Using SMM Tools to Increase the Online Visibility of Firms

Elena Kostuchenko[1], Zumrat Gaibnazarova[2], Rustam Yakhshiboev[3], Boburbek Giyosidinov[4] and Malokhat Sarimsakova[4]

[1]*Euphrosyne Polotskaya State University of Polotsk, Blokhin Str. 29, 211501 Novopolotsk, Belarus*
[2]*University of Science and Technologies, Diydor Str. 71, 100208 Tashkent, Uzbekistan*
[3]*Tashkent State University of Economics, Islom Karimov Str. 49, 100066 Tashkent, Uzbekistan*
[4]*Tashkent State Transport University, Temiryolchilar Str. 1, 100167 Tashkent, Uzbekistan*
e.kostuchenko@psu.by, z.gaibnazarova@usat.uz, r.yaxshiboyev@tsue.uz, bobur_b@tstu.uz, maloxatsx@gmail.com

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Abstract: This paper analyzes how Social Media Marketing (SMM) tools affect firms' online visibility and proposes an applied IT extension that transforms descriptive SMM practice into an implementable digital solution. Using three Belarusian case studies (LLC "Pnevmotekhtsentr", Tourist Complex "Krasny Bor", and OJSC "Savushkin Product"), we compare multi-platform performance by observable social signals (subscribers, posting activity, and engagement) and derive unified indicators for cross-platform assessment (e.g., average likes per post and engagement per subscriber). The main contribution is a technical blueprint for automating SMM monitoring and decision support: (i) a data collection layer (platform APIs / structured scraping), (ii) an analytics layer that computes normalized visibility and engagement metrics and generates trend alerts, and (iii) a recommendation layer that outputs platform-specific actions (content timing, hashtags, targeting, and influencer collaboration). To strengthen the IT component, the paper also proposes a Telegram-based digital assistant (chatbot) for customer interaction: onboarding via a short questionnaire, rule-based dialogue management, a lightweight content recommendation module, and event logging for iterative improvement. The proposed workflow also defines a pilot evaluation path through chatbot retention, CTR, completion rate, and feedback-based monitoring. The proposed architecture provides a reproducible path from raw SMM statistics to software modules that may support pilot implementation in small and medium firms seeking to improve visibility and customer communication.

1 INTRODUCTION

The growth of digital channels and social media has made online visibility a key factor for firms' competitiveness. Social networks as public communication platforms and media environments are described in [1]-[3]. Social Media Marketing (SMM) provides instruments for two-way communication with customers, rapid feedback collection, and measurable engagement signals that can be used for performance evaluation and optimization [4]-[6]. At the same time, many firms still apply SMM analytics in a descriptive way (counts of subscribers, views, likes), which does not directly translate into implementable software components for decision support. The global number of social network users continues to grow and exceeds several billions [7].

This paper analyzes SMM tools using three Belarusian case studies (LLC "Pnevmotekhtsentr", Tourist Complex "Krasny Bor", and OJSC "Savushkin Product") and proposes an applied IT extension that shifts the focus from marketing narration to a reproducible technical workflow. The workflow consists of: (i) automated data collection from multiple platforms, (ii) computation of unified engagement/visibility metrics enabling cross-platform comparison, and (iii) a recommendation layer that generates actionable promotion steps based on analytics results [4]-[6].

To strengthen the applied IT component, the paper also proposes a Telegram-based digital assistant (chatbot) for customer interaction and retention. The assistant is formulated as an implementable architecture with dialogue logic, lightweight content recommendation, and measurable evaluation metrics (retention, CTR, completion rate) [8]. Similar applied

IT workflows-combining analytics with practical automation-are used in other domains, confirming the feasibility of implementing decision-support modules in real settings [9], [10].

