Market Perspective

Building Sustainable Product Design Strategies for Consumer-Durable Brands

In partnership with

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Is this report for me?

Incisiv’s market perspective, “Building Sustainable Product Design Strategies for Consumer-Durable Brands,” offers a structured perspective on how consumer-durable brands can embrace and implement a holistic, sustainable product design strategy.

This report will be especially relevant if you are:

- Committed to sustainability as a core pillar of your future product design strategy;
- Dedicated to bringing about a positive change, and ready to make a transition to a circular and sustainable economy by design; or
- Responsible for maximizing enterprise valuation based on an investor's environmental, social, and governance (ESG) criteria

The intent of this report is to offer you a running start by identifying what should be key components of your sustainable product design plan.

Let’s dive in.
Design Challenges and Solutions:
A deep-dive into each of the sustainable product design-related challenges and how they can be solved.

Sustainable Product Design Techniques:
Approaches for achieving sustainable product design and ethical business practices.

Why Sustainability Matters:
How a convergence of 3 macro trends is necessitating that consumer-durable brands rethink product design strategies.
A Confluence of Factors is Reshaping Humanity
The world is moving more durable goods - from refrigerators to footwear - as consumers embrace eCommerce across categories. With more buying and disposing, digital acceleration brings a larger carbon footprint.

In a year, the world produces as much as 50 million tonnes of e-waste, weighing more than all of the commercial airliners ever made. Only 20% of this waste is formally recycled.

Forecasting demand and planning supply are trickier than ever before, leading to multiple inefficiencies in product design - from excess materials to wasteful manufacturing operations.

Nearly 1 in 5 consumers purchase identical items in several colors and sizes. They also frequently make impulsive purchases, knowing they’ll probably return the item.

When brands compete on convenience alone, they make suboptimal decisions (such as using a wasteful but speedy product design method) to keep shoppers satisfied.

80% of consumers are more likely to make a purchase when brands offer personalized experiences.
Be it climate change, a pandemic, a port blockage, or threat of war - uncertainty is the next normal.

<table>
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<tr>
<th>The disaggregation of supply</th>
<th>Oscillating supply-demand dynamics</th>
<th>Lack of transparency</th>
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<td>With a diverse set of new suppliers in new places - a necessity brought on by continued supply chain uncertainty - economies of scale in materials have suffered.</td>
<td>With fast and free shipping and returns now table stakes, consumer-durable goods returns are at an all-time high. Shoppers have little incentive to consolidate shipments or to reduce “bracketing” (buying more than one size or color and returning what they don’t need).</td>
<td>Lack of transparency across the extended supplier’s network, business processes, and practices amplifies the inefficiencies in the product design process.</td>
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<td>33% of businesses had difficulty identifying diverse suppliers that also meet procurement criteria. Another 27% said there is a lack of supplier diversity data and insights.</td>
<td>With automated and centralized assortment reviews, consumer-durable brands can achieve more than 90% weekly forecast accuracy.</td>
<td>Overall supply chain transparency is poor, with 65% of procurement leaders having limited or no visibility beyond Tier 1 suppliers.</td>
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As consumers passionately embrace new values, they expect their favorite brands to stand up and be counted.

<table>
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<th>Environmental friendliness</th>
<th>Holistic wellness</th>
<th>Social justice</th>
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<td>Consumers value environmental consciousness more than ever before. They want their favorite brands to help leave a better world for future generations.</td>
<td>The idea of health and wellness is finally more than surface deep. From a positive body image to a sense of mental well-being, consumers value products, brands, and experiences that help them be the best version of themselves.</td>
<td>Shoppers expect companies to “do well by doing good”. Building a sustainable brand is about more than being environmentally conscious. It is about embracing inclusivity, diversity, and other important constructs of social justice.</td>
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<td>In an experimental project to reduce the carbon impact of its products, Nike used factory scraps and recycled “space waste yarn” to create the Space Hippie Sneakers.</td>
<td><strong>66%</strong> of consumers increasingly expect companies to do a better job in motivating them to live by their values and to make them feel more relevant in the world.</td>
<td>More than <strong>30%</strong> of consumers consider diversity and inclusion when making purchase decisions.</td>
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To safeguard the environment, consumer-durable brands need to design a better tomorrow with sustainable product design strategies.

