António Pires
School of Engineering – Polytechnic of Porto
Dep. of Mechanical Engineering
4200-072, Porto
Portugal
ant@isep.ipp.pt

Paulo Ávila
School of Engineering – Polytechnic of Porto
Dep. of Mechanical Engineering
4200-072, Porto
Portugal
psa@isep.ipp.pt

An approach about the value analysis methodology

Abstract

The markets globalization requires enterprises to continually investing in innovation, competitiveness and excellence. It is important to create a value culture in organizations, through methods such as Value Analysis (VA).
We pretend to enhance the relevance of the value concept and the creation of a value culture in the organizations, in order to foment and increment their success.
In this paper we intend to provide a better knowledge of value analysis and suggest possible ways of its application. These allow us to put on perspective in a sustainable way new slopes to be incorporated that contributes to increase surplus values in the enterprises.

Keywords

value analysis, job plan, functional analysis, virtual enterprises, value creation.

1. Introduction

In this paper we intend to approach the advantages of the use of VA. We will start by describing the methodology of its application and the evolution of the method. It is highlighted the importance of creating a value culture in the organizations and the VA contribution for the conventional systems. The importance of VA increases with the application in the conception phase, so it is necessary to expand the boundaries of the method utilization to every type of project or configuration models. One example of the emergent potentialities of VA is its integration in the project of virtual enterprises. The contribution of the virtual enterprises organizational models in the improvement of the organizations performance is a concrete reality and that has been object of an intense investigation.

The incorporation of VA contributes with additional support for the organizations configuration process. These factors are related to the nature of partners, trust, integrity, dynamic reconfiguration and organizational integration.

2. Value Analysis Methodology

VA is a well-known structured method to increase value and support the selection of the most valuable solution (Romano, Formentini, Bandera and Tomasella, 2010). Throughout recent decades, VA has proven able to reduce costs and ensure quality, while also contributing to the improvement of decision-making and other important organizational tasks (Rich and Holweg, 2000). The VA can be defined as an organized and creative methodology that uses a functional approach and aims to increase the value of a product/service (Ho, Cheng and Fong, 2000; Boulton, Anderson and Libert, 2000). The VA provides a means to link, align and maximize the efficiency of the value chain (Dove, 1996; Fowler, 1990).

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2.1. Value Analysis Evolution

The VA appeared in 1947 in the United States, from work carried out by Lawrence Miles, executive of the purchasing department of the General Electric Company. Initially, VA was applied only in the reformulation of existing products (Miles, 1972). However, it soon became apparent that organizations could get higher benefits if VA is introduced into the product design phase, because redesign a product can involve large investments.

Currently VA is considered a method and not a simple technique. This is because, not only is an organized approach to improve and create value, but also uses several different techniques to achieve this goal.

We are witnessing today an attempt to renew the VA. The competition is forcing companies to re-examine its range of products in order to provide a higher level of satisfaction to their customers without increase the costs. In addition, some companies are also using the AV with its suppliers. This need is based on a growing competitiveness and globalization of the markets and an increasingly essential innovation capacity.

2.2. Value Analysis Job Plan

The VA methodology uses a structured and methodical job plan contemplating several steps to assure the success in their application. In the extent of our work we use the following job plan (Pires, Putnik and Ávila, 2007).

The most known and distinctive phase is functional analysis, nowadays an autonomous tool of VA. In this section is this phase that will be described with more detail. The other setps will be described more briefly. The importance of an effective diagnostic, namely in the information search phase, in order to obtain an objective knowledge of the organization and the product in analysis, is another relevant factor, for perspective possible actions and solutions derived from the method application.

Table 1. VA Job Plan

Phases	Management	VA Team	Operational Departments
Orientation/Preparation	•		○
Information Search		•	○
Functional Analysis		•	○
Creativity		•	○
Evaluation		•	•
Development		•	○
Presentation	•	•	○
Implementation	•	○	•

- • - Responsability
- ○ - Participation

The main objective of the Orientation/Preparation is the preparation of VA application, while in the Information Search, the VA team should obtain all the necessary information. Functional Analysis is an important phase of the method with five main steps: 1) identification; 2) carachterization; 3) weighting; 4) ranking; 5) evaluation.