The novelty of this study lies in transforming descriptive SMM observation into a reproducible applied IT workflow for cross-platform visibility assessment and decision support. The study contributes: (i) unified engagement and normalized visibility metrics for cross-platform comparison, (ii) mapping of SMM practice to implementable software modules, and (iii) a Telegram-based digital assistant architecture together with a defined pilot-evaluation protocol. The remainder of the paper is organized as follows. Section 2 presents the methodological framework and metrics. Section 3 reports the case-study results and the chatbot-based technical proposal. Section 4 discusses applicability and limitations. Section 5 concludes the paper.

2 METHODOLOGICAL FRAMEWORK

This study combines a literature-based systematization of SMM tools with a case-study method applied to three firms operating in Belarus. In accordance with the Oslo Manual, marketing innovation includes the implementation of new or significantly improved methods of promotion, presentation, and sales strategies [11]. In this paper, SMM is treated as a set of promotion activities conducted through social platforms with measurable feedback signals (engagement and reach) [12]-[15].

2.1 SMM Tool Taxonomy (For Applied Use)

To avoid overly broad classifications, we group SMM tools into five implementable categories:

1) Content management (content plan, posting schedule, format selection);
2) Audience growth (hashtags, collaborations, targeted advertising);
3) Engagement and community management (comments/replies, interactive formats, UGC);
4) Analytics and monitoring (platform insights, third-party trackers, review monitoring);
5) Automation and conversational interfaces (chatbots and digital assistants).

Representative approaches to marketing-innovation classification are discussed in [16].

This taxonomy aligns with common SMM interpretations and practical guidance [12]-[15] while allowing direct mapping to software functions in Section 3.3, including data collection, analytics, and automated interaction. For the purposes of this paper, a compact implementable taxonomy is sufficient because the main objective is not to review all classification traditions, but to translate SMM practice into software-oriented modules.

2.2 Data Sources and Case-Study Procedure

The empirical part of the study is based on publicly observable SMM data collected from the official social media accounts of the selected firms: LLC “Pnevmotekhtsentr”, Tourist Complex “Krasny Bor”, and OJSC “Savushkin Product”. For each company, the analysis covered the platforms that were actively used for public communication at the time of observation. The empirical data for the three case studies were collected over a three-month period from September 2025 to November 2025. This interval was chosen to capture consistent posting cycles and engagement dynamics across all analyzed platforms (Instagram, TikTok, YouTube, VK, Odnoklassniki, and Facebook). The basic indicators recorded for each platform were the number of subscribers/followers, the number of published posts visible in the account, and the total number of likes or average likes per post as a publicly observable engagement proxy. Official company web resources were used to verify the business profile and product/service scope of the cases [17], [18], while additional public contextual information was used where relevant for case interpretation [19]. Differences in platform popularity and audience distribution were considered when comparing the observed data across channels [7], [20].

To improve reproducibility, the data collection procedure followed a unified manual observation protocol. First, the official company websites and linked public social media accounts were used to verify the identity of each firm [17], [18]. Second, platform statistics were recorded from publicly accessible account pages and transferred into comparative tables using the same unit logic across all cases. Third, only publicly visible and mutually comparable indicators were used, rather than platform-specific internal statistics. This design does not fully eliminate differences between platform algorithms, audience structures, and content lifecycles, but it provides a transparent basis for

cross-platform comparison under conditions of limited API access [4]-[6].

2.3 Applied IT Extension (From Statistics to Implementable Modules)

A high-level overview of Internet-based promotion mechanisms is shown in Figure 1.

To move beyond descriptive marketing reporting, we propose an applied IT workflow that can be implemented as a software pipeline:

1) Data acquisition via platform APIs or structured scraping (where APIs are limited);
2) Unified metrics computation (engagement per post, engagement per subscriber, normalized visibility indicators);
3) Recommendation generation (rules and templates for content, targeting, and scheduling based on metric trends);
4) Customer interaction automation via a chatbot/digital assistant to support retention and feedback loops [4], [8].

This workflow aligns with modern digital marketing practice and enables reproducible evaluation across cases [4]-[6], [21]. This applied workflow can be implemented as a modular software pipeline that combines automated SMM analytics, event-based monitoring, and conversational customer interaction [22].

