EXTENSIVE AREA TO APPLY THE VALUE OF ENGINEERING (II)

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În această parte vom prezenta un studiu de caz prin care ne-am propus să demonstrăm fezabilitatea metodologiei propuse şi eficiența aplicării acesteia la proiectarea/reproiectarea sistemelor informatice ale întreprinderilor. Studiul de caz vizează o societate comercială din categoria IMM, profilată pe activități de comerț. În prezent societatea este total nemulțumită de sistemul informatic de tip ERP pe care îl utilizează.

In this paper we will present a case study through which we intend to demonstrate the feasibility of the proposed methodology and its use effectiveness in designing/redesigning information systems of enterprises. The case study is focused on a company included in the SME category specialized in trading activities. Actually, the company is fully unsatisfied by its integrated information system.

Keywords: function, function cost, use value, marketing, importance level

1. Applying the methodology proposed to redesigning the information system of an enterprise

1.1 Redesigning of information system using Technical Oriented FAST diagrams

The stages of implementation of the proposed methodology are represented in fig. no. 1. Obviously, space doesn't allow us to talk about each stage, so in the paper have been chosen only those which are the most suggestive to demonstrate the feasibility and effectiveness of the methodology.

The case study subject is redesigning the information system of a small company, engaged in trading activities. In addition to the purpose of verification of the new methodology, the choice of this type of application has been done from practical considerations.

We are talking about the absence of software that provides appropriate solutions for the specific requirements of the SMEs, available at affordable prices for their investment budget. Because of this, the decision-making processes

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unfolding in a predominantly empirical mode due to the lack of appropriate information, at the right time.

It shows that the software developers do not take into account the real needs of the SMEs, they performed such products at large companies' demands, exceed their functionality for the specific needs of SMEs, but at the same price.

