REVOLUTIONIZING BEAUTY: HOW ARTIFICIAL INTELLIGENCE IS TRANSFORMING THE BEAUTY INDUSTRY IN THE USA

Abstract. The article focuses on the revolutionizing of the beauty industry through artificial intelligence (AI) technologies in the USA. The aim of the study is to explore how the implementation of AI affects customer service and business management in modern beauty salons. The research utilized general scientific methods of cognition, such as analysis, synthesis, induction, deduction, and comparison. The results show that the beauty industry, which generated approximately $430 billion in 2022, exhibits a steady growth trend and is forecasted to reach $580 billion by 2027. The main beauty products include skincare, hair care, makeup, and fragrances. Modern beauty salons are actively integrating AI technologies into their operations, leading to significant changes in customer service and business management. Notably, the use of smart mirrors, virtual makeup trial apps, skin condition analysis, and on-demand services, which allow receiving cosmetic procedures at any location and convenient time, ensures a new level of service and consumer satisfaction. The primary directions of AI application in the beauty industry can be broadly divided into two categories: enhancing customer interaction and developing business models. In the first category, AI is used for personalized recommendations, virtual try-ons, skin analysis, and custom care programs, as well as for customer service through chatbots. Regarding business development, AI promotes sustainable growth in the beauty sector, the development of new and sustainable products, the use of advanced technologies, inventory management, and supply chain optimization. However, the use of AI in the beauty industry also comes with certain challenges, including risks of confidential information leaks and the potential loss of clients due to excessive automation of business processes. The practical significance of the study lies in identifying key
areas for AI implementation to improve customer service and optimize business processes in the beauty industry.

**Keywords:** artificial intelligence, beauty salons, customer service, business models, automation.

**Problem Statement.** The beauty industry in the United States is experiencing a period of rapid development, driven by the popularization of social media and the digitization of consumer habits. The widespread use of platforms like Instagram and TikTok promotes beauty products and procedures, stimulating demand and innovation. This digital transformation is changing the way consumers discover, purchase, and use beauty products, creating a dynamic and competitive market.

In recent years, artificial intelligence (AI) has become a key technology in various sectors, including the beauty industry. The integration of AI into daily life has led to significant shifts, offering new solutions and enhancing the consumer experience. From personalized skincare recommendations to virtual makeup try-ons, AI is redefining the standards of cosmetic services, making them more accessible and individualized.

The application of AI in the beauty industry extends beyond consumer interactions; it is also revolutionizing business processes. Through predictive analytics, inventory management, and customer service automation, AI helps beauty businesses optimize operations, reduce costs, and increase efficiency. The ability to analyze large volumes of data allows companies to predict trends, personalize marketing strategies, and offer products that meet audience demands.

However, as with any automation, the implementation of AI in the beauty industry should be approached with caution. Over-reliance on automated systems can lead to a loss of the personal touch, which is an integral part of cosmetic services. While AI can significantly improve consultation processes and business operations, it is essential to balance technological advancements with the human elements that define the beauty industry. This way, the sector can leverage the benefits of AI without compromising the quality and authenticity valued by consumers.

**Analysis of recent scientific research and publications.** The issue of transforming the beauty industry in the USA through artificial intelligence (AI) is well-explored in the scientific literature. Significant contributions to this topic have been made by authors such as P. Ahluwalia and H. Kaur [1], who demonstrated the effectiveness of influencer marketing in the Indian beauty and wellness industry, which can be compared to similar processes in the USA. Additionally, Androic [2] examines the prospects of AI in the beauty industry, highlighting global trends in the adoption of advanced technologies in this field.

Analytical reports also make a substantial contribution, such as the InsightAceAnalytics report [3], which provides an in-depth analysis of the AI market in the beauty and cosmetics industry, including segmentation by products and
regions. Furthermore, Golden Arrow [4] explores the impact of technologies and AI on retail in the beauty industry, emphasizing changes in consumer preferences and business models.

In his study, Halai [5] underscores how AI is revolutionizing the beauty industry, particularly through innovative skincare methods and personalized recommendations. This trend is also confirmed by the McKinsey report [7], which analyzes the current state of the beauty market, considering the impact of AI on consumer trends and business strategies.