3 RESULTS

3.1 LLC "Pnevmotekhtsentr

LLC "Pnevmotekhtsentr" is a Belarusian online store of industrial equipment and tools operating in B2B/B2C segments and maintaining an active presence in multiple social platforms [17]. Table 2 summarizes the observed platform statistics (subscribers, number of posts, and likes as engagement proxy).

3.1.1 Unified Engagement Metrics (Applied IT Extension)

To enable cross-platform comparison and support automation, we compute:

$$L_{avg} = \frac{Total\ likes}{Number\ of\ posts} \quad (1)$$

$$ER = \frac{L_{avg}}{Subscribers} \times 100\% \quad (2)$$

Optionally, a normalized visibility score is defined as

$$V = w_1\overline{S} + w_2\overline{P} + w_3\overline{L_{avg}} \quad (3)$$

where $\overline{S}$, $\overline{P}$, and $\overline{L_{avg}}$ are min-max normalization across platforms and $w_1=w_2=w_3=1/3$. These indicators convert simple public platform statistics into comparable operational signals. Average likes per post reflect interaction intensity while reducing distortion from unequal posting volumes, and engagement per subscriber relates visible reactions to audience size. The normalized visibility score is used as a compact comparative indicator for multi-platform ranking; equal weights are adopted as a neutral baseline in the absence of validated platform-specific coefficients. In practice, higher values indicate stronger observable visibility and interaction, whereas lower values signal the need for corrective actions in content design, posting frequency, targeting, or use of short-form interactive formats [4]-[6].

Worked example (Instagram, Pnevmotekhtsentr, using the values in Table 1): with subscribers S, posts P, and Lavg taken across the six platforms in Table 1, min-max normalization gives $\bar{S} = (2{,}893 - 39)/(6{,}112 - 39) \approx 0.470$, $\bar{P} = (636 - 228)/(3{,}181 - 228) \approx 0.138$, and $\bar{L}avg = (48.04 - 0.04)/(48.04 - 0.04) = 1.000$ (Instagram has the maximum Lavg in this dataset). With w1 = w2 = w3 = 1/3, this yields $V \approx (0.470 + 0.138 + 1.000)/3 \approx 0.536$ for the Instagram account, illustrating how Equation (3) is applied in practice; the same procedure can be repeated for each platform/case using its own Table 1 row.

Subscriber counts are reported as absolute values (people), consistent with Table 1.

3.2 Tourist Complex "Krasny Bor"

Tourist Complex "Krasny Bor" is a premium-class destination in Belarus and maintains active promotion primarily through Instagram, with Facebook used as a secondary channel [18]. Instagram shows higher reach and interaction due to visual-first content formats and platform mechanics, while Facebook activity is limited and primarily news-oriented. The analysis indicates two main gaps: the lack of a structured content strategy (informational/engaging/sales content balance) and insufficient use of targeting to expand reach beyond the current follower base [4]-[6].

Recommendations include: (i) a clear content strategy with weekly rubrics (facts, services, offers), (ii) targeted advertising for defined segments (families, hunters/fishers, couples), (iii) expansion to

short-form video formats to increase organic reach, and (iv) simplified onboarding in profile (links, pricing highlights, reviews) to improve conversion from reach to booking inquiries [4], [6]. This growth trend is consistent with global user statistics reported in [7]. The reached audience distribution is shown in Figure 2.

Engaged accounts of the Krasny Bor tourist complex are presented in Figure 3.

3.3 OJSC "Savushkin Product"

Savushkin Product OJSC is a major Belarusian dairy brand with broad offline and online promotion channels [24]. The brand actively uses social networks (content marketing, recipes, news, targeted campaigns) and integrates trade marketing with analytics and merchandising functions [25], [26]. Given the high competition in the food market, scalable digital tools for customer communication and retention are especially relevant [4]-[6].

Industry reports forecast a growing share of chatbot-mediated customer interactions [27], [28].