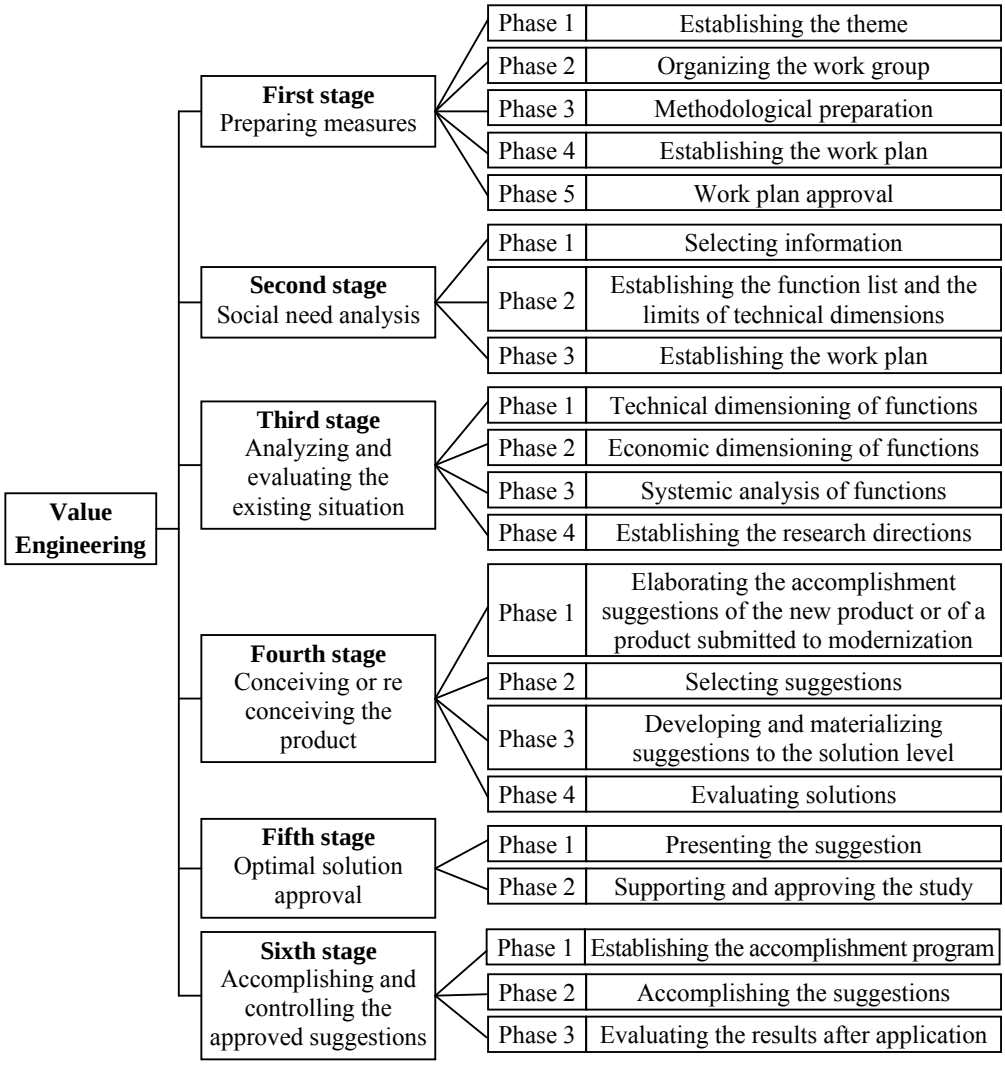

Fig. 1. The methodology of design/redesign of information systems

For this study we have cooperated with managers of SMEs, with specialists in activity coordination of financial and accounting departments, with project managers for systems development and IT specialists. To obtain the best possible representation of the demands of end users in the system functions dedicated to SMEs, end-user demands study was expanded to ten companies from the same category: small, with main activity in the trading field. The purpose of the case study was to achieve the following objectives:

- experimentation and verification of sustainability of the new methodology based on concepts of Value Engineering which have been assimilated and FAST diagrams, by customizing the case of small trade business;
- reducing the total cost of the solution to the level of becoming attractive for SMEs, in terms of satisfying the demands of their information system;
- improving the functions of the information system, and thereby, the information system;

improving the functions performed by the information system in such way that system should be in a relationship to the whole party, achieving an advanced management, with direct repercussions on the competitiveness of the entire enterprise.

1.1.1 Establishment of nomenclature functions of the redesigned information system

Collection of information was achieved by interviewing a group of specialists in information technology. After they have explained the purpose of the study and they have given us specific concepts, they have been asked them to submit their own vision on the functions of the system trading activity system major components, identified in an earlier stage: hardware, operating system, database and software application for business management.

After the initial tests were shown, they agreed that the functions met by the hardware can not be separated from those which must satisfy the operating system and that technical solutions for the two components of the system determine each other.

After going through this phase, we have set the nomenclature of functions for each system component. For exemplification, tables no. 1, no. 2, no. 3 shows the functions for hardware, operating system, database and software.

1.1.2 Economical dimension of functions using Technical Oriented FAST Diagram for the redesigned information system

Furthermore, it was set the order of importance of the functions, and have been assigned, in turn, the total costs based on each of the three major components identified above, as shown in the tables no. 4, no. 5 and no. 6.

1.1.3 Systemic analysis of the functions of redesigned information system

An image of the actual status of each system component by using the redesigned – Technical Oriented FAST Diagram was obtained by comparing the costs level of functions, with their importance level in the general use value. Based on the data obtained by calculation of functions cost for operating system and software, we created Chart no. 1: Functions for hardware and operating systems; Chart no. 2: Functions for database; Chart no. 3: Functions for software.

From the graph we could observe that the functions J, H and G are located on the right of regression, so the costs that were achieved are directly proportional share of the functions in use. The functions K, I and A are easy sub-evaluated, while E and D have been overstated. Sub-evaluated functions are those where achievement do not have an important role among the components of the information system and does not involve acquisition costs.

