Entering the Third Wave of New Product Design

The new product design (NPD) process is entering an AI-powered Third Wave, and this one promises to be even more impactful and disruptive than the previous two.

2024

First Wave

In the First Wave, product managers, project managers, and designers used traditional tools and processes to create new products. Typically, the team was physically located in one place. The voice of the customer was captured via such methods as observations, in-person interviews, focus groups, surveys, and market data, although often products were developed without deep customer insights.

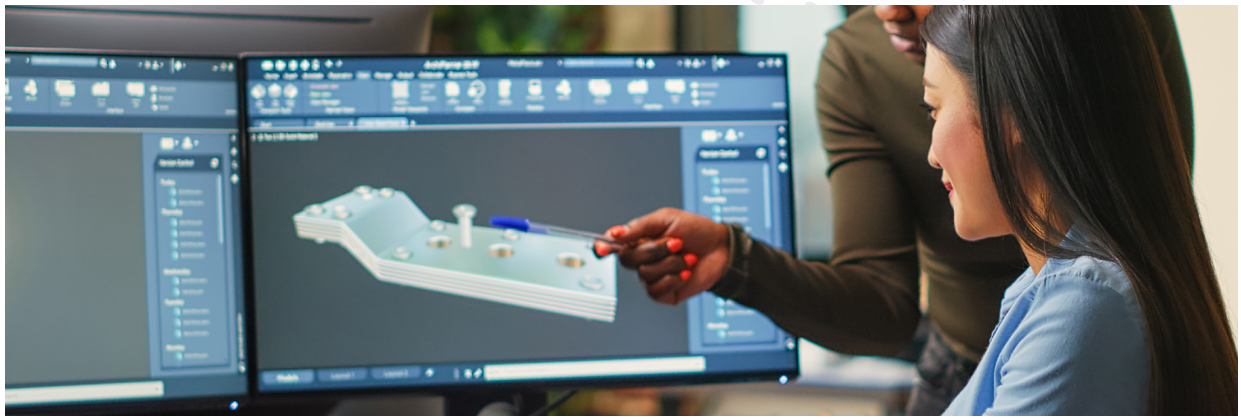
Many designers were masterful at drafting, which was done on a drafting table on drawing sheets with pencils of varying widths and leads, and with drafting machines, rulers, T-squares, triangles, protractors, circle templates, engineer's scales, and so forth.

The prototypes were created in a machine shop by other master craftspeople. Then production specs, molds, stamps, dies, etc. were created by hand.

The entire process of designing, prototyping, testing, redesigning, and manufacturing was costly and time consuming.

And design was largely driven by intuition, and not as focused on consumer needs as it needs to be today.

Second Wave



The Second Wave of NPD began with the invention of computer-aided design (CAD) in 1957, and greatly accelerated in the 1980s with the introduction of CAD systems from companies such as Dassault Systems, PTC, and SolidWorks. While there is far more to great design than speed, just using CAD instead of physical drafting could accelerate design speed by 2-5X. Today, a CAD system subscription may be less than $1,000/year.

Beginning with the popularization of the internet in the mid-1990s, it was possible for teams to be distributed and global. Many CAD providers developed their own collaboration tools, which supplemented standard business collaboration tools like Microsoft Sharepoint, Google Docs, and project wikis, as well as Webex, Zoom, virtual whiteboards, and 3D virtual workspaces.

Analysis tools integrated into the CAD systems empowered teams with virtual testing, even of systems as complex as jet engines, reducing the need for many physical prototypes. Notably, the Boeing 777 was designed entirely by a distributed team using digital tools.

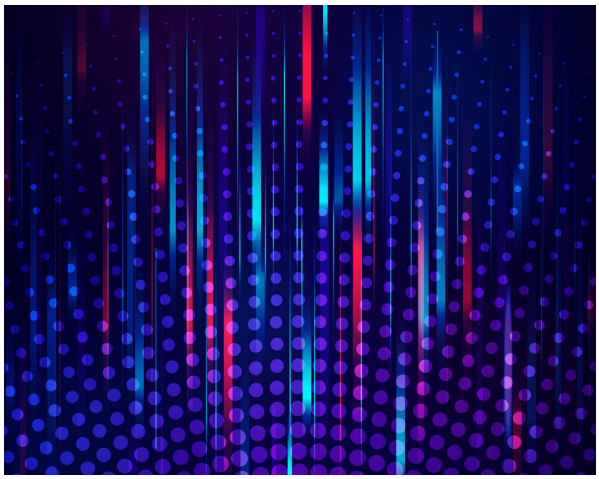
Then 3D printers enabled companies to quickly and inexpensively create product prototypes.

