Adapt or Die: How Data Analytics and Social Media Have Changed the Fundamentals of Marketing

Authors: Advaid Menon

Author affiliations:

Corresponding authors: Jarred Mattera

Introduction

Operational adaptation is a crucial skill needed to survive in a competitive world. The process of adjusting internal policies and strategies in response to changing environments or requirements is of utmost importance. In our modern-day business world, there is no exception. Companies must analyze the market and adapt to better suit their environment. But how do some companies consistently rise to the top of the market and tie these skills in with innovation, financial management, and regulatory strategies? Data analytics, Artificial Intelligence(AI), and social media are the prime examples of adaptation and change seen by many corporations today. This paper looks specifically into McDonald's, Pfizer, and Nike. All three are Fortune 500 companies that utilize these tools to survive in the market.

McDonald's adaptation over time

As time passes, people alter their likes, dislikes, and needs for products, adapting to the ever-changing market. McDonald's is undoubtedly an example of a core idea, selling hamburgers to the public, modifying its operations and marketing over time to withstand the evolutionary nature of our world, whilst still staying true to its roots. This theme aligns with McDonald's original business model, which was born out of innovation. The concept of fast food, utilized first by the McDonald brothers, instantly set the company apart from competitors. The mass production of patties via clamshell grills and automated fryers shows McDonald's has had a strong foundation of kitchen efficiency, which they continue to build upon even today. Investopedia, a global financial media website headquartered in New York City, mentions how McDonald's was the first fast food restaurant to go international. McDonald's was also among the first drive-thru windows and is often credited for making key refinements and popularizing the use of drive-throughs. Even today, McDonald's remains a driving force in the fast food industry in terms of innovation. (Investopedia). This highlights how McDonald's started up from a unique concept and continues to maintain its status as a company pushing innovation and new ideas. The brand continues to invest in new technologies such as Automated Order Taking ("AOT"), their mobile app, and constant maintenance of their social media platforms, allowing them to stay at the top (Forbes).

AOT technology

AOT is a tool made by IBM(a multinational technology company that partners with various other companies) that automates customer interactions using previous customer data and order details to speed up the order process, improve efficiency, and minimize the need for direct human interaction (Emerji). The use of AOT has proven to have a mutual benefit for the operator and the consumer. Some customers like the faster and more accurate service automation offers, but others miss talking to real people and the personal touch they provide. Still, the benefits of fewer mistakes, easier ordering, and quicker service have generally been good for customers. Current employees recognize improved production capabilities, as customers can now order without even needing to reach the counter. The company stated that only 15% of orders had required human intervention (QSR), enabling staff to focus on more meaningful and engaging tasks. McDonald's is aiming to further their digital transformation. Efforts in this field are focused on merging physical and digital activities that would allow them to improve further reliability, efficiency, and ease of use for customers, what Craig Brabec, chief data analytics officer (CDAO) at McDonald's, calls 'moments that last.' McDonald's is aiming beyond simply delivering quality products, with the overall goal of personalizing customers' individual experiences, allowing them to increase customer loyalty (Forbes). This is a clear example of how McDonald's is shifting their focus to maintaining their customer base as well as the strength of their brand. For example, the McDonald's app, developed in 2015, has features that allow customers to order beforehand and pick up their food easily. The app even provides bonuses and deals for frequent purchasers to maintain a user base.

