Qualitative and Quantitative Analysis for the Evaluation of the Informatics Systems Projected by Value-Based Concepts

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Abstract

The present study aims at improving the system of indicators used for the evaluation of informatics systems by introducing a system of indicators which allows its analysis and complex appreciation, by quantifying the elements brought with the introduction of organizational aspects in projection, especially the introduction of use value. The use of the suggested indicators can bring benefits in the evaluation of the informatics system by the developers of informatics solutions so as to choose the best variant after the process of projecting and may assist the staff's decision regarding the acquisition of some informatics systems.

Keywords: indicators, evaluation, informatics systems, value based methods

1. Introduction

The informatics systems aims to collect, stock, organize, transform, distribute and use data and information utilized by the staff involved in operational and managerial functions of an enterprise in order to achieve the objective of the management, by information and communication technologies [12]. However, the existence of an informatics system in an enterprise is not sufficient for the managerial demands. The management needs a certain projection so as to properly meet the specific demands of enterprises. That is why, the tendency in the development of the integrated informatics applications for the administration of the business, is to customize the management of the enterprises for specific needs [10].

Therewith the evolution of the informatics systems is also the perfection of the projection methodologies. The efforts made in order to formalize the activities specific to the development of the informatics applications, led to the development of a new methodological trend, also known as "the hard approach for the projection of the informatics systems", which proved to be defective in defining the demands of the informational systems that the informatics system ought to satisfy [3]. This is the main reason for which the informatics products proved to be unsuitable from the qualitative point of view; more precisely they did not successfully meet the users' demands, respectively the more and more

dynamic economic field's demands. In the intercessions made in order to improve the projection methods, the specialists aimed at some factors whose influence on the final product wasn't adequately appreciated. By including the social and organizational aspects, the bases of a new orientation have been established, namely "the soft approach for the projection of the informatics systems" [2].

The great progress consists of the transition from the independent product – informatics application, as a final objective of the application of projection methods, to the development as a part of the informational system and the focus on the final destination – the enterprise's service of the informational system. This is, in fact, one of the fundamental concepts which constitutes the basis of the products' projection, by using the value concept and which represents the connection link between the soft approach and that which uses the concepts of the Value Engineering, Value Management Human Resources Management, or Quality Management [1].

Using these approaches will allow the elimination of the discrepancies between the beneficiaries' expectations and the characteristics of the delivery informatics systems – as main shortcoming caused by the use of the traditional methods – by placing in the centre of the methodology the demands of the beneficiaries. The initiative is considered an innovation from the perspective of the functional approach in the re projection of the informatics solutions for the informational systems of the enterprises, and is also technically and methodologically highly useful because it changes the managers, designers, specialists and executors' way of thinking, from the constructive approach (from what the informatics system is) to the functional one (to what the informatics system does) [13].

2. Evaluation methods of informatics systems

The introduction into analyzing and projecting the informatics systems of the organizational aspects and the consideration of the human factor by using Value Analysis in the process of projection, determine to add the informatics system of some facilities which reflect mainly in the increase of their utility. Value Analysis, as a technical and economic method of

projection, fundamentally differs from the classic methods of the cost reduction through the functional and systemic approach of the projected objects, processes and services. The first step of the projection process is to identify the needs that the system has to fulfill. Then, the specialists project the physical, tangible form of the object/process that satisfies the identified needs. Because the economic value of a product/service is, in fact, the customer-recognized social value, the Value Analysis can be considered as the method that ensures, on one hand, the needs' fulfillment and, on the other hand, the individual value reduction of the product/service through cost reduction.

At the beginning of the '90s, Dahlberg put the fundaments of the evaluation of the informatics systems [4]. Later, McCabe [14], von Hellens [6] and Halstead [5] contributed at the development of the concept that avoids realizing a coherent analysis of all the aspects connecting with the evaluation activity. There was developed multiple modalities of approaching of the evaluation of the informatics systems, but no one of them proposed solution accepted both by the academia and industry, too. A great part of the proposed approaches are oriented to the technical aspects and to the quality control. The results used by the use of these methods were not satisfactory for the evaluation purposes. More than, the classic methods of informatics systems' analysis and evaluation don't take into account the aspects introduced by the use of value based methods, the currently used system of indicators ought to be completed with new indicators.

