Value Engineering and the Lean Start-Up

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Let me start by saying that I am not a Value Engineering expert; I started my journey about six months ago and have achieved the distinction of Associate Value Specialist with The Society for the Advancement of Value Engineering (SAVE) by completing a course, participating in a workshop team, and passing a test. However, that was enough for me to recognize what a powerful methodology and what a great fit it is for our business. We have already held one successful Value Engineering workshop at GE's Bently Nevada product line site in Minden, Nevada and have another planned for early 2016. Even though Value Engineering was pioneered by a General Electric employee, Larry Miles, in the 1940s, it is in recent years that there has been a revival of the methodology in our business. Just as in the 1940s, when it was first pioneered, GE businesses again need a competitive edge in challenging times. Today's markets are incredibly competitive and the pace of technology change has never been greater; speed is the competitive edge we need to carry us into the future.

One of the ways that GE is becoming faster is through the adoption of FastWorks. Based on the model introduced by Eric Reis in his book, The Lean Startup, FastWorks helps GE use "Lean" concepts historically used in manufacturing, and more recently in Agile software development, to quickly bring successful products to market. FastWorks is a set of tools, principals, and behaviors that require teams to act with the agility and responsiveness of a start-up, allowing us to achieve speed, flexibility, innovation, and customer focus [1]. Sounds great, but what does this have to do with Value Engineering? Value Engineering is Lean! The foundational principal of Lean is to define value from the customer's perspective, which is also at the heart of Value Engineering. The second key principal of Lean is to identify the value stream. In traditional Lean, this is accomplished by creating a Value Stream Map that breaks the value stream into steps that provide the customer value and identify how much cycle time each step takes as well as the wait time between those steps. It is a tool for finding and eliminating waste in a process. When I attended my first Value Engineering workshop and training, I had the epiphany that "this is taking the value stream right into the part design!" The Value Stream Map used in Value Engineering is the FAST diagram which breaks down a part into its functional elements that provide value to the customer and evaluates them on cost of each function. It is a tool for finding and eliminating waste in a part design.

Figure 1: example Value Stream Map for RFQ process [2]