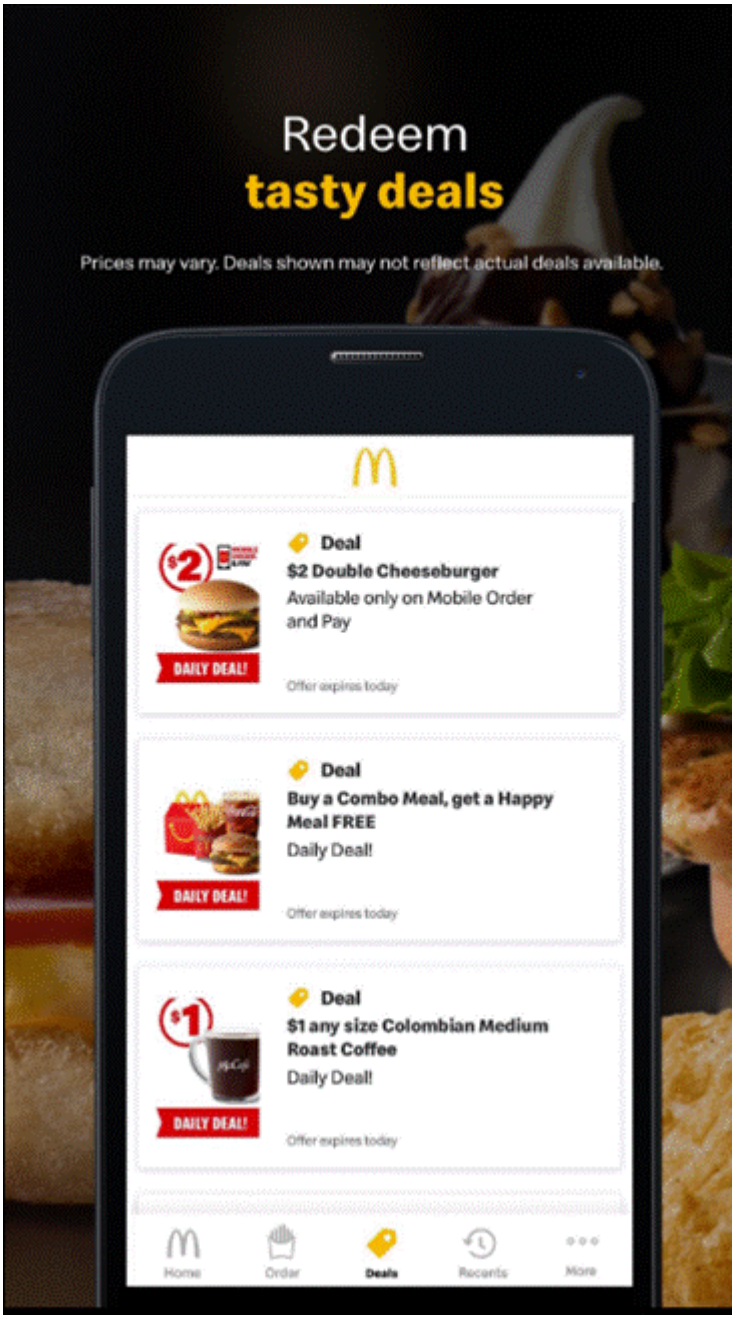

Figure 1. As seen here, the McDonald's app offers benefits and rewards for its users, including daily deals such as discounts on menu items and exclusive mobile-order promotions.

As evidenced by the graph below, since the introduction of the app, McDonald's sales increases have taken an upward swing compared to years prior, having gone up by 8%, adding 2 billion to McDonald's revenue(McDonald's Corporation).