Table no. 1:

Functions for hardware and operating system

Symbol of function	Function Name	Type of function
A	Resources use	Basic function
B	Allows maintenance from distance	Auxiliary (determinate by A)
C	Allows working from distance	Auxiliary (determinate by A)
D	Gives information	Required function
E	Stock information	Required function
F	Assure the security of information	Auxiliary (determinate by E)
G	Memorize information	Required function
H	Makes calculus	Required function
I	Enter information	Required function
J	Is viable	Auxiliary general available
K	Easy to use	Auxiliary general available

Table no. 2:

Functions for database

Symbol of function	Function Name	Type of function
A	Combines information	Basic function
B	Stock information	Requested function
C	Modify information	Auxiliary (determinate by B)
D	Delete information	Auxiliary (determinate by B)
E	Aligns information	Required function
F	Is independent	Auxiliary general available
G	Is viable	Auxiliary general available
H	Easy to maintain	Auxiliary general available

Table no. 3:

Functions for software

Symbol of function	Function Name	Type of function
A	Calculates	Basic function
B	Eliminates redundant information	Auxiliary (determinate by A)
C	Saves information	Required function
D	Assure security	Auxiliary (determinate by C)
E	Processed information	Required function
F	Receives information	Requested function
G	Is viable	Auxiliary general available
H	Easy to use	Auxiliary general available
I	Allows extension	Auxiliary general available
J	Is independent	Auxiliary general available

Table no. 4:

Centralized table with the functions cost of hardware/operating system (RON)

No.	Function	A	D	E	F	G	H	I	J	K	Total
1.	SO license server database	900	0	0	0	0	0	0	0	0	**900**
2.	SO license server LTSP	1,920	0	0	0	0	0	0	0	0	**1,920**
3.	Server	0	4,000	3,200	0	2,400	1,600	0	800	0	**12,000**
4.	Clients	5,622	4,919	4,217	0	3,514	2,811	2,108	1,406	703	**25,300**
Total cost:		**8,442**	**8,919**	**7,417**	**0**	**5,914**	**4,411**	**2,108**	**2,206**	**703**	**40,120**

Table no. 5:

Centralized table with the functions cost of database (RON)

No.	Cost specifications	A	B	E	F	G	H	Total
1.	SGBD – materials spendings	-	-	-	0	0	0	**0**
2.	Labor building database	1,200	990	900	0	0	210	**3,300**
Total cost:		**1,200**	**990**	**900**	**0**	**0**	**210**	**3,300**

Table no. 6:

Centralized table with functions cost of informational application (RON)

No.	Cost specifications	A	C	E	F	G	H	I	J	Total
1.	Labour hours	1,450	1,250	1,100	1,000	750	180	350	550	**6,630**
2.	Informational application labor	4,350	3,750	3,300	3,000	2,250	540	1,050	1,650	**19,890**
Total labor:		**4,350**	**3,750**	**3,300**	**3,000**	**2,250**	**540**	**1,050**	**1,650**	**19,890**

Note: The total amount of labour was divided by 10, resulting the number of active customers who will be in charge to change applications redesigned as specified results of this study.

As the chart no. 1 illustrates, functions J, H and G are situated on the regression line, therefore the accomplished costs are directly proportional with the weight of functions in the use value. Functions K, I and A, are easily under evaluated whereas E and D were over evaluated.

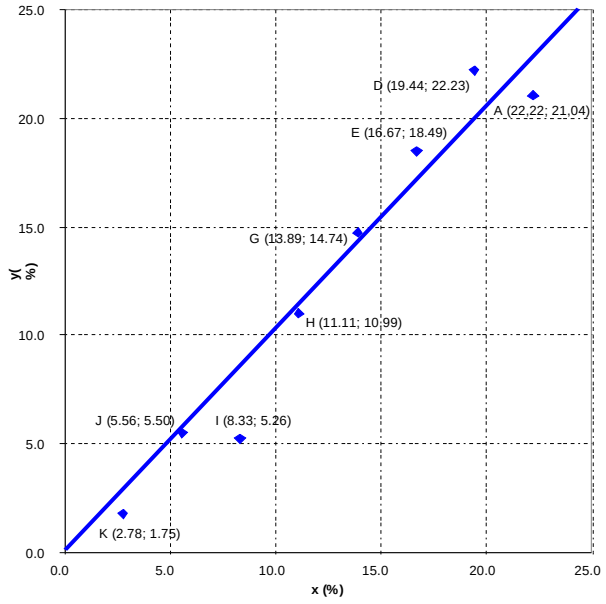

Chart. no 1: Graphic representation of systemic analysis of hardware/operating system functions which do not involve acquisition costs

The under evaluated functions are the functions with a successful accomplishment determined by the components of the informatics system that do not imply acquisition costs.

