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## ANALYSIS OF AUTOMATION AND DIGITAL TECHNOLOGIES IN THE NAIL SERVICE

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### Abstract

The article discusses the introduction of automation and digital technologies in nail services, with a focus on modern innovative solutions that aim to improve the efficiency of beauty salons. These solutions include online booking systems, automated inventory management, and customer database management, as well as the use of digital tools for nail art design. Notes the impact of these technologies on enhancing the quality of services, reducing waiting times, and increasing customer satisfaction. It also discusses challenges and opportunities for further digitalization in the nail industry, such as the integration of artificial intelligence and personalized services.

**Keywords:** automation; digital technologies, nail service, customer base management, nail design, artificial intelligence, digital devices

Automation and digital technologies are transforming the nail service industry. Traditionally, this industry has been based on manual labor and individual craftsmanship. However, with the development of digital tools, it is becoming more advanced and efficient. Today, beauty salons are implementing online systems for registration, sales, customer relationship management (CRM), and training. This allows for a more personalized approach to customer service, convenience in recording and payment, and reduction of human error in business management.

Automation makes it easier to plan work, manage inventory, and analyze activity effectiveness, leading to lower costs and higher profits. This is a positive trend for the indus-

try, as it improves the overall experience for both customers and businesses.

Digital technologies are also opening up new opportunities for promotion through social media and mobile apps, creating unique communication channels with customers and expanding the reach of businesses. As a result, the integration of these innovations into the nail service industry is becoming a crucial factor in the success and sustainability of modern salons. This article will explore the main areas of automation and the technologies being used, as well as their impact on the industry.

The modern beauty industry is facing increasing competition and constantly evolving customer demands for quality and fast service. Digital technology is becoming a crucial

tool for enhancing the efficiency of nail salons. Automation enables salons to streamline client scheduling, manage craftsmen's schedules, track materials, and improve marketing strategies. During the COVID-19 pandemic, digital tools provide a secure and convenient experience, including online booking and contactless payments.

Additionally, implementing digital solutions reduces costs, improves business transparency, and increases profit margins. This is particularly beneficial for small and medium-sized enterprises seeking to adapt to changing market conditions.

The main goal is to identify and implement effective methods of using digital technologies to significantly improve the quality and speed of customer service, optimize salon management, and increase consumer loyalty and business competitiveness.

The study aims to:

- analyze modern digital tools and software for nail services;
- identify the advantages and potential challenges of automation;
- develop recommendations for successfully integrating technology into beauty salons' daily operations;
- assess the impact of digitalization on the economic and operational performance of the industry.

The research helps to understand how technology can transform the nail service industry, making it more modern, convenient, and profitable. Automation and digital technologies have been introduced in the field of nail services relatively recently, as part of the development of the IT industry and digitalization of businesses.

Previously, nail services were mostly a traditional industry with limited use of technology. Focus was on craftsmanship and manual processes, such as recording customers and accounting for materials and finances in salons.

However, with the growing popularity of computers and the internet, specialized programs for beauty salons started to emerge. These programs included CRM systems and tools for managing customer databases and scheduling appointments. These tools have made the process of managing a nail salon more efficient and streamlined.

The advent of cloud-based services, mobile apps, and online platforms has greatly transformed the way nail salons manage their businesses. Automation has impacted customer records, material accounting, marketing (e.g., mailing lists, promotions), and the analysis of salon performance. During this time, efforts to integrate digital technologies in order to enhance service quality and optimize business operations have begun.

The COVID-19 pandemic has significantly accelerated the digital transformation of the beauty industry. The use of online booking, contactless payments, virtual consultations, social media and automated customer service systems has become the norm. Research is ongoing into the implementation of AI, automated inventory management and personalization through digital technologies.

The history of nail service automation and digitalization is closely linked to the broader trend of business digital transformation and the proliferation of internet technologies. This has provided salons with new tools to improve efficiency, making this topic an important area for research and practical implementation.