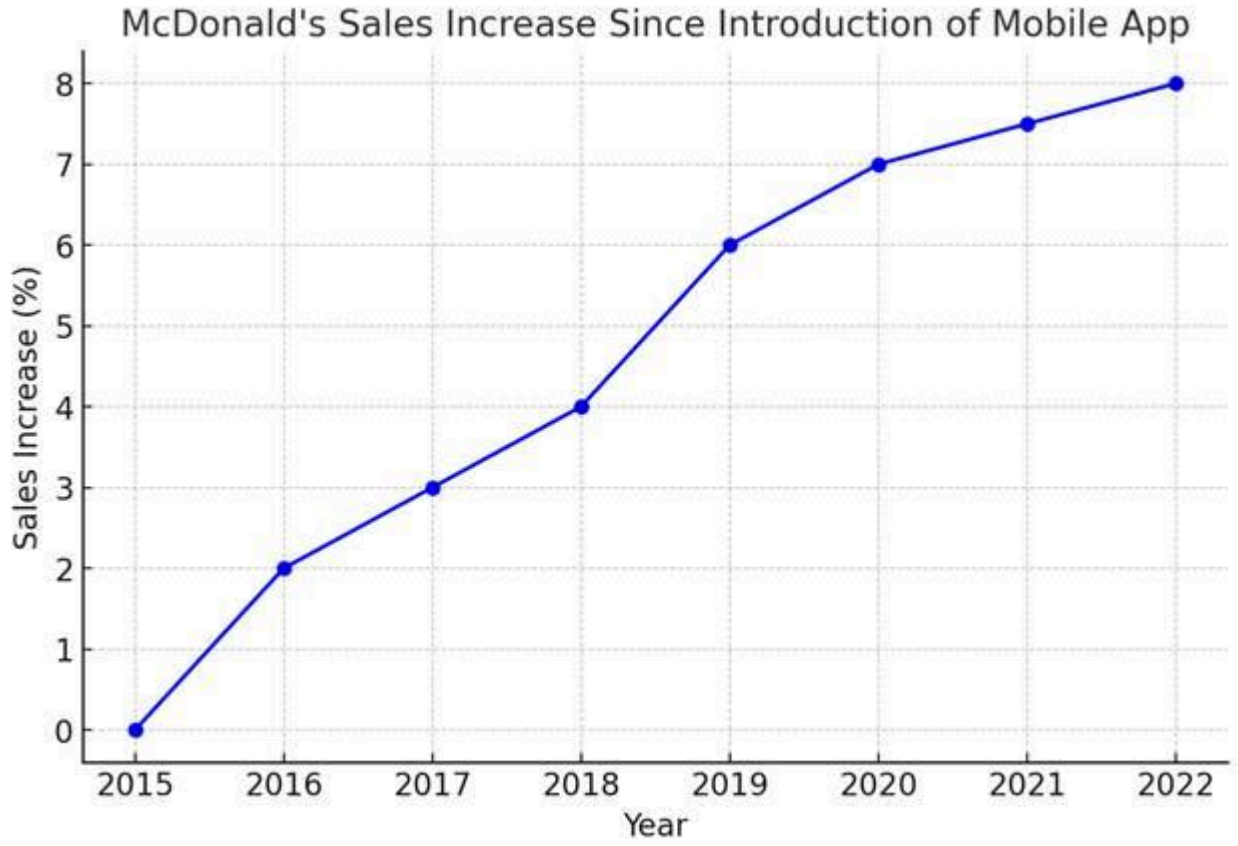

Figure 2. This graph illustrates the percentage increase in McDonald's sales from 2015 to 2022 following the launch of its mobile app. Data was sourced from McDonald's Annual Reports, which provide insights into the company's financial performance. The graph was created using Canva (McDonald's Corporation).

By focusing on their order speed and reliability, McDonald's maintains their reputation as a fast, efficient, and popular restaurant that offers dine-in, pick-up, or drive-thru. Data analysis and the development of AOT have opened a whole new pathway for McDonald's via online ordering. This technology perfectly blends the standard system with a new evolving method of ordering, maintaining the system's integrity while allowing room for massive growth and progression in the future.

AOT has made its way to the McDonald's kiosks at their physical locations, a previous development made by the company to streamline the ordering process. The order-taking Kiosks are an example of innovative creations that have been seen to be successful. Now, with even

more development thanks to AOT, the company can further enhance already strong tools in its system.

Social media branding

Another tool McDonald's utilizes is branding on social media platforms such as Instagram and Twitter. McDonald's uses social media to frequently update their customer base and ensure the brand image remains at the top of all markets via the use of campaigns, spreading offers, and hashtags, allowing it to create a viable and secure brand image.

McDonald's has always been a brand that focuses on the people. As owner Ray Croc said, "McDonald's is a people business, and that smile on that counter girl's face when she takes your order is a vital part of our image" (Kidadl). Even at its start, McDonald's was a company heavily focused on its brand image. Ray Croc had established from the very beginning that McDonald's must uphold its image. McDonald's uses popular social media apps such as Twitter and Instagram to better establish its friendly brand image and frequently advertise the brand. They often directly interact with their audience as well. By directly interacting with their audience, they create a more personalized feel, whilst still directly advertising their product. They create a more customer-friendly brand image, seen as one not afraid to answer their eager customers' questions, spread awareness of future deals and promotions, and provide an easy way to answer customer support. The customers perceive McDonald's as a brand they can rely on and communicate with. This perfectly aligns with the brand's theme of being a fun and family-friendly

experience for all.

Figure 3. As seen here, McDonald's advertising campaigns often focus on building family-friendly environments, reinforcing its brand image as a welcoming and enjoyable place for people of all ages.

McDonald’s marketing campaigns heavily rely on the use of emotional appeal that connects with their audience. With the use of positive emotions such as joy, happiness, and unity, the company aims to associate the McDonald’s brand with enjoyable experiences and great times in customers’ lives. This would build customer loyalty as the association of positivity in customers' lives would keep drawing them in (Voymedia). These campaigns further reinforce the idea of McDonald’s being a friendly brand open to all. The marketers hone in on the idea of reliability. By creating iconic slogans like the “I’m Lovin’ It” jingle, McDonald’s can create a positive association with the brand and further attract customers to the brand. Social media is a valuable tool in this case as it helps provide a platform in which McDonald’s can show its company and advertise to the world.