Another important aspect is the historical context of the beauty industry's development. For instance, Jones [6] examines the globalization of beauty standards since the mid-20th century, providing a better understanding of the contemporary changes brought about by technology. Thomas [9] investigates the history of using skin-lightening products, highlighting the long-standing sociocultural aspects of the beauty industry.

The study also utilized expert literature, including publications in modern online editions such as Cubix [5], Arbelle [2], Golden Arrow [4], InsightAce Analytics [3], and McKinsey [7], which illuminate contemporary aspects of the topic.

Despite the sufficient amount of literature on this subject, there is a lack of systematized material on the research topic. Therefore, using various scientific methods of cognition, the information was analyzed, grouped, and systematized to present it in the light of the research topic.

The aim of the article is to show the directions of AI usage in the development of the US beauty industry. The main tasks to achieve this goal are: to study the beauty market in the USA; to show the market composition; to identify development trends; to show the directions of AI usage for the development of beauty industry companies; to highlight the threats companies may face when using artificial intelligence.

Results. The global beauty market is characterized by high dynamics and a significant diversity of products, including skincare, decorative cosmetics, perfumes, and hair care products. Innovations and technological advancements play a crucial role in shaping trends and product development. Notably, there is a growing demand for natural and organic ingredients, reflecting a shift in consumer priorities towards health and environmental responsibility. Furthermore, digitalization and the rise of e-commerce facilitate easy access for consumers to a wide range of products, stimulating competition and compelling companies to continuously improve their offerings. The industry’s average growth rate ranges from 5% to 10% annually, largely driven by the intensity of new technology implementation [7].

The global beauty market continues to attract new companies and investors despite increasing competition.
The beauty industry, which generated approximately $430 billion in 2022, shows a steady growth trend and is forecasted to reach $580 billion by 2027. The annual market growth rate will be around 6%, which is higher than or equal to other consumer segments such as apparel, footwear, pet care, and food products.

The beauty market comprises four main categories: skincare, makeup, hair care, and fragrances. Each of these categories demonstrates stable growth, which is expected to continue in the future, as illustrated in Fig. 1.

![Dynamics and Structure of the Global Beauty Market](image)

**Fig. 1. Dynamics and Structure of the Global Beauty Market [7]**

Beauty market trends vary by region. The largest markets are China and North America, where significant growth is expected. However, other regions, such as the Middle East and India, also show high growth potential, offering opportunities for brands willing to adapt their strategies to local markets.

![Dynamics of the US Cosmetics Market in Billion Dollars](image)

**Fig. 2. Dynamics of the US Cosmetics Market in Billion Dollars [7]**
The US market continues to demonstrate significant growth despite the challenging macroeconomic situation. In 2019, the volume of the US beauty market was $80 billion, and it is forecasted to reach $113 billion by 2027. This indicates steady market growth over recent years.

The beauty market is influenced by several key factors. One of these is the redistribution of growth patterns, as the slowing growth rates in China and increased local competition contribute to the growing importance of the US market. Another important factor is the rising popularity of wellness products that combine beauty and health. This includes skincare and makeup products with probiotics, Ayurvedic ingredients, ingestible supplements, and beauty devices. Additionally, Generation Z significantly impacts the market, demanding transparency and product efficacy from brands, as well as support for values such as sustainability, diversity, and inclusion [2]. This generation actively researches product ingredients and benefits before purchasing, creating high demands on brands [7].

Jones [6] notes that despite the beauty industry’s need to consider ethnic and racial features and preferences since the mid-20th century, it has generally promoted established images. Certain ideals, particularly those related to women, have achieved global prominence. Among these ideals are body deodorants, white natural teeth, a slim waist, light skin, and rounded eye shapes. Thus, the beauty industry has simplified and diminished the diversity policy that has become a slogan for many world democracies. The attractiveness of the white standard of appearance is so widely advertised and promoted that it is often associated with positive character traits such as kindness, empathy, and friendliness [9].