Note that there are several ways to study automation and digital technologies in nail services.

1. *Analyzing literature and market research.* Reading scientific publications, industry articles, reports, and reviews on digital technology in the beauty industry can help you understand current trends and the direction of automation in nail services.
2. *Case studies.* Analyzing specific salons that have implemented digital tools like CRM systems, online booking, mobile apps, and inventory management can help identify the benefits and challenges of automation.
3. *Surveying and interviewing experts.* Gathering qualitative and quantitative data about the perception, adoption level, and expectations regarding automation can provide valuable insights.
4. *Experimentation.* Implementing and testing new digital solutions in real-world salons can help assess their effectiveness and impact on productivity and service quality.

5. *Analysis of User Data and Metrics.* Study of statistics on service times, customer records, turnover, and material consumption using digital systems to determine the results of automation.
6. *Comparative Analysis.* Comparison of traditional working methods with automated processes based on criteria such as efficiency, speed, customer comfort, and error reduction.
7. *Technological Monitoring.* Tracking of innovations in the IT field that could be adapted to nail services, such as artificial intelligence, machine learning, mobile applications, and cloud services.

These combined methods provide a unique opportunity to comprehensively study and evaluate the impact of digital technologies and automation on the development of the nail industry.

The modern practice of automation and the introduction of digital technologies in the nail industry is a complex process that significantly transforms the traditional way of doing business for nail technicians and the management of salons. One of the key aspects of this transformation is the use of specialized online platforms and customer relationship management (CRM) systems, such as Fresha, Booksy, and Schedulista.

These platforms allow customers to easily book appointments through websites or mobile apps, and nail technicians to efficiently manage their schedules, customer databases, and service histories. This automation not only reduces the workload on receptionists but also minimizes mistakes associated with manual bookings. The digitalization of nail services is part of the broader trend towards digital transformation in the service industry (Martynova K. S., Ryndina S. V., 2022, p. 35).

In addition, modern salons are implementing systems for automated accounting and warehouse management. These systems allow for the timely control of material consumption and stock replenishment, avoiding both surpluses and shortages of professional cosmetics and tools. Digital solutions also help to optimize financial reporting and analysis by tracking the profitability of individual services and the performance of each technician.

Another important area of development is the use of digital marketing and communication tools. Automated email lists, review management, promotions, and loyalty programs through SMS, email, and social media allow salons to retain customers and attract new audiences. Many salons have created their own mobile apps or integrated with popular platforms, significantly improving the customer experience through convenient ordering, payment, and service status tracking (Table 1).

**Table 1.** *The impact of various social networks on the promotion of manicure services*

Platform	Advantages for manicure promotion	Disadvantages
Telegram	High visual appeal, opportunity to showcase works, storytelling, targeted advertising	High competition, the need for constant content updates
Classmates	A variety of content formats (photos, videos, text), opportunities for targeted advertising	Less interest among the younger audience, low engagement
Pinterest	A platform for visual search, high conversion through visual images and ideas	Fewer opportunities for real-time customer interaction
VK	Video content, the ability to create a viral effect, audience engagement through trends and challenges	Requirements for creative content, rapid trend changes

Online platforms for booking appointments are systems that allow customers to choose the date and time of their visit to a salon independently. Platforms like ZenBooker, Booksy, and Acuity Scheduling provide salon owners with the opportunity to automate the booking process, which greatly simplifies the scheduling process and eliminates the need for manual management. These solutions minimize the risk of errors, reduce time spent on organizing the schedule, and increase efficiency (Sumenkova A. N., 2021, p. 91).

New digital devices and equipment with built-in sensors and timers are being developed by craftsmen to improve the quality and safety of their procedures. For instance, gel polish drying lamps with automatic timing or hardware manicure machines that adjust settings based on skin type and nail plate condition (see Fig. 1). Additionally, QR codes are being actively implemented, allowing for the storage of data on performed procedures, recommendations, and material compositions. This helps to personalize service for each client.

