

Scientific article

UDC 330.47

DOI: <https://doi.org/10.57809/2025.4.3.14.5>

INFORMATION SYSTEM DESIGN FOR THE NEWSPAPER EDITORIAL OFFICE: ARCHITECTURAL APPROACH

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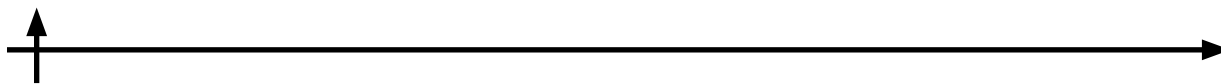
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Abstract. The modern business environment is constantly changing due to the influence of technology and customer needs. In conditions of high competition and rapid pace of change, traditional methods of marketing process management are no longer able to cope with the challenges that have arisen. In this regard, the introduction of information systems (IS) in marketing departments is becoming not only relevant but also vital. Information systems can significantly improve work efficiency by optimizing data collection and analysis, automating processes, and improving communication within a team. This implementation helps companies adapt to changes in the market, providing more accurate targeting and a personalized approach to customers. In modern conditions, when information is becoming an essential asset, the use of information technology in marketing shapes foundation for business success and sustainability.

Keywords: business process, business structure, architectural model, information system, information technologies

Citation: Kartasheva M. Information system design for the newspaper editorial office: architectural approach. Technoeconomics. 2025. 4. 3 (14). 46–54. DOI: <https://doi.org/10.57809/2025.4.3.14.5>

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Научная статья

УДК 330.47

DOI: <https://doi.org/10.57809/2025.4.3.14.5>

ПРОЕКТИРОВАНИЕ ИНФОРМАЦИОННОЙ СИСТЕМЫ РЕДАКТОРСКОГО ОТДЕЛА ГАЗЕТНОГО ИЗДАНИЯ: АРХИТЕКТУРНЫЙ ПОДХОД

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Аннотация. Современная бизнес-среда постоянно меняется под влиянием технологий и растущих клиентских потребностей. В условиях высокой конкуренции и быстрого темпа происходящих изменений, традиционные методы управления маркетинговыми процессами уже не способны справляться с возникшими вызовами. В этой связи внедрение информационных систем (ИС) в маркетинговые отделы становится не просто актуальным, но и жизненно необходимым. Информационные системы могут существенно улучшить эффективность работы, позволяя оптимизировать сбор и анализ данных, автоматизировать процессы и улучшить коммуникацию внутри команды. Данное внедрение помогает компаниям адаптироваться к изменениям на рынке, обеспечивая более точное таргетирование и персонализированный подход к клиентам. В современных условиях, где информация становится важнейшим активом, использование информационных технологий в маркетинговых процессах служит гарантом успеха и устойчивости бизнеса.

Ключевые слова: бизнес-процесс, структура предприятия, архитектурная модель, информационная система, информационные технологии

Для цитирования: Карташева М. Проектирование информационной системы редакторского отдела газетного издания: архитектурный подход // Техноэкономика. 2025. Т. 4, № 3 (14). С. 46–54. DOI: <https://doi.org/10.57809/2025.4.3.14.5>

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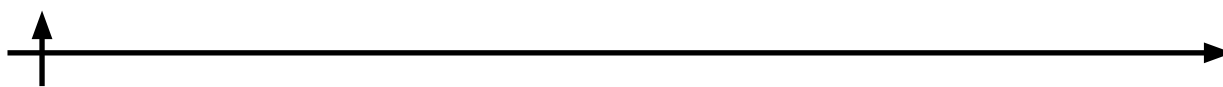
Introduction

This research considers a variety of methods for designing an information system, examines the architectural method, analyzes the company ООО “Editorial Office of the “Prizyv” Newspaper,” identifies the organizational structure of this company, and suggests a framework for the architectural vision of the IT system for the marketing department.

According to GOST R 57193-2016, “Systems Engineering—Lifecycle Processes of Systems,” which also describes the process of architecture design, the system architecture is seen as the fundamental organization of the system embodied in its elements, their internal and external connection, as well as the principles guiding its design and evolution.

