
RAD-Based Public Opinion Monitoring Information System for BSN

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ABSTRACT

The growing influence of online media in shaping public opinion has driven government institutions to modernize their monitoring and communication systems. This study aims to develop a web-based information system for monitoring public opinion, tailored to the needs of the National Standardization Agency of Indonesia (BSN). Using the Rapid Application Development (RAD) approach, the system was built through a phased prototyping and user involvement to ensure functional relevance. The final system enables sentiment classification of news articles, centralized data storage, trend visualization, and automated news clipping. Evaluation results indicate improvements in monitoring speed, accuracy, and usability compared to previous manual methods. This study confirms the effectiveness of RAD in building practical digital tools for public sector communication and reputation management.

Keywords: public opinion; online media; web-based system; RAD; monitoring; BSN

INTRODUCTION

The development of information technology has had a significant impact on modern society, particularly in how people acquire and disseminate information. One of the most prominent implications is the growing role of online media in shaping public opinion. Online media allows for rapid, widespread, and interactive dissemination of information. In the context of government institutions, online media can serve as a strategic tool to build public image, communicate policies, and monitor public perception of institutional performance.

The National Standardization Agency of Indonesia (Badan Standardisasi Nasional - BSN), as a government body responsible for the development and supervision of standardization in Indonesia, plays a crucial role in ensuring the quality of products, processes, and systems through the Indonesian National Standard (Standar Nasional Indonesia - SNI) (Arianty, 2025). Public trust in BSN is strongly influenced by the institution's ability to maintain its reputation and credibility among stakeholders. Therefore, monitoring public opinion becomes a strategic activity to support decision-making processes.

Online media coverage greatly influences public opinion about BSN, whether in the form of appreciation or criticism. Amid the rapid and disruptive flow of information, the spread of negative content or hoaxes can damage the institution's reputation in a very short time. For this reason, BSN requires a system capable of recording and analyzing public opinion quickly, accurately, and in a structured manner to enable timely issue response.

Currently, media monitoring by BSN's Public Relations Team is still carried out manually through news clipping collection, weekly reports, and institutional issue analysis. However, this method has limitations in terms of speed, efficiency, and data integration. When the volume of news increases significantly or when the agency faces strategic issues, manual processes become inadequate to support effective response.

Unintegrated monitoring activities can delay issue analysis and hinder public communication responses as well as crisis management. Moreover, manual monitoring results make it difficult to search archives, track specific issues, and compile long-term trends due to the lack of database systems and automated reporting. In fact, BSN's 2024 Public Relations Strategy highlights the importance of improving data-driven public communication performance.

An integrated public opinion monitoring information system would support BSN in composing press releases based on current issues and evaluating internal policies responsively. Information technology enables the development of a web-based system supported by databases and analytics that can generate real-time and highly useful insights. This system also aligns with digital public service transformation policies that emphasize efficiency and bureaucratic accountability.

The system development is designed using the Rapid Application Development (RAD) approach, which emphasizes rapid prototyping, active end-user involvement, and iterative testing. This method is well-suited to

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government needs that require quick and relevant outcomes. The system is expected to enhance the professionalism of BSN's Public Relations Division in managing public opinion in a digital, structured, and sustainable manner.

Based on the above background, the research questions of this study are as follows:

1. How to design a public opinion monitoring information system for online media that meets the needs of BSN's Public Relations Division?
2. What features and components are required for the system to effectively filter, store, and analyze public opinion?
3. How can the Rapid Application Development (RAD) method be applied in designing and developing this information system?

The objectives of this study are:

1. To design a public opinion monitoring information system for online media that aligns with the needs of BSN's Public Relations Division.
2. To determine the key features and components required to effectively filter, store, and analyze public opinion.
3. To appropriately implement the Rapid Application Development (RAD) method in the development of BSN's public opinion monitoring system.

