases this is a dangerous assumption. I've never seen a case where all necessary market research had been done and was available for the team when the project started. Also, I believe, that poor market information is the second biggest reason for QFD failures. (I'll tell you what the first one is later.) You need good (not necessarily 100% complete) market information when you start. The QFD process will help you identify the additional information needed for a good product development effort. Then you can focus your requests for specific additional market information - instead of asking for the whole marketing story.

I have found that the QFD/VA process helps you get cooperation and input from the marketing/sales functions because you were asking for specific customer information. They believe you know more about what you are doing if you can ask for specific customer information rather than asking them to tell you everything about everything.

CUSTOMER EXPECTATIONS

We have discussed the market research section, let's continue with the "customer expectation" section of the QFD process (by the way, in this article we will only cover the House

of Quality (HOQ) and not the total QFD process). Customer expectation analysis includes 1) identify customer expectations (30 to 60 of them), 2) rate their market importance on a scale of 1 to 10 with 10 being high) and 3) evaluate their sales importance (3 to 6 should be identified). When this section is complete you convert the customer expectations into functions and generate conceptual ideas on how to meet these functions. Imaging and visualization are the most powerful tools for this stage. It is best to generate concepts before you get into more detail. The further you go into details of the process - the more you inhibit the creative process. This is the best time to generate ideas with respect to the discipline of the process - but the team members also want to generate concepts now. They have been feeding information to their minds for a significant time and they are ready to "create". This provides the greatest degree of freedom - total openness and concentrating only on customer expectations. This is the first formal integration of the VA and QFD processes. It is especially important that you describe customer expectations in "function" terms because this assures the greatest potential for exciting quality (wow's).

COMPETITIVE BENCHMARKING

The second major step in the QFD process is competitive benchmarking. Here you compare your company against the "Best in World Class" of your competitors. You may, at certain times, need to consider competition outside your industry (e.g. television vs. movies vs. sports). Don't fall into the trap of considering too small a scope of competitors. The next activity in the competitive area is to develop your planned level of performance against customer expectations. This is your product plan. As you are developing this plan, refer to your conceptual ideas to see if you have successfully impacted all areas where improvement is necessary or new areas that would give you a real competitive edge. If you haven't, then go back to the VA problem solving approach and generate ideas where improvement is necessary and not yet attained. Also, look for areas where you can make major breakthroughs or where you can attain exciting quality. This is the second interface of VA and QFD. The use of function is the key to success.

TECHNICAL/SERVICE CHARACTERISTICS

The third major stage of QFD is to identify the technical/service characteristics of the project and determine their relationship to the customer expectations. This is done by team consensus. For best results, you should blast through and come back to refine. Once you have completed this, generate ideas on all areas where there is a strong relationship between the technical/service characteristics and a customer expectation. This time it is also best to convert the expectation to a function. This is the third major integration of QFD and VA. As you can see, each time we travel one step farther into the matrix we are getting into more detail and the potential for major change is reduced. This is the same step down in potential scope of solution as when you take a step down in the function diagram.

Continue this step with technical/service benchmarking and setting of technical/service targets. Again, as you did in the competitive benchmarking, you must generate ideas on technical/service characteristics where you don't have ideas which appear to attain your targets. Converting the technical/service characteristics to function and generating ideas is the VA integration, and the best way to generate ideas. You may also choose to do technical/service correlation at this time. This analysis is especially important when evaluating tradeoffs.

The key to most of the technical areas is to use Functions - it is the key to VA and also to effective idea generating during the QFD process.

COST/TIME TARGETS

The last major step of the HOQ is setting cost/time targets. You do this by setting targets which are related to the importance of each technical/service characteristic. These targets are of the same nature as targets set in Quality and Design for Productivity programs. They are somewhat idealistic, but never-the-less a target which must be striven toward under the context of "continuous improvement". Use the VA technique to address characteristics where cost/time estimates have a major difference from the targets. This may be the area of greatest similarity to V.A. because you are relating cost/time to a function or set of functions. The cost/time targets are very similar to the concept of function worth.

Product Planning House of Quality

Correlations

P = Strong Positive

+ = Positive

- = Negative

N = Strong Negative

The Customer		Project Parameters	System/Technical Parameters															Competitive Benchmarking													
																		Competitive Points													
Customer Expectations		Degree of Importance																Our Company Rating	Company "A" Rating	Company "B" Rating	Company "C" Rating	Planned Level	Improvement Ratio	Importance Weight	Relative Weights (%)						
		Sales Points	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15									Poor—Good—Best					
1																											1	2	3	4	5
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		Cost																													
		Target Values																													
		Technical																													
		5																													
		Technical																													
		4																													
		Benchmarking																													
		3																													
		2																													
		1																													
Special Requirements																															

Relationships

S = Strong = 9

M = Moderate = 3

W = Weak = 1

HOQ IS ONLY THE FIRST STEP

The HOQ is not the end of the QFD process. It is only the

first of three or four matrices. In all of them, you have the same type of relationship and the potential to improve your output. The HOQ is called the planning matrix. The second matrix is the design matrix (used mainly for hardware projects). The third matrix is for process/service development and the last matrix is

for Quality aspects. Therefore you can strengthen not only the planning, but also the design, process/service and quality elements of a project by using QFD and VA simultaneously.

You should carry this same VA function approach across the design matrix, the process matrix and the quality matrix. Then you will have the full and complete integration of the QFD and VA processes. You generate the ideas on the functions identified in the QFD process and carry them forward through the complete development process.

You can see that we have integrated the two techniques to develop a powerful blend of problem (opportunity) identification and opportunity solving. The QFD HOQ helps VA to work on the right, and most important, functions and VA is the most specific method to deal with the issues brought up by QFD. They make each other more powerful.

Oh yes, the major reason for failure of the QFD/VA process is failure to implement the plan/proposals identified during the process. YOU must make specific work plans and commit the necessary resources to avoid dropping the ball.

In VA projects, one of the keys to success is implementation of the proposals - QFD is not different. You must also implement the ideas generated in the HOQ and the balance of the QFD process if you are to gain maximum benefit.

QFD and VA truly are the most powerful product/service development techniques available today. TRY IT, YOU'LL LIKE IT.