The result of architecture design is a solution project that meets both functional and non-functional requirements. Such an architectural design, documented in an appropriate document (specification), can be presented in the form of sketches, drawings, or other descriptive methods.

The architectural method rests on frameworks that can be easily adapted to meet all technical requirements of potential clients. A distinctive feature of this approach is dividing the design task into two separate subtasks: developing a reusable framework and creating a specific software product based on it (Asanov, 2025; Blinov, 2023; Dulesov, 2024). These two tasks can



be performed by different specialists.

The architectural approach allows for prompt modifications of existing functionalities and adds new features to the designed information system.

Materials and Methods

The authors conducted expert assessment and review of domestic and international scientific studies on business processes. In order to evaluate the efficiency of suggested IT solutions the IDEF0 notation was used for pre and post implementation effect at all levels.

Results and Discussion

OOO “Editorial Office of the “Prizyv” Newspaper,” founded in 1969, is one of the most well-known publishers in the Crimean region. The company's main activities are related to the publication and distribution of newspapers, as well as providing informational services. The company is located in Krymsk. Its primary activities include conducting investigations, writing articles, interviewing interesting personalities, and covering relevant topics. The team of journalists actively researches a wide variety of locally important issues.

In addition to the print version, the company develops its website and social media platforms to attract a broader audience. This includes posting news, interviews, and material on current topics.

The “Prizyv” newspaper offers advertising opportunities for local businesses, thus supporting the editorial funding and fostering mutually beneficial relationships with entrepreneurs.

The staff of OOO “Editorial Office of the “Prizyv” Newspaper” consists of 18 employees. The newspaper's circulation in April 2025 amounts to approximately 2.500 copies. The sales volume varies depending on the current circulation and advertising revenue. The main target market is the Crimean region.

The primary goal of the company is to become a leading regional media outlet, providing high-quality journalistic content, prompt news coverage, and significant reader engagement in societal processes.

The “Prizyv” newspaper aims to inform and educate the population about important events, social initiatives, and cultural activities. In order to serve as a reliable source of information, the newspaper sets the following strategic objectives:

- Increase sales volume and circulation
- Expand the audience
- Develop partnership relations
- Maintain high quality standards

The OOO “Editorial Office of the “Prizyv” Newspaper” offers the following products and services:

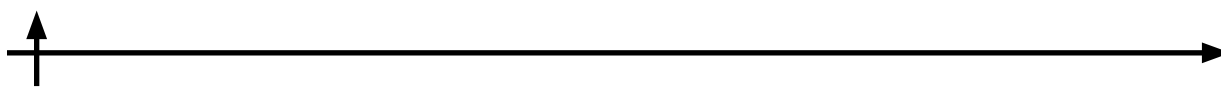
1. *Newspaper Publications*: The core product is the printed edition of the newspaper, covering a broad range of topics including politics, economics, culture, sports, social news, and events.

2. *Online Platform*: The website provides access to current news, an archive of past publications, and analytical materials.

3. *Special Editions*: Periodic thematic magazines and brochures dedicated to specific events or social issues.

4. *Advertising*: The company offers advertising services for businesses both in print and on-line.

5. *Events and Activities*: Coverage of local events, contests, and campaigns aimed at strengthening ties with the local community.



Each department uses specialized software tailored to their specific requirements. The accounting department uses 1C:Accounting, the journalism department uses the Microsoft Office, and the documentation-related department uses 1C:Enterprise.

Business processes within the “Editorial Office” can be divided into several key stages (Fomin, 2025; Galimyanov, 2017, 2019; Grekul, 2025):

1. Research and Planning: Audience analysis, calendar planning
2. Content Creation: Journalism, editing, design, and layout
3. Production: Printing and quality Control
4. Distribution: Logistics and delivery
5. Promotion and Advertising: Marketing and advertising partner engagement
6. Feedback and Analytics: Collecting feedback, sales analysis
7. Continuous Improvement: Strategy adaptation
8. Financial Accounting: Budgeting and reporting
9. Staff Training and Development: Courses and training programs

