



5 Key Steps for a Successful Product

Your team believes it's found a new opportunity. You've pitched this as the next big thing. Management has given the green light to product development. That's when the doubts begin. Do you have a plan for making the idea a reality? Do we have the skills on staff to make this happen? How can you be sure your new product will be a success?

What is Product Development?

Product development is the process of bringing a product to market, be it a new product, an update to an existing product, or entering an existing product into a new market. The Product Development processes are the activities a company will undergo to develop the new product, from concept through to launch.

In most instances, the Product Development processes includes some aspects of each of the following steps:

Market Analysis: gathering and analyzing relevant data and insights to gain a deep understanding of the market landscape and future trends. This element enables businesses to identify emerging customer technology needs, anticipate technology market shifts, and make informed decisions. By staying informed about customer preferences, competitor activities, and technological advancements, companies can align their product development efforts with market demand and stay ahead of the competition.

Solution Development: understanding the needs of the market and available technologies and their application to provide a solution. Development starts by creating a business plan and overall product positioning strategy to properly define the major design decisions that are required. Following is the scouting for relevant technologies, generating ideas, and evaluating the potential impact of emerging technologies, assessing their feasibility

and compatibility with the existing infrastructure. With all relevant detail reviewed, a final product design concept is promoted for development.

Engineering & Design: designing and prototyping, optimizing the production process, and ensuring product reliability and quality. Engineers collaborate closely with the technology team to translate concepts into reality, and with the manufacturing team to create a scalable and cost-effective solution, considering factors such as materials, manufacturing methods, and product specifications. The engineering phase aims to develop a product that meets both customer requirements and business objectives.

Validation: involves rigorous testing of the product to ensure its functionality, reliability, and compliance with defined performance specifications. This element includes various testing methods, and can often include additional market interaction to solicit feedback. Through comprehensive review, businesses can identify and rectify any design flaws, refine the product's features, and ensure a high-quality end product that meets customer needs.

Production: scaling up the manufacturing or service delivery process to meet market demand. This involves establishing efficient production facilities, supply chain management, and quality control processes. Production considerations include cost optimization, inventory management, and meeting delivery timelines. By ensuring consistent and reliable product or service delivery, businesses can

build customer trust and loyalty, supporting long-term success.

Managing Successful Product Development

Once a project has been approved, the hard work truly begins. Planning the steps in process becomes the top priority. Every product and product development project is different, and every organization has a different mix of capabilities. There is always time and resource pressure weighing on a project manager. Where should you begin? What are the top priorities? What steps should I focus on to make this product a success.?

Through years of design and development projects, working across a range of industries, and employing a range of technologies, we have defined the Five Key Step for Developing a Successful Product. Companies and Individual managers looking to stay on the track to a successful product launch can learn from our knowledge and insights and focus on the steps below to meet their product development goals.

1. Marketing: Understanding the customers' needs and the target market to effectively design and promote the product

It is crucial to have a full understanding of the user's preferences, needs, and potential frustrations with the proposed new product, or similar existing products. To achieve a success in the market place, a product must meet or exceed the user's expectations. To assure the correct path is taken, the developer should conduct user studies, by interviewing the potential users as to what is truly needed, what is preferred, and what could be potentially frustrating.

When the initial market study is completed and the information gathered, at this point some rough study models should be made in order to convey the potential form, user touch points, size, and weight, etc. These models are intended to help describe and demonstrate the intended use model, and what can potentially be developed. These models are

used to aide in the future user studies to gather feedback, and to uncover the user's perceptions.

Next, A user questionnaire will be generated that is intended to uncover information that can help the product development team focus on the user's desires and needs. An expectation of retail pricing can also be gathered during the user session, which will drive product development decisions. Using the questionnaire and the rough study models, more investigative user studies can be conducted. These further studies will help solidify that the correct path is laid for what is needed and easily accepted in the market.