Nike’s adaptation over time

Like McDonald’s, Nike has also seen the power of marketing led by brand imaging. By implementing data analytics as well as social media advertising, both companies changed the

way they function and market drastically. Throughout the past two decades, Nike has remained at the top of their market, claiming a large portion of the market share (38.68%) within the sports industry (Investing).

Nike adapts its data by analyzing patterns to better track trends and new market themes and predict customer purchasing decisions. In 2018, Nike bought Zodiac, a marketing tool designed to analyze data from Nike's various apps, enabling the company to gain insights into customer behaviors and forecast purchasing patterns (Harvard).

By expanding its toolkit with these various tools, Nike increased its ability to analyze trends. Zodiac uses the info Nike collects to gain more in-depth knowledge of customers, helping facilitate personalized product recommendations and content for customers on the Nike app. It uses the info Nike collects to gain more in-depth knowledge of customers. After acquiring Zodiac in 2018, Nike's annual revenue increased by approximately 7% by the year 2019, rising from $36.4 billion to $39.1 billion. By utilizing the data tools around them, big companies can further all of their strengths and gather quick results, assuming they provide a substantial amount of data and comply with all privacy regulations.

Recently, the average social media user is on platforms for 2 hours and 24 minutes per day. Advertisements are frequently seen on social media and play a monumental role in the representation of brands and their products. Nike owns brand pages with millions of followers on various relevant apps such as Instagram and Twitter, both meticulously monitored to maximize customer engagement. Nike not only uses their platform to market products but also encourages a healthier lifestyle, allowing them to build a loyal community. In a report run by "Brand24" on their blog, it was documented that in February 2024, Nike had accumulated 570,000 mentions within 30 days, the bulk of which were from Instagram and Twitter, shown below.

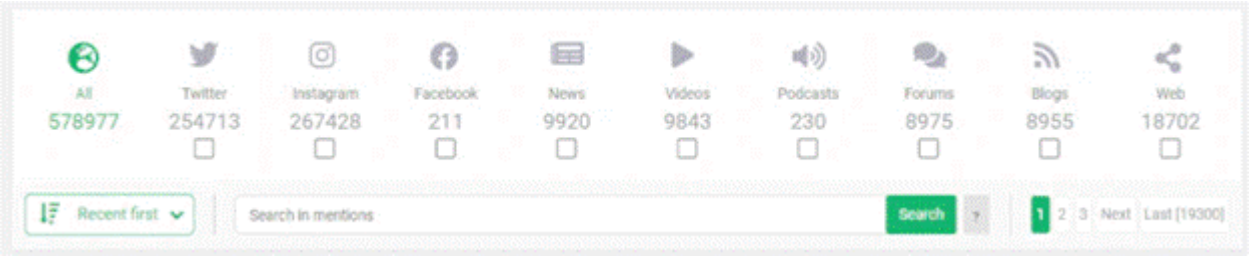

Figure 4: Social media mentions of Nike in February 2024. The data, collected by Brand24, show that Nike was mentioned around 570,000 times in 30 days on different internet platforms. The largest number of mentions came from Twitter (254,713) and Instagram (267,428), with Facebook, news sites, videos, podcasts, forums, and blogs accounting for the rest. This is a sign of the strong social media visibility and usage of Nike on visually focused and discussion-focused websites (Brand24).

Nike enhances their strong brand image by catching on to the latest trends and keeping their products at the forefront of all these viral videos, allowing them to accumulate all these mentions. With the incredible amount of mentions they receive, they can push their products to the homepage of many potential customers, allowing them to remain in many consumers' minds as a premier athletic brand. As seen by the chart below, Nike is the most well-known and widely owned sportswear brand among consumers, showing its strong brand image and loyal customer base.

