

Impact of The Implementation of Digital Technologies on Operational Efficiency and Customer Loyalty in The Nail Business

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ABSTRACT

The study analyzes how the introduction of digital solutions affects internal efficiency and the degree of customer loyalty in the nail service segment. The aim of the work is to systematize existing electronic tools, assess their separate and combined impact on key business metrics, and formulate a conceptual framework for the quantitative evaluation of such effects. The empirical base relies on a review of specialized publications from recent years and accompanying industry reports with up-to-date statistics. The study performed an analysis and classification of digital technologies applicable to the organization of nail salons, identifying their role in improving operational procedures and strengthening customer interactions. The findings indicate that the synergistic use of online booking systems, CRM solutions, and digital marketing tools contributes to the reduction of administrative costs, the rational use of resources and, consequently, an increase in customer retention rate (CRR) and customer lifetime value (LTV). The result of the work is the confirmation of the hypothesis of a synergistic effect, in which the growth of operational efficiency acts as a mediator in enhancing customer loyalty. The proposed integrated model makes it possible to clearly demonstrate the relationship between the volume of digital investments and the financial performance of enterprises. The practical significance of the study is manifested in its applicability for owners and managers of beauty businesses, as well as for developers of software products oriented toward this sector.

KEYWORDS

digital transformation, nail business, operational efficiency, customer loyalty, CRM systems, online booking, digital marketing, beauty industry, small and medium-sized business, customer retention.

INTRODUCTION

At present, the beauty industry, and especially the nail service segment, is facing fierce competition and continuously evolving consumer expectations. Under such conditions, digital transformation has ceased to be merely an optional development tool and has become the cornerstone of ensuring competitiveness and sustainable growth. The relevance of the study is determined by the rapid penetration of IT solutions into the sphere of service provision and the need to understand their impact

on the business processes of small and medium-sized enterprises. According to the analytical report by Global Market Research, the size of the global nail care market was estimated at 19,10 billion US dollars in 2021 and, according to forecasts, will reach 30,08 billion US dollars by 2030, while from 2022 to 2030 the CAGR will grow at 5,2%. Nail care has become an integral part of personal care, and nail polish and nail art have become especially popular in the corporate and fashion industries [1]. Such dynamics increase pressure on operational

margins and dictate the need to search for innovative strategies for attracting and retaining customers.

Despite the broad discussion on digitalization, predominantly in the context of large corporations, existing research insufficiently accounts for the specificity of niche segments such as the nail-care business, where service personalization and direct client interaction are of primary importance. In the scholarly literature, operational efficiency and customer loyalty are often examined in isolation, which overlooks their complex interdependence mediated by digital tools.

The **purpose** of this study is to systematize existing electronic tools, evaluate their separate and joint impact on key business metrics, and formulate a conceptual framework for the quantitative assessment of such effects.

The scientific novelty of the research is manifested in the systematization of digital tools applicable to this industry and in the proposal of an integrated model linking specific digital solutions with measurable indicators of operational efficiency and customer commitment.

The author's **hypothesis** assumes that the coordinated implementation of a defined set of digital tools (online booking systems, CRM, automated notifications) will lead to a synergistic effect, whereby improvements in operational efficiency directly and positively mediate the growth of customer loyalty.

Materials and Methods

The literature on the researched topic is logically grouped into four semantic blocks: macro-level market and trend sources; studies of digital transformation and IS/cloud solutions in SMEs; works on CRM/social CRM and service quality as a mediator of loyalty; operational aspects (inventory, online service management, marketing ROI assessment) and the role of social media in salon choice.

Macro-level sources include industry reports and statistical overviews that set the context of market capacity, the demographic structure of demand, and technological trends. The Grand View Research report records the dynamics and segmentation of the nail service market by service type, gender, and age, and also emphasizes regional differences in growth [1]. Euromonitor highlights the key trends of 2025 for beauty & personal care—personalization, sustainability, digital

service channels, and the integration of wellness services [8]. Statista provides revenue indicators and the penetration of digital channels in the global beauty & personal care segment, creating a statistical basis for comparing the effectiveness of digital strategies [9]. Separately, there is the industry Benchmark Report from Zenoti, focused on performance metrics of beauty and wellness salons (occupancy, retention, average ticket, share of online bookings), which makes it possible to see real KPIs of front- and back-office digitalization [11].

