

STEPS OF VALUE ENGINEERING IMPLEMENTATION IN CONSTRUCTION

Taking into consideration theoretical skills and analytical approaches discussed previously author suggested steps of implementation of value engineering in the real projects.

This report is an action plan for the design team where it displays the ideas and proposals as facts based on accurate information technically and financially and documented in a clear formula specific meaning. It does not need further explanation during its applying.

Keywords: value engineering, construction projects, cost, steps of implementation

The organized sequenced logical steps applied as phase of implementing Value Engineering. There are many steps that adopt a certain sequence in dealing with Value Engineering implementing plan. In spite of the number of sequenced steps, it all agreed that it is seven main phases as mentioned above: 1. Information gathering, 2. Functions analysis, 3. Innovation and brainstorming, 4. Evaluation of alternatives and ideas, 5. Developing ideas, 6. Brief and recommendations, 7. Applying and following-up [1].

The most important reasons of failure that results from making wrong decisions, is incomplete information which has an important role in any study. The collection and reviewing the information before starting the study, gives the work team better understanding of the problem. Each type of project has a specific list of the required data usually derived from four main sources: the beneficiary – the ultimate user or beneficiary - the specifications and measurements - the work team.

The collection of the information stage is the main stage based on value engineering so it is better not accelerate because when the information increased and become more detailed and accurate, it will be more effective and achieve better goals for the project. How to make use of the information is more important than collecting it so it is preferably to use a structured approach to collect information according to:

- Studying charts and project documents tested and reviewed. It is the most important stage in any study, so devoting sufficient time to review and make notes is a must. It is preferably at this stage that the team gets the explanation about the project by beneficiary at the outset;
- Studying the project (subject of the study) from the technical, financial, economic and marketing aspects to analysis it and understand it;
- The need to understand the user requirements and discuss it to develop the basics and standards of the targeted design accurately;
- Business financial analysis of the costs and estimations and informing everyone involved in this project about it and taking into account from the designer to the end;
- The site, its features, and the possibility of maximum use for the benefit of the end uses for the project;
- Preparation of required forms by the Value Engineering and determine their requirements and elements and try to be provided in conformity with the study required for the project including:
 - A- Space models: taken from the drawings provided by the project designer,
 - B- Cost model: taken from the table quantities that is attached to with charts and graphs,

- C- Quality models: the value study team draw value network through design standards in charts and graphs,
- D- Energy models: calculate the consumption of the project components of energy such as lighting, cooling, ventilation...etc.,
- E- Project life cycle models: calculate the total cost of the project which consists of construction + maintenance and operation +depreciation and replacement over the lifetime of the project [2].

Sources of information are limited by documents and papers – certified technical references and standards – interviews with the owner of the project – interviews with the second beneficiary of the project, and general regulations controlling the project area and residential system.... etc. This phase aims to get all the facts about the subject of the study and realize the elements of the project, its area, and places of high cost, and analyze it scientifically.

The second steps of jobs analysis are the substrate on which the value studies depend on and that distinguish it from other methods of solving problems. At this step, functions of the project recognized and understood well and the relationship between them is realized.

The job analysis phases consist of:

- Identifying and determining the function and purpose of the project;
- The task or goal that element plays solely or combined with elements;
- The estimated financial cost of the project;
- Function identifying : is the goal that the whole project built for or the basic function of the project, then analyzing each element and determining the purpose of making the project, what is the function performed by each element and the extent of the role of this function in achieving the basic function of the project. It is possible to determine and the work of each element in a set composed of actual act and the name [3].

Third step represents the launch of talents and stimulating creativity through brainstorming style and other similar styles; the members of the value study present a creative ideas freely and without restrictions to create proposals and provide alternative functions or required performance that has been defined in the previous step in a better way or with low cost or both.

These ideas and suggestions recorded spontaneously without criticism or evaluation so the good idea does not get killed in its cradle; the rating is up to the subsequent step.

Anyway, there are two major rules must be remembered always [1]:

The first rule: not to judge the ideas put forward because this will help us to get the largest possible number of ideas and avoids us from abortion any idea before it takes its chance to study, and this will also preserve the team members time and reduce controversy as some debates occur due to misunderstanding between team members which may limit the contribution of each one and thus limit the innovation and creativity.

The second rule: ideas are having attention even if it turned out to be impractical. At this stage, all ideas are equal in terms of importance. The good ideas is a part of ideas put forward so if we assume that the percentage of good ideas is 30% we will have 30 good ideas from 100. But if there were only 10 ideas to propose the good ideas will be only 3.