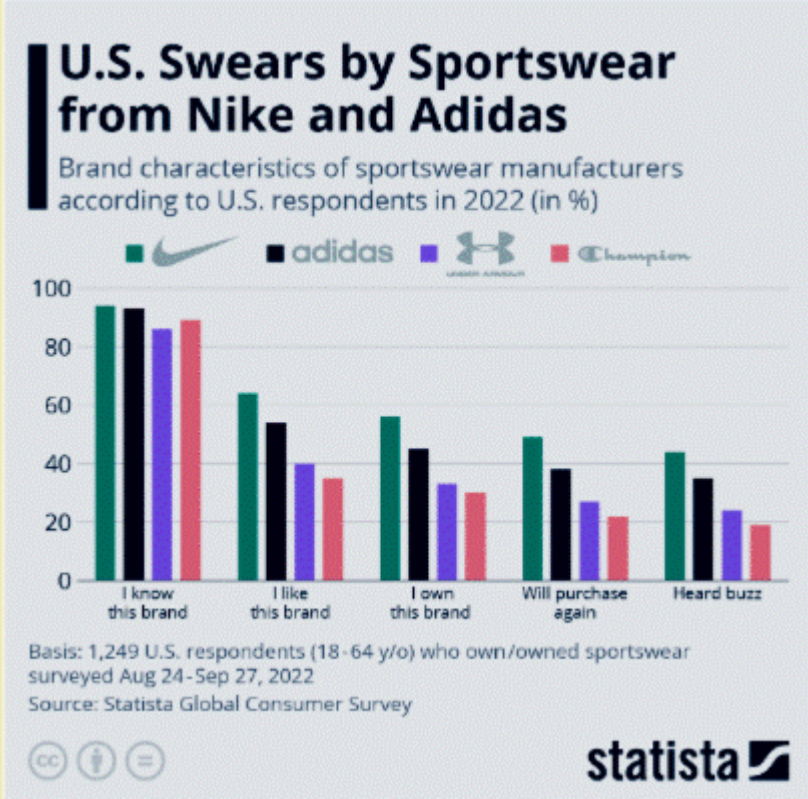

Figure 5: Consumer Brand Awareness and Sportswear Brand Ownership. This chart presents U.S. consumer attitudes towards major sportswear brands, specifically Nike, Adidas, Under Armour, and Champion, based on a 2022 survey. It offers data on brand awareness, brand preference, ownership, repurchase intention, and brand buzz. The data is based on the Statista Global Consumer Survey, which surveyed 1,249 U.S. respondents between the ages of 18-64 years old who own or have owned sportswear (Statista).

Pfizer's adaptation over time

Although a pharmaceutical company is very distinct from consumer-focused McDonald's and Nike, Pfizer uses data analytics services, machine learning, and artificial intelligence to aid in

drug development and predict FDA responses, as well as improve research to produce quality drugs efficiently. Pfizer, similar to McDonald's and Nike, has been widely considered a reliable brand for a long time. Pfizer is known for the discovery of Penicillin, a group of antibiotics that treat bacterial infections by stopping bacterial cell wall synthesis. This was a huge milestone for the drug industry and earned the company billions of dollars. They later followed up in 1950 with Terramycin, becoming the first pharmaceutical drug to be sold in the U.S. under the Pfizer label. This success was not only a huge boost for the company's reputation, but it also laid the foundation for the company's dedication to research and development. They solidified their reputation as a strong pharmaceutical company, a huge milestone for the company, as the world relies on them to deliver quality. With their newfound success, they can further expand into newly developed fields such as data analytics and AI.

Charlie AI platform

Pfizer's advancements in data analytics and AI have not only affected their sales efforts but also their operational and treatment efforts. Pfizer's internal AI platform, named "Charlie" has been steadily gaining more healthcare data as time passes. This allows insights across therapeutic areas to help better understand Pfizer's customers. Bill Worple, Pfizer's VP of customer engagement platforms and technology, has been vocal about the use of AI in medical research. Worple stated how "Large language models also gather insights across therapeutic areas to better understand customers and treatments. For example, Worple mentioned how a "parent might be affected by a migraine differently than someone without a family." (Digiday). He emphasized that every patient may be different to prove how important it is to gather insight on all these patients. Through machine learning and natural language models, doctors and researchers can now see other forms of correlations between medical and non-medical factors. "You start creating different insights into who your customer is," said Worple. "And then [knowing] what the actual pain point is for them. It's not something we would classify as medical research. That insight of 'X percentage of these people are this type of individual' really helps you understand who your customer is. Now you know how to talk to them better.'"(Digiday). AI's capability to house large datasets allows the user to create custom-specific marketing reports, overarching conclusions for particular medicines, etc. This allows sales teams and other marketing teams to gather a more pointed approach in their actions as opposed to sending out a wide net with low success rates.

