**New Product Development Process**

Quote...If you do not launch a new product..your competitor will do..

Every product will go through incubation, growth, maturity, saturation and decline..

Four Stages of new product development..

* Concept Generation: understanding what the customer needs are and translating them into alternative ideas for products that services that can be developed
* Design: detailed specifications are first drawn about the product/service
* Development: physical development of the product; during this stage, the details arrived at the drawing board are physically transferred to reality as a prototype.
* Production: regular production in smaller/pilot quantities followed by mass production as per market demand.

Different approaches for new product design :

* Design for manufacturing (DFM)‏
* Design for assembly (DFA)‏
* Design for recycling (DFR)‏
* Re-manufacturing
* Design for disassembly (DFD)‏
* Robust design

*Modular design* is a form of standardization in which component parts are subdivided into modules that are easily replaced or interchanged. It allows:

* + easier repair and replacement
  + simplification of manufacturing and assembly
  + easier diagnosis and remedy of failures

Some methodologies for efficient design and development..

* Standardisation
  + uses commonly available parts
  + reduces costs & inventory
* Modular design
  + combines standardized building blocks/modules into unique products
* Product Platforms

Concurrent Engineering can be defined as the simultaneous development of product design with open and interactive communication among all team members for the purpose of

* + Reducing time to market
  + Decreasing cost and improving quality and reliability

Reverse engineering…Another route for Product development

Notwithstanding above efforts..new products do fail because..

* Costs are too high
* Quality is too low
* Introduction was too late
* Production couldn't keep up with demand.

**Advancements in new product design and development**..

3D technologies promise new age of smart, 'augmented' product design

Jim Romeo, Business Applications Digest-12-7-2016

Experts explain how integrated 3D technologies -- scanning, imaging, modeling and printing -- can make the old trial-and-error process of product design nearly obsolete**.**

Experts explain how integrated 3D technologies -- scanning, imaging, modeling and printing -- can make the old trial-and-error process of product design nearly obsolete**.**

Walluk, a staff engineer at Rochester Institute of Technology, or RIT, in New York, said it's because initial designs often fail to fully solve a problem -- there's still work to be done. So subsequent designs are introduced, each requiring additional tooling and prototyping. This trial-and-error process is costly and time consuming, and especially onerous in highly competitive markets.

The solution may lie in 3D technologies such as [3D imaging and scanning](http://searchmanufacturingerp.techtarget.com/feature/3D-technology-additive-manufacturing-speeds-production) that allow designers to input parameters and product characteristics into "intelligent" software to generate a realistic 3D image of a product without actually creating it. The image can then be fed into a 3D printer to make either a physical prototype or the final product.

IndustryARC, a market research and consulting firm, predicts [3D scanning](http://whatis.techtarget.com/definition/3-D-scanner) -- analyzing an object to collect the data needed for a 3D model -- will grow at a 4.7% compound annual growth rate through 2020. It said 3D scanning for manufacturing will ultimately reduce installation costs by 6% to 8% and contract schedules by 10%.

"Before the advancement of [3D printing technology](http://searchmanufacturingerp.techtarget.com/news/450286741/Desktop-3D-printers-showcased-at-Inside-3D-Printing-Conference), each potential solution could require a change in machine tooling -- a new CNC code [computer numeric code] -- or a customized single-use mold," Walluk said. "All of these things added time to market and could be rather expensive, as traditional production systems are designed for consistent and bulk-order production. With the [growth of 3D printing](http://searchmanufacturingerp.techtarget.com/news/450281626/3D-printing-industry-described-as-healthy-and-growing), however, that process is much quicker and much less expensive. New and complex designs can be prototyped within hours or minutes using a variety of materials and can give test engineers a sound indication of actual performance, cutting weeks of time and thousands of dollars from the process."

**3D technologies could lead to better products -- faster and cheaper**

Walluk cited an example from Ford Motor Co. that amply demonstrated the benefits of 3D technologies like 3D printing and rapid prototyping for the highly competitive global automotive market. He described an intake manifold design that required four months of preparation and about half a million dollars -- all to develop just one part.

The flexibility and speed of 3D printing technologies make them uniquely scalable," Walluk said. "So anyone from a local parts manufacturer to Ford Motor Co. can realize the benefits of reduced production costs and time-to-market delays."

Varun Bhartiya, a partner at ProtoTech Solutions, a [software development and consulting](http://www.prototechsolutions.com/Live/development.html) company based in Rahatani, India, said that traditional designs have been dependent on legacy designs, which companies modified slightly to build new products.

"With the advancements in the internet of things, designers now have access to real-time data and can look at the performance of their designs in action," Bhartiya said.

**Finding solutions in 3D technologies**

Walluk described an industrial outreach project at RIT set up to analyze a prominent failure in a common household vacuum and then develop a corrective retrofit solution.

"After analysis of the system, RIT engineers designed and 3D printed a device to allow for measurement of a specific part's dynamic operation," he explained. "We discovered that the manufacturing variance of that part was the root cause of the problem. Once pinpointed, RIT engineers designed a new CAD [computer-aided design] model of the problematic part with a necessary mechanical correction and created a functional version with our polymer-selective, laser-sintering 3D printer. Testing proved that the part eliminated the failure and provided the customer with a solution that could be retroactively adopted for a high-volume injection molding process."

Walluk said that the entire process -- from problem identification to solution -- only took a few weeks. "By using 3D printing to quickly create both a testing mechanism and a problem solution, the company avoided having to spend months on traditional testing, redesign and solution verification," he said. "This shortened the time-to-market delay, and therein saved both time and money."

Experts say that in the years ahead, such uses of 3D technologies will be useful in making spare parts for products that are no longer in production.  According to the research firm Gartner, by 2019, 10% of out-of-production spare parts for cars, trucks, bicycles and motorcycles, in addition to military vehicles and drones, will be 3D printed.

"We are entering an 'augmented age,' in which designers can provide certain metrics, and the [3D modeling](http://whatis.techtarget.com/definition/3D-modeling) platform searches all the possible designs and suggests the best design for engineers to choose," Bhartiya said. These designs will hone in on salient characteristics and subsequently save time and money for designers and manufacturers.

Traditionally, we have been using tools that we direct and tell what to do," he said. "In the future, 3D modeling tools will learn about you, your likes, dislikes and your tastes. In the future it will be possible for us to work with 3D modeling tools that will be able to think alongside the designer to help them build great products for the future."