The second block consists of theoretical and methodological studies of digital transformation in SMEs. The systematic review by Ben Slimane S., Coeurderoy R., Mhenni H. [2] provides an integrative framework for digital transformation in SMEs, highlighting strategic, organizational, and technological dimensions, as well as barriers (resource constraints, competencies, resistance to change). Rahman S., Hossain M. Z. [10] consider cloud-based management information systems as an opportunity to reduce transaction costs and increase flexibility, while simultaneously pointing to security risks and dependence on the provider. In the vein of IT infrastructure for operational support, the review by Chavhan P. G. et al. [3], devoted to service management systems in the online beauty industry, can also be interpreted: the authors structure service-management architectures, including booking, payment, CRM, and analytics modules, which is important for modeling end-to-end digital processes in the nail business. Finally, Kittisak A. [6] raises a tactical layer—inventory management in SMEs of the cosmetics industry: problems of demand forecasting, seasonality, and the implementation of digital tools (ERP and RFID solutions) are analyzed, although the focus is on cosmetic products more broadly than narrowly on nail service.

The third block is devoted to customer relationship management (CRM) and social CRM as a mechanism for forming satisfaction and retention. Cavaliere L. P. L. et al. [4] empirically show that the influence of CRM on customer satisfaction and retention is mediated by service quality—that is, the digital shell is effective insofar as it supports the relevance, reliability, and responsiveness of the service. Yasiukovich S., Haddara M. [5] systematize studies of social CRM in SMEs, identifying the roles of social platforms for dialogue with the customer, value creation, and social listening; it is emphasized that in SMEs the implementation of S-CRM faces a lack of competencies and data integration tools. In the context of the nail business, social media acquire

special significance as a channel for choosing a salon: Ham H. J., Lee J. N., Lee E. S. [7] show that the reliability of information in social networks influences the criteria for choosing nail shops; the authors differentiate the effect depending on the intensity of social media use to search for salons, thereby indicating the segmentation of clients by digital maturity.

The fourth block emphasizes the operational and marketing effects of digitalization. Ramachandran K. K. [12] discusses approaches to assessing the ROI of digital marketing campaigns: metrics of end-to-end analytics, attribution, and multichannel effectiveness are proposed, which is critical for nail salons actively using targeted advertising and lead generation through social platforms. Combined with the Zenoti Benchmark, this sets a methodological toolkit for measuring operational efficiency (technician utilization, no-show rate, average customer cost) and linking it to marketing activity [11]. Cloud MIS described by Rahman S., Hossain M. Z. [10], and service-management platforms in the logic of Chavhan P. G. et al. [3], provide the technological basis for automating schedules, managing inventory (ties in with Kittisak A. [6]) and analyzing customer behavior.

Methodologically, the authors use different research approaches. In the block of digital transformation and S-CRM, systematic literature reviews (SLR) with the construction of integrative frameworks and taxonomies prevail [2, 5]. In operational studies, analytical reviews and conceptual articles dominate [6, 12] with the proposal of sets of metrics and strategies, but limited empirical verification in narrow industries. Cavaliere L. P. L. et al. [4] and Ham H. J., Lee J. N., Lee E. S. [7] rely on quantitative methods (surveys, statistical modeling) to identify mediating and moderating effects of service quality and trust in information. Industry reports [1, 8, 9, 11] use methods of market analytics, panel data, and aggregated web tracking, but remain black boxes in terms of the reproducibility of academic procedures.

As a result, several contradictions and problematic aspects are visible. First, in the literature on digital transformation of SMEs there is a gap between strategic frameworks and industry-specific empirical tests in the nail salon segment: most models are generalized and do not take into account high fragmentation, the creativity of the service, and dependence on personal relationships between technician and client [2] versus industry KPIs without theoretical linkage [11]. Second, CRM researchers assert the mediating role of service quality [4], whereas proponents of social CRM emphasize the