A practical applied IT recommendation for this case is the creation of a Telegram-based digital assistant (chatbot) that supports personalized micro-content delivery (nutrition tips, recipes, habit tracking) and collects feedback signals for continuous improvement. Chatbots are widely used for automated customer support and marketing communication and can be implemented with lightweight dialogue logic and analytics feedback loops [4], [8].

3.3.1 Technical Proposal: Telegram Chatbot Architecture, Logic, and Metrics

The proposed digital assistant is designed as a Telegram bot connected to a lightweight backend service and analytics module. Its purpose is to transform SMM interaction from one-way content publishing into an iterative software-assisted communication loop that supports onboarding, personalized micro-content delivery, feedback capture, and recommendation adjustment. The architecture includes: (1) Telegram Bot API as the user interaction interface, (2) backend application service with REST endpoints, (3) user profile store, (4) content repository with tagged cards, (5) dialogue manager, (6) recommendation module, and (7) analytics logger with an admin interface for moderation and simple A/B testing [4], [8].

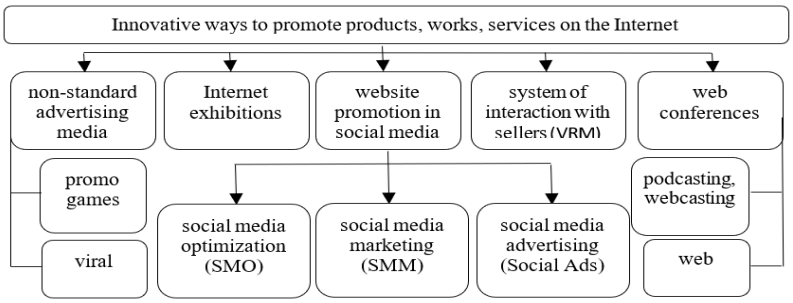

Figure 1: Innovative ways to promote products, works, and services through the Internet (adapted from [23]).

Table 1: Comparative analysis of social networks of LLC "Pnevmotekhtsentr".

Social media	Indicators			
	Number of subscribers, people	Number of posts, pcs.	number of likes, pcs.	
			In total	On average per 1 publication
Instagram	2 893	636	30 563	48.04
TikTok	5 263	400+	114 022	31.81
YouTube	6 112	300	9 543	31.81
VK	945	634	1 350	2.13
Odnoklassniki	39	228	94	0.41
Facebook	173	3 181	126	0.04

Note: For TikTok, the platform interface displayed the post count in aggregated form ("400+"). Therefore, the corresponding engagement indicator was interpreted as an approximate operational value for comparative purposes.