And big data provided companies with far greater, and more timely, market insights than were previously possible. These insights were often successfully integrated into new products through quality function development, which gained popularity starting in the 1980s.

Lastly, the second wave saw transformative changes in communication and collaborative tools such as Basecamp, Jira, and Miro. Collaborative information technology (CIT) tools have had a significant impact on the innovation process, particularly in NPD. These tools have improved collaboration and knowledge sharing among team members, leading to better NPD outcomes. CIT tools have also increased transparency in communication and improved project harmony within organizations.

Of course, as with any technological disruption, new challenges cropped up. Easy adoption of tools can lead to churn and excessive iteration, which can negatively impact project harmony if not managed properly. Overall, the increasing power and sophistication of CIT tools have turned them into a competitive advantage when managed properly, contributing to changes in design activities during the NPD process and accelerating the pace of discovery and development phases.

The impact of the Second Wave was a hugely positive transformation. Combined, these tools and processes enabled new ways for teams to work and collaborate, greatly reducing product development times and costs, and even creating entire new industries, such as fast fashion.



However, the Second Wave produced a huge amount of data with hidden, unexploited insights. NPD teams simply didn't have the tools to take advantage of it. Manually scrolling through and evaluating thousands of reviews, as is done at some companies, is ineffective.

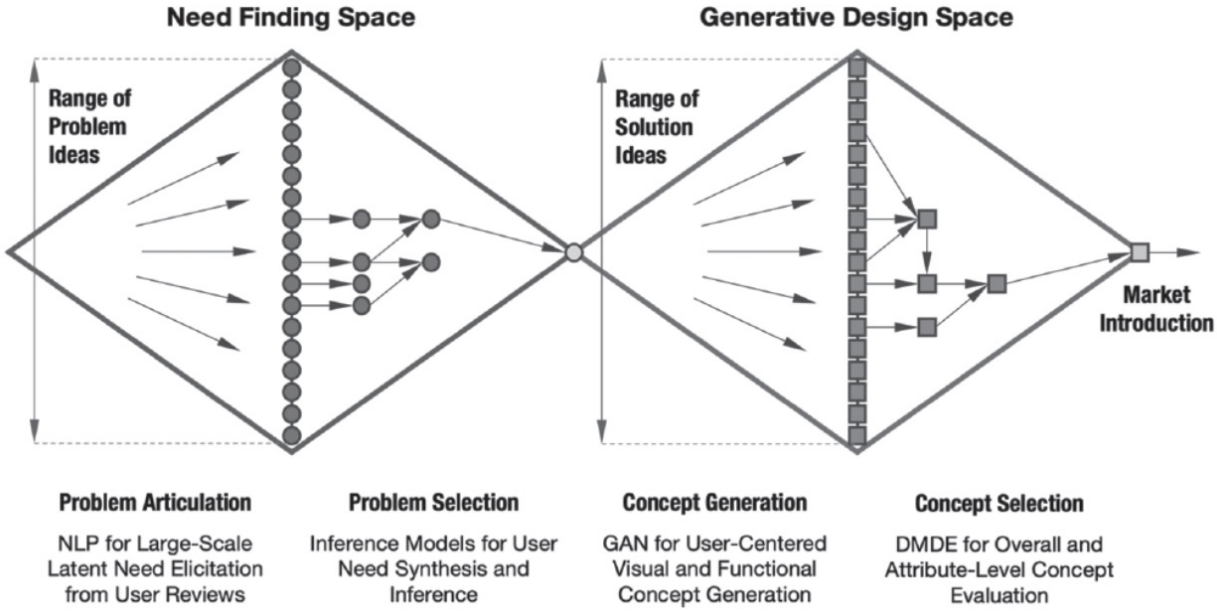
As a result, companies still suffered from a high rate of new products that failed or underperformed expectations.

Third Wave

The Third Wave of NPD, powered by artificial intelligence (AI), has begun in the past few years, and it promises to provide benefits and profits that make those from the first two waves pale in comparison.

AI can quickly analyze and report on the data that was unexploited in the Second Wave. It can analyze it, and inform generative designs with those insights. AI can power more effective decision making while reducing time and cost to market.

