Productivity Methodologies, Tools, and Techniques

Value engineering

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Value engineering (VE) is also called value analysis. It is a systematic, function-based approach used to increase the value of a product to the customer by providing the same or better functions at lower cost. This is done without sacrificing the required performance, reliability, availability, quality, safety, and environmental attributes of the product. The value of a product can be expressed as a ratio of its function relative to its cost:

Value = Function / Cost

Value is not simply a matter of minimizing cost. The value of a product can also be raised by increasing its function (performance or capability) and cost as long as the added function increases more than its added cost. A function describes what something does. In VE, functions are always described in a two-word abridgement of an active verb and measurable noun, i.e., “create file,” or “tighten screws.”

Functions may be broken down into a hierarchy, starting with a basic function, which is what a product or process must do to work or sell and the customer is willing to pay for, followed by secondary functions that support that basic function. Secondary functions can be modified or eliminated to reduce product cost.

Function analysis identifies both basic and secondary functions, analyzes the functions, and measures the cost of each component as accurately as possible, including all material and production costs. Function analysis can be enhanced with a graphic mapping tool known as the function analysis system technique (FAST). FAST applies why/how logic to test functions, creates a common language for a team, and tests the validity of the functions in the project. Take a wooden pencil, for example, as shown in the table.

Table. FAST applied to a wooden pencil.

Item	Function	Classification	Cost (S$)
Eraser	Remove marks	Secondary	0.02
Ferrule	Hold eraser	Secondary	0.02
Wooden body	Hold graphite carbon	Secondary	0.07
Paint	Protect wood	Secondary	0.02
Label	Identify product	Secondary	0.02
Lead	Draw/write	Basic	0.05
Total			0.20

The value equals the total cost divided by the basic cost and is therefore 0.20/0.05 = 4.0. The value calculated should not be greater than 3. This means that VE study is required.

The VE process involves a multidisciplinary team of people following a structured VE job plan. The process helps team members communicate across boundaries, understand different perspectives, innovate, and analyze. The eight phases of the job plan are:

1) Project: Selection, objectives;

2) Information: Collection of relevant information;

3) Analysis: Function and cost analysis;

4) Speculation: Generation of alternatives;

5) Evaluation: Selection of alternatives;

6) Development: Shortlist ideas and develop those with merit into value alternatives;

7) Presentation: Obtain approval; and

8) Implement and follow up.

CASE STUDY

Product: Staple remover of an office stapler, as shown in Figure 1.

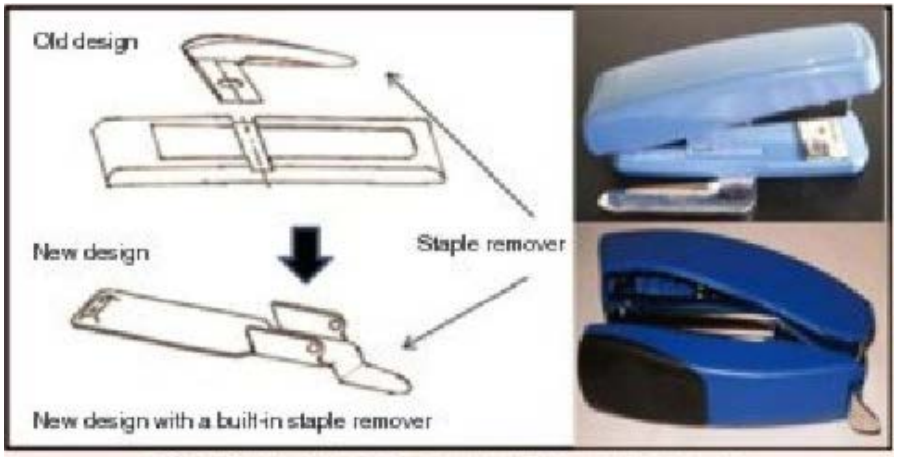

Figure 1. VE applied to a common office stapler.

Before VE: The staple remover is placed in an awkward position and obstructs the user's fingers when the stapler is held in the palm of the hand. It is attached to the stapler with a plastic catch and becomes loose when the catch wears down. Moreover, it makes the stapler look bulky.

After VE: The staple remover is incorporated into the lower body of the stapler.

Result: About an 8% reduction in manufacturing cost is achieved.

SUMMARY

VE can be applied not only to products but also is equally suitable for all functions of business such as product design, processes, systems, or services. It is also particularly useful during the research, development, and introduction of new products or services.

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