To implement the information system in the marketing department of the “Editorial Office” it is essential to determine the functionalities to offer (Grigoryev, 2025; Karpova, 2025; Nagel, 2022; Orlova, 2022; Rogozov, 2014):

1. Customer Data Management – storing customer information, audience segmentation
2. Marketing Campaign Automation – planning and managing campaigns, email distribution
3. Data Analysis and Reporting – collecting and analyzing data, generating reports
4. Social Media Management – content publication, interaction monitoring
5. Content Management – content calendar, resource library
6. Customer Interaction Support – CRM features, chatbots, tech support
7. Effectiveness and Adaptability – A/B testing, real-time analytics
8. Integration with other systems – CRM and ERP, APIs for third-party applications

Using the IDEF0 notation we will develop the IS architecture of the OOO “Editorial Office of the “Prizyv” for a more comprehensive assessment (Voronova, 2019, 2025; Zaromensky, 2025; Zikov, 2025).

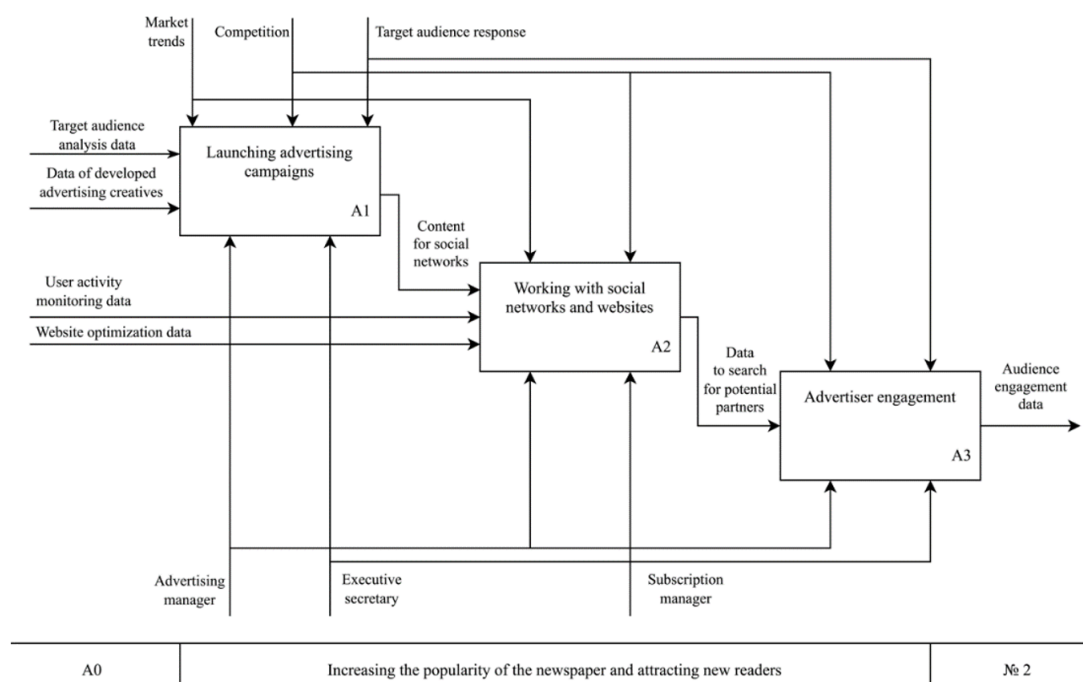


Fig. 1. Level 2 business processes of the marketing department.

