

VE FOR DEMAND ANALYSIS AT INFORMATION SYSTEM DEVELOPMENT
(INTRODUCTION OF A TOOL FOR THE PRECEDING VALUE EVALUATION)

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ABSTRACT

This study presents an idea for quantization of early actualization of potential needs and techniques for value diagnosis and evaluation through the evaluation formula $V = N/C$ based on my experience. It introduces an approach and technique for diagnosing customer values so as to offer a more effective system within the limit of the customer's budget at the time of developing an information system.

INTRODUCTION

An information system entering around software cannot be seen with the eye. This is the point that differentiates an information system significantly from the tangible products that exist in large numbers as VE cases of the past.

With the marked diversification, complexity and expansion of user demand in recent years with regard to information systems, including software and hardware, the demand for complex systematization exceeding one million steps is no longer rare today. Under such circumstances, putting the entire information system in a visible state that can be seen with the eye has become essential in creating value for customers.

According to my experience, however, the point which is really difficult to see is whether the systematization of a customer's demand will work effectively and whether it will be used effectively, in other words, true value for the customer. Information system VE cannot be accomplished until this is fully met at a reasonable price and delivery time.

THE TWO WHEELS NEEDED FOR DEVELOPMENT OF AN INFORMATION SYSTEM

Effectiveness and Efficiency

Interest in information system development is concentrated on how to achieve efficient development. Research and practice with regard to standardization for maintaining quality and improving efficiency through the use of development support tools have made considerable progress in the last several years.

The approach is to increase the efficiency of development itself and realize cost reduction to improve productivity. Behind this approach is an emphasis on production efficiency and quality as a result of the need to respond within a short time to the rapid increase in large scale and complex social demands in recent years. However, it must not be forgotten that there is another important factor that determines true productivity.

That is, whether the system is truly effective and valuable for the customer. This is indeed the starting point of VE. The point is that the customer will not be happy no matter how efficiently you provide a high quality system at a low price if it is not effective.

As shown in Figure 1, narrowing down on things that are effective within the customer's budget is the process at the uppermost stream, and constitutes the first hurdle. Efficient development is positioned after that, and becomes the second hurdle..

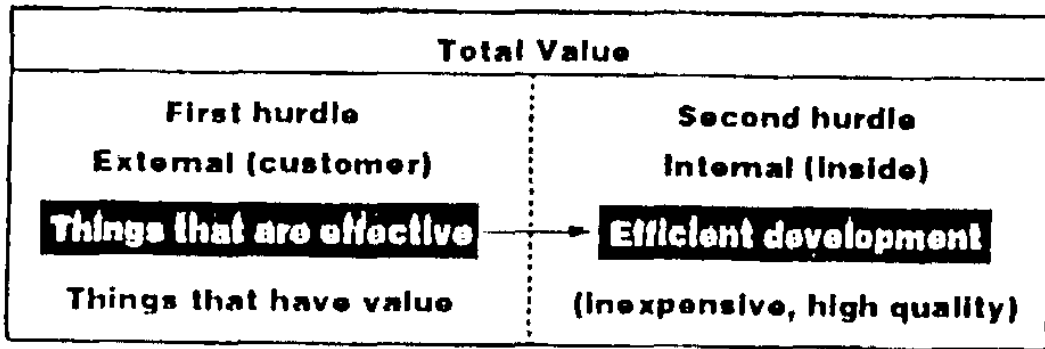


Figure 1. The Two Wheels of Information System Development

These two wheels are needed to truly please the customer and create one's own profit at the same time.

Present Tasks

The major task at present is to avoid what is generally known as "a computer that doesn't work". That is, to create a design that does not waste enormous amounts of time and

expense. While it goes without saying that this requires the two wheels, I would like to emphasize in this paper the first hurdle, narrowing down to things that are effective.

Looking at today's results, a questioning of effectiveness or being able to question effectiveness is frequently seen after development. As shown in Figure 2, it is too late to question this after development is completed (point B).