The currently used indicators, selected so as to evaluate informatics systems and developed by means of traditional methodologies, are not able to quantify their use value, which is a relative value varying according to the position towards the evaluator's informatics system (beneficiary/user or developer). The indicators' system proposed for the analysis of the informatics systems developed by means of value-based methods throughout the analysis and projection stages measure:
- the efficiency belonging to informatics systems' producers;
- the degree of satisfying the needs of the informatics systems' beneficiaries;
- the expenses made for the implementation of the informatics system;
- unquantifiable effects;

The Efficiency Belonging to the Informatics Systems' Producers
The efficiency belonging to the informatics systems' producers will be measured by evaluating the quantifiable effects, by indicators derived from value indicators of the production activity like cost economy and the increase of the turnover, as well as by indicators that characterize qualitatively the evolution of the work and commerce process through the increase of the work productivity [8].

Cost economy that will be determined as a difference between the costs registered a year before the reprojection and the costs for the achievement of the system after its projection:

$$Ce = C_0 - C_{rp} \qquad (1)$$

where:
- Ce – cost economy;
- C_0 – costs before the reprojection;
- C_{rp} – costs estimated after the reprojection;

The increase of the turnover that will be determined as the difference between the turnover posted after introducing into production a new system and the turnover booked a year before re projection:

$$IT = T_{rp} - T_0 \qquad (2)$$

where:
- IT – the turnover increase;
- T_{rp} – the turnover achieved after implementing the new system in the production;
- T_0 – the turnover booked a year before the re projection;

The increase of work productivity will be determined as the difference between work productivity achieved after introducing the new system in the production and work productivity booked a year before the reprojection:

$$IW = W_{rp} - W_0 \qquad (3)$$

where:
- IW – the increase of work productivity;
- W_{rp} – work productivity achieved after bringing into production the new system;
- W_0 – work productivity booked a year before the reprojection;

The Degree of Satisfying the Needs of the Informatics Systems' Beneficiaries
The degree of satisfying the needs of the informatics systems' beneficiaries represent, in fact, the measure of use value and it may be obtained by approximating and evaluating the use characteristics. The value received after applying the study refers to the minimal limit of use value which represents one of the objectives of the reprojection activity. The minimum limit of use value is defined as the minimum levels' sum of the informatics system's characteristics and it presupposes a comparative evaluation with similar products from our country and/or from abroad as well as with the trend of the evolution.

Evaluating the use characteristics of an informatics system is a complex and laborious process since the use value is a measure difficult to quantify, it is not constant for all the beneficiaries and it has a strong dynamic feature. That is why is suggested the use of a prevailingly descriptive evaluation system.

The first method of evaluation suggested is based on Ishikava's Evaluation tree [11], a concept that is borrowed and adapted to the specific of the approach that the present paper forwards. The analysis is being made on a double coordination:

- − evaluating the benefits brought to management activity of the enterprise;
- − evaluating the degree of satisfying the demands that the informatics system ought to meet.

The evaluation is made separately, on more components that have been chosen according to the extension of the procedures used for the qualitative evaluation of the informatics systems.

In order to present the conclusions for the analysis was holded forth their tabular ordination. In a cause-effect relationship-like, table 1 highlights aspects that underlie the descriptive evaluation made by the users for the quality of an informatics system.

The descriptive evaluation of the informatics systems can be improved by means of complementary methods and techniques.

In this way, is advanced the application of the Woroniak method by Cap Sesa [8]. Like the previous method, this one has its starting point in the user's/beneficiary's point of view. Its application presupposes the creation of some users groups with common interests in the informatics system. The selected beneficiaries for this study will have to note a series from the above mentioned attributes, according to the system's level of use, so as to follow them and eventually to assign a score quantifying the performed appreciation. These results will help to evaluate the way in which the value based methodology leads to the increase of the users' degree of satisfaction [9].