direct influence of social media engagement on loyalty, bypassing a detailed operationalization of quality in the digital environment [5]. Third, methods for assessing the ROI of digital marketing remain poorly adapted to microbusinesses with small budgets and short customer life cycles; here there is a methodological gap between complex attribution models and the practical capabilities of nail salons [12]. Fourth, issues of integrating operational modules (scheduling, inventory, finance, CRM) into a single digital platform are covered fragmentarily: Chavhan P. G. et al. [3] and Rahman S., Hossain M. Z. [10] discuss architectures and clouds but do not provide industry cases of implementation; Kittisak A. [6] is limited to inventory and does not consider its connection with customer loyalty. Longitudinal studies that capture the dynamics of operational efficiency before and after digitalization, as well as cross-cultural comparisons within one industry, are practically absent (the exception is macro-regional market assessments [1], but without linkage to salons' internal processes). Issues of ethics and privacy of client data in the context of S-CRM and cloud MIS, as well as the impact of algorithmic personalization on the perception of service quality, are poorly covered. Finally, there is a lack of works integrating sustainability and digitalization in a specific salon context, although the trend toward sustainable beauty is recorded by industry sources [8].

Thus, future research should bridge the gap between strategic and operational levels of analysis, develop validated metrics of digitalization ROI for micro and small enterprises in the nail segment, and empirically test models of the influence of S-CRM and service quality on loyalty, taking into account the specifics of channels (social networks, booking apps) and organizational processes (inventory, scheduling, staff training).

Results and Discussion

The information obtained in the course of the study makes it possible to systematize digital technologies applicable in the nail industry and to comprehensively assess their multifaceted impact. At the initial stage, a methodologically verified classification of these technologies was developed, which serves as the foundation for the subsequent analysis of their effects (see Table 1). The categorization system goes beyond a simple enumeration of tools, establishing their direct

connection with key business segments affected by digital innovations.

Table 1. Classification of digital technologies for the nail business (compiled by the author based on [2, 3,5]).

Category	Specific tools	Primary impact on operational efficiency	Primary impact on client loyalty
Client management and appointment scheduling	Online booking systems (OBS), CRM platforms, IP telephony with integration	Reduction of time spent on appointment administration, minimization of errors, schedule optimization, decrease in no-shows	Increased client convenience (24/7 booking), personalized communications, storage of history and preferences
Operational management	Inventory management software, cloud-based point-of-sale (POS) systems, analytics and reporting systems	Automation of consumables accounting, optimization of procurement, control of financial flows, analysis of service profitability	Indirect impact: price stability through cost control, availability of all necessary materials
Marketing and communications	SMM tools, platforms for email and messenger broadcasts, review management systems	Automation of posting and advertising campaigns, analytics of channel effectiveness	Community building, portfolio demonstration, social proof collection, direct communication and informing
Financial management	Online payment systems, integration with accounting software	Acceleration of settlements with clients, simplification of financial reporting	Increased payment convenience, transparency of settlements

Operational efficiency is affected particularly markedly: the integration of online booking services (OBS) — for example, Yclients, DIKIDI or Appointy — frees a significant amount of working time previously spent on telephone and messenger correspondence with clients to coordinate schedules. Practical cases of small salons indicate that the use of OBS makes it possible to reduce

the share of administrative duties of practitioners and administrators from approximately 25 % to 5 % of total working time [11]. The released resource can be directed to the provision of core services, the enhancement of specialists' competencies, or the development of marketing activities (see Figure 1).