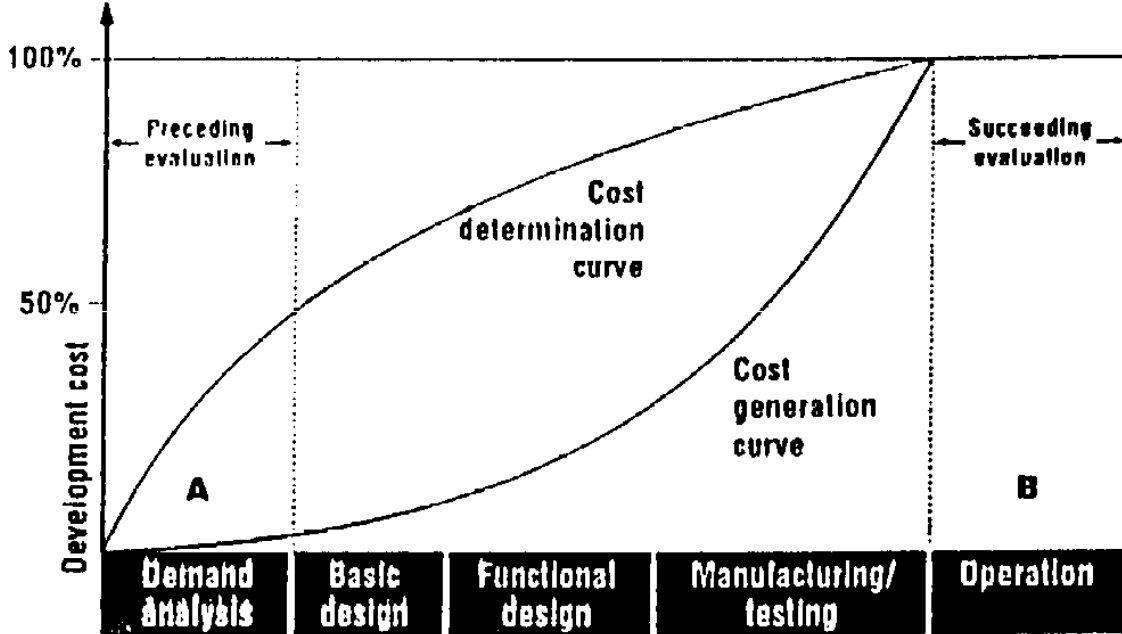


Figure 2. Development Cost Determination Curve and Cost Generation Curve

One of the major tasks confronting industry today is the fact that the curve that determines the effectiveness of diagnosis and cost is difficult to see or cannot be seen during the demand analysis phase (point A). The following points are possible reasons for this:

1. The idea of diagnosing the effectiveness of systematization has not been established.
2. The overall picture of the information system cannot be seen with the eye or is hard to see.

3. Since effectiveness is determined by humans, there is variation in values depending on a person's position or experience.

These reasons (1) through (3) are considered to be the causes that are making the preceding evaluation difficult. As a result, a system like that shown in Figure 3 is created in some cases. Moreover, it often becomes necessary to add functions which are lacking as well as delete unnecessary functions after a system goes into operation, which not only deteriorates the maintenance and stability of the system but requires several times more cost as a result.

