

A Study on the Relationship between Ideal Prototypes and Implemented Products in Industrial Design and Manufacturing

Weiqiao Tan

Industrial Engineering, University of Pittsburgh, Pennsylvania, The United States of America

Corresponding author: WET42@pitt.edu

Abstract:

In the context of industrial production and design, finding a balance between the ideal design solution and the actual implementation is crucial to the long-term prosperity of a real business. This is due to the fact that these types of businesses are often in control of the production program and front-end sales operations. This thesis focuses on two large international companies, Nike and Apple, and utilizes a literature analysis that focuses on their development history and individual cases of prominent products for both companies, including the corresponding economic benefits and changes in product reputation. After the case analysis, it was concluded that the company should always take the user's needs as the first design standard. Following the user group portrait, the company should combine the expected economic benefits to adjust the product design and cost, and constantly summarize the user pain points and market benefits of previous products to adjust the product focus and optimize the product design. Finally, the enterprise also needs to appropriately use marketing strategies to motivate users to accept the enterprise's philosophy and form their own design language and logic. In this way, the company can ensure the increment of user loyalty and occupy a higher share in the market.

Keywords: Customer demand/experience; design language; marketing strategy; economy effect.

1. Introduction

This study focuses on the analysis of two gigantic global companies, Nike and Apple, and their outstanding products; this study is very meaningful to study how the companies balance the ideal design scheme and the actual results in order to maximize the interests of the company and the reputation; this

study mainly summarizes the relative success of the products of the two companies and the individual examples of the products that are not popular in the market to carry out the specific aspects of the two companies; the use of the literature analysis method and the search for and reading of the relevant information and literature to find and read, the advan-

tage of this method is that it can be well analyzed in the development of the two companies in the course of the market research and its launch of the product has a very clear picture, conducive to the study; the ultimate goal of this study is to derive a relatively reasonable enterprise product planning based on the existing case study. In order to achieve the goal, the case study is summarized, and suggestions are made for the company's future product design and production.

2. Background & Topic

In the field of industrial design and manufacturing, a comprehensive understanding of the needs of different groups of customers and the functional reform and improvement of current products are the fundamental secrets of all companies that continue to gain prestige and profitability in the industry [1]. Companies should always keep the customer's needs as the primary basis for updating their products [2]. Some global corporations even go so far as to try to incorporate a deeper level of humanistic concern into their industrial products. Their pursuit of a unique design language has been recognized as a great example of desirable product development [1]. However, if a company tries to optimize one single feature of its products, it may end up with a relatively less desirable economic effect. Therefore, based on the premise of understanding the demands of targeted users, knowing how to find a balance between idealized design sketches and predicting the corresponding economic benefits to implement the plan is what a company's decision makers should think about.

3. Case Analysis

3.1 Everything Centers on the Customers

Founded in 1964 as Blue Ribbon Sports, Nike Inc. is a global leader in athletic footwear, apparel, and equipment. After changing its name in 1971, Nike became known for its innovative products, such as air cushioning technology and the iconic Swoosh logo [3]. With a presence in both the sports performance and lifestyle markets, Nike continues to inspire athletes and consumers worldwide, making it one of the most recognized brands in the sports industry. Nike's success is due to innovative product design, aggressive marketing, strategic athlete endorsements, and a strong global brand presence that resonates with consumers.

Focusing on one of Nike's most accomplished products, the Air Jordan 1, a revolutionary basketball shoe that was born in 1985. More than just a shoe, the Air Jordan 1 has transcended its initial purpose as a basketball performance shoe to become a symbol of cultural relevance,

