Design for X

ABSTRACT:

Design for “excellence” (also known as DFX) is a general term used in the engineering world that serves as a placeholder for different design objectives. In reality, the term DFX is better thought of as Design for “x” where the variable x is interchangeable with one of many values depending on the particular objectives of the venture. Some of the most common **substitutes for x include assembly (DfA), cost (DfC), logistics (DfL), manufacturability (DfM), reliability (DfR), serviceability and/or repairability (DfS).**

Designs can vary wildly depending on which items you prioritize over others and the degree to which you make them your focus. Under the label *design for X*, a wide set of specific design guidelines are summarized. Each design guideline addresses a given issue that is caused by, or affects the traits of, a product. The design guidelines usually propose an approach and corresponding methods that may help to generate and apply technical knowledge to control, improve, or even invent particular traits of a product. From a knowledge-based view, the design guideline represents an explicit form of knowledge, that contains information about *knowing-how-to*. However, two problems are prevalent. First, this explicit knowledge (i.e., the design guidelines) were transformed from a tacit form of knowledge (i.e., by experienced engineers, or other specialists). Thus, it is not granted that a freshman or someone who is outside the subject area will comprehend this generated explicit knowledge. This is because it still contains embedded fractions of knowledge or respectively includes non-obvious assumptions, also called context-dependency. Second, the traits of a product are likely to exceed the knowledge base of one human. There exists a wide range of specialized fields of engineering, and considering the whole life cycle of a product will require non-engineering expertise.

Looking at all life stages of a product (Product life cycle (engineering)) is essential for design for X; otherwise the *X* may be sub optimized, or make no sense. When asking what competencies are required for analyzing situations that may occur along the life of a product, it becomes clear that several departmental functions are required. An historical assumption is that new product development is conducted in a departmental-stage process i.e., new product development activities are closely associated with certain department of a firm. At the start of the 1990s, the concept of concurrent engineering gained popularity to overcome dysfunctions of departmental stage processes. Concurrent engineering postulates that several departments must work closely together for certain new product development activities. The logical consequence was the emergence of the organizational mechanism of cross-functional teams.

The study is about each and every parameter that is related to Product Design i.e. - all those that are associated with *X*. *X* may represent several traits or features including: manufacturability, power, variability, cost, yield, or reliability. This gives rise to the terms design for manufacturability (DfM, DFM), design for variability (DfV), design for cost (DfC). Similarly, other disciplines may associate other traits, attributes, or objectives for *X*.

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