The benefits of this research can be described as follows:

1. Academically:
Contributing to the advancement of knowledge in the development of monitoring information systems using the RAD method.
2. For BSN:
 - Providing an information system capable of enhancing the efficiency of public opinion monitoring.
 - Supporting the formulation of communication strategies and press releases based on data.
3. For government public relations practitioners:
 - Offering a replicable model of public opinion monitoring systems for other government institutions.
 - Serving as a reference for managing institutional reputation strategically and based on data.

LITERATURE REVIEW

This study is grounded in several interrelated concepts, including information systems, media monitoring, public opinion, online media, and the Rapid Application Development (RAD) approach. A review of previous literature indicates a strong connection between advancements in information technology and the needs of organizations, particularly government institutions, to respond to public opinion in a timely and data-driven manner.

Information System

An information system serves as the foundational framework that enables organizations to manage and utilize data effectively. It comprises a structured integration of hardware, software, communication networks, and other resources that function collaboratively to collect, process, store, and distribute information. Within this system, data is transformed into meaningful information that supports decision-making and reduces uncertainty.

A system, by definition, consists of interrelated components operating under defined procedures to achieve specific objectives. These components include system boundaries, external environments, and the direction or goals of the system itself. When applied in an organizational context, particularly within government institutions, information systems become vital tools for managing complex workflows, enhancing transparency, and ensuring accountability (Pratama & Ikhwan, 2023).

In the context of this study, the information system acts as the core mechanism through which public opinion data is monitored, analyzed, and presented. By leveraging the capabilities of a web-based system, organizations such as BSN can respond more effectively to public sentiment and institutional reputation issues. Thus, the role of the information system is not only technical but also strategic, supporting a responsive, data-driven approach to public communication and reputation management.

Monitoring

Monitoring is understood as a systematic and continuous process for gathering and analyzing information against predefined indicators so that the implementation of a program can be evaluated and improved (Pramana & Hidayatullah, 2022). When embedded in an information system, monitoring provides tangible benefits such as

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real-time performance tracking, accelerated service completion, and early-warning alerts for impending deadlines or anomalies (Pramana et al., 2022).

In managerial practice, monitoring plays a crucial role in ensuring that activities are carried out as planned, identifying problems at an early stage so that they can be addressed promptly, evaluating the appropriateness of the work methods and management strategies being used, and assessing the extent to which ongoing activities align with the established objectives (Pramana et al., 2022).

Within the context of this study, monitoring becomes the operational backbone of the proposed public opinion system. By automating data collection and analysis, the system enables BSN to evaluate emerging issues and institutional performance indicators almost instantaneously, providing precisely the timely and data-driven response that modern government communication requires.

Media Monitoring

Media monitoring represents a specialized application of the broader monitoring concept in the field of public relations. It involves systematically collecting, evaluating, and interpreting media content to understand how an organization, its policies, or related events are portrayed in the public sphere (Kholida & Dulwahab, 2024). The primary aim is to gauge reputational impact by classifying coverage as positive, negative, or neutral (Kholida et al., 2024).

A typical media monitoring workflow consists of four iterative stages that operate in sequence. It begins with data mining, where relevant online content is retrieved using targeted keywords. This is followed by data processing, which involves identifying the sentiment of the content and categorizing it accordingly. The next stage is analysis, in which trends are aggregated and interpreted to reveal broader patterns. Finally, the reporting stage presents these insights to decision-makers, enabling them to take informed and strategic actions (Kholida et al., 2024).

In government institutions, where public perception can influence policy legitimacy, media monitoring functions as an early-detection radar for reputational risks and stakeholder concerns. Coupling media monitoring with a robust information-system architecture, as this study proposes, allows BSN to move from reactive press-clipping routines toward proactive, data-driven reputation management.

Public Opinion

Public opinion refers to the collective attitudes and beliefs held by a group of individuals concerning a specific issue. It is formed through continuous social interaction and communication within a community (Serliana, Aqillah, Lumban Gaol, & Zhafran, 2025). In democratic societies, public opinion serves as an essential mechanism of social oversight, helping to evaluate government performance and ensuring institutional accountability to the public.