In chart no. 2 it is shown that the functions F and G are located on the x axis, which means that the two officials do not involve cost of materials and labour. Instead, the functions A, D and E are slightly overstated, which may be a consequence of achieving cost-sharing database only on the last one.

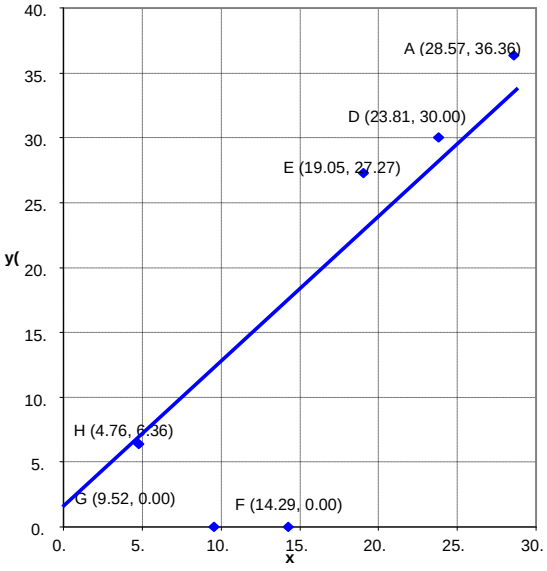

Chart no. 2: Graphic representation of the database systemic analysis

Chart no. 3 shows that software functions (except F) have been completed with costs directly proportional to their importance in the amount of usage. Relatively small number of main functions determined by applying the Technical Oriented FAST Diagram is due to the limitation through the methodology several of critical functions number of the critical path and that some of them are found in several of analyzed components. It is different from the chart based on the use of Task Oriented FAST system, as one will see further:

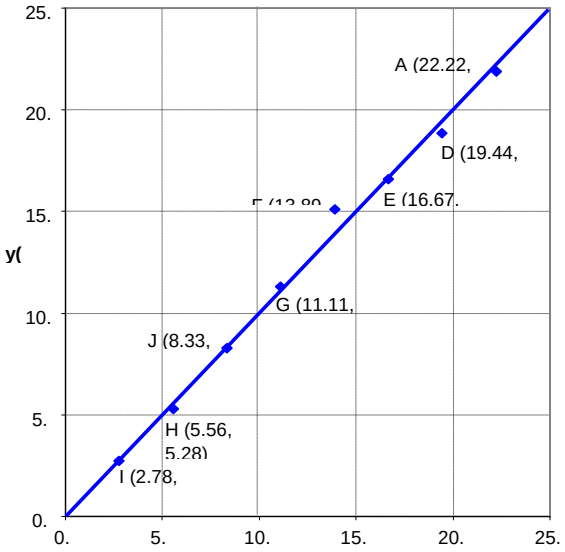

Chart no. 3: Graphic representation of systemic analysis of service applications

2. Redesigning of system using diagrams FAST-oriented tasks

2.1 Establishment of the nomenclature of functions by using the chart FAST - oriented of the task of the redesigned system.

After analyzing the system characteristics established in the previous paragraph (1.1.2), after eliminating those that have been overlapped and those which have been in contradiction, each of the selected characteristics was transposed into a feature. As one can see in table no. 7, where Task Oriented FAST Diagram information system resulted in a greater number of functions in comparison with the Technical Oriented FAST diagram used.
The explanation lies in the particularity of the charts, which aims to meet priority needs of specific beneficiaries. In the case of trade companies, these are realized through several supporting functions.