Table 1: Evaluating the degree of satisfying the demands by an informatics system

Benefits brought to the management activity	Benefits	Indicators for the informatics application	Indicators for equipments	Satisfying the demands that the informatics system ought to meet
	Time economy	Savings control	Reliability	
	Procedures automatization	Friendly interfaces	Security	
	Reports quality	Lack of errors	Documentation evaluation	
	Emergence of new services	Agreement with the beneficiaries'/users/ demands	Application-oriented editing	
	Decisional process improvement		Coherence and program correspondence	
	Operational processes improvement		Completitude	
			Integration in the informatics system	
			Possibility of update according to the current version of the application	

Hereinafter, are proposed examples of evaluation grids, possibly to use in appreciating the degree of satisfaction of those who use an informatics system,

by recouping on two main levels that they serve: the operational and managerial level.

Table 2: Quantification grid of the degree in which the informatics system meets the users' demands

Evaluation card	Satisfying the users			
Appreciation made by the operational level	Very Good	Good	Satisfactory	UnSatisfactory
	100 - 80	80 - 50	50 - 20	20 - 0
Appreciation made by the managerial level	VG	G	S	US
	100 - 80	80 - 50	50 - 20	20 - 0

The model of selecting data is presented in table 3, where the appreciation becomes the degree of satisfying the demands. The values range from 0% to 100%:

Table 3: Model of selecting data in order to evaluate the informatics system

No.	Activity offered by the informatics system	Observations
1	Activity 1	
2	Activity 2	
…	…	
n	Activity n	

Expenses Made for the Implementation of the Informatics System

The expenses made for the implementation of the informatics system in this situation, comprise the total cost (TCO – total cost of ownership) and the cost for the analysis and projection study. In order to compare the obtained costs, the standards require the reference to a maximum accepted level. For establishing the maximum threshold, the market prices for similar products, including providers' profit, are taken into account together with the sums that the possible clients/beneficiaries are willing to pay.

Unquantifiable Effects

Another distinct indicator by means of which the result of the reprojection activity can be evaluated is the socio-economic efficiency which is defined as the aggregate of the useful socio-economic effects, registered after implementing the informatics system, in relation to the efforts made for their acquirement [7]. Given its particularly complex character, the situation asks for a deep approach of the socio-economic efficiency, back grounded by the implications on the management system. In this category are included:

- the use of indicators referring to cost, quality, service, time, so as to express the performances of the enterprise;
- the simplification of the structural configuration, its rendering flexible, obtained by reprojection;
- the increase of the response speed and the response quality to internal and external stimuli;
- the creation of premises regarding the introduction and the application of some modern managerial systems of great efficiency like: budget management, project management, and so on.

3. Conclusions

The strategies we suggest for the evaluation of the informatics systems projected by using some value-based methods take into account both the points of view of the informatics systems' producers and beneficiaries that differ considerably very often from one another. The suggested method envisages not only indicators from the traditional system of evaluation – expenses for the implementation, but it also introduces new methods of evaluation, by taking into account the aggregate of the socio-economic useful effects booked after the implementation of the informatics system. Both the quantifiable and the unquantifiable effects are not exhaustive; they are to be established by the value engineering collective, whose target is to emphasize the obtained results by reprojecting the informatics system.

No matter the strategies and the selected indicators for illustrating the efficiency of a reprojected informatics system, the eventually selected variant is expected to fulfill the following conditions, which certifies the procurement of an optimal report between the use value and the total costs:

- the use value of the selected variant must be greater or at least equal to the use value of the informatics systems from the present on the market;
- the total costs necessary to accomplish the selected variant must be lower or at least equal to those of the informatics systems they are compared to; if the cost inequality standard is not respected, therefore a hedge in the increase of use value must also exist.

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