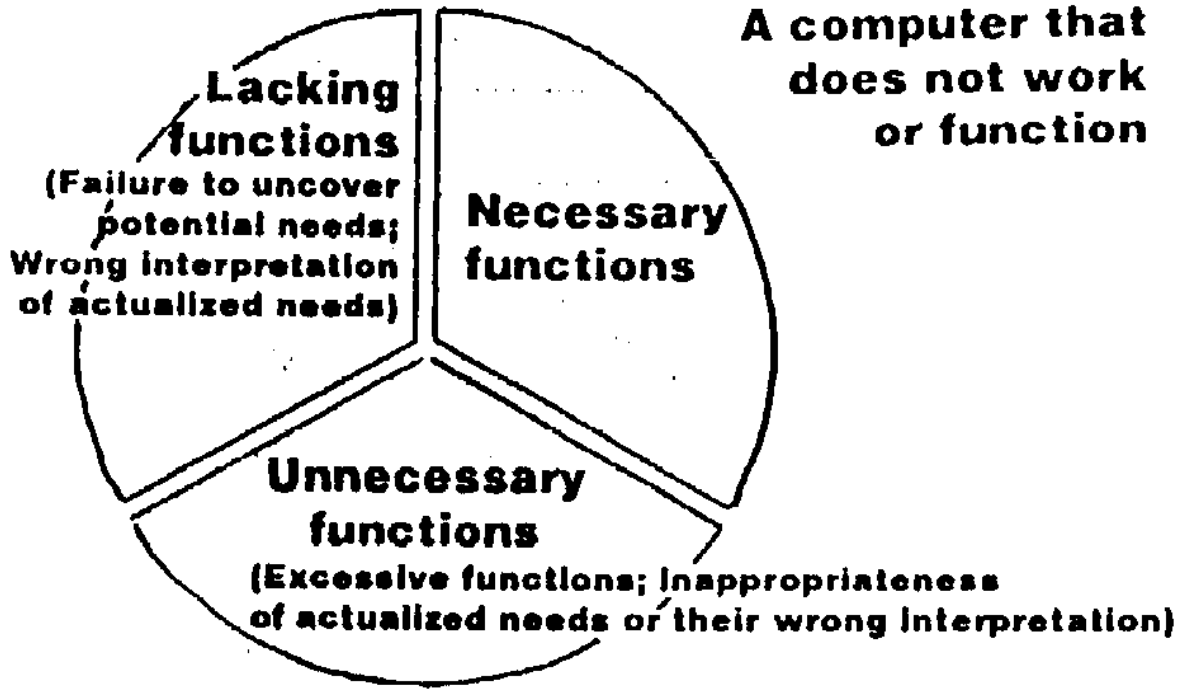


Figure 3. Examples of Failures in System Development

Therefore, it is necessary to think out the construction of a valuable system by performing the preceding evaluation to prevent providing unnecessary or insufficient functions.

The matters that are being taught and practiced by the me through inhouse VEC education and VEC activities to prevent

such a situation are shown in the following.

To solve the problem mentioned above, it is necessary to return to the starting point once again and sort out how an information system is created. An information system is more or less born according to the flow chart shown in Figure 4.