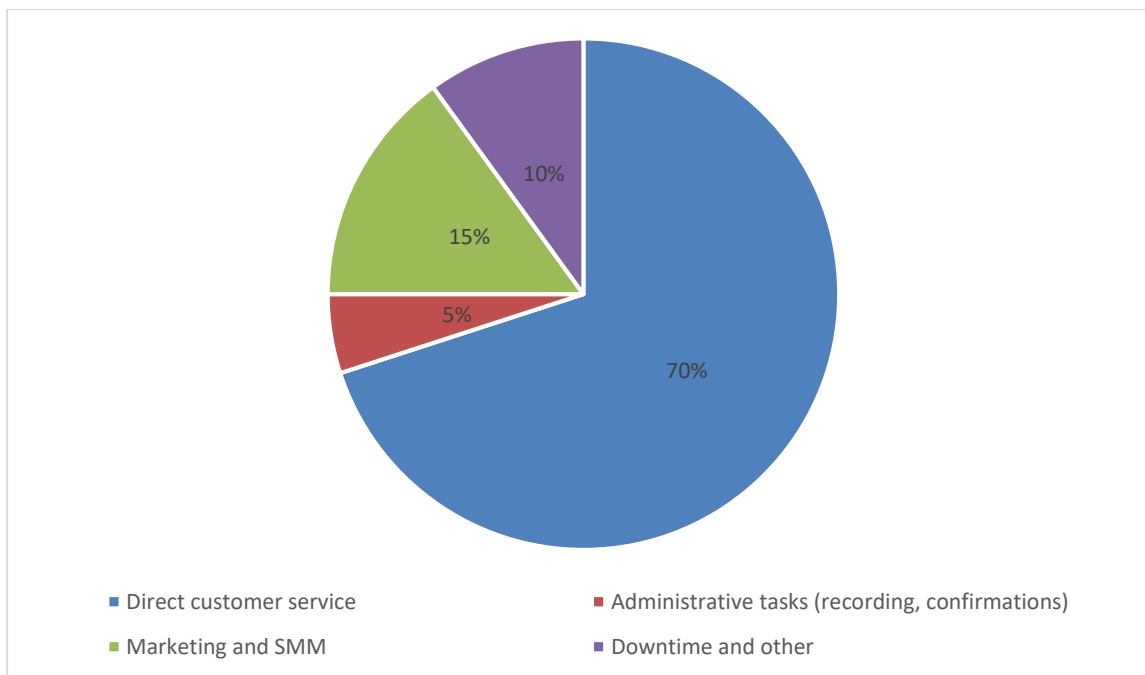


Fig. 1. The impact of the implementation of the online booking system (OBS) on the distribution of working time in a nail studio (%) (compiled by the author based on [1, 7,11]).

At the same time, the implementation of CRM systems, often integrated with OBS, constitutes a fundamental element of the strategy for strengthening customer loyalty. The concept of loyalty here goes beyond the simple return of a visitor: it refers to an emotional attachment to the brand (the practitioner or the salon), a willingness to recommend it to acquaintances, and immunity to competitive offers. Digital infrastructure provides a reliable framework for this. CRM platforms accumulate and analyze an extended client profile — visit history, preferred services and specialists, reactions to marketing campaigns, birth dates, and other

parameters. On the basis of these data, a personalized approach is implemented which, according to research findings, is one of the key drivers of loyalty in the service sector [4, 8, 9]. Automated mechanisms are able to send birthday greetings with a discount offer, as well as remind about the need for manicure correction three weeks after the previous visit, which creates in the client a feeling of individual care. This interaction cycle represents a closed scheme in which digital solutions accompany the client at every stage of their journey (see Figure 2).