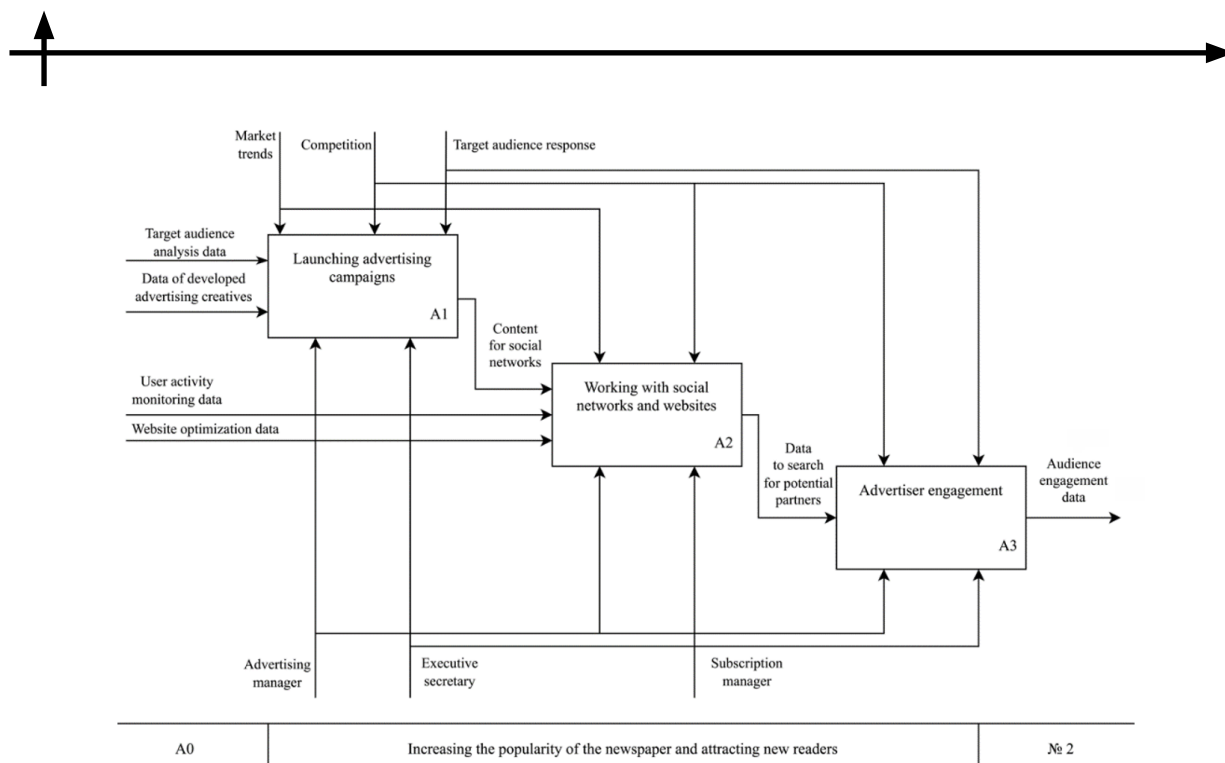


Fig. 2. Level 3 business processes of the marketing department.

Implementing an information system (IS) in the marketing department has a significant impact on business processes. One of the main changes is the improvement in data management. With centralized access to information about clients, markets, and campaigns, the collection and analysis of data are automated, allowing for more accurate and faster analytical reports. In turn, it enhances strategic planning, as employees can rely on up-to-date information and improve the precision of target audience segmentation.

Let us detail the architecture of the information system for launching advertising campaigns in OOO “Editorial Office of the “Prizyv” Newspaper.”