We will next briefly describe each of these steps illustrating with graphical examples the most relevant phases. In the identification we should make the description of the product functions. In the carachterization the satisfaction levels for each function (sma-minimum acceptable and spex-existent) should be defined as shown in figure 1, with its flexibility and ranges.

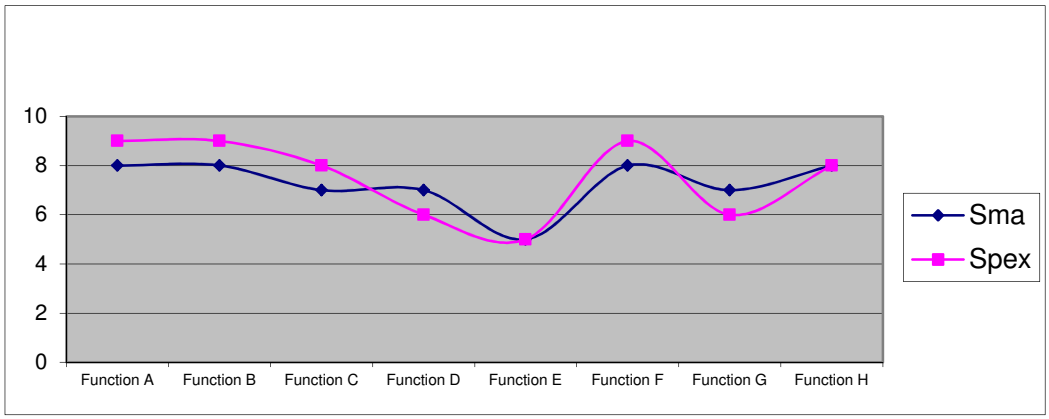

Figure 1. Example of the charachterization step

In the next step we weight the product functions, using a weighting matrix (see figure 2) that represents the following example:

Example of weighting the requisites of quality system for the determination of the objective function: A – quality systems, B - guarantees; C - service level; D - quality customer focus; E - total quality management;

	B	**C**	**D**	**E**		**TOTAL**	**%**	**Order №**
A	B1	A1	D3	E1		1	5,3	F4
	B	B2	D2	B1		4	21,0	F2
		C	D3	E2		0	0	F5
			D	D3		11	57,9	F1
				E		3	15,8	F3
						= 19	= 100%	

Figure 2. Example of the weighting matrix

Objective function of the quality system: F.S.Q._rij = (ΦSQ1 * PQ1_rij + ΦSQ2 * PQ2_rij + ΦSQ3 * PQ3_rij + ΦSQ4 * PQ4_rij + ΦSQ5 * PQ5_rij)

That is, in simplified form: F.S.Q._rij = ∑ (ΦSQi * PQi_rij). So, in the previous example: F.S.Q. = (0,579 * PQ1_rij + 0,210 * PQ2_rij + 0,158 * PQ3_rij + 0,053 * PQ4_rij + 0 * PQ5_rij)

The fourth step is the ranking of the product functions, as ordered in the weighting matrix. Finally, appears the evaluation of the product functions vs cost, using the matrix cost-function (see figure 3).

			FUNCTIONS							
ITEMS	**Total Cost**	**% Total**	F1	F2	F3	F4	F5	F6	F7	F8
TOTAL		100 %								

Figure 3. Example of matrix cost-function

The other phases are the creativity phase where is promoted the generation of alternative ideas, followed by the evaluation and selection of the best alternative ideas. Next, the selected ideas are developed and presented and the job plan finishes with the implementation of the VA project.

2.3. Value Analysis Results

A process of quality improvement, for a certain product/service must be customer oriented. The possible changes or innovations must become integrated with the VA, i.e. it is from the VA application that changes will occur in such a way that the improvement process will be correctly orientated to increase the product/service quality levels. Due to its versatility VA can be applied to all sectors or types of organizations and in every phase of the product life cycle. One of the areas that organizations should be open to innovations is at the level of new methodologies for costs reduction or quality increase in the products. VA allows conciliate both situations.

The elimination of the excess costs in conventional systems through the use of VA appears in the following figure.