Pfizer's capabilities to analyze data quickly and more accurately allow it to provide insights faster than local municipalities. Doing so results in quicker treatment times to prevent a more dangerous spread. This has resulted in mobile testing sites, authorizations for state-licensed pharmacists to treat patients, awareness of particular conditions more susceptible than others, etc.

Pfizer has implemented AI within their systems to predict queries from their government, restricting and regulating the products it releases to the public. This allows them to better follow the predicted regulations rather than wasting time releasing unusable products into the market. “By cutting down on an endless back-and-forth of submissions taking weeks, anticipating regulatory feedback saves not just money but time, perhaps even more precious for enterprises when dealing with regulators.”(Emerji). In this case, AI has been a major development in Pfizer’s business as it saves time and money, whereas previously they would’ve spent hours waiting for approval from regulators and wouldn’t have utilized their time as efficiently. By cutting down time spent and money needed to carry out such actions, Pfizer can focus their attention on other fields.

AI / ML in COVID-19 vaccine development

The company has utilized more than AI to gather data. As documented on the official Pfizer website, “In the U.S., for example, Pfizer applied advanced analytics to analyze wastewater data provided by the Centers for Disease Control and prevention (CDC), validating that infection rates around the country were much higher than had been reported through standard testing” (Pfizer). This was particularly effective during the COVID outbreak when larger cities had higher rates of infection than others based on their normal city/town characteristics. For example, cities like New York, Philadelphia, and Los Angeles had higher numbers at the peak of the outbreak as opposed to more rural areas.

Pfizer employed the use of AI and Machine learning (“ML”) to further the accessibility of their new COVID-19 oral treatment, PAXLOVID. “AI and ML capabilities also played a key role in running Pfizer’s PAXLOVID clinical trials, enabling the team to perform quality checks and analyze vast amounts of patient data 50% faster than before. Building on this success, AI and ML capabilities are used in over half of all Pfizer’s clinical trials (Pfizer). By speeding up the analysis process of patient data, Pfizer could successfully launch a campaign made specifically for the underserved communities previously lacking access during a time when speed was critical.

AI has continued its role in launching PAXLOVID post-clinical trials. “Pfizer colleagues have also leveraged data and AI to optimize the manufacturing of PAXLOVID by analyzing supply chain data to identify, address, and monitor issues in production, creating a system of continuous improvement. In one case, the cycle time of a critical step in the supply chain was able to be reduced by 67%, which enabled the production of 20,000 extra doses per batch (Pfizer). With the predictive capabilities of AI, Pfizer can manufacture more medicines to benefit even more patients around the world. AI, in this case, was a crucial part of the product manufacturing and release. While manually it would take significantly more time and have a

possibility of error, whereas AI, on the other hand, streamlines the process and has little chance of error unless programmed wrong. Furthermore, this allows Pfizer's team to dedicate their time to other aspects of the supply and production, knowing that AI can take a large portion of the work.

Pfizer is not the only company in the pharmaceutical field relying on AI, the overall market has had a tremendous increase in AI usage in the last 5 years. The entire industry relies on this technology and plans to utilize it in the foreseeable future.