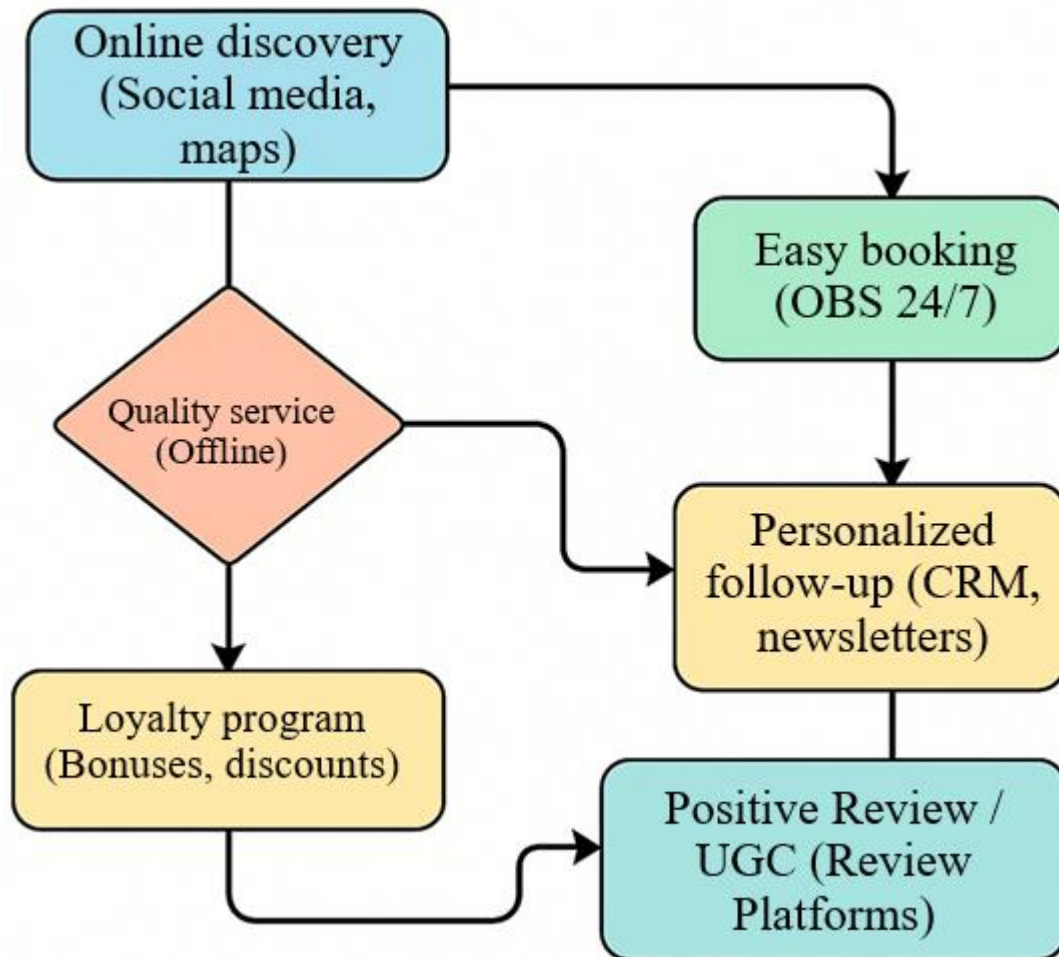


Fig. 2. The cycle of forming digital customer loyalty in the nail business (compiled by the author based on [4, 6, 8, 9]).

An advantage of the conducted study is the demonstration of the synergistic interrelation between operational efficiency and customer loyalty. These parameters do not function in isolation: process optimization directly determines the enhancement of customer experience quality. Thus, relieving a specialist from the need to handle incoming calls during the procedure provides an opportunity to focus maximally on technical execution and empathetic communication, which increases the subjective evaluation of the service

provided. Similarly, the automation of consumables inventory management [6] eliminates the risk of lacking the required shade of gel polish or decorative element, thereby preventing customer disappointment. As a result, operational efficiency forms the foundation on which complex mechanisms of loyalty formation unfold. It is this synergistic mechanism that underlies the developed integrated model of the impact of digitalization (see Figure 3).