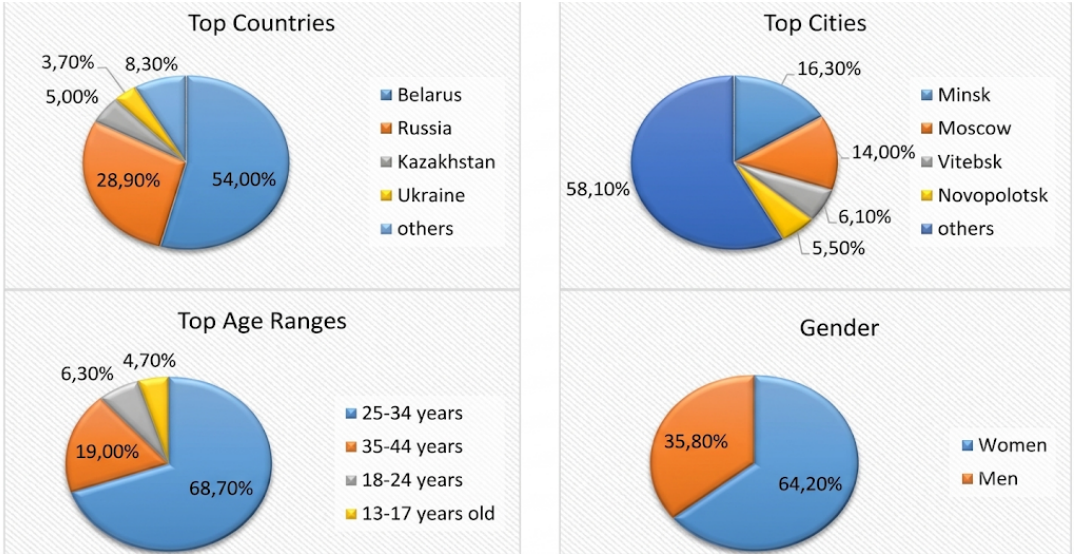

Figure 2: Reached audience of Instagram accounts of «Krasny Bor tourist complex».

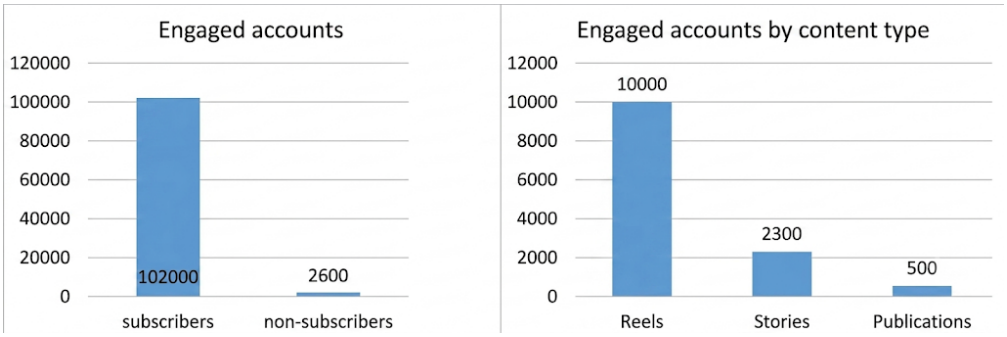

Figure 3: Engaged accounts of «Krasny Bor tourist complex».

The system processes onboarding answers, preference tags, interaction history, clicks, task-completion events, and explicit feedback to update user profiles and generate personalized content plans. The dialogue follows a finite-state workflow from onboarding and profile assignment to daily content delivery, feedback capture, and plan adaptation. Recommendations are generated through a lightweight rule-based procedure that matches content tags to the user profile and ranks candidates by relevance, novelty, and feedback consistency [4], [8]-[10], [29], [30].

3.3.2 Proposed Pilot Evaluation Scenario and Metrics

To strengthen the practical IT contribution, the chatbot workflow is validated through a realistic pilot scenario based on the empirical SMM patterns identified in the three case studies. At this stage, the paper does not claim full production deployment; instead, it validates an implementable analytics-and-recommendation workflow linking observable inputs to software-assisted outputs. In the pilot scenario, a user completes onboarding, receives an initial profile, and is then provided with personalized content cards; subsequent clicks, task completion, and explicit reactions are used to update the next-step recommendation logic.

To support systematic evaluation of the chatbot's functional operability, this paper defines a pilot-testing protocol based on 50 planned controlled interaction sessions. The target thresholds for this planned evaluation are summarized in Table 2; execution of the pilot itself, together with the observed results, is left for subsequent work.

Recommendation precision is planned to be estimated as the share of delivered content cards

marked as relevant by users during the planned controlled pilot sessions; a recommendation will be counted as relevant when the user either explicitly marks the content as useful/relevant or interacts with it in a way consistent with the assigned profile logic. Concretely, the latter behavioral signal is intended to include actions such as clicking through to the referenced content, engaging with it for longer than a minimum dwell-time threshold, or proceeding to a related follow-up action in the chatbot flow; the specific dwell-time threshold and the relative weighting of explicit versus behavioral signals are to be finalized during the planned pilot rather than fixed in advance.