streetwear style, and sneakerhead obsession [4]. From its association with Michael Jordan to its timeless design, brand storytelling, and enduring influence on sneaker culture, there are numerous factors that contribute to its lasting appeal. Another crucial element of the Air Jordan 1's appeal lies in its design. Created by Peter Moore, the sneaker's silhouette is both functional and stylish. The high-top design offered support for basketball players, but its sleek and simple lines allowed it to cross over into the world of fashion seamlessly [4]. The iconic Nike Swoosh and the distinctive Air Jordan "wings" logo on the collar set the shoe apart, giving it an identity that could stand on its own. While the Air Jordan 1 remains rooted in its original design and 1980s aesthetic, Nike has continuously innovated the shoe in subtle yet impactful ways. Over the years, the brand has experimented with different materials, from premium leather to patent leather, suede, and canvas, offering new textures and looks while maintaining the integrity of the classic silhouette. These updates keep the shoe fresh, while also honoring its heritage. Additionally, technology has been infused into certain versions of the Air Jordan 1, with some models featuring upgraded cushioning systems for added comfort, making the sneaker not only stylish but also functional for everyday wear.

The recently launched Air Jordan 1 CMFT series is certainly a fruitful market case based on customer demand. Due to the original need to reduce weight for the court, the original Air Jordan 1 features a thinner midsole structure and a compact rear palm air cushion. After years of continuous market research, Nike's designers launched a series based on user demand that is more suitable for daily travel, the CMFT. This series of Air Jordan 1 has thickened the thickness of the midsole, added a new era of zoom full palm air cushion, so that the wearer can walk more comfortably, greatly expanding the practical scene and the user population [5]. However, CMFT retains the original shape of the Air Jordan 1, reflecting the product's heritage and unique design language, which has led to the Air Jordan 1 classic sneaker regaining a great deal of discussion and consolidating user loyalty today. Furthermore, the Air Jordan series bridged the gap between different generations, from Air Jordan 1 to 38, fitting the customer's demand and renewing its appearance through development of new materials and air cushioning technologies. For example, the Jordan 3 looks completely different from Jordan 1, while Jordan 4 again looks completely separated. It was redesigned by another designer called Tinker Hatfield. Hatfield applied mesh paneling for breathability and the "wings" as the new design language [6]. This demonstrates the constant recreation and innovation of the Air Jordan series as a whole. While releasing the new generations of Air Jordans, Nike still frequently put on the new reproduction of old Air Jordans (known as retros) to

mark milestone and emphasizing the company's great legacy. This also guarantees customer loyalty and fulfills the market satisfaction.

Nike's advertising techniques are a masterclass in brand storytelling, emotional resonance, and leveraging cultural moments to connect with consumers. The brand often employs a narrative-driven approach, showcasing athletes' personal journeys and triumphs to inspire audiences and create an emotional bond with the product. Iconic campaigns like „Just Do It“ focus on empowerment and motivation, appealing to the aspirational nature of consumers [7]. Nike frequently collaborates with high-profile athletes and celebrities, using their influence to reach diverse demographics and enhance brand credibility. This strategy is complemented by targeted social media marketing, where visually striking content and engaging storytelling drive interaction and community building among followers. Additionally, Nike capitalizes on cultural and social movements, aligning its messaging with issues such as equality and social justice, which not only enhances its relevance but also builds brand loyalty among socially conscious consumers. The use of innovative technologies, such as augmented reality in apps and immersive digital experiences, further enhances consumer engagement [7]. By continuously adapting to changing trends and consumer behaviors, Nike has established itself as a leader in the sportswear industry, effectively using advertising not just to sell products but to foster a lifestyle and community around its brand [3].

3.2 Pursuits of Design Philosophy and its Outcomes

Apple Inc. is another great example of how meeting the customers' needs is crucial to the development of entrepreneurship. Founded by Steve Jobs in 1976, Apple has grown into the biggest technology company in the world. Apple's success is rooted in its unique combination of innovative product design, a seamless ecosystem of devices and services, and masterful marketing that creates a strong emotional connection with its users [8]. The company is renowned for its ability to anticipate and shape consumer demand by introducing products that redefine categories, such as the iPhone, iPad, MacBook, and Apple Watch. These products are designed not only with cutting-edge technology but also with a focus on simplicity and user experience, making them accessible and appealing to a broad audience [9]. The company has built a strong, almost cult-like following through its sleek, minimalist product design and its ability to market itself as more than just a technology company, but as a lifestyle brand.