Impact on the environment
Multiple factors contribute to the product’s impact on the environment. This triggers a call to action for consumer-durable firms to reduce their carbon footprint on the environment.

Sustainable design is a way forward
Considering a product’s entire lifecycle and its potential effects - whether in the manufacturing, packaging, transportation, end-of-life stage - the design stage is a perfect opportunity for consumer-durable brands to find unique ways to get sustainable and circular goods into the economy.

When sustainability is applied to design:
• It highlights the effects the product will have on the environment during its entire lifecycle.
• Allow designers to produce a product that will exist sustainably, and offers:
  o a higher value than what was lost in its creation; and
  o provision to maximize its value across its full lifecycle, and keep materiality in a value flow.

By using a sustainable product design strategy, consumer-durable brands can raise the value of their products while still preserving functionality, aesthetics, and practicality.
Techniques for Sustainable Product Design
Design to reduce embodied carbon in the built environment.

- To achieve low-carbon products with low greenhouse emissions, planning must start during the product design phase.
- So, explore, compare material alternatives, and consider the materials with the lowest carbon footprint (such as cyclopentane) in the product design to achieve a carbon neutrality state.
- For instance, using aluminum that contains 60% recycled material can lower the product’s embodied carbon by up to 90%.

The embodied carbon in the major parts and components used to assemble computer products accounts for nearly 60% of its total analyzed footprint.

Prioritize design for recyclability of the materials.

- Design for recyclability firstly mandates that a product be made to be very simply disassembled for recycling at the end of its useful life.
- So, go beyond just selecting the materials on the basis of aesthetics and consider the materials that can be recycled easily (such as cork and algae) after the end of product life.
- Consider factors like the way in which they are assembled and labeled, and minimize the usage of different types of materials (single material products) for an easier recycling process.

As per a recent estimate, nearly 300 million pairs of footwear, with 600 million toe caps, end up in landfill or are incinerated every year.
Dematerialize to improve product efficiency.

- Lightweighting is one of the easiest strategies to keep the product emission as low as possible.
- So, reduce the environmental impact of your products by downsizing the overall size, use lightweight materials, such as aluminum, and avoid incorporating several different materials into a design.
- As more materials lead to larger impacts, consumer-durable brands need to use fewer types of materials and reduce the overall weight without compromising product quality.

According to a U.S.-based study, 6-8% energy savings for every 10% weight reduction can be achieved by switching to aluminum for the production of consumer-durable goods.

Design to evolve for energy management.

- Many products need constant inputs during the use phase, such as electricity in the form of charging.
- So, bring down the constant energy input requirements, such as charging throughout the use phase of the product by choosing the right energy-efficient motor and solutions.
- This in turn will lengthen the product's lifespan and improve its environmental performance while reducing product wear.

Without new policies, the energy consumed by information and communications technologies, as well as consumer electronics, will double by 2022 from 2018 and increase threefold by 2030 to 1,700 Terawatt hours (TWh).
Design to extend the product lifespan.

- Few products that are sold to consumers are made to be thrown away after their usage. This throwaway world is largely made by design.
- So, move away from inbuilt or planned obsolescence and create products with materials that are aesthetically timeless, highly durable, and enable a long life, such as natural rubber.
- Consider multiple use case scenarios, such as resale encouragement and repair options so that a product will retain its value over time.

Consumers want their durable goods to last between 1.7 and 3.6 times longer than they are used.

Design for repairability and remanufacturing.

- The circular economy's primary tenet is repair. Things need to be made to be easily repairable, upgradeable, and fixable, as they wear out, break, and get damaged.
- So, promote a longer product lifespan by making it easy to repair, upgrade, and fix issues with standard components usage, labelling, and repair guides.
- Seek out the possibilities of how the parts or entire product can be re-manufactured into new usable goods.

In the next three years, 47% of U.S. consumers are expected to reuse products by having them repaired instead of throwing them away.
Challenges in the sustainable product design and their solutions
Lack of material knowledge, suboptimal material selection, and inability to measure its impact on the overall product weight result in poor product performance.