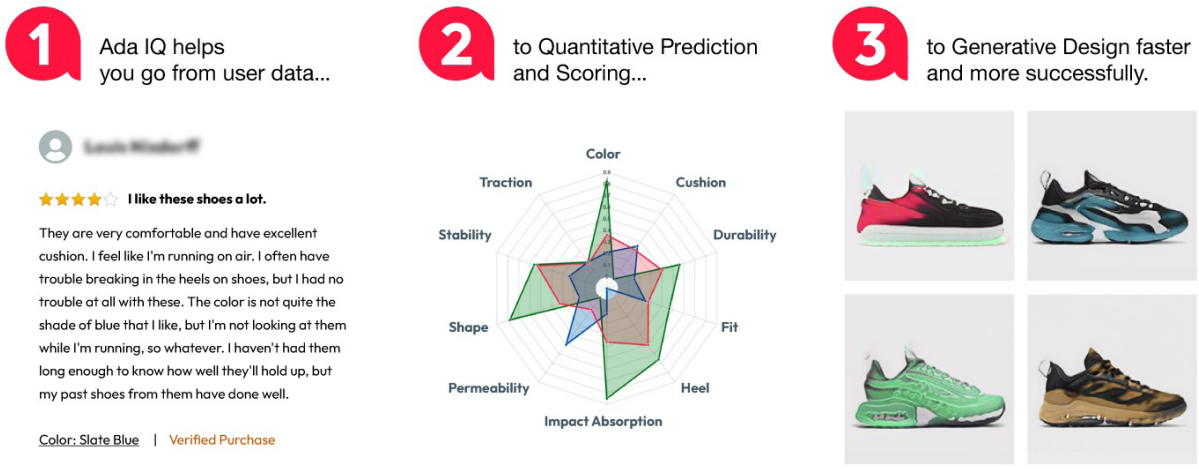
AI has the potential to disrupt every stage of the NPD process, as this double diamond graphic illustrates.



The first areas of impact are AI-powered customer insights and problem articulation. AI can provide superior customer insights by using various forms of Machine Learning (ML) to analyze large amounts of unstructured data, such as customer reviews and social media posts. From this, the AI can determine, with a high level of probability, user sentiment, emotion, and latent needs and identify the most important attributes to be included in a new design.

The releases of DALL-E and ChatGPT in 2021 and 2022 sparked a huge surge of interest in generative AI. Suddenly, using simple, English language prompts, people could bring forth virtually limitless creations. However, the quality of these was often suspect, as illustrated by the presence of AI “hallucinations”.

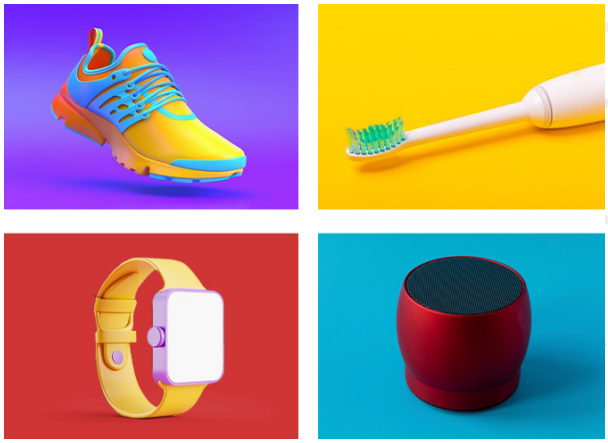
The promise of Third Wave systems, though, is not an explosion of random designs, but the infusion of every stage of NPD with customer insights. Systems being developed will combine the analysis of large user and proprietary data sets, quantitative prediction and scoring on specific product features on multiple axes, and data-infused empathic, generative design.



The result will be products that are much better aligned with consumer needs and desires, and which produce greater market success and a competitive edge.

To date, the greatest amount of research -- across many companies -- has been in analyzing and extracting sentiment analysis and consumer insights from the large sets of unstructured data available inside and outside of the organizations. The Deep Multimodal Design Evaluation (DMDE) model developed by researchers at Northeastern University is an example of a data-driven design concept evaluation tool based on user sentiment which can predict attribute-level customer reaction to new products with 98% accuracy.

The infusion of new, generative designs with these insights is the area with the greatest potential, and which still requires the greatest amount of work, although significant advances in industry-specific expert systems are happening at a rapid pace.



These Third Wave NPD systems significantly change the field, and the roles of team members. For example, the ability of AI to analyze concepts on multiple dimensions combined with generative AI will create concepts faster and more in line with customer desires.

Designers may find that taste is more important than design skill when curating the many design options presented by AI, as they move from design creation to design selection. They will also need to understand how to guide the AI model with appropriate prompts, constantly infuse it with more data, audit the AI's output, and make better design decisions faster.

The impact of Third Wave NPD promises to surpass even that of the introduction of computers and the internet to the field.

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