The iPhone stands as Apple's most successful product due to a remarkable combination of innovative design, strategic marketing, and its profound impact on the technology

landscape and consumer behavior [10]. The iPhone's contribution to Apple's financial success cannot be overstated; it consistently generates a substantial portion of the company's revenue, often accounting for more than half of total sales. In fiscal year 2022, Apple reported over \$205 billion in iPhone revenue, highlighting its critical role in the company's financial performance [10]. Launched in 2007, the iPhone revolutionized the smartphone market by integrating a touch interface, a sleek design, and a powerful operating system in a way that was unprecedented at the time. Its introduction of the App Store in 2008 not only transformed how users interacted with their devices but also created an entirely new ecosystem for developers, resulting in millions of apps that cater to virtually every need and interest. This app ecosystem has been a significant driver of the iPhone's appeal, providing users with an ever-expanding range of functionalities that enhance their daily lives. Furthermore, Apple's focus on quality and user experience has fostered immense brand loyalty among consumers, ensuring that users are often willing to upgrade to the latest models, contributing to sustained sales growth over the years [11]. The iPhone has also benefited from Apple's highly effective marketing strategies, which position it not just as a smartphone but as a lifestyle choice, appealing to both practical and aspirational consumers. The allure of the iPhone is bolstered by its consistent introduction of innovative features, such as high-quality cameras, advanced security through Face ID, and seamless integration with other Apple products, which collectively enhance its value proposition. Additionally, the iPhone's design aesthetics—characterized by premium materials and sleek lines—have established it as a fashion statement, making it highly desirable among a wide demographic [12]. Its ability to maintain relevance through continual updates and improvements has kept it at the forefront of consumer technology, allowing Apple to capture a significant share of the global smartphone market. Moreover, the iPhone serves as the cornerstone of Apple's broader ecosystem, which includes products like the iPad, Apple Watch, and services like iCloud and Apple Music, creating a cohesive experience that encourages brand loyalty and drives additional revenue streams [10]. This interconnectedness not only enhances user convenience but also reinforces the notion of Apple as a comprehensive lifestyle brand. iPhone's legacy extends beyond its sales figures; it has fundamentally reshaped modern communication and lifestyle, solidifying its status as Apple's flagship product and a cornerstone of the tech world [11]. However, in 2015, Apple introduced the MacBook 12-inch to the market. It struggled to appeal to a broad audience due to several key shortcomings that made it less competitive in the market. First, its high price point positioned it as a premium product, but it failed to deliver the perfor-

mance expected at that level [13]. The MacBook's slim design, while visually striking, prioritized portability over functionality, leading to compromises like a single USB-C port, which limited connectivity options and required users to purchase additional adapters for basic tasks like charging while using external devices. The lack of standard ports such as USB-A, HDMI, or SD card readers was especially frustrating for professionals and power users who needed versatility in their workflow. Additionally, the 12-inch MacBook's Intel Core M processor, designed for energy efficiency, could not keep up with more demanding applications, making it unsuitable for heavy multitasking, video editing, or other performance-intensive tasks that are common among creative professionals and even average users today. Despite its Retina display, the MacBook's performance limitations in terms of processing power and graphics capabilities detracted from the user experience, particularly when compared to other MacBook models like the MacBook Air or MacBook Pro, which offered better performance at similar or slightly higher price points. Battery life, while decent for basic use, also fell short of expectations for a device marketed primarily for its portability. Furthermore, the introduction of the controversial butterfly keyboard mechanism in the 12-inch MacBook, which was prone to failure and widely criticized for its uncomfortable typing experience, further alienated potential buyers. As Apple refined its MacBook lineup, the 12-inch model was left in an awkward position, caught between the affordability and solid performance of the MacBook Air and the power and versatility of the MacBook Pro [13]. Ultimately, the 12-inch MacBook failed to offer a compelling balance of price, performance, and features, leading to its discontinuation in 2019 as consumers gravitated towards other models that provided better value and utility for both professional and casual users [14]. Its niche appeal to those prioritizing ultra-portability could not outweigh the frustrations with its limited power and connectivity, leading to its lackluster reception and eventual exit from Apple's lineup.