The fourth stage is evaluation of alternatives and ideas. In this stage, criticism and evaluating all the alternatives, the ideas, and the proposals that have been put forward in the previous step are done. The purpose is filtering a large number of ideas to exclude the ideas that cannot be applied and then arrange the

ideas and alternatives. The ideas and alternatives evaluation process is based on the following principles and criteria:

- Modernity and ingenuity of the idea and to what extent it achieves the required function;
- The cost of developing the idea;
- Possibility and ease of application;
- The amount of the intended benefit.

The idea should answer two questions when it is completed:

- What is the cost of each good feasible idea?
- Does the idea or proposal achieve the desired function?

Developing ideas is fifth step. It's a step to change the ideas and solutions that been considered previously to a specific action plan by the specialist in the value study group where the idea is the developed to in an integrated and clear-in-details work duly in the preparation of engineering drawings and specifications prior to the implementation include the way of the application encompassing a total cost estimation.

This step must offer the answers to the following questions at the completion:

- What is the cost of the idea in case of application?
- Does the idea satisfy the requirements?
- What are the savings of financial and non-financial result from?

In sixth step (the brief and recommendation), the presentation and briefing to the owner to inform him to the study and its results and realizing the effort have been made and the approach that has been followed in the study to reach those results where a reviewing of the report of the study, recommendations, ideas, proposals, solutions and suggestions about the designation work to make decision and be included in the next phase of the designing stages.

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Application and follow up is the seventh stage. To ensure implementation of the recommendations and proposals must follow the executive plan in line with the management style in the organizing [4, 5].

The most important goals of the application and follow up phase are:

- Developing practical measures to ensure the implementation and application of the recommendation and proposals value;
- Following-up the application and implementation through following-up and monitoring of results;
- The continuity of application of Value Engineering.

The application and implementation step are almost neglected in most of the technical studies though it is the real standard to the success of these studies. This negligence may be a result of the lack of regulation or of application governing method, implementation, and following –up.

There are three main elements value engineering cannot be applied successfully without it, in addition to financial support for studies:

- The board of directors of value: it is the committee responsible of providing support, advisory, and direction to the team;
- The value director: also known as Value Engineering manager; he is the leader of the value study team;

- The team: the trained group holding the study.

All of these elements play a significant role in any successful value study.

The following is a demonstration for the overlapping of their works, responsibilities, and participation of each in any value study as shown in figure.