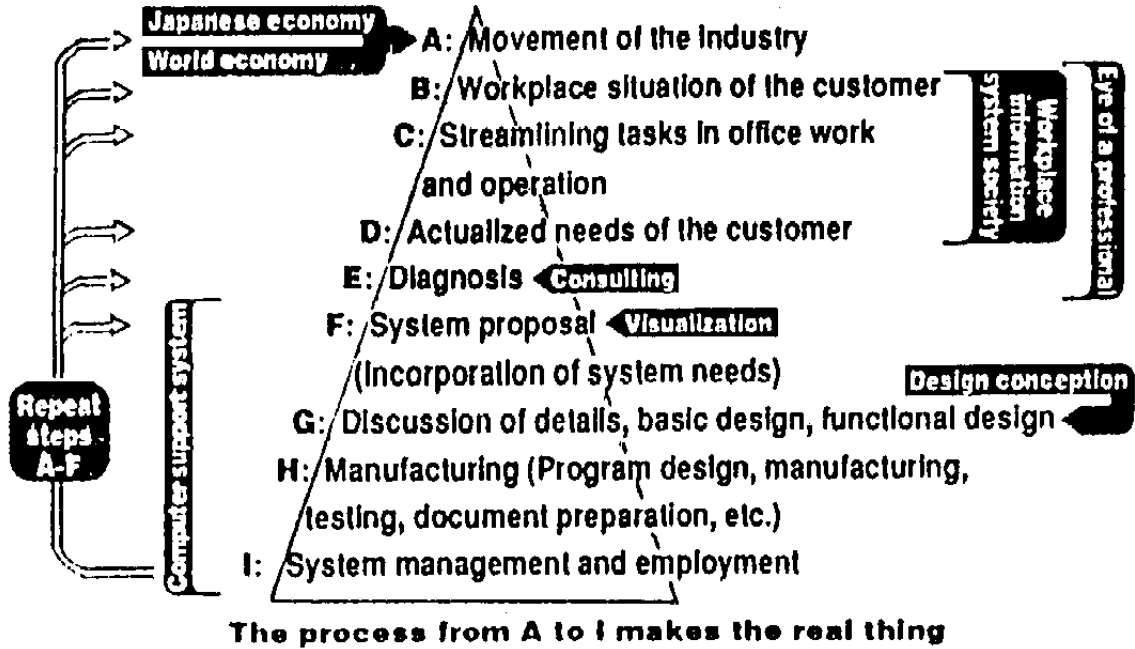


Figure 4. Formulation Process of an Information System

Pursuit of the genuine purpose by stepping into the customer's operation is essential in the development of an information system.

Proposal and design of an information system, for instance, will not be relevant unless you are familiar with the customer's workplace.

The customer's workplace is the whole and the computer support system is the part.

Put another way, a workplace is an information system society in a broad sense of the term while the computer system is an information system in a narrow sense of the term. The narrow sense portion will not be a valuable system with true functions

unless the broad sense whole is understood.

As the same principle applies to the entire industrial market and the workplace information system society of the industry ranked above it, it is important to understand the relationships between these series of forests and trees.

As shown in Figure 5, value cannot be created without a sufficient eye for distinguishing the workplace information system society (part) from the market (whole) and the computer support system (part) from the workplace information system society (whole). In other words, an eye that discriminates the inside from outside is important, and that's what makes the eye of the professional.

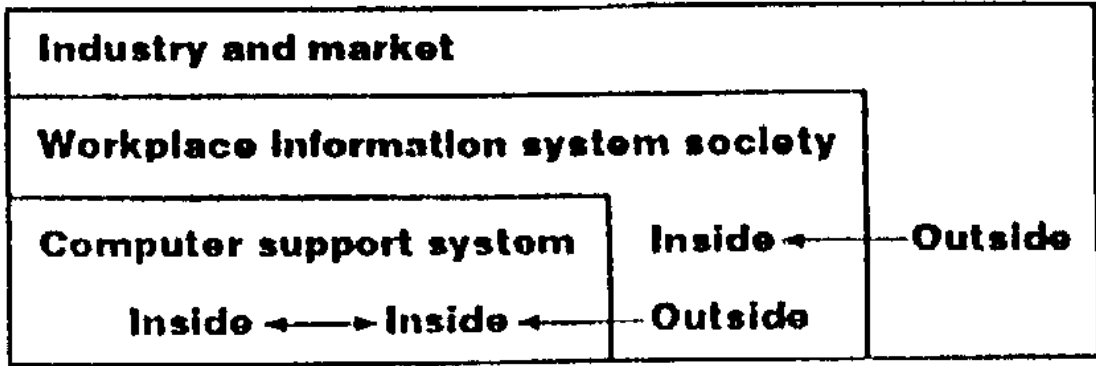


Figure 5. Conceptual Diagram of the Whole and the Part

EVALUATION OF THE VALUE OF SYSTEMATIZATION
DURING DEMAND ANALYSIS

The failure pattern in Figure 6 illustrates a case where

development is performed more or less in line with the demand of the customer but gives rise to both lacking and unnecessary functions after development, turning the system into "a computer that does not work".