4. Discussion

Nike's example is a vivid example which illustrates that no matter how in the ideal program and the actual results of the balance of trade-offs, the user experience should always be placed in the first product design and manufacturing purposes [15]. A good company will certainly conduct continuous market research, personally try or get feedback from consumers, and learn about the pain points of users in the process of using and modify them. The more product styles can continue to expand the potential user base and optimize the user experience [16]. The way to classify customers can be based on different age

groups, different genders, different preferences of use scenarios, and different degrees of professional needs. Under the premise of maintaining a unique design language, try to use new materials and technologies to enrich the user's physical sense and cultivate user loyalty. In addition, a successful marketing strategy is essential: Nike uses a range of advertising methods and reinforces the brand story to deepen users' appreciation of the brand's design language. This is especially crucial because a heartfelt and informative brand story can be a great bridge between the brand and its customers [16]. The followers of a company can generate free exposure, allowing the brand to gain a steady stream of followers who are willing to pay an additional brand premium for great ideas as well as weaken the drawbacks of the design itself [17].

On the other hand, Apple really deserves to be learned by most tech companies in terms of its unique design language. One of them is that designers boldly use innovative technologies to accomplish new functions while maintaining the original recognizable exterior [18]. This allows users not to have barriers to operation due to the generation of updates. Another key feature of Apple's success is that it emphasizes the interconnectivity of individual products, enriching the user experience and allowing users to feel the significant productivity gains and powerful support of technology products. In terms of the aesthetics of design alone, Apple during the Steve Jobs era was constantly moving forward on this path. Jobs' extreme pursuit of design language gained him a certain level of followers, yet the company's product sales were unremarkable. Later, under Cook, Apple's design compromised more on practicality, which led to the company's financial success, and today it is the number one tech company in terms of market capitalization [19]. In the MacBook 12-inch case study, companies should also be aware of the fact that focusing on highlighting certain aspects of a product's features may actually be counterproductive, bringing less favorable market economic benefits and user reputation. There is no denying that MacBook 12-inch has revived the pursuit of design aesthetics from the time of Steve Jobs, focusing on a lightweight office experience. However, its poor thermal design, limited battery capacity, ineffective graphics performance, and single Thunderbolt port completely ignores the user experience in most usage scenarios [20]. Its pricing is high, with a price difference of less than \$300 from the Pro model, yet its versatility is far less than that of the Pro series. In terms of lightweight office work, the Air series is good enough for most tasks, but the price difference with the 12-inch series is more than \$500. It's an unattractive product, and one that none of the original admirers of Apple's design language were willing to pay for. In the end, Apple had to cancel the production of this series of products, only to retain the Air

and Pro models. From this, we can conclude that in the product too much to emphasize the beauty of the design and ignore the practical value and does not consider the economic benefits of the market can bring to a marketing disaster. Such an approach is very adventurous and unwise to make.

5. Conclusion

The result of this study is that a balance between aesthetics and practicality of products is essential, which further leads to the conclusion that companies should put user experience in the first place, conduct product research in combination with the expected financial result and product reputation, conduct research on the exploration of the unique design of corporate branding as appropriate, consider the actual application of the product scenarios to adjust the design ideas, and reasonably apply marketing strategies to strengthen user viscosity, weakening the limitations of the design to a certain extent. This study provides a great number of valuable references for future research in this direction, which mainly influences the factors and manufacturing standards that enterprises should consider when designing products, and thus obtains the enhancement of brand power and solidity, and brings a steady stream of economic benefits. Future research should focus more on the selection of materials, design costs, and market research in various countries, as well as on the coordination between different departments of the company.