2. Solution Development: Capturing and Conceiving the Solution

Once understanding of the market and its needs is achieved, work can begin on the business plan, and overall product positioning strategy to properly define the major design decisions that are required. A team will need to ask itself: What is the anticipated yearly demand and thereby production projection? What is the expected life of the product? Along with this, what is the anticipated retail sale price and cost target? This information will guide decisions for what best methods of production, packaging, shipping, service, and more.

It is critical to have a collaborative team working together through all phases of the product development process, but especially at this crucial definition phase. Industrial Designers and Human Factors Specialists, working closely with engineering will not only produce the desired aesthetics, but will be grounded in DFM (design for manufacture) very early on in the process. This avoids issues of expectations not being met, by not understanding cost implications early on. The early collaboration between the art (Industrial Design) and science (Engineering), spawns the most realistically achievable, aesthetic, user friendly results that fit into the overall business plan. This avoids disappointments that often occur when all stake holders are not involved early on in the process.

When the stake holders have a full understanding of what the user wants and needs, the best path to successfully achieve the goals are documented. Such documents include the Development Plan, the User Requirements, and the Product Specification. The Development Plan is the guide the team will follow, striving to adhere to schedule, resource allocation, deliverables, and budget. The User Requirements document is created to capture all that is needed through a market analysis, and user studies. User studies are used to uncover the most desirable features, and understand the use model for the product (“What is needed”). The specification document is developed to capture each element of technical data that is needed to meet each of the requirements listed in the product requirements document (“technical data to meet each need”).

Continuing the Collaboration during the conceptual development of the product is important. Activities such as Technology Scouting and Scouting for Ideation occur at this stage. The creativity of a team of interested parties can uncover opportunities from the various vantage points, which can overcome the single path usually envisioned by a single contributor. With multiple stakeholders actively searching for and monitoring potential technologies, the team can stay abreast of the best available solutions. Couple this aspect with the search for similar innovative designs, and the collaborative process expands the thinking exponentially, as one idea can build into many more from other team members.

From all these thoughts and ideas, high level product concepts will be captured and then evaluated using a weighted pro / con matrix (Pugh analysis) . From all of the captured concept ideas, all the best features that most meet the product requirements, and fit into the business plan, a final chosen concept direction will then be generated and refined into the proposed concept.

3. Engineering: Creating the Realization of the Product

The engineering phase of the development process should be a seamless continuation of the collaborative steps in the previous phases. Transition-

ing from Industrial design concepts into Engineering development is a much easier transition if the engineering team has been involved in the earlier phases, collaborating with the industrial designers.

As this transition from idea and technology to tangible product is taking place, the Industrial designers should also stay involved up to a point when it is determined that the design intent is fully transferred. The designers will maintain availability to consult if there are decisions to be made that may impact the aesthetics or usability.

During engineering development, a virtual 3D CAD model will be developed to guide the rest of the development towards meeting all specifications. Based on the production methods chosen (that best fit into the production forecast and business plan from step #2) the appropriate vendors will be contacted. In collaboration with the chosen vendors, periodic part reviews will occur to avoid any future setbacks, as the vendors will be aware of the design, and best prepare for the production build.

As the engineering database starts to solidify, parts of the design may be peeled off and functioning models will be produced to mitigate any risk around areas of the design that may be deemed problematic. As the database and requisite testing are developed, a formal test plan will be generated, to guide a controlled testing process for an Alpha prototype that will eventually be produced. Drawings in a 2D format will be produced to document and guide the fabrication of components and assemblies. Usually only critical dimensions will be defined, along with specific colors and finishes, as standard manufacturing process tolerances will guide the rest.

4. Validation: Proving the Product Meets the Need

Using the 3D database and the 2D documentation that has been generated in the previous phases, an Alpha prototype will be developed. It is best to have the production vendors produce the alpha prototype, but this does not always have to be the case, given time constraints, capabilities, or preferences. The Alpha model will be tested per the test proto-

col developed in the previous phase. From these findings, any adjustments and enhancements will be performed and the CAD database will be updated to reflect the changes. If required, parts will be remade and retested to confirm that the product expected functions are met.