80% of the respondents said they have considered energy efficiency when buying electric appliances, including 44% who said it was a major consideration.

Reduce time-to-market by virtually testing multiple material options to optimize material choices based on various characteristics, such as weight and energy consumption, to achieve better product performance.

Case study

Business challenge
- To transform a legacy unicycle design model into an ergonomic electric unicycle.
- Failure to take first concept through to manufacturing.
- Performance-to-weight is of critical concern.

Analysis
- Created 3D models of elements, such as the external styling of the plastic case, metal for pedals, and motor.
- Almost 400 different components and 25 pieces of tooling were created and assessed.

Result
- Transformed a generic unicycle design into an ergonomic and reliable one.
- Overall weight was reduced by more than 2 pounds, bringing the product weight to around 24 pounds.

To know more kindly visit here.
#2 Sustainable material choices

**Industry challenge**
Failure to quickly select material, visualize, and analyze product performance characteristics before they are developed leads to multiple inefficiencies and longer production time.

**Solution**
Create a digital replica of your physical product, understand product behavior and validate before production to reduce material waste in developing prototypes.

**Case study**

**Business challenge**
- To modernize the traditional approach to helmet design and engineering.
- Unable to quickly make a material choice and test that match the highest safety requirements.

**Analysis**
- Utilized NX for innovative design and engineering.
- Developed an accurate digital twin of each part of the helmet that covered key engineering details.

**Result**
- Reduced time-to-market and met market demand for more personalized and individualized products.
- Saved 2-3 weeks per design.

"**By 2030**, the use of digital twins by manufacturers can help to cut worldwide CO2 emissions by **20%**."

To know more kindly visit [here](#)
Case study

Industry challenge
Unable to quickly respond to the requirement of technical excellence and style due to legacy design tools and manual processes, which led to multiple inefficiencies, poor design quality, and longer response time.

Solution
Break away from geometric design constraints and execute highly-technical designs with maximum accuracy to improve product aesthetic quality using 3D surface tools.

Business challenge
• To advance its existing design tool to stay competitive in terms of style and mechanical design trends.
• Overcome production and design limitations to improve design quality.

Analysis
• Executed highly-technical designs with precision.
• Used visualization and realistic rendering tools to optimize the aesthetic quality of the products.

Result
• Optimized the aesthetic quality of the products by 20%.
• High quality of 3D surface tool reduced tool breakage by 70%.

To know more kindly visit here
Case study

**Industry challenge**

Legacy infrastructure and complicated system characteristics make assembly and disassembly of isolated parts more complicated, thus resulting in longer lead times and poor system performance.

**Solution**

Elevate customer experience by eliminating complex and lengthy assembly processes through integrated design for manufacturing processes.

**Business challenge**

- To meet high standards in accuracy, richness in detail, and cost effectiveness at the same time.
- Ability to build more complex tools in a shorter time and manage global complexity.

**Analysis**

- Used a modern, adaptable tool to digitize the company-wide PLM environment.
- Standardized advanced product development and engineering processes at core global R&D centers.

**Result**

- Lowered the development cycle for complex tools by about 20%-30%
- Reduced development costs by 15%-20% with improved quality.
- Shortened time-to-market of the product by 20%-30%.

"30% of automotive OEMs believe product development cycles has increased due to complex design and assembly processes."
#5 Lack of effective communication

**Industry challenge**
Lack of clarity on product design characteristics and alterations due to legacy infrastructure and poor communication across enterprises results in more rework and reduced efficiency.

**Solution**
Improve and establish bi-directional communication throughout the organization, and optimize decision-making related to product design intent and characteristics using 3D models. Automate manual documentation process to improve efficiency.

“Companies with effective internal communication are up to 50% more productive than those without.”

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**Case study**

**Business challenge**
- To streamline communication across the extended enterprises.
- Time-consuming back-and-forth communication process with the clients.

**Analysis**
- Used 3D files and models to design reviews, other client communication.

**Result**
- Significantly reduced response time to minor and major changes.
- Reduced rework rate.
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