**Figure 1.** *An example of 3D printing on nails (Zhusupova A. T., 2024)*



Online courses, webinars, and training platforms are becoming increasingly popular as a way to improve skills for professionals. This provides access to new techniques and innovations, without the need for time off from work or travel to seminars. These opportunities significantly expand one's professional horizons and help maintain a high level of competence.

Additionally, modern digital solutions allow owners and administrators to collect and analyze data on customer preferences, ser-

vice popularity, and marketing effectiveness. This helps them make informed management decisions and optimize business processes, leading to improved quality of service. The digital transformation of nail services increases their competitiveness, enhances the customer experience, and promotes more efficient use of resources. This allows craftsmen and salons to better organize their work and provide high-quality, personalized services to their clients.

The challenges in the implementation of automation and digital technologies in the nail industry are associated with various technical, organizational, and human factors. Firstly, salons face high costs in implementing modern digital systems. This is particularly challenging for small businesses with limited budgets, as they require additional investments in training staff.

Secondly, a lack of digital literacy among nail technicians and administrative staff can hinder the effective use of new technologies. Difficulties in mastering software interfaces, fear of change, and low motivation can lead to partial or incorrect use of software solutions.

Thirdly, technical issues like platform failures, internet connectivity problems, hardware incompatibilities, and inadequate support from software providers can significantly reduce the efficiency of automation.

In addition, there is a risk of confidentiality of customer data when using online databases and applications. It is necessary to protect personal information from leaks and hacks. Not all salons pay enough attention to cybersecurity issues, which can lead to the loss of sensitive data.

The adaptation of business processes to a digital format is also an important issue. Many traditional working methods are not compatible with a digital environment, making it difficult to schedule appointments, record materials, and interact with customers.

Finally, the introduction of new technologies is not always followed by adequate analytics and adjustments to business strategies. This can lead to investments in automation not bringing the expected increase in efficiency or improvement in service quality.

Despite the obvious advantages, the process of automation in the nail industry faces serious challenges that require an integrated

approach and professional training. To successfully and fully utilize digital solutions, it is essential to provide system support and ensure the availability of technology for different business categories.

To address these challenges, we propose an integrated and step-by-step approach. Firstly, it is crucial to make technology accessible for various business categories by implementing flexible payment models, offering equipment rental, and utilizing cloud services. This will reduce initial costs and make automation more feasible for smaller salons.

Secondly, it is vital to enhance the digital skills of staff through regular training sessions, webinars, and workshops. Additionally, creating user-friendly software interfaces tailored to the specific needs of nail technicians is essential. These measures will ensure a smooth transition to automation and maximize the benefits of digital technology in the nail industry.

Technical support should be available promptly and easily accessible, including monitoring of systems and regular updates of software to prevent failures and ensure compatibility. To protect customer data, reliable cybersecurity systems must be implemented, encryption should be used, and strict compliance with legislation on personal data protection must be ensured.

It is essential for the organization to adapt business processes to a digital format through expert consultations and the use of analytical tools to optimize salon operations and evaluate the effectiveness of new technology implementation. Additionally, it is crucial to foster a strategic understanding of automation among owners and employees to increase motivation for change and facilitate the integration of digital solutions into daily operations, ultimately leading to improved service quality and customer satisfaction.

The practice of automation and introduction of digital technologies in nail services is an important step in the industry's development, aiming to improve salon efficiency, enhance customer experience, and optimize business processes. Using modern software solutions, such as online booking, digital accounting, and data analytics systems, reduces the human error factor, saves time on routine tasks, and increases profitability. However, successful implementation demands attention to staff training, adaptation of technology to specific services, and protection of customer data.

Digitalization of nail services not only enhances competitiveness but also creates a comfortable environment for both customers and employees. This process is an integral part of the modern beauty industry.

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