A second round of user studies could be conducted at this time to confirm that the product meets or exceeds the user's expectations. During this phase the manufacturing representative will be contacted and start to be involved as the final 2D documentation is generated, ensuring that the assembly documentation will fit easily with the anticipated manufacturer's process control system and/or production floor cell flow through.

5. Production: Technical Support During Ramp-up

Once transition to the production phase has begun, companies need to begin the process of

scaling up the manufacturing delivery process to meet market demand. This involves establishing efficient production facilities, supply chain management, and quality control processes. Production considerations include cost optimization, inventory management, and meeting delivery timelines. The engineering team would stay involved during Production ramp up, to assist the manufacturing team in achieving maximum yield.

The transfer of knowledge of the product from the engineering development team to the manufacturing team is critical. This is true, not only the understanding of the documentation and processes, but to the understanding of the product and the product use. This helps instill the manufacturing staff with a level of buy-in into the ultimate success of building quality into the product. The product becomes a vested interest personnel at each manufacturing level, and not just a CPK target (measure of process capability).

Five Key Steps for Developing a Successful Product

Key Step	Key Activities	Key Elements
Marketing	Market Analysis Customer Survey Market Modelling	Customer Needs Market Preferences Key Targets
Solution Development	Develop Design Decisions Finalize Requirements Technology Scouting Stakeholder Collaboration	Business Plan Market Strategy Proposed Concept Documentation
Engineering	Product Design Test Design Engineering Collaboration Transition to Production	Production Method 3D CAD Models 2D Drawings Test Plan
Validation	Alpha Model User Studies Develop Production process	User Feedback Assembly Documentation
Production	Technical Support Knowledge Transfer Cost Optimization	Production Ramp-Up Manufacturing buy-in

Conclusion

With your project approved, and the pressure mounting, you now have a guideline to take you through the steps of the Product Development process, From Market Analysis, Solution Development, and Engineering & Design to Validation and Production.

A Marketing focus provides the understanding of customers' needs and the target market to effectively design and promote the product. Through disciplined cross function collaboration, Capturing and Conceiving the Solution work can begin to develop the business plan and create the overall product positioning strategy to properly define the major design decisions. Engineering teams Create the Realization of the Product by building a knowledge base for the future processes that includes 2D and 3D design drawings, complete with critical information for manufacturing. Alpha Models in coordination with manufacturing, and a 2nd round of customer feedback will prove the product meets the defined need.

By following the steps above, built on tested knowledge and insight, individual managers and companies alike have a path to meeting their product development goals. By maintaining discipline, developing the communication channels needed to facilitate collaboration, and keeping the customer needs in focus during design, a product development process such as this will ultimately result in a successful product.

About the Author

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John directs product development activities that include industrial design, human factors, user research, and preliminary engineering concepts across the firm's vertical business units. John transitions product concepts effectively to ensure the design intent is achieved, verified, and validated.

"Transform aesthetic, safe, and user-friendly concepts into fully engineered products ready for manufacture."

About Boston Engineering Product Development Management

Product companies face a variety of challenges that can impact their success in the marketplace. These challenges can include everything from rapidly changing customer needs and preferences to supply chain disruptions and intense competition. To overcome these challenges, product companies may need to seek Product Development management help.

For nearly three decades, Boston Engineering has been transforming promising concepts into impactful solutions. Our experienced team guides your innovative visions through every stage of development, with the discipline and dedication necessary to engineer quality into your products.

About Boston Engineering

Making a meaningful impact drove us to start the business in 1995 and it has driven every project since. From designing advanced products and technologies to accelerating time to market, Boston Engineering thrives on solving tough client challenges. We provide product design and engineering consulting from concept development through commercialization. Clients benefit from our deep product development capabilities, focused industry expertise, and ISO-certified quality management system.



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