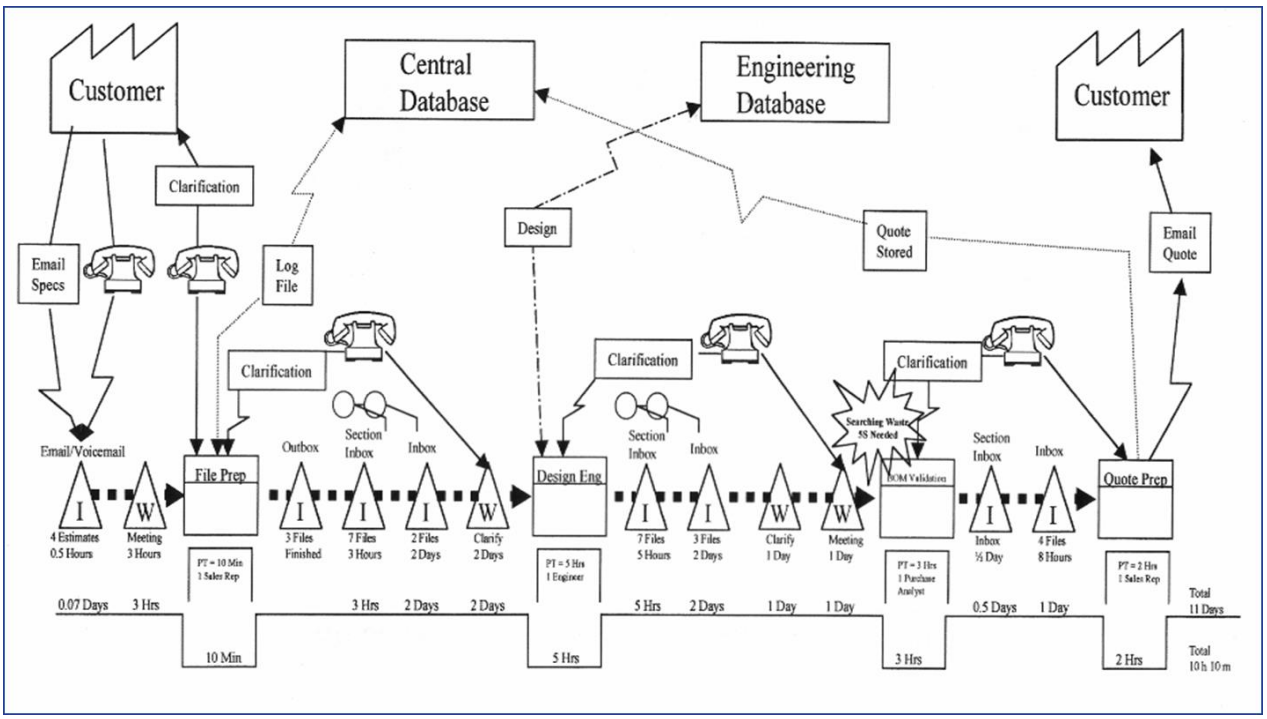
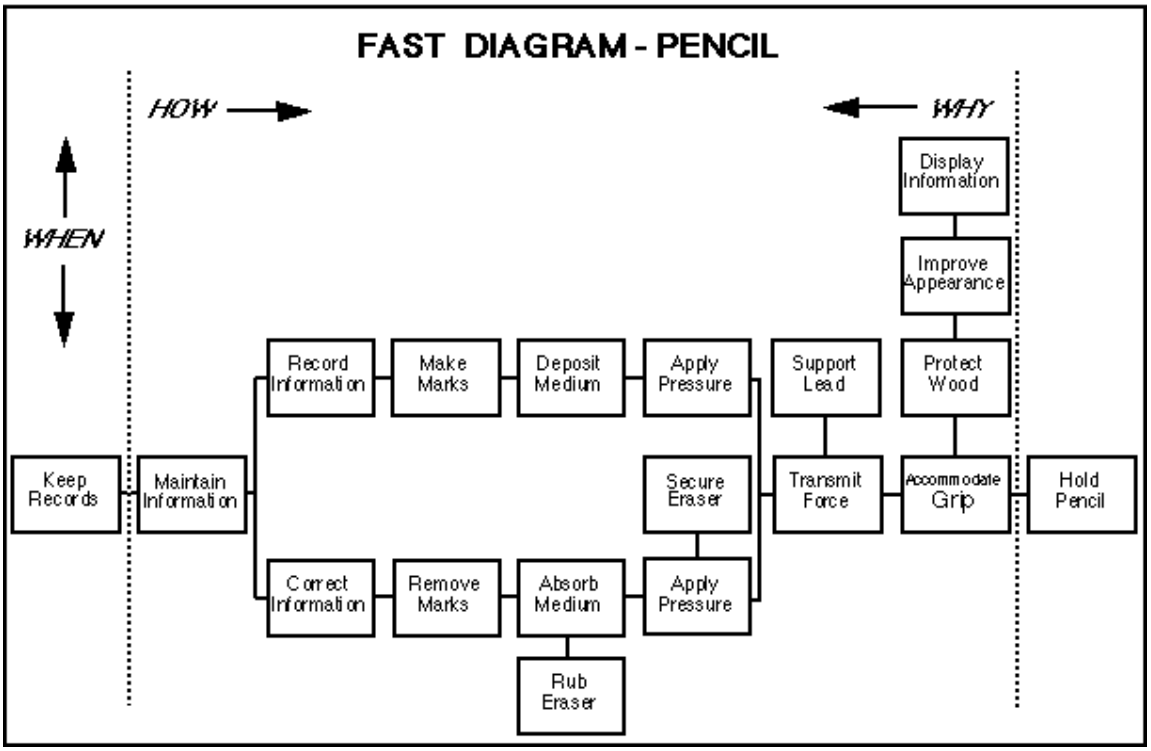


Figure 2: example FAST diagram for a pencil [3]:



The most common types of waste that Value Engineering is able to eliminate from parts are:

- Over Processing: Are there more components than needed to meet the functions desired by the customer?
- Defects: Is the material being used robust enough for the function? Does assembly of the part introduce opportunities for defects?
- Motion: Is there excessive motion within the part or in assembling the part?