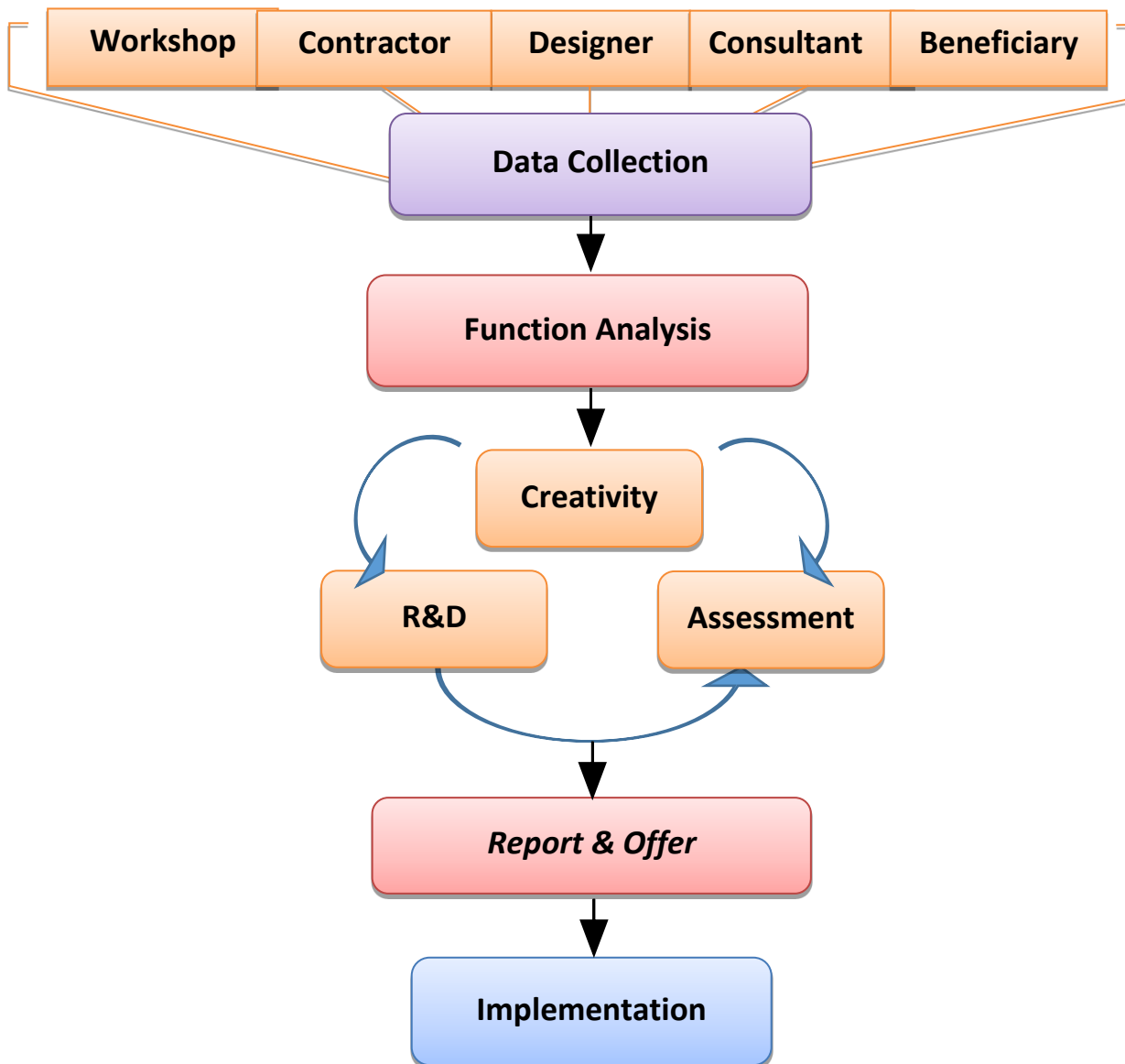


Fig. 1. Demonstration for the Overlapping of Works, Responsibilities, and Participation of Each in Any Value Study

Value engineering is different from other techniques and other methods some advantages and peculiarities can be summarized as follows:

1. Methodology and organization in the stages of the work plan;
2. Focus on the job and the cost of achieving value;
3. Collective work by a multidisciplinary team;
4. Freedom in the placement and creativity;
5. Methodical Assessment that organizes the ideas;

6. Carefully developed proposals and presentation.

In conclusion: From the previous view of the stages of the value study, we can say that the implementation of value engineering study is possible at any time of the stages of the evolution of the project which aims at all stages to the following:

- Expanding the use of resources (financial – manpower - management) by deleting the unnecessary or excessive costs without sacrificing quality or performance;
- The quick application of the changes with economic characteristics or in other words the creation of good-quality change to the owner of the project, which works to add value to the project and thus the owner;
- The evolution of the growth of employers and employees satisfaction by providing effective economic skills which lead to increase the cost awareness and the cost impact on employers;
- Work on linking the basic functions through which the project is designed and its relationship to social cost and continuous following-up of this relationship until the last stages of the project.

Դ.Է.Բուկաի

ՇԻՆԱՐԱՐՈՒԹՅՈՒՆՈՒՄ ԳՈՐԾԱՌՆԱԱՐԺԵՔԱՅԻՆ ՎԵՐԼՈՒԾՈՒԹՅԱՆ ԿԻՐԱՌՄԱՆ ՓՈՒԼԵՐԸ

Առաջարկվում է դիտարկել շինարարական նախագծերում գործառնաարժեքային վերլուծության իրականացման փուլերը: Ներկայացված առաջարկությունների համար հիմք են հանդիսացել տեսական մոտեցումներն ու վերլուծությունները:

Տրված է գործողությունների ծրագրային փաթեթ, որում առաջադրված են գաղափարներ և առաջարկություններ՝ տեխնիկական և ֆինանսական տեսակետներից հիմնված ճշգրիտ տեղեկատվության վրա: Այն ձևակերպված է պարզ լուծումներով, որոնց կիրառման դեպքում հետագա պարզաբանումներ չեն պահանջվում:

Առանցքային բառեր. *գործառնաարժեքային վերլուծություն, շինարարական նախագծեր, արժեք, իրականացման փուլեր*

Д.Э.Букаи

ЭТАПЫ ПРИМЕНЕНИЯ ФУНКЦИОНАЛЬНО-СТОИМОСТНОГО АНАЛИЗА В СТРОИТЕЛЬСТВЕ

Основываясь на теоретическом материале и обсуждении метода функционально–стоимостного анализа, предложены этапы реализации данного метода при осуществлении строительных проектов.

Дан программный пакет действий, в котором представлены идеи и предположения, основанные на точной информации с технической и финансовой точек зрения. Пакет оформлен простыми решениями, не требующими дальнейших разъяснений при их применении.

Ключевые слова: *функционально-стоимостный анализ, строительные проекты, стоимость, этапы реализации*

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