Social media and the influencers who populate them are primary drivers in the US beauty sector. According to Harvard Business School, two-thirds of cosmetic product buyers turn to influencers to discover new products. Moreover, one-third of consumers interact with brands on social media, and four out of five cosmetic buyers use Instagram daily. Despite controversies, lack of regulatory oversight, and a constantly changing landscape, the importance of this segment in the beauty industry cannot be underestimated [1].

Consider the beauty market trends that will influence consumer spending in the US this year:

- **Sustainability:** the focus on sustainability remains, but consumers are not willing to pay more for it, despite claims to the contrary.
- **Efficacy over "cleanliness":** science is critically important, and consumers recognize this, preferring product effectiveness.
- **Premiumization:** there is growth in premium products in every category. Despite economic concerns, beauty remains an affordable luxury and a means of short-term self-satisfaction.
- **Growth in specific categories:** hair and scalp care, niche perfumes, supplements, and sexual wellness products show potential for steady growth [10].
The impact of artificial intelligence (AI) on the development of the beauty market in the US is significant and multifaceted. According to data, the AI market size in beauty and cosmetics was $3.22 billion in 2022, and it is projected to reach $15.75 billion by 2031, growing at a compound annual growth rate (CAGR) of 19.6% during the forecast period of 2023-2031 [3].

Companies such as L’Oréal, Estée Lauder, and Unilever are actively implementing innovative AI-based solutions to develop personalized and sustainable products. They use AI to create virtual try-ons, analyze skin, and develop new products, allowing them to stay at the forefront of innovation and meet consumer needs.

The main directions of artificial intelligence application in the beauty industry can be broadly divided into two groups. The first is customer interaction, and the second is the improvement of business models.

Let's consider the directions of AI usage in customer interactions.

**Personalized product recommendations.** AI enables brands to analyze users' skin types, preferences, and purchase history to create individualized recommendations. Thanks to AI algorithms, the process of choosing cosmetics becomes simpler and more satisfying. Each consumer receives advice that best suits their needs, enhancing trust in the brand and satisfaction with purchases [5]. Innovative startups like Skin Match and DCYPHER develop AI-based solutions that analyze customers' faces and recommend suitable shades of cosmetics, even creating makeup adapted to the exact skin tone of the customer. This not only improves the shopping experience but also positively affects customer satisfaction, loyalty, and ultimately company revenues [8]. For example, AI-generated recommendations can lead to increased sales and brand loyalty. Research by McKinsey & Company shows that 76% of consumers are more likely to make a purchase after receiving personalized recommendations, and 78% are willing to repurchase products and recommend your company to friends and family [2].

**Virtual try-ons.** Virtual try-ons using augmented reality (AR) and AI technologies allow users to test cosmetic products without physical contact. This significantly simplifies the process of selecting cosmetics by allowing consumers to see how a product will look on them. Such functionality boosts buyer confidence in their choices and enhances their loyalty to the brand [5]. Recent developments include Maybelline's release of an AI-supported plugin for use during video calls in Microsoft Teams [8].

**Skin analysis and personalized care programs.** AI-powered applications enable users to scan their skin, diagnose issues such as acne or wrinkles, and create personalized care programs. This approach allows for more effective solutions to specific skin problems by providing individualized recommendations and improving skincare effectiveness [5]. For instance, Neutrogena's Skin360 web application uses image recognition and machine learning to analyze facial features, detect skin issues such as acne and dehydration, and recommend appropriate products or care routines [8].
Chatbots and customer service. AI-based chatbots and customer service platforms have improved the overall shopping experience in the beauty sector. Customers can now receive instant responses to product inquiries, get personalized skincare regimes, and even schedule appointments with beauty specialists. According to a Revieve study, 19% of consumers expressed interest in shopping via text messages, and over 57% of retailers have begun implementing self-service alternatives like chatbots. These chatbots are available 24/7, providing continuous support, which is especially useful for international customers in different time zones [4].

Let's consider the directions of AI usage for business development in the beauty sector.

Sustainable development in beauty. AI promotes environmental responsibility in the beauty industry by helping to predict demand and optimize supply chains. This reduces overproduction, minimizes inventory, and implements more efficient distribution methods, contributing to lower waste and a reduced environmental footprint [5].