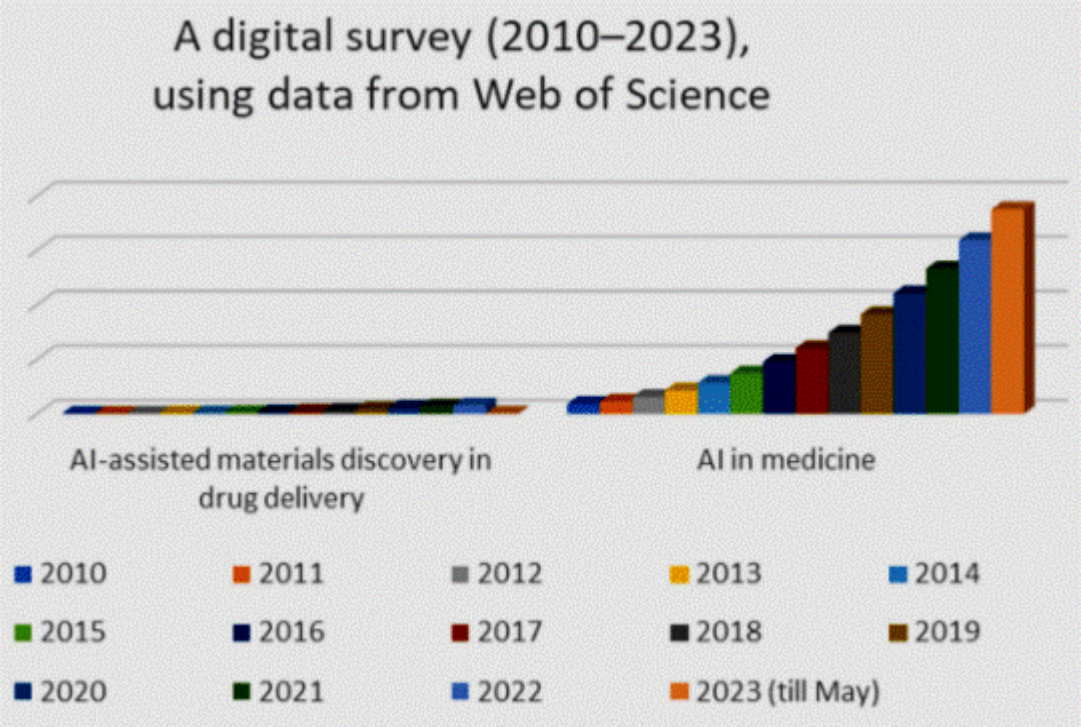

Figure 6. Growth in AI-Assisted Drug Discovery and AI in Medicine (2010–2023). This digital survey, based on data from the Web of Science, reflects the increasing application of artificial intelligence in pharmaceutical settings. The chart reflects the expansion in AI-aided materials discovery for drug delivery and application of AI in medicine, with an increasing rate of acceleration over the last five years. The trend suggests there is more use of AI technologies within the pharmaceutical industry, with publications and activity skyrocketing up to 2023 (MDPI)

AI in drug discovery

Pfizer uses machine learning to simulate models of the human immune system as well as other necessary diagrams, to better test their resources and further develop medicine via the

process of trial and error. One of the most prominent of these developments is a partnership with CytoReason, a company utilizing AI to create simulations of disease models, to build a simulated model for the immune system or a weather map for disease, as the company calls it (Emerj). Before these technological breakthroughs, medical companies such as Pfizer had to test their drugs on actual living beings, which was fairly risky, knowing the complications or chance for error while making trials. With the use of machine learning and data analytics to help create an accurate simulation, the process of releasing drugs has become much easier. The media contact of Cytoreason in Tel Aviv stated how and why Pfizer and Cytoreason were expanding their collaboration. Since launching the collaboration in 2019, Pfizer has used CytoReason's models in Pfizer's research to enhance the understanding of the immune system in the pursuit of developing innovative drugs. CytoReason's platform has provided Pfizer with multiple insights in several R&D programs across over 20 diseases." As evidenced by the graph below, the pharmaceutical industry has seen a peak and a trough of expectations for drug delivery. Noticing this trend, technologies such as AI and machine learning are reigniting demand and expectations for drug delivery due to their promising and efficient nature.