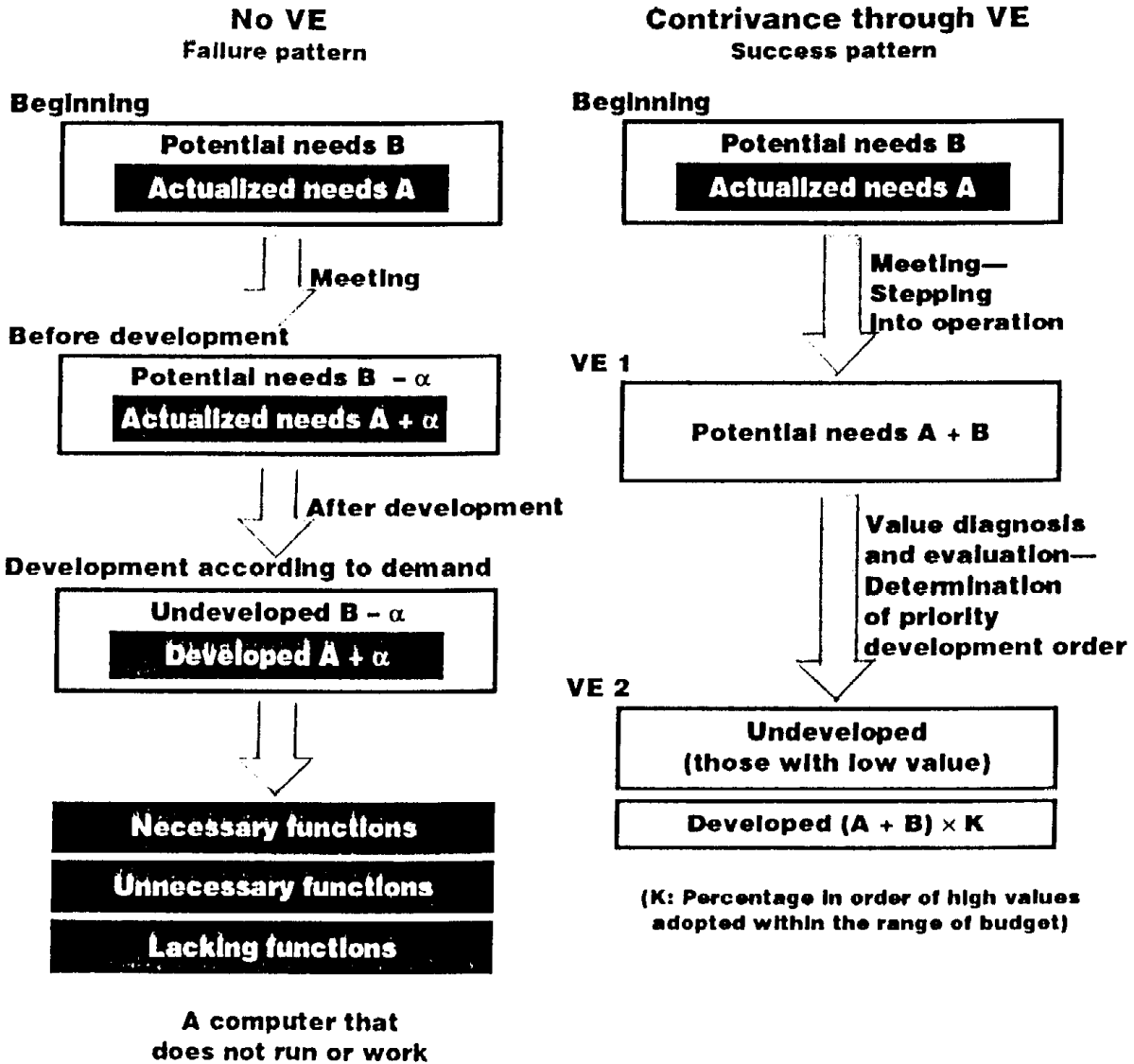


Figure 6. Selection and Evaluation of Items with High Value

Moreover, the repeated addition of functions and readjustment to cope with dissatisfaction regarding functions which are lacking, etc., will result not only in the customer's annoyance but deterioration of cost performance.