Because it is Lean, Value Engineering is a terrific fit for FastWorks for several different reasons. First, it is fast. During the first three day workshop that I attended in Houston, I was on a team of eight people who came up with roughly 300 ideas for the three highest cost functions we identified for our part. These ideas were filtered down into three proposals that would yield $2MM-$3MM in annual savings. In my experience, reducing part cost had historically been a negotiation between Sourcing and Engineering which could take weeks or months and the savings are typically significantly less than what has been achieved with the Value Engineering approach. The speed of the process will help our development teams better achieve cost targets for new products.

Second, Value Engineering is innovative. In my second workshop, which I facilitated at the Minden site, we were trying to achieve two goals:

1. Identify additional short-term cost savings for the existing product in next release.
2. Come up with innovative value concepts for future designs.

In this workshop, we were putting additional focus on innovation ideas that could be product differentiators in future product by increasing function and/or reducing costs. Nearly 20 viable ideas were proposed for future product and technology research – most ideas improving both function and cost. There is a Will Rogers quote that comes to mind, “It isn't what we don't know that gives us trouble, it's what we know that ain't so”. Oftentimes, we may be so knowledgeable at doing things a certain way, that we blind ourselves to innovative, better solutions. The brainstorming approach used in Value Engineering is very effective in pushing past the boundaries of “what we know” and driving innovation as a result. Another key piece of this is having the right mix of expertise and creativity on a team - if subject expertise dominates, the paradigm shifts will not result; if creativity dominates, you get ideas that aren’t grounded in reality. The balance of expertise and creativity on a team results in innovative solutions that will work. My first workshop team had expertise in mechanical engineering, process engineering, and metallurgy; we were working on a mechanical process solution that required these types of expertise. My background is in software, project management, and quality. I didn’t see where I would be of much value to the team, but the resulting proposals ended up with a couple of my ideas, including one idea that my team members took back to their business for further research and development. I was able to contribute because I wasn’t limited by what I knew and the experts were able to determine which of my ideas were plausible.

The third reason I see Value Engineering as a good fit for FastWorks is that it is an excellent vehicle for transforming customer requirements into technical solutions that can be used for customer validation. The Harvard Business Review article, “How GE Applies Lean Startup Principles”[4] describes how GE Appliances’ first FastWorks project for their high end Monogram line refrigerator. The engineering team went through several iterations of testing with the customer, getting feedback on the stainless steel finish, lighting, and other features. However, the end result was half the historical program cost to develop the product and sales at over two times the normal rate. Value Engineering generates multiple technical solutions for a specific function needed by the customer. The assumptions these requirements are based on are what are called “Leap of Faith Assumptions.” Leap of Faith Assumptions are assumptions that must be true to achieve your product vision and must be tested to validate that they are correct [5]. Value Engineering provides development teams with a fast way to produce several technical options that can be prototyped and tested with a customer.

My final reason for proposing Value Engineering as a FastWorks tool is that it provides actionable information to Product Managers to make decisions that best meet the needs of the business. There is always a compromise between product cost and time to market. Value Engineering provides the cost breakdowns for different functions; this allows the Product Manager to quickly determine the optimal trade-off between time to market and product cost. Those cost saving proposals that take more time can then be postponed for a post-release sustaining effort. When we held the report-out with the Product Line Leader for our workshop , she was excited about the costs savings and immediately asked if we had the breakdown for each proposal so that she could find the right balance between speed and cost.

Value Engineering is a great fit for our business, especially at a time when we have so much focus on speed and simplicity to keep us competitive an a difficult economic climate. I look forward to becoming more experienced in applying the methodology and expanding its use and discovering it potential in other areas that need improvement. The feedback from everyone who has been involved so far is positive. Even our toughest customers for new methodologies, our engineers, have told me they recognize Value Engineering as a valuable tool.

References

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2. Total Quality Lean Six Sigma Green Belt Student Manual, © 2013, General Electric
3. © 2002 DRM Associates. All rights reserved. May be used with attribution.
4. Written by Brad Power, Harvard Business Review, April 2014
5. FastWorks – © General Electric, 2013