Evaluating Tools for Improving the Packet Radio Development Process at UNICEF

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Customer and/or supplier involvement in the development process is way to help decrease development time and costs. Crowdsourcing is perhaps the best known and one of the most commonly used methods of external involvement used by firms (Schilling, 2012); it involves the use of users or outside developers to aid in particular phases of the development process. Beta testing is a form of crowdsourcing often used . These forms of collaboration help companies focus their development process, understand what features and processes are important to their users, and reduce development costs by integrating supplier inputs into the development cycle earlier . Involving users and suppliers in the development process of packet radio for UNICEF could decrease development costs by bringing engineering and logistical problems to light sooner, therefore allowing more time to cost-effectively solve those challenges. Controlling costs is important to the success of a new product or process but also important to a nonprofit with a variable annual income and budget, therefore I would recommend using external involvement in developing packet radio for UNICEF.

A stage-gate process is a framework for new product development helps avoid developing products past their date of expected value, or the last date which the product is potentially profitable (Schilling, 2012). This process is characterized by "gates" or milestones where a project's development status can be evaluated and an informed decision made as to whether to continue with development. This is a very popular framework in many industries from software development to industrial manufacturing (Schilling, 2012) because it helps effectively evaluate development costs. Due to its popularity and effectiveness at controlling costs, I would recommend using some sort of stage-gate process during packet radio development at UNICEF. The type and complexity would need to be determined after knowing the specific user requirements.

Quality function deployment, or QFD, is a highly structured Japanese process characterized by the "House of Quality" matrix that maps attributes of the product to user requirements (Schilling, 2012). This technique is highly valued for its focus on the customer or user (“Quality function deployment - Wikipedia, the free encyclopedia,” n.d.)and ability to get a company focused in the right direction (Hauser & Clausing, 1988). QFD provides a common language for all members that allows exceptional collaboration (“What is Quality Function Deployment (QFD)? | ASQ,” n.d.)and helps developers break down functional barriers (Hauser & Clausing, 1988). Because of its complexity, it can be difficult to implement correctly and there aren't many templates because the information contained within a matrix is highly proprietary (“Quality function deployment - Wikipedia, the free encyclopedia,” n.d.), which could lead to implementation problems in a nonprofit. While QFD could encourage teamwork and reduce costs for UNICEF, I don't believe it's a timely solution for UNICEF due to the complexity of both QFD and the user base of UNICEF. In addition, UNICEF often doesn't have access to the amount of information needed to make an effective QFD House of Quality matrix in a timely fashion.

Design for manufacturing, or DFM, is a model that helps integrate the often disparate functions of engineering and manufacturing into the development cycle to reduce production costs (Schilling, 2012). To accomplish this, DFM implements a set of design guidelines that determine manufacturability, or the relative ease with which a product can be manufactured at a profit (“Design for manufacturability,” 2015). This approach can significantly shorten development time by addressing production problems in the design phase when adaptation is less costly (Anderson, 2014; Schilling, 2012) and can help align a product with customer requirements. I would highly recommend a DFM methodology for developing packet radio for UNICEF. Due to the unpredictable nature of natural disasters and the variety of infrastructure and ordnance relating to packet radio, adopting a proactive DFM approach during the development phase can help reduce manufacturing costs later.

Failure modes and effects analysis (FMEA) is a systematic method that identify actual and potential failures in a system or process and categorizes them according to severity and likelihood of occurrence (Schilling, 2012). Often used in QFD methodologies (Tague, 2005), this vertical approach is highly detailed and allows all involved a high level of confidence in future product manufacturing (Bowles, 2002), although their validity is limited when used alone (“Failure mode and effects analysis,” 2015). Another potential disadvantage is that FMEA often only identifies major flaws in a system, which makes it a less comprehensive analysis than some of the others discussed. I would not recommend FMEA because I believe the inverse relationship between the amount of information required and the immediate benefits of the model is not a cost-effective approach to improving the development cycle for packet radio at UNICEF.

Computer-aided design (CAD, also sometimes known as CAM: computer-aided manufacturing) is the relatively new process of using computers to improve the design and/or manufacturing processes (Schilling, 2012). For example, in recent years three dimensional printing (3D printing) has become a popular method for lowering the cost barrier for many small production lines, and is rapidly replacing injection-mold manufacturing in short-run or prototype production lines (Jansen, 2014). I believe CAD would be an excellent choice to improve the development cycle of packet radio at UNICEF because it could help rapidly develop prototypes as requirements evolve, saving on overall development costs and making a product that is better aligned with customer's needs.

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