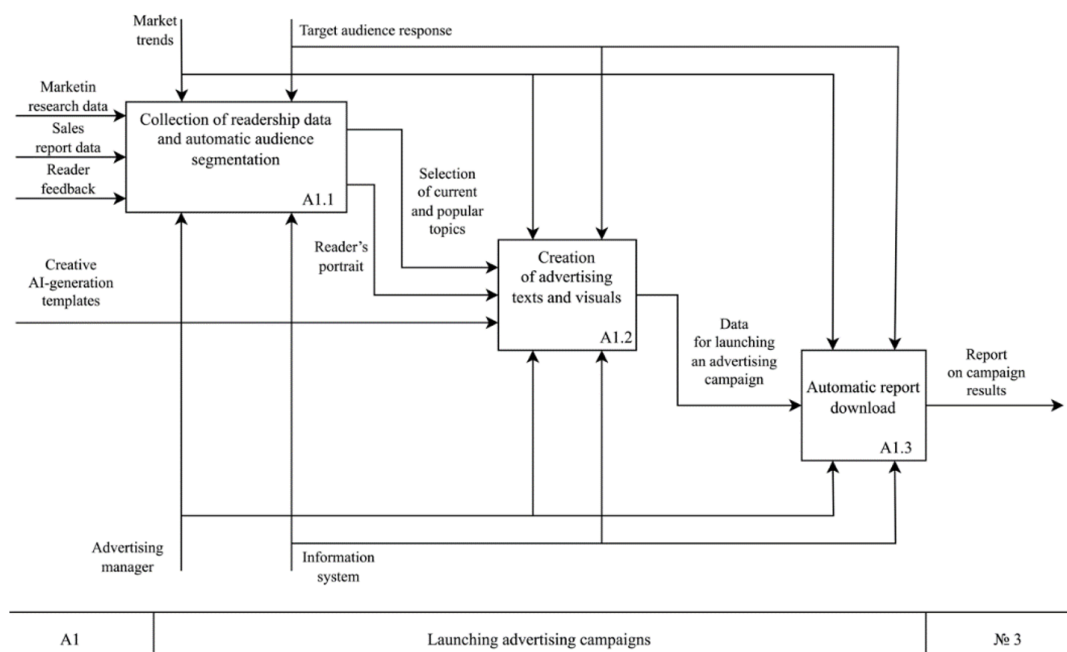
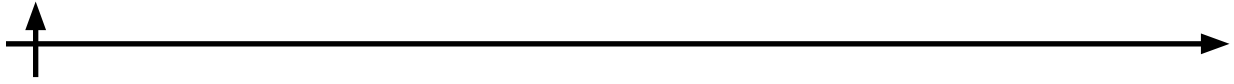


Fig. 3. Level 3 business processes of the marketing department post IS implementation.



Automation of campaign launch and management processes, as well as the use of A/B testing tools, significantly reduces the time required for organizing and monitoring advertisements. This leads to an increase in return on investment (ROI) through more rational budget allocation and improved quality of advertising materials based on their effectiveness analysis (Ryzhko, 2025; Tappuni, Vakorin, 2022; Van Looy, 2020).

Moreover, the implementation of the IS contributes to enhancing internal team collaboration. Platforms for joint work and data sharing improve communication between different departments, which speeds up decision-making processes and reduces errors and misunderstandings. Ultimately, this increases the overall productivity of the department's employees.

Decision-making algorithm for OOO "Editorial Office of the "Prizyv" Newspaper":

Step 1: Data Collection

At this stage, metrics and data from various sources related to the editorial activity are collected:

- $Dt = \{Mt, Lt, Tt, Ct\}$, where:
- Mt — Metrics (circulation, audience coverage, material views);
- Lt — Logs (publication dates, website outages, responses to materials);
- Tt — Traces (visitor interactions with websites and applications);
- Ct — Contextual data (reader feedback, competitor analysis).

Step 2: Incident Classification

Incidents may occur during operations, such as a sharp decline in website traffic or negative reactions to a material:

1. We use a machine learning-based approach to classify incidents:
 - When determining an incident, the conditional probability $P(I | Dt)$ is calculated, where I = incident.
2. Incidents are classified into:
 - *Type 1*: Negative reaction (reviews, comments);
 - *Type 2*: Technical failures (website downtime);
 - *Type 3*: Reputation violation (scandals, information leaks).

Step 3: Decision Path Selection

The decision depends on the incident type and probability:

- *Fast route* (hybrid approach): Predefined solutions for certain incident types (e.g., changing headlines, publishing materials upon reader requests).
- *Slow route* (analytical approach): Using algorithms to analyze the consequences of more complex incidents (e.g., social media analysis during a crisis).

Step 4: Execution and Feedback

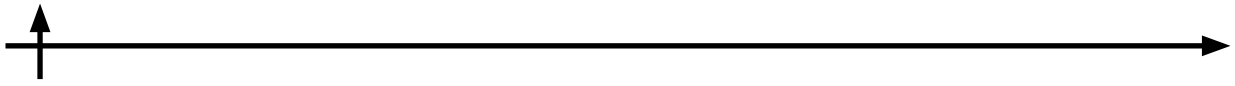
1. Implement solutions through the editorial team (using content management systems).
2. Collect results and feedback from readers:
 - Analyze changes in traffic Tf and reader interactions Rf .
 - Calculate the revised perception of reviews Nr compared to initial data.