In contrast, the success pattern is considered to come closer to realization by carrying out the following two designs according to VE to prevent this from happening.

Actualization of potential needs by stepping into the operation

Sketching an output layout early. It is the information on output slips and on screen that a customer wants directly, and one can go so far as to say that file content, software and hardware do not really matter because they are intermediate means. Therefore, it is important to sketch out an output layout from the actualized needs.

Direct contact with receivers and users of information

This is the most fundamental requirement. There are many cases where the people who demand a system and participate in a meeting are not necessarily the people who will use it.

Therefore, a meeting on information concerning the five W's and one H, including the purpose and situation in which information from an output layout is to be used e.g., what kind of problems arise if such and such is not available should be conducted with the people who will use the system. For this purpose, it is important to walk up and down the workplace as much as possible. By doing so, according to my experience, one will be able to incorporate errors in actualized needs as well as actualization of potential needs before he knows it and can put together pertinent needs as a result.

Value diagnosis and evaluation

The above approach is not sufficient in itself for the following reasons :

1. Although the needs of those demanding systematization development have been understood, there are things that are actually not suitable for systematization and their

systematization will be wasted (unnecessary functions).

2. Actualization of potential needs will increase the scale of development and exceed the customer's budget in many cases.

Therefore, it is necessary to diagnose and evaluate the value of systematization, which is the point I would like to emphasize most in this paper, in an approach to select the items that are high in value.

Value and Evaluation Diagnosis Technique

This is a technique for diagnosing and evaluating more or less all the demands that have been modified by incorporating the

initial potential needs, and aims at the following two points:

- (1) To set criteria for finding out whether the systematization itself is appropriate.
- (2) To use it as a reference in determining the priority of development for systematization within the budget.

Example of results based on this evaluation formula

This evaluation formula places V's in order of high value and is used as a reference in determining the priority order of development. An example of personnel information system development (partial) based on this evaluation method is as shown in Table 1 and Figure 7.

1. Value diagnosis and evaluation formula

$V = N/C$	————— (1)
$C = \frac{C_2 + 5C_3}{5C_1}$	————— (2)
$N = \alpha_i \cdot \beta_i$	————— (3)

2. Explanation of variables

V: value coefficient of the system
N: necessary coefficient of the system
C: diseconomy coefficient of the system
C1: cost prior to systematization (\$million/year)
C2: system development cost (\$million/year)
C3: operation cost subsequent to systematization (\$million/year)
 α_i : point of i factor
 β_i : weight coefficient of i factor
S: system life cycle years (random setting)

3. N (necessity coefficient of system): example

Evaluation factor	α_i (points)	β_i (weight coefficient)
1. Frequency of system use (times/month)	10 times/month or more (10) 8 times/month (9) Once a month (1) Less than once a month (1)	10
2. Urgency of the system	Immediate (10) By the following day (8) 3 to 5 days (5) 1 month or more (1)	10
3. Number of sections in the system used	10 sections or more (10) 2 to 9 sections (8) Only 1 section (5)	6
4. System uniformity	No modification for a while (10) Modified once a year (8) Reviewed 2 times/year (5) More (1)	8
5. System user	Used by the management (10) Used by administrators (7) Used by the person in charge (5)	5

Table 1. Development Priority Order Based on the Value of

Systematization of the Personnel Information System (Example)

Demand screen	Systematization necessity coefficient (N)	Dis-economy coefficient (C)	V (Value) (N/C)	Development cost (CZ)	Development priority order
1. History Inquiry screen	283	0.85	345	15	2
2. Qualification Inspection screen	189	1.10	172	8	6
3. Area of specialization reference screen	340	.92	370	8	1
(etc.)					

