Product Realization Group®

Tech Briefing

The 8 Most Common Problems with Hardware New Product Introduction

And How to Solve Them!

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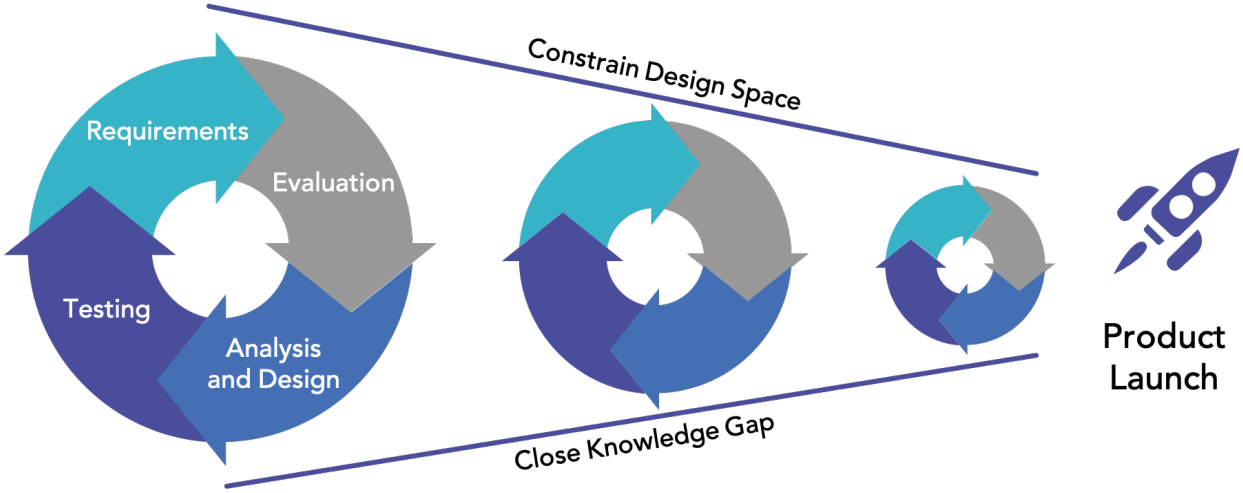
New Product Introduction consists of people, processes and technology, which together provide a formal methodology for a product's transition from engineering to manufacturing.



In today's global marketplace, a strong hardware NPI process is critical to successfully launching the next innovative new product, enabling growth, and meeting cost, quality, and time-to market goals. Regrettably, many new products never make it to market because key steps in the NPI process are missed, or executed in ways that prevent a successful launch.

Warning signs of a weak NPI Process

- Slipping schedule.
- Exceeding budget.
- Exceeding product cost target.
- Missing requirements.
- Rapid team growth.
- Breakdown in communications.
- Customer "beta" test failures.
- Low manufacturing yields.
- High number of pre & post launch ECOs.
- Field failures and product returns.

The 8 Best Practices of New Product Introduction

1 Use Concurrent Engineering

Concurrent engineering ensures that a high quality product is built at the lowest possible cost. New product development is difficult and can be chaotic. If changes are made last minute or ad hoc, delays, cost-overruns, awkward features, and other problems can seriously affect the success of the new product.

- Assign an experienced NPI project manager who owns driving the project.
- Assemble a truly cross-functional NPI team. All functions should be involved early on in the product development process.
- Follow an agile hardware development process leveraging project management software and hardware sprints to help keep the project on track.

2 Mitigate Risks

You ignore risks of developing a new hardware product at your peril.

- Understand market opportunities and competition.
- Focus on basic product requirements and features.
- Perform feasibility studies early.
- Develop a product roadmap and set realistic timelines.
- Use risk assessment tools such as Failure Mode and Effect Analysis (FMEA).
- Choices made early by engineering can affect a product for a long time. A solid NPI ensures manufacturing and service teams can live with those choices.

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3 Design for Excellence

Design for Excellence (DFX) is the umbrella term for designing high quality products that can be cost effectively built, tested, shipped and supported.
Designs that are done "just" for the prototype may miss many real-world problems such as component obsolescence, technology that can't scale, unrealistically high costs, features that aren't wanted by customers, and designs that are difficult to manufacture or test.
DFx typically includes:

- Design for Cost.
- Design for Reliability.
- Design for Procurement.
- Design for Manufacturing.
- Design for Test.
- Design for Logistics.
- Design for Service.

4 Rapid prototyping/ Accelerated life testing

Designing a minimum-viable product, and iteratively improving your design based upon market feedback, along with rapid prototyping tools may help to mitigate market and development risks.
New manufacturing techniques such as 3D printing allow you to quickly and cost-effectively see what the product will look like and how it will function.

- Shape analysis for fit, ergonomics, appearance.
- Use "disposable" assembly tooling, when they wear out, just print more.
- Use component fitting for both internal and external enclosure designs.
- Perform air flow testing for cooling or other functional aspects.
- Utilize highly accelerated life testing (HALT).

5 Agency and environmental compliance

We can't get around standards and regulations. These requirements are critical for shipping products in volume, but are often overlooked or minimized by entrepreneurs and folks new to product design.
Define your strategy for compliance with directives based on your industry. Common agency and environmental compliance for high-tech electronics include (there are many more):

- Food and Drug Administration (FDA).
- Underwriters Laboratory (UL).
- European Conformity (CE).
- Restriction of Hazardous Substances (RoHS).
- Waste Electrical and Electronic Equipment (WEEE).

6 Scalable business systems

Engineers who work in "silos", communicate poorly with other areas and miss critical information from other teams. This can increase development costs and the risk that designs are not manufacturable, have high product costs, or do not meet regulatory requirements.
Deploy systems early to support rapid development, from customer relationships to outside partners.
Systems include (again, there are many more):

- Computer aided design for electrical, mechanical (CAD).
- Customer Relationship Management (CRM).
- Product Lifecycle Management (PLM).
- Quality Management Systems (QMS).

7 Prototype/pilot manufacturing builds

Some companies speed product development and fail to follow a solid industry-best-practice "stage-gate" process.

The risks of bringing products to market without a few iterations deprives your team of important lessons that can result in serious marketability, quality, functional, and scalability problems.

Costs for mistakes escalate rapidly from feasibility to prototype to pilot to full production. By implementing best practices, and actively reviewing and mitigating issues found as the result of feasibility, prototype, and pilot builds, design issues can be reduced or eliminated and manufacturing processes optimized for volume production.

8 Operations and Supply chain

Companies that do not consider key materials and supply chain decisions it takes to get their product into volume manufacturing risk the trap of "designing for prototype". This trap prevents companies from scaling into volume because parts are not available, materials costs are too high, quality is lowered and customer shipments are missed.
Here are some examples of supply chain considerations:

- Understand end user market location, capabilities, politics and tariffs.
- Utilize standard and short lead time parts in design.
- Stabilize your product design prior to scaling into volume.
- Carefully select your suppliers.

This is just a high-level summary of the full PRG whitepaper and other information we have on this topic. If you want the whitepaper, or if you'd like to discuss our education classes on this subject, please contact us at the address shown below.

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