



FROM SKETCH TO SHELF

WHY YOUR PRODUCT LOOKS SO DIFFERENT

A common challenge in the journey from design to manufacture relates to a lack of awareness regarding the complexity involved. While passion and enthusiasm are crucial drivers towards innovation, they must be balanced against a realistic understanding of the multifaceted nature of bringing a product to market. Innovators often focus intensely on the technical benefits of their design, but this tunnel vision can lead to overlooked elements that are just as critical, such as cash flow requirements, market understanding, and the intricacies of production.

To successfully navigate this process, it is helpful to adopt a mindset of “Systems Thinking”. This approach emphasizes the need to simultaneously and incrementally develop all aspects of a product—from functionality and form to financial viability and market appeal. By considering these factors in tandem, innovators can better manage risks and create products that are not only technically sound but also manufacturable, commercially viable, and attractive to investors.

It’s also important to set realistic risk thresholds and have a clear exit strategy. If progress stalls and you’re self-funding beyond your comfort level without a clear path to return, it may be wise to reconsider your approach. Relentlessly pursuing an idea based on unclear costs can be detrimental to both business success and personal well-being. Moreover, defining whether you’re building a business or developing an idea directly to sell from the outset can help clarify your strategy and guide your decisions throughout the entire development process.

This holistic perspective is crucial because, as the product moves from an initial sketch to mass production, various adjustments and compromises are often necessary. The end result may differ from the original vision, but these changes are usually made to ensure the product is practical, cost-effective, and suitable for the market. The following sections will delve into why these deviations occur, exploring the challenges and decisions that shape the final product.

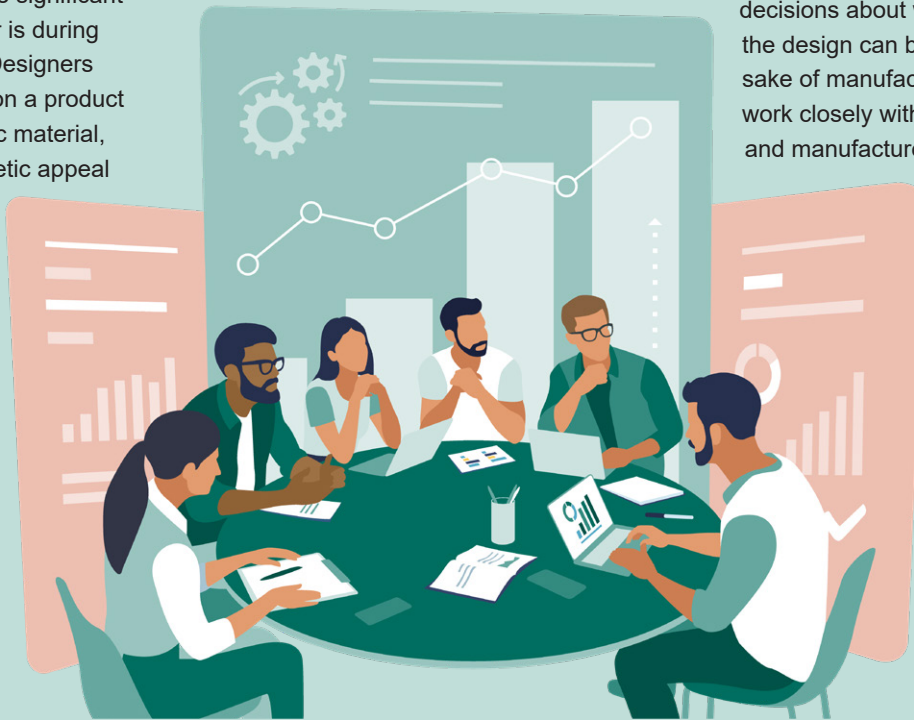


Design Constraints and Material Selection

The first stage where significant changes often occur is during material selection. Designers might initially envision a product made from a specific material, chosen for its aesthetic appeal or theoretical performance. However, when the project moves from the design phase to production, the realities of material availability, cost, and manufacturability can force changes. For instance, a designer may select a premium metal for its sleek look, only to find that it's too expensive or difficult to work with at scale. This often leads to substitution with a different material, maybe even plastics, which can alter the product's appearance, production, assembly, and feel without severely affecting the overall performance.