Tables no. 7:

Classification of system functions determined by using the Task Oriented FAST Diagram

Symbol of function	Function Name	Type of function
A	Enter information	Basic Function
A2-1	Allows different ways to enter information	Basic Function
A2-2	Verify information	Basic Function
A2-3	Ensure operating unit	Basic Function
A2-4	Remove repeat operations	Basic Function
B	Process information	Basic Function

Symbol of function	Function Name	Type of function
B2-1	Perform calculations	Basic Function
B2-2	Allocates accounting records	Basic Function
B2-3	Modify information	Basic Function
C	Generates output	Basic Function
C2-1	Generate forms	Basic Function
C2-2	Generate reports	Basic Function
C3-1	Generate mandatory reports	Basic Function
C3-2	Generate specific reports	Basic Function
C2-3	Providing real information	Basic Function
D	Ensure safety	Basic Function
D2-1	Protect physical support	Basic Function
D2-2	Protect information	Basic Function
D3-1	Protect the environment from internal threats	Basic Function
D3-2	Protect the environment from external threats	Basic Function
E2-1	Simplifies the instructions for use	Supporting Function
E2-2	Allow service from outside	Supporting Function
E2-3	Is reliable	Supporting Function
F2-1	Simplifies reports	Supporting Function
F2-2	Motivates employees	Supporting Function
F2-3	Minimize the time of introduction	Supporting Function
F2-4	Minimize the time of verification	Supporting Function
F2-5	Minimize the time of implementation	Supporting Function
F2-6	Minimize processing time	Supporting Function
F2-7	Minimize time to generate reports	Supporting Function
F2-8	Maximizes the processing of information	Supporting Function
G 2-1	Presents nice interface	Supporting Function

The next stage was the separation of the basic functions from the supporting function (table no. 7). To facilitate the systemic analysis, each feature function has a letter attached, and functions of grade 2, 3, etc. were attached letter function level 1 (basic or supporting), the corresponding figure in rank and serial number. Next step was to set the agenda for important functions. The basic functions were considered more important than the supporting functions, and within each category it was made a ranking. The same principle was applied to the functions of rank 2 and 3, which facilitated the establishment of importance levels of each of the two types of functions (basic and helpful). After determining the order of importance of the functions it was assigned, in turn, the total cost for each function performed by redesigned system. Systemic analysis of service obtained is shown in the chart no. 4. As you can see from the chart, some of the functions are above right of recourse, which means that they are overstated. It shows that the

model developed by using Task Oriented FAST Diagram more reserves to improve the proportionality of the costs needed to carry out their functions and contribution to ensuring product whose value items meet fully requirements of users. The situation can be improved by finding technical solutions to achieve more effective functions.

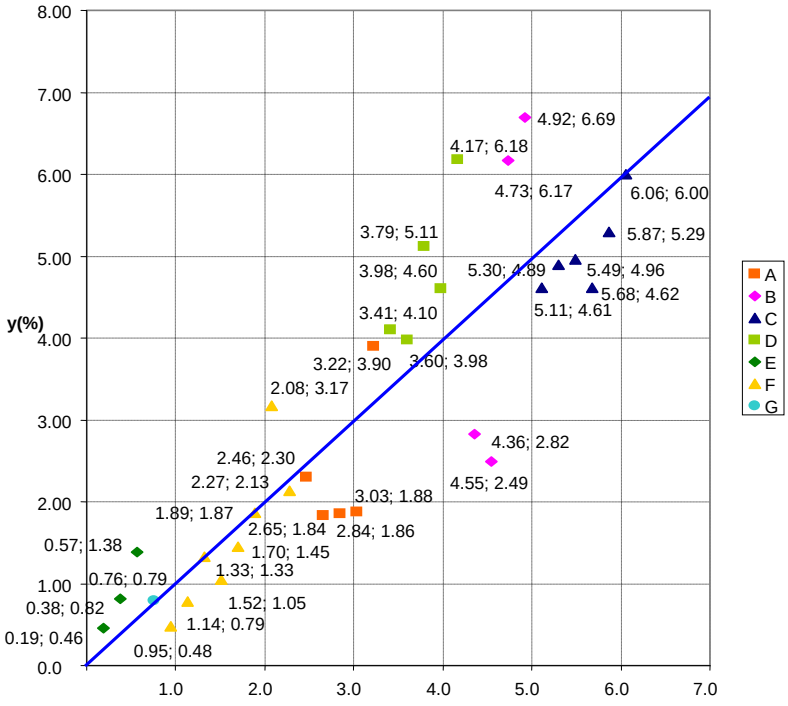

Chart. no. 4: Graphic representation of systemic analysis of redesigned information system functions