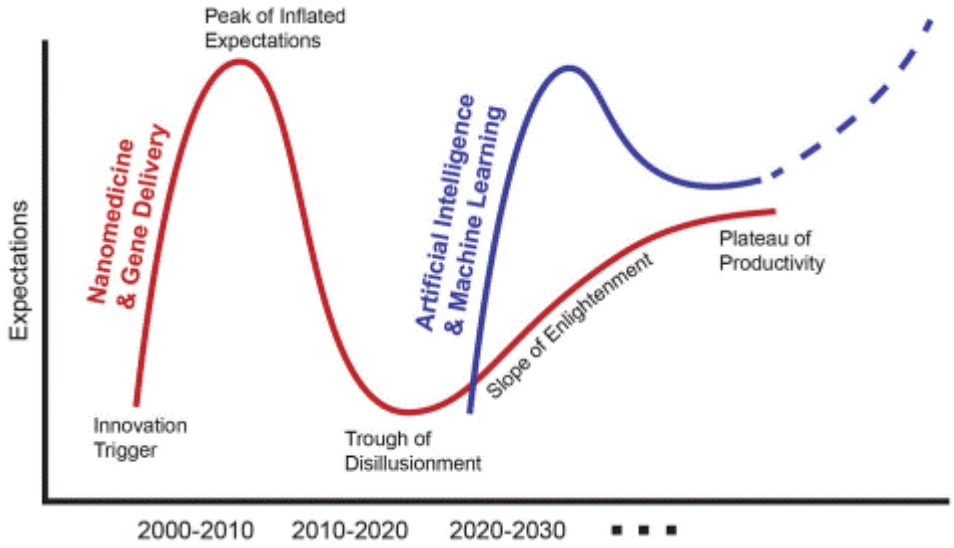

Figure 7. This graph shows the hype cycle of drug delivery technologies over time. The red curve represents the original increase and decrease in hopes for nanomedicine and gene delivery, and the peak followed by the trough of disillusionment. The blue curve represents the revived interest spurred by artificial intelligence and machine learning, with a new cycle of technological advancements to a plateau of productivity. The trend suggests that AI-driven innovations play a core role in redefining drug delivery expectations.

Conclusion

Data analytics, AI, and social media have had a tremendous impact on the way our business world operates today, as seen by McDonald's, Nike, and Pfizer. The technology in our world has been advancing at a rapid pace, and as a result, the market and business world have changed as well. With these new data analytics tools and social media platforms, marketing and statistical analysis have reached a whole new level of accessibility. Companies don't have to put all of their emphasis on traditional marketing and operational approaches. Now, they have the option to implement new cutting-edge data analysis and AI-driven tools to maintain their competitiveness in the market.

These industry giants facing a massive digital transformation highlight the necessity of agility and responsiveness to the constantly changing marketing trends. McDonald's, for instance, leveraged automated ordering systems and AI-powered customer engagement strategies to streamline its services and elevate user experience. Nike, through its use of data-driven marketing and predictive analytics, has successfully built a strong customer base and further expanded its global reach. Pfizer, by incorporating AI and machine learning into drug development, clinical trials, and supply chain management, has accelerated the innovation cycle in the pharmaceutical industry.

The increasing reliance on automation, artificial intelligence, and digital marketing campaigns signals a broader shift in business-customer dynamics and operational optimization. The business landscape continues to demand that corporations not only adapt but also get ready for what the future market changes to if they want to stay ahead. In an era where technology is evolving at a pace never before seen, companies that fail to innovate risk being left behind.

With data analytics and AI shaping the future of industries, companies will need to prioritize innovation, customer-centric strategies, and technological integration to remain relevant. Even in a technologically advanced world, a basic principle from the past remains: Adapt or die.

Acknowledgments

Jared Mattera - Editor and advisor of the project

Sydney Smith - Helped provide feedback in the editing stages of the paper

Reid Champlin - Helped provide feedback in the editing stages of the paper

References

Brand24. "Social Media Mentions of Nike in February 2024." Brand24, Feb. 2024.

https://brand24.com

Digiday. "Pfizer's AI and Data Analytics in Healthcare Research." Digiday, n.d.

https://digiday.com

Emerji. "IBM's Automated Order Taking (AOT) and AI in Business." Emerji, n.d.

https://emerji.com

Harvard Business Review. "Nike's Acquisition of Zodiac and the Impact of Data Analytics." Harvard Business Review, 2018.

https://hbr.org

Investing.com. "Nike's Market Share in the Sportswear Industry." Investing.com, n.d.

https://investing.com

Investopedia. "McDonald's Innovations and Business Expansion." Investopedia, n.d.

https://investopedia.com

Kidadl. "Ray Kroc's Business Philosophy on McDonald's Brand." Kidadl, n.d.

https://kidadl.com

McDonald's Corporation. "Annual Reports and Financial Statements." McDonald's, n.d.

https://corporate.mcdonalds.com

MDPI. "Growth in AI-Assisted Drug Discovery and AI in Medicine." MDPI, 2023.

https://mdpi.com

Pfizer. "AI and Machine Learning in Drug Discovery and Vaccine Development." Pfizer, n.d.

https://pfizer.com

QSR Magazine. "Automation and Digital Transformation at McDonald's." QSR Magazine, n.d.

https://qsrmagazine.com

Statista. "Consumer Brand Awareness and Sportswear Brand Ownership." Statista, 2022.

https://statista.com

The Savvy Scientist. "How to Write a Figure Legend for Research Papers." The Savvy Scientist, n.d.

https://thesavvyscientist.com

Voy Media. "Emotional Appeal in McDonald's Marketing Campaigns." Voy Media, n.d.

https://voymedia.com