The Testing Phases

Once a prototype is built, it undergoes rigorous testing to ensure it meets safety standards, performance criteria, and durability expectations. During this phase, issues often arise that were not apparent in the initial design and may lead to multiple design iterations. For example, a product may not withstand the intended stress levels, or it might not perform as efficiently as required. To address these issues, engineers may need to reinforce certain areas, include additional features, or even change the product's overall shape. These adjustments, while crucial for functionality, can result in a product that differs significantly from the original concept.



a product that can be mass-produced efficiently while maintaining as much of the original design intent as possible. This often involves making difficult decisions about what aspects of the design can be sacrificed for the sake of manufacturability. Engineers work closely with both designers and manufacturers to ensure that the final product is functional, reliable, and marketable, even if it means deviating from the original design.

Concept Cars and the Reality of Production

An obvious but nonetheless illustrative example of this process can be found in the automotive industry, particularly with concept cars. These vehicles often showcase cutting-edge designs, materials, and technologies. However, when it comes time to bring these cars to market, many of these features are altered or removed due to cost, safety regulations, and production limitations. For instance, concept cars might feature exotic materials like carbon fibre or futuristic, aerodynamic shapes that are expensive or difficult to mass-produce. When these cars enter production, they are often made with more conventional materials and altered designs to meet safety standards and production costs.

A specific case is highlighted by Hankook & Company, where concept tires designed for innovative looks and advanced performance often undergo significant changes before reaching consumers. These changes are necessary to ensure the tires can be produced at scale, meet safety regulations, and perform well under various conditions.

Adjustments for Mass Production

Mass production introduces another layer of complexity. Processes that work well on a small scale or in handcrafted prototypes may not be feasible or cost-effective when producing thousands or millions of units. To streamline production and reduce costs, manufacturers might alter the design to simplify assembly, reduce the number of parts, or use more cost-effective production methods. This can lead to compromises in design, such as using a less detailed mould, opting for fewer colour options or selecting a different manufacturing process.

The Role of Engineering Teams

Engineering teams play a critical role in bridging the gap between design and manufacturing. They are responsible for translating the designer's vision into

Consumer Electronics and Usability Adjustments

Further examples can be found in the consumer electronics industry. When designing a new gadget, engineers and designers often envision a sleek, compact device with cutting-edge features. However, as the design moves toward production, compromises must be made.

Battery life may require a larger battery than originally planned, impacting the device's size and weight. Similarly, cooling requirements might necessitate the inclusion of vents or fans that disrupt the clean lines of the original design. These changes are often necessary to ensure the device's usability, reliability, and safety, even though they may detract from the original design vision.

For such volume production items, it is common to see products evolving over time. If the product is successful in the marketplace, then future versions of it can be seen to include complex design features and upgrades in materials, options, etc. Whilst the basic functionality and purpose may remain the same, such additional features can lengthen the overall lifetime.

Apple's iPhone and the Evolution of Design

Apple's iPhone development offers a clear example of how design changes arise due to production and usability needs. The original iPhone, launched in 2007, was a revolutionary product, but its development involved significant adjustments.

“ Collaboration between the design, engineering, and manufacturing team plays a vital role in the [product design] process ”

Initially, Apple planned to use an aluminum back for the iPhone, aligning with its premium image. However, it was found that aluminum interfered with wireless signals, such as Wi-Fi and cellular connectivity. To resolve this, Apple switched to a plastic casing for the first-generation iPhone, enhancing functionality at the cost of the sleek, metal look originally envisioned.

Apple's ongoing evolution of the iPhone design highlights this balance between vision and practicality. For instance, the iPhone 6 introduced a larger, thinner design but faced issues with bending under pressure (“bendgate”), leading to structural changes in later models.

These examples show that even design-driven companies like Apple must make practical adjustments during development, resulting in a product that may differ from the original concept but is better suited for consumer needs and mass production.

Balancing Vision and Reality

The transformation of a product from an initial design sketch to a finished product involves numerous challenges and adjustments. While these changes can sometimes lead to a product that looks or functions differently than originally intended, they are often necessary to ensure that the product is practical, safe, and viable for mass production. Collaboration between the design, engineering, and manufacturing team plays a vital role in this process, as they are working together to maintain the integrity of the original design while making the necessary adjustments for manufacturing and the market. Ultimately, whether these design alterations are acceptable depends on how they impact the product's quality, functional, and market requirements. ■