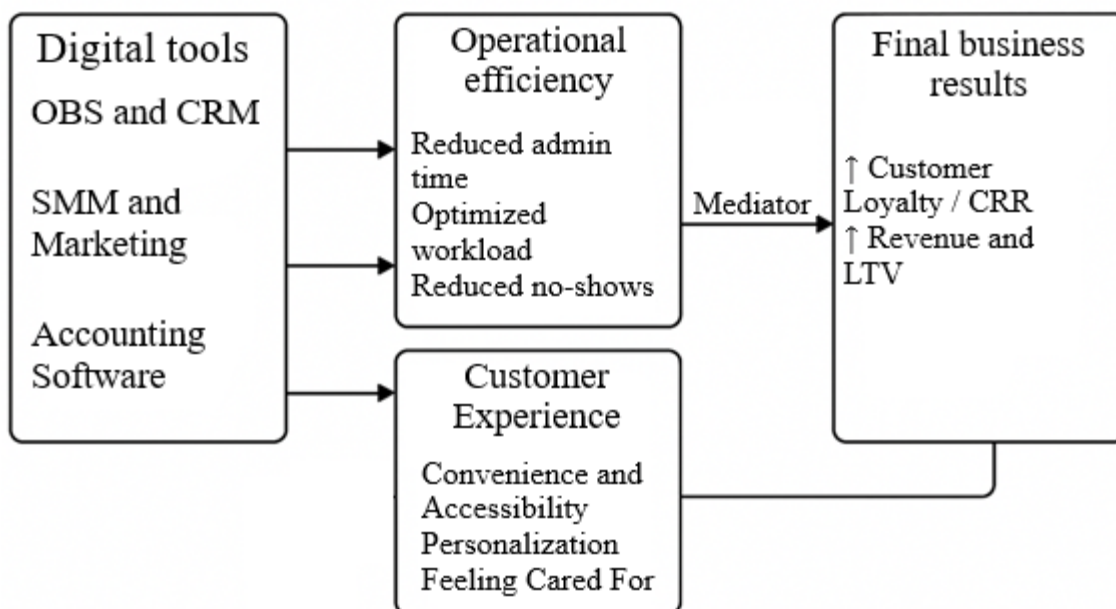


Fig. 3. Integrated model of the impact of digitalization on the performance of the nail business (compiled by the author based on [7, 10, 12]).

The presented conceptual model demonstrates that digital tools (first block) influence intermediate outcomes (second block) — operational efficiency and customer experience. In particular, operational efficiency not only directly contributes to improved financial performance but also serves as a mediator in the process of building customer loyalty (arrow from O to

L). The improvement of internal processes creates prerequisites for enhancing service quality, which, in turn, strengthens customer commitment. For quantitative verification of the specified impact, the application of a set of key performance indicators (KPI) presented in Table 2 is recommended.

Table 2. KPIs for assessing the effectiveness of digitalization in the nail business (compiled by the author based on [4, 7, 12]).

KPI	Definition	Influencing digital tools
Client Retention Rate (CRR)	$((\text{Number of clients at the end of the period} - \text{Number of new clients}) / \text{Number at the beginning}) * 100\%$	CRM, Loyalty programs, SMM
Customer Lifetime Value (LTV)	$\text{Average ticket} * \text{Average number of purchases per year} * \text{Average customer lifetime}$	CRM, Personalized mailings
No-Show Rate	$(\text{Number of clients who did not show up} / \text{Total number of bookings}) * 100\%$	OBS with auto-reminders and prepayment
Utilization Rate	$(\text{Actual working time} / \text{Available working time}) * 100\%$	OBS, Analytics systems
Customer Acquisition Cost (CAC)	$(\text{Marketing and advertising expenses} / \text{Number of new clients})$	SMM tools, Advertising analytics

Integration of the specified performance indicators makes it possible to move from empirical qualitative

judgments (improved level of convenience) to a substantiated quantitative analysis.

Thus, the introduction of digital technologies in the field of nail services is not merely a facilitation of standard operations, but a systemic process which, when properly methodologically justified, fundamentally transforms both the internal organization of business processes and the format of interaction with the client audience. The integration of modern digital solutions contributes to the formation of synergy between increased operational productivity and strengthened customer loyalty, thereby acting as a fundamental mechanism for ensuring long-term competitive advantage in a dynamically developing market.

Conclusion

As a result of the conducted study, the declared objective was achieved: an analysis of the impact of digital solutions on operational efficiency and customer loyalty in the nail service segment was carried out. The findings confirm the proposed hypothesis and underscore the scientific novelty of the work. First, a system for classifying digital tools is proposed, which gives enterprises in the industry the opportunity to select the necessary technologies on a more substantiated basis. Second, a differentiated analysis of the effects of these technologies on internal business processes (operational efficiency) and on the external level of interaction with customers (loyalty) was performed, within which specific mechanisms were identified: optimization of administrative costs and personalization of the services provided.

The result of the study is the proposed integrated model demonstrating the synergistic effect of digitalization. It is shown that the growth of operational efficiency is not an end in itself but an important mediator creating the prerequisites for improving the quality of the customer experience and, consequently, strengthening brand commitment. This logic shifts the emphasis from perceiving digital tools as cost centers to understanding them as strategic investments in customer capital. The set of KPIs included in the model provides managers with a tool for quantitatively measuring the return on implemented technologies.

The practical significance of the obtained results lies in the fact that owners and managers of nail studios can use these data when forming a digital transformation strategy, and software developers can use them to create

products maximally adapted to the needs of the beauty industry. Prospects for further research are seen in conducting longitudinal empirical experiments based on specific salons for quantitative verification of the proposed model, as well as in studying the influence of innovative technologies, such as artificial intelligence, on predictive analytics of customer behavior.

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