New product development. AI is used to analyze ingredient data and consumer feedback, predicting successful formulas and accelerating the development of new cosmetic products. This ensures the creation of products that meet the ever-changing needs and preferences of consumers, enhancing their satisfaction and loyalty to the brand [5].

Development of sustainable products. AI assists beauty companies in developing more sustainable products that meet the growing demand for responsibly created items. By analyzing ingredient data and product life cycles, AI can suggest environmentally friendly alternatives and reduce the ecological footprint of cosmetic and care products. Some companies, like Lush, also consider ethical aspects of technology and AI use, publishing digital ethics policies [8].

Utilizing advanced technologies. The use of generative AI for content creation and adapting recommendations based on user feedback and beauty trends is becoming increasingly common. 3D printing allows the creation of personalized cosmetic products, such as lipsticks or serums, specifically tailored to individual consumer needs. This provides a new level of personalization and customer satisfaction [5].

Inventory management and supply chain optimization. Behind the scenes, AI also plays a crucial role in inventory management and supply chain optimization. Retailers use AI algorithms to forecast product demand, reducing excess and shortages. CosmeticsDesign notes that by using zero- and third-party data, self-reports of preferences, as well as behavioral and psychographic data, retailers can create a picture of their customers to make informed decisions about inventory, product assortment, and merchandising, increasing revenue and customer retention.
This ensures the availability of the right products in stores or for online shopping, enhancing customer satisfaction and boosting sales [4].

However, despite the prospects and advantages of AI in the beauty industry, challenges arise from the application of AI and the complete automation of customer service processes. One of the most critical issues is privacy.

Many new solutions use facial images or scanning technology to create individual digital templates or profiles, which may require compliance with legal requirements for the collection, storage, and processing of biometric data. Biometric data are classified as sensitive personal data under the GDPR in the UK, so their collection and processing must be conducted with explicit customer consent [8].

Apart from the collection, storage, and processing of biometric data, the use of AI and AR in beauty increases the risk of data misuse and information leakage. Therefore, reliable data protection should be a top priority for companies implementing new technologies [8].

Companies in this field must consider whether the use of behavioral biometrics with algorithmic AI approaches the prediction of users' intentions and emotions, against which the UK's Information Commissioner's Office (ICO) warns. Examples of behavioral biometrics include eye-tracking and the analysis of movements or facial expressions [8].

In the EU, AI regulation progresses with the development of the AI Act, but the UK's approach to AI regulation takes a different path. According to the government's White Paper published in March 2023, beauty innovators should be aware of five principles that will underpin future regulation in this area:

- safety, security, and robustness;
- transparency and "explainability";
- fairness;
- accountability;
- contestability and redress.

Adhering to these principles during AI product development will help innovators apply a "compliance by design" approach to enhance consumer experience. AI-based solutions must be carefully thought out from the outset to avoid compliance issues in the future [8].

At the same time, businesses must also consider that full automation of processes may lead to a reduction in clientele. Studies have shown that brands perform better and increase sales when they have a presence in both the online segment and physical stores. To significantly scale and enhance brand recognition, ensuring a presence in traditional stores is important. Although technology and AI rapidly advance in the beauty category, nothing compares to the real experience of using cosmetics, such as applying red lipstick or spraying perfume.

Conclusions. Modern beauty salons are actively incorporating artificial intelligence (AI) technologies into their operations, leading to significant changes in
customer service and business management. Examples include smart mirrors, virtual makeup try-on apps, and skin condition analysis, as well as on-demand services that allow for cosmetic procedures to be performed at any location and time. This ensures a new level of service and meets consumer needs.

The main directions of AI usage in the beauty industry can be broadly divided into two categories: enhancing customer interaction and developing business models. In the first category, AI is used for personalized recommendations, virtual try-ons, skin analysis, and personalized care programs, as well as for customer service through chatbots. In terms of business development, AI promotes sustainable growth in the beauty sector, the development of new and sustainable products, the use of advanced technologies, inventory management, and supply chain optimization.

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