

Why do so few companies use the DFSS Methodology ?

Part 1: The Operational Roadblocks

Ray Hemmele, Avior Group Partner, Master Black Belt



Design for Six Sigma (DFSS) has long been known as a way to design things right the first time so that later efforts to “fix what’s broke” are avoided. But what holds so many companies back from applying the power of DFSS? This two part series will discuss two categories of roadblocks, operational and organizational, and provides some insight on how to overcome them.

The concepts of DFSS have their origins in systems engineering...but unfortunately, the applicability goes well beyond the engineering of systems and beyond the hands of engineers. Why is it not as widely practiced as DMAIC or Lean? Many reasons, but first VERY simply, let’s strip down DFSS to the bare bones... it is really just this:

1. Ask the customer for their desired outcomes
2. Figure out how to measure those outcomes
3. Generate design concepts that produce those outcomes; be innovative!
4. Select the best candidate concept
5. Figure out how inputs translate to outcomes for that concept
6. Manipulate the inputs (on paper and/or in the computer) to produce the desired outcomes.
7. Variation in the inputs will cause variation in your outcome from what is desired. Adjust the inputs until the variation about the target is acceptable or change the design to be more insensitive to variation in the inputs
8. Build and test your design to verify the desired outcomes are within the range that would satisfy your customer.
9. Launch design

It’s an approach that is hard to argue with. So why do so few companies harness the power of DFSS? Of the nine steps above, let’s look at four of the more difficult ones tend to present a roadblock to DFSS design teams.

Step #1: Asking the customer what their desired outcomes are is no easy task. Most of the time we guess and guess what? We guess wrong.

The Solution: Talk with the customer and understand what problem they are trying to solve. Watch them struggle with your own eyes in their environment. They “hire” your product or service to solve *that* problem. Your goal is to understand what it is. Additionally, get the “unfiltered” Voice of the Customer(VOC), not the fancy, distilled summary report. In that raw, unfiltered VOC lies the unspoken needs that when met, will differentiate your product or service from the competition.

Step #3: Being innovative isn’t always easy AND most people will gravitate to things that are comfortable and easy. Therefore, the resulting solutions have a high “Ho hum” factor or in other words, are undifferentiated from competitor offerings or produce only a slight improvement in performance.

The Solution: Utilize innovation tools throughout the DFSS process. Using the power of TRIZ to fuel our innovation activities, we can break free of the psychological inertia that constrains our creative thought

processes. Additionally, by conducting innovation “events” we can leverage the experiences of a broader team so that our solutions have “game-changing” possibilities.

Step #5: Finding how inputs translate to outcomes for a given design concept takes work. Many companies lack the expertise and tools to do it during the design and tend to resort to “let’s just try it and see...”

The Solution: Identifying the cause and effect of how inputs create outcomes for a design can be done with a combination of experimentation, understanding of the “physics”, simulation, and historical data. Assembling a team with the right expertise in these areas as well as appropriate amounts of training and mentoring can produce a usable “model” that can be leveraged for the predictive design activities in DFSS.

Step #7: Predicting variation in the outcomes as a result of variation in the inputs implies you actually KNOW the variation in the inputs. For example, wait time at the bank is going to depend on arrival rate of customers, type of banking activity those customers are conducting, experience of tellers, and number of tellers. Without that information on how the inputs vary, it is very difficult to estimate the variation in customer wait time.

The Solution: In the example above, we would need information on how arrival rate, and banking activities vary to then be able to specify the minimum teller experience level and minimum number of tellers needed to keep the wait time below an acceptable level. But where can we find information on how much variation to expect in the inputs? Actual data is of course the best, benchmark data, “similar to” process data, followed by an estimate are all acceptable sources.

The above operational roadblocks albeit very common, are all things that can be easily overcome. The other type of roadblocks that can stop a DFSS effort in its tracks are the organizational difficulties. More on that next time...