Mathematical Optimization Model

The optimization of the decision-making process involves calculating the total costs associated with incidents:

$C_{total} = \alpha * t_{response} + \beta * C_{neg} + \gamma * C_{reputation}$, where:

- C_{neg} — costs associated with negative reactions;
- $C_{reputation}$ — expenses for reputation recovery;
- $t_{response}$ — response time to an incident;
- α, β, γ — weighting coefficients that determine the significance of each factor.



Optimization condition:

$$\min(C_{total}) \text{ with } t_{response} < t_{max}$$

where t_{max} – maximum response time.

Let us consider the example of algorithm operation.

Suppose the editorial office encounters an incident of subscriber shortage:

1. Data collection shows a decrease in traffic.
2. Classification: the system identifies this as a Type 1 incident.
3. Decision path selection:
 - Fast route: promotional subscription offers.
 - Slow route: analyzing reasons through surveys and gathering reader opinions.
4. Execution: implement promotional offers and publish surveys.
5. Feedback: Analyze the growth in subscribers T_f and feedback received (N_r).

Conclusion

The hybrid decision-making algorithm, which combines machine learning methods with predefined solutions, ensures flexibility and efficiency in incident management within the newspaper's editorial office. Cost optimization helps reduce risks and increase reader loyalty, which is a vital aspect in the highly competitive media environment.

Automation of reporting and analytics also becomes increasingly important. Using automated report generation tools and interactive dashboards for data visualization decreases the workload on analysts, allowing them to focus on more complex tasks. Rapid response to changes in audience behavior and campaign results enhances understanding of customer preferences, which is a key factor in maintaining competitiveness.

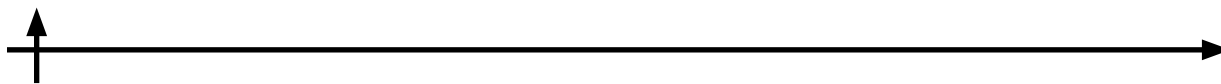
Moreover, customer interaction significantly improves through the integration of CRM systems, which help better manage relationships with clients. A personalized approach based on collected data increases customer satisfaction, enables prompt resolution of their issues, and facilitates effective feedback management. This, in turn, fosters loyal customers and extends Customer Lifetime Value (LTV).

Finally, the IS provides the ability to quickly adapt to changing market conditions, an especially critical feature in today's business environment. Fast realignment of strategies in response to new trends and competitive actions ensures sustained competitiveness. The ability to adjust marketing campaigns in real time helps quickly meet evolving audience needs.

In summary, implementing an information system in the marketing department leads to numerous positive changes, enhancing operational efficiency, decision-making quality, and customer relations. These improvements make business processes more flexible, adaptive, and productive, contributing to the overall growth of the company.

The impact of information systems on a company's operations cannot be underestimated. Through IS deployment, companies can not only boost the efficiency of internal processes but also improve interactions with clients. Automating routine tasks frees employees to focus on strategic issues, positively affecting overall business success. Additionally, employing IS shapes conditions for rapid and flexible response to market changes, which is especially important in today's dynamic environment. Companies leveraging modern information technology create a sustainable competitive advantage by delivering greater value to clients and ensuring sustained long-term growth and development.

Therefore, information systems are becoming an integral part of future marketing strategies, fostering innovation and efficient management.

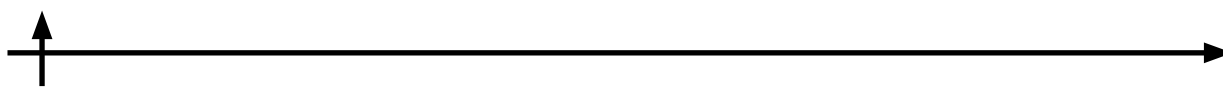


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Статья поступила в редакцию 25.07.2025; одобрена после рецензирования 04.08.2025; принята к публикации 11.08.2025.

The article was submitted 25.07.2025; approved after reviewing 04.08.2025; accepted for publication 11.08.2025.