Thus, the manuscript clearly distinguishes between implemented and proposed elements. The implemented contribution includes the case-based analytics workflow and the metric computation logic applied to the three case studies. The chatbot component - including its modular architecture, profile-oriented recommendation rules, and the pilot-evaluation protocol in Table 2 - is proposed but not yet empirically tested; its validation, together with live API integration, persistent user-database operation, large-scale online feedback accumulation, and controlled A/B testing in production settings, is left for future work (see Table 3).

4 CONCLUSIONS

This study examined how SMM tools influence firms' online visibility using three Belarusian case studies and showed that descriptive reporting of subscribers, posts, and likes is not sufficient for reproducible decision support. The main scientific and applied contribution of the paper is the transformation of descriptive SMM analysis into an implementable digital workflow that combines cross-platform metric computation, automated recommendation generation, and chatbot-assisted customer interaction [4]-[6], [8]-[10]. The proposed chatbot architecture, together with a defined pilot-evaluation protocol (onboarding completion rate, backend response time, recommendation precision, and click-through rate), offers a concrete basis for testing the practical feasibility of the automated recommendation workflow in future work. The case evidence indicates that platforms oriented toward short-form and visual content tend to provide higher interaction dynamics, whereas secondary channels with low engagement require targeted investment and content adaptation to deliver comparable visibility outcomes.

Table 2: Proposed pilot evaluation protocol and target thresholds for the Telegram-based digital assistant.

Metric	Target / Benchmark	Status
Onboarding Completion Rate	> 80%	Not yet measured
Average Response Time (Backend)	< 1.5 s	Not yet measured
Recommendation Precision	> 70%	Not yet measured
Content Card CTR (Click-Through Rate)	> 5%	Not yet measured

Table 3: Cross-case synthesis of SMM patterns and software-oriented actions.

Case	Dominant platform pattern	Main observed issue	Key metric signal	Recommended digital action	Relevance for chatbot / automation
LLC "Pnevmotekhtsentr"	Multi-platform presence with uneven interaction	Large audience but low efficiency on some channels	Strong contrast in average likes per post and ER across platforms	Reallocate content effort and improve platform-specific targeting	Medium
Tourist Complex "Krasny Bor"	Instagram-driven visual engagement	Weak content structure and limited targeting	High visual engagement but limited conversion orientation	Weekly content rubric, short-form video, onboarding simplification	Medium
OJSC "Savushkin Product"	Broad-scale brand communication	Need for scalable retention and personalized follow-up	High potential for repeated interaction and micro-content delivery	Telegram-based digital assistant with profile-based content delivery	High

The main applied IT contribution is a technical workflow that transforms SMM practice into implementable software modules: (i) data acquisition (APIs/structured scraping), (ii) analytics (metric computation, trend detection, alerts), and (iii) recommendation generation (platform-specific actions for content and targeting). In addition, we proposed a Telegram-based digital assistant for customer interaction and retention, specified as an implementable architecture with a dialogue state machine, lightweight content recommendation logic, and measurable evaluation criteria (retention, CTR, completion rate, user feedback). This shifts the paper's focus from marketing description to software-oriented design that can be prototyped and tested. In practical terms, this contribution can serve as a reproducible software blueprint for small and medium firms seeking to automate SMM monitoring and customer communication.

In practical terms, the proposed framework can be integrated into a lightweight decision-support environment for small and medium firms, where cross-platform SMM analytics, recommendation templates, and chatbot-assisted communication operate as mutually connected software modules for visibility management and customer retention.

Limitations and future work. The current analysis relies on publicly observable engagement proxies and does not directly measure conversions (leads, bookings, purchases). Future work should include a prototype implementation of the analytics pipeline and chatbot, integration with platform APIs where available, and experimental evaluation using conversion-oriented metrics and controlled A/B testing of content and chatbot message templates. At the current stage, the chatbot component should be interpreted as a proposed architecture and evaluation protocol rather than a validated system: the pilot itself has not yet been executed, and its future execution should be reported together with a transparent description of the testing procedure (participant recruitment, deployment environment, and session logging) to support the validity of any reported outcomes.

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