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Where does good Product Quality originate?

5 initial elements in ensuring good product quality

I think most people would say that good product quality originates with a good idea for a product. However, that might only be true in some cases. Even the best product ideas will fail if they are not developed the right way. My own belief is, that good product quality starts with a mix of people who share the right mindset and who want to use good development methods.

*Good product ideas must be developed
with the right processes and methods*

Given that the people involved are having the right mindset; e.g. want to make a great product with excellent quality, and that they also have the right skill set for doing it. What are then the essential elements in ensuring a good quality product?

For me there are at least 5 essential elements – beside the right resources:

1. Great Project Management
2. An accepted, well documented and implemented set of development processes & methods
3. Good, clear and unambiguous product documentation



4. Quality in the product verification
5. Early involvement by suppliers and operations/production in the product development.

Great Project Management

For project management, I have found that besides the more classical elements taught in project management classes (Scope definitions, Planning, team leading, stake holder alignment etc.), the combining of elements from Lean Development like visual planning, the focus on learnings and reusable knowledge and key decisions are key elements in creating a great project management style. Also, it is important for the project manager to build a good environment for the project team, physical as well as concerning the softer areas like trust, empowerment and team spirit. Great project management comes from both the physical and the psychological environment build by the project manager, the team and the company culture.

Great project management is also about the culture in the team

An accepted, well documented and implemented set of development processes & methods

For a product development process, to function at its best, it is not enough that the process is described in the business process management system, it also needs to be implemented, but most important, it needs to be accepted by the users. This does not mean that it cannot be challenged and improved. It definitely should. But to really challenge it, it also needs to be understood by the users. Otherwise they will challenge something they do not really comprehend, which by its very nature isn't really possible. I have in my career seen this happen several times, leading to the renewal of processes that were fundamentally good, but just poorly implemented and it has not always been an improvement. A well described and implemented process also supports the smoother interactions between functions and stakeholders in the development project.

Continuous improvement cannot be derived from anarchy

It is also about having solid processes and templates for subtasks like tolerance analysis, approvals, reviews, concept generation (E.g. set based engineering), fast failure testing etc. As well as having a focus on a continuous learning mindset, where the focus is not only on capturing lessons learned, but focusing on what needs to be learned to create a given product and thus ensure that this knowledge is also captured for future use.



Good, clear and unambiguous product documentation

In an earlier article, I have talked about the importance of making unambiguous drawings. This is essential, but also all other product documentation must be of high quality and unambiguous. It can be tolerance analysis, test descriptions, assembly and operator instructions. I have unfortunately often seen designers using a lot of time to make great 3D CAD files, then to only put less quality into the drawings and instructions the suppliers and operations will be using. This might be because it is more fun to do the 3D CAD where you can see the product coming to life. I think most engineers see the other documentation as less interesting. But the fact is, that it seldom is in the 3D CAD quality that the real problems for the product quality lie hidden. It is often in the documentation around the 3D CAD; tolerance analysis, drawings, test & validation descriptions and manufacturing & operator descriptions.

Quality in the product verification

Making a test and noting the result is the easy part of product verification. The real challenge lies before and after the execution of the test. First the test needs to be well described; What and how it is to be tested, what is the success criteria and the expected output. Test equipment needs to be designed according to this, but also verified that it is working as expected. Tests need to be reproducible. After the testing is done, observations during the test and its results need to be documented and analyzed compared to the expected outcome. It is important not to neglect either the activities prior to testing, nor the documentation afterwards, as this is essential for later analysis if problems occur. Also, to ensure that the test can be performed again with the same conditions, so correlation between tests is kept. Test results also often holds a great deal of reusable knowledge, if it is properly documented for such a purpose.

*Tests is not only about performing the test
and see the result*

A lot of tests can often be described as standard tests. Here it is also important that they are well documented and learnings from them can be captured and documented for the improvements of the test methods.

Early involvement by suppliers and operations/production in the product development.

The early involvement of suppliers and operations/production personnel in the product development is all about knowledge sharing and continuous learning. Nokia, one of my former employers, was excellent in this. I think, that this is also one of the reasons for the acknowledged Nokia mobile phone build quality. Nokia development teams had suppliers and operational/DfA/DfM people in the project from beginning to review manufacturing and assembly methods and convey learnings from earlier products, ensuring easy introduction to production.

As an example, mechanical suppliers were asked to participate in drawing reviews to ensure that dimensions could be measured and agreement was made on how this should



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be done. This result in faster and better part verification from the suppliers. But already earlier in the project, suppliers were asked about manufacturing input and readiness/development of possible new technologies.

I believe that these 5 items are of great importance to create truly great products.

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