As shown in Figure 7, assuming that the budget for the personnel information system is \$250,000, this example is adopted by giving development priority order in the order of high V(N/C) value within the range of \$250,000.

Systematization necessity coefficient (N)

This is the subject that requires the most wisdom.

I gave the highest priority to frequency of use and system urgency. In other words, I considered the extent to which output layout information (slips, screen) is used as the benchmarks that shows the function and effectiveness of things. Meanwhile, urgency does not require much explanation because it is another word for "time is money" and everyone knows the importance of timing that is required. The three other points that have been brought up are also necessary. In addition, my idea when this is applied to another system is that these evaluation factors should be added or modified according to the characteristics of the party demanding system development. Evaluation according to these factors is not only effective in creating ideas for questioning effectiveness in advance but suggests the ideal design with regard to performance and quality that are required.

Dis-economy coefficient

No matter how high the needs are, evaluation of whether the system is truly effective changes depending on cost performance. In this sense, setup of the life cycle and ideas for absorbing development cost during that period is important.

Points (α) and weight (β)

This subject requires more cooperation from customers than any other subject. There is no sense in a manufacturer performing evaluation on its own according to its own rules of logic. This must be performed with the customer, with the customer making the final decision.

EVALUATION

Construction of a Cost Determination Curve

Figure 8 shows a cost determination curve from the use of the technique, which is a successful pattern.

On the other hand figure 9 is a large scale system failure pattern.

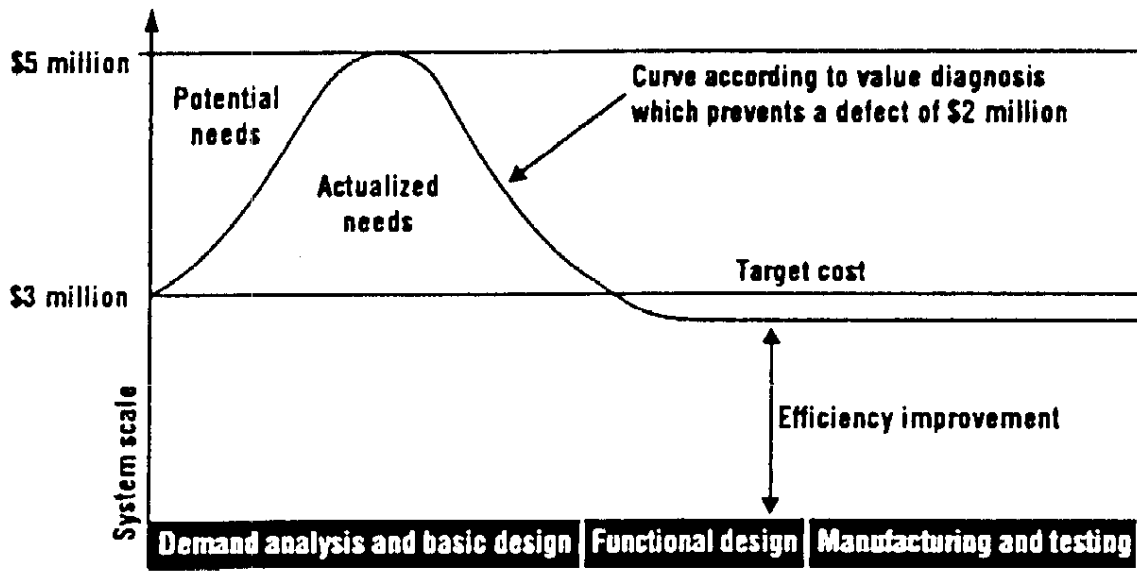


Figure 8. Cost Determination Curve (After VE)