References

- [1] Magistretti S., Sanasi S., Dell’Era C., & Ghezzi A. Entrepreneurship as design: A design process for the emergence and development of entrepreneurial opportunities. *Creativity and Innovation Management*, 2023, 32(1): 5-21.
- [2] Jin J., Liu Y., Ji P., & Liu H. Understanding big consumer opinion data for market-driven product design. *International Journal of Production Research*, 2016, 54(10): 3019-3041.
- [3] Mahdi H.A.A., Abbas M., Mazar T.I., & George S.A. Comparative Analysis of Strategies and Business Models of Nike, Inc. and Adidas Group with special reference to Competitive Advantage in the context of a Dynamic and Competitive Environment. *International Journal of Business Management and Economic Research*, 2015, 6(3): 167-177.
- [4] Coleman C.A. Classic Campaigns-” It’s Gotta Be the Shoes”: Nike, Mike and Mars and the” Sneaker Killings”. *Advertising & Society Review*, 2013, 14(2).
- [5] Veryzer R.W., & Borja de Mozota B. The impact of user-oriented design on new product development: An examination of fundamental relationships. *Journal of product innovation management*, 2005, 22(2): 128-143.
- [6] Lin Y.C., Chen Y.H., & Lee Y.C. The effect of product attributes, brand awareness and product knowledge on consumers-A case of Air Jordan retro shoes. *Journal of statistics and management systems*, 2021, 24(5): 1151-1168.
- [7] Mothersbaugh D.L., & Hawkins D.I. *Consumer behavior: Building marketing strategy*. McGraw-Hill, 2016.
- [8] Chang Y., Kim J., & Joo J. An Exploratory Study on the Evolution of Design Thinking: Comparison of Apple and Samsung. *Design Management Journal*, 2013, 8(1).
- [9] Edson J. *Design like Apple: Seven principles for creating insanely great products, services, and experiences*. John Wiley & Sons, 2012.
- [10] Merchant B. *The one device: The secret history of the iPhone*. Little, Brown, 2017.
- [11] Park J., Gunn F., Lee Y., & Shim S. Consumer acceptance of a revolutionary technology-driven product: The role of adoption in the industrial design development. *Journal of Retailing and Consumer Services*, 2015, 26: 115-124.
- [12] Goggin G. *The iPhone and communication*. In *Studying mobile media*, Routledge, 2012, 11-27.
- [13] Kato T. Does concept recall in brand image show high loyalty? An experimental study on the Apple MacBook. In *Marketing and Smart Technologies: Proceedings of ICMarTech 2021*. Singapore: Springer Nature Singapore, 2022, 1: 69-77.
- [14] Bocken N. M., De Pauw I., Bakker C., & Van Der Grinten B. Product design and business model strategies for a circular economy. *Journal of industrial and production engineering*, 2016, 33(5): 308-320.
- [15] Kim M. How Phil Knight made Nike a leader in the sport industry: Examining the success factors. *Sport in Society*, 2020, 23(9): 1512-1523.
- [16] Gallego G., Ratliff R., & Shebalov S. A general attraction model and sales-based linear program for network revenue management under customer choice. *Operations Research*, 2015, 63(1): 212-232.
- [17] Boustanifar H., & Dae Kang Y. *The Brand Premium*. *The Review of Financial Studies*, 2024, 056.
- [18] Buede D.M., & Miller W.D. *The engineering design of systems: models and methods*. John Wiley & Sons, 2024.
- [19] Sahoo, D. Strategic Change of Campaign at Apple Inc. *Vidwat*, 2012, 5(2): 38.
- [20] Chandrasegaran S. K., Ramani K., Sriram R.D., Horváth I., Bernard A., Harik R.F., & Gao W. The evolution, challenges, and future of knowledge representation in product design systems. *Computer-aided design*, 2013, 45(2): 204-228.