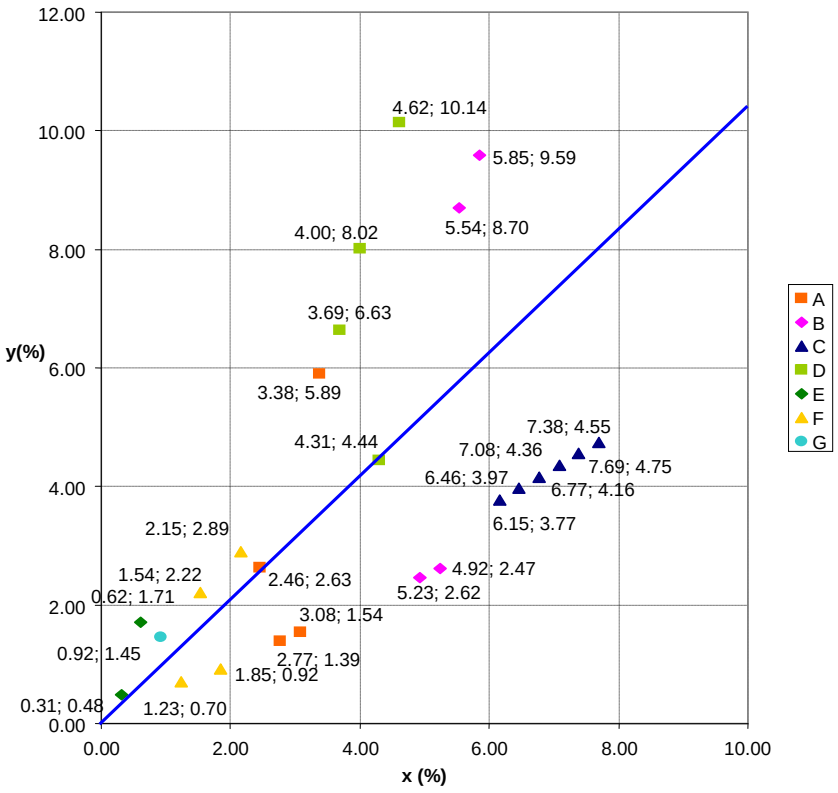

Chart no. 5. Graphic representation of systemic analysis of the existing information system functions based on used software

However, the experiment has allowed us to demonstrate the feasibility of the proposed methodology and the results, which were compared with the current applications offered to SMEs by developers of applications, demonstrating its superiority.

3. Conclusions

The two versions of FAST Diagram used for determining and ranking system functions have brought some changes in how to apply the methodology proposed, starting from the original structure. Following the application of the method Technical Oriented FAST Diagram, for the hardware, operating system and database there were proposed original constructive solutions providing optimum performance in conditions of service system, especially for the main

functions. Task Oriented FAST Diagram generate a greater number of supporting functions, since the start of the system requirements established after studying the operating characteristics must be fulfilled in accordance with the users requirements.

This chart has proven efficient in designing software where it predominates functions leading to fulfillment of the requirements for the specific sector analyzed. To design the hardware, operating system and database for components having a pronounced technical nature it is recommended that the functions use a variant Technical Oriented FAST Diagram, and such critical functions of the road are determined to be used as a starting point for the basic function of task oriented version of the diagram.

The solutions effectiveness analysis proposed of the information system designed for the needs of the SMEs, was achieved by comparing function systems obtained after using the two variants of the FAST diagram and the reference information system.

We consider that the new methodology of design/redesign of information systems using Value Engineering concepts, supplemented with the two diagrams FAST, could form the basis for developing a European standard by the ISO to ensure widespread application Value Engineering to the European Union.

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