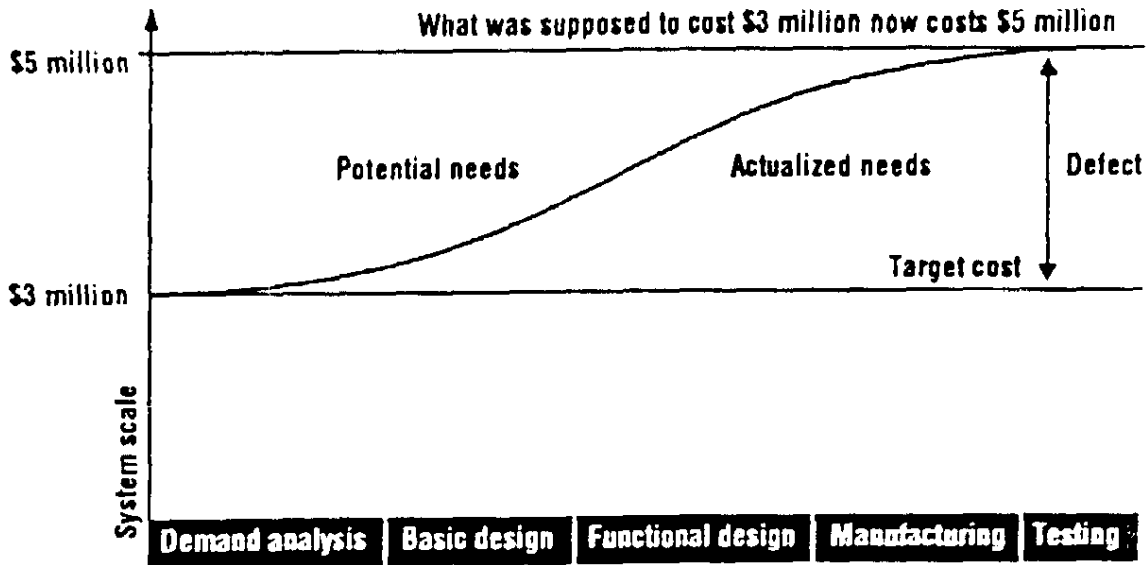


Figure 9. Cost Determination Curve (Before VE)

To explain this diagram, assuming that the upper limit of the customer's development budget is \$3 million, development cost can easily soar up to \$5 million due to insufficient estimation or negotiation techniques or delay in timing.

The goal of my practice in education and VE activities is the pattern shown in Figure 8 and I teach implementation of the ideas in

There is a high possibility that development of an information system will have the polarized results of either a major success or a major failure.

Therefore, I am convinced that avoiding invisible risks through initial stage design and leading the system to a pattern of major success is needed more needed than anything else .

History and Conditions of Execution

It was the many demands for systematization with regard to accounting system , salary system and personnel systems at the same time from a customer that gave me the opportunity to perform this evaluation. As the budget was limited at the time, the starting point was what needed to be conceived to create the highest possible value within the limitation of the budget.

In addition, the following conditions are necessary when using this technique:

1. To perform VE activities so that the customer will also understand the VE approach and popularize it extensively.
2. To have the customer understand the importance of "Walk Don't Run" in the development of intangible things, obtaining their cooperation in the upstream phase.
3. To obtain their approval at the first meeting to determine the range of systematization according to this approach and procedure.

FUTURE OUTLOOK

While this paper introduces ideas based on the evaluation formula $V = N/C$, there are probably many other means of expressing value.

A point worthy of further study is $V = (a N)/(C)$; i.e., the weight of N and C. In reality, this weight should not be 1:1 .

It is a well known fact that the development of information systems will keep expanding and diversifying in the future. Although there is a large amount of information and papers concerning the efficiency of information system development, hardly anything has been presented on the preceding evaluation of effectiveness. This large gap is a serious problem.

In other words, the high risk of major expenses and long waiting periods turns into something of almost no value once the evaluation of effectiveness is neglected at the first hurdle of the initial stage. It is the frontier spirit and effort of VE men that prevents such a disaster from occurring. Furthermore, teaching and practicing valuable system construction as a true professional is a joy for me worthy of a lifetime.