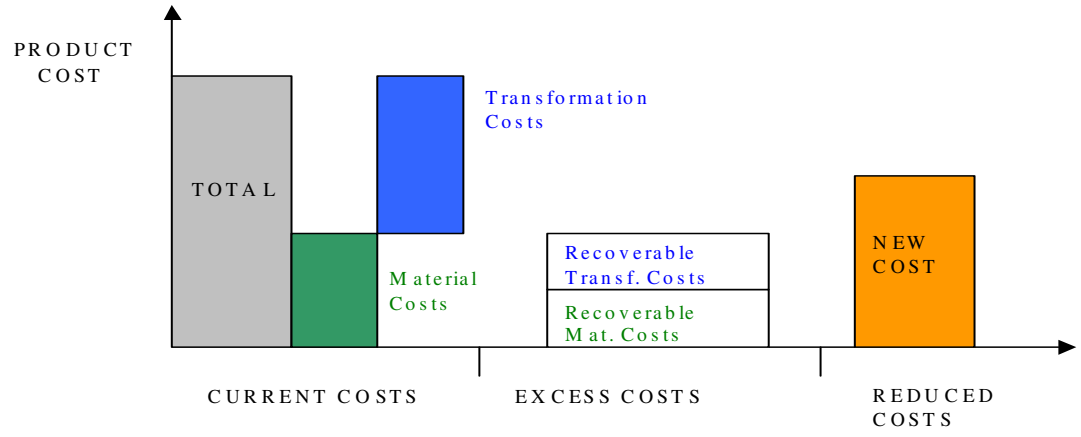

Figure 4. Costs Reduction with the use of VA (adapted from Rich and Holweg, 2000)

The timing of introduction of VA in the product life cycle can be debatable. The decisions made in the course of a project or in the process of product development during his life cycle will influence favourably or not his total cost. Better results are obtained when VA is applied to the new products in the initial phase, where the costs of implementing changes are smaller and the potential of results is higher (Pires, 2011).

The differentiation of a product can be defined by the constant seek in joining more and new values to the products. The value is reached, fundamentally, in the conception phase. VA should be an integral part of the conception project.

3. New Slopes for Value Analysis Methodology

3.1. Value Analysis integration in Virtual Enterprises

We intend to discuss the benefits that the VA can add to the virtual enterprises. How can the value generated by this kind of enterprise to be measured and estimated? To answer this we must then relate them with value models. It is essential to identify and create procedural models and criteria for evaluating the required performance and its consequent impact on organizational change. The performance measures entail benefits for businesses from both economic, technical and social (Kaiara and Fujii, 2006).

Currently it is fundamental that companies improve their performance in order to produce products more focused in customer requirements ideal, sustainably, with lower costs and generating resources for its ongoing development. One of the methods which may contribute to these goals is the VA, as we refer in the previous section. The joint application of VA, with the paradigms of the virtual enterprises, in which we believe that companies can explore the implementation of its potential as it happens in the conventional systems, goes towards the future perspective of these enterprises performance.

These type of companies, which are under development and optimization involve other factors not considered in conventional companies, and the VA incorporation will bring a new support decision for the configuration process. These factors are related to the nature of inter-organizations such as: trust, integrity, dynamic reconfiguration and dynamic organizational integration.

Thus, an important aspect for our work and which regards of the considered models analysis for conventional enterprises and for virtual enterprises has to see with the reference and incorporation of the value concept in the existing models (Pires, Putnik and Ávila, 2010). None of the virtual organizations models found and analyzed in the existent literature incorporates formally the value concept, which it indicates that there is a whole basic slope that is a paradigm actually, the value creation, which is not treated, not even analyzed, and not integrated in the aspects inherent to this type of process.

4. Conclusions

The value creation should be sustainable, and it is very important to properly understand the VA methodology. The analysis of results of VA application demonstrated that the VA enables not only consequent cost reductions, but also other relevant benefits. The importance of VA methodology increases with the application in the conception phase, so it is necessary to expand the boundaries of the method utilization to every type of project or configuration models. None of the existing models for virtual enterprises incorporate the VA integration.

This is an innovative approach towards greater sustainability in the configuration of this kind of companies. The VA can play an important role and establish itself as one important support tool throughout the virtual enterprise project, which is increasingly emerging as one of the existing paradigms of organizational change.

As a final conclusion it can be said that in this paper we intend to provide a better knowledge of VA, its boundaries and potentialities. We also suggest possible ways of its application, namely the integration in the virtual organizations models. The use of VA together with the paradigms of virtual enterprises, allows organizations to explore the method potentialities, already verified in the conventional systems, for new challenges.

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