Mass media, including newspapers, television, radio, and digital platforms, plays a central role in shaping and conveying public opinion. It functions not only as a channel for delivering information but also as a powerful influence on how the public perceives and responds to evolving social and political issues (Aridho et al., 2024). The way media presents and emphasizes certain narratives can significantly affect the direction and intensity of public sentiment.

In the context of this study, public opinion is viewed not merely as a passive reflection of social attitudes but as a dynamic force that government institutions must actively monitor and respond to. As the flow of information becomes increasingly digital, institutions such as BSN are required to track public sentiment more frequently and more precisely. The proposed system is designed to meet this need by enabling the automated collection and analysis of opinion data from online media sources. This capability supports the institution in delivering timely and evidence-based communication strategies, in line with the literature's emphasis on responsiveness and data-driven decision-making in public sector communication.

Online Media

Online media represents the third generation of mass communication, emerging after traditional print media such as newspapers, magazines, and books, as well as electronic media including radio, television, and film. It is the result of journalism practices developed on digital and internet-based platforms (Rosidin & Hamid, 2020). As a subset of what is known as new media, online media, also referred to as cyber media, signifies a major shift in how information is created, distributed, and consumed (Kustiawan, Ja'far, Siregar, Purba, & Muhammad, 2022).

Online media has several distinct characteristics that set it apart from conventional media and serve as its primary advantages in delivering information. These characteristics include:

- a. Unlimited space – web pages can host content of unlimited length.
- b. Flexible management – content can be uploaded and edited anytime, from anywhere.

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- c. No publishing deadlines – content can be published at any time, independent of a fixed schedule.
- d. Access speed – once published, content can be instantly accessed by the public.
- e. Global reach – can reach audiences worldwide as long as they have internet access.
- f. Timeliness – presents up-to-date information thanks to the ease and speed of distribution.
- g. Continuous updates – information can be updated at any time as needed.
- h. Interactive and egalitarian – enables two-way communication through comment sections, discussion forums, polls, and other interactive features.
- i. Well-documented – information is stored digitally and can be retrieved through archives, related links, or search functions.
- j. Linked to external sources – hyperlinks allow users to trace related information from other sources relevant to the content being read (Kustiawan et al., 2022).

In relation to this study, online media is not only a channel for public communication but also a strategic data source for understanding public sentiment. Its capacity to generate large volumes of real-time and sentiment-rich content makes it particularly valuable for institutions like BSN to monitor public opinion effectively. Integrating online media into an automated monitoring system supports faster institutional responses to emerging issues and strengthens the practice of data-informed public engagement in a rapidly evolving digital environment.

Rapid Application Development (RAD)

Rapid Application Development (RAD) is a system development methodology that prioritizes speed and adaptability through rapid prototyping and iterative development. This approach emphasizes user involvement and continuous feedback throughout the development cycle to ensure that the resulting system aligns closely with user needs and expectations (Salsabila, Pradini, and Rikatsih, 2023).

RAD is especially well-suited for projects that require frequent system updates and fast delivery of results. By promoting flexibility and encouraging active participation from end-users, this method supports continuous improvement during development while helping to reduce time and cost (Mulyati, Herdiansah, Taufiq, Prianggodo, & Bukhori, 2024). It relies on key principles such as prototype iteration, repetitive development cycles, quick response to user input, and accelerated project completion.

In this study, RAD was chosen as the most appropriate development strategy for building a public opinion monitoring information system tailored to the needs of BSN. The dynamic nature of online media and the demand for timely public communication responses require a development approach that is both flexible and efficient. RAD offers a practical solution by allowing user feedback to be incorporated in real time and by enabling system features to evolve based on institutional requirements. This reflects the broader consensus in the literature regarding the importance of agile, user-driven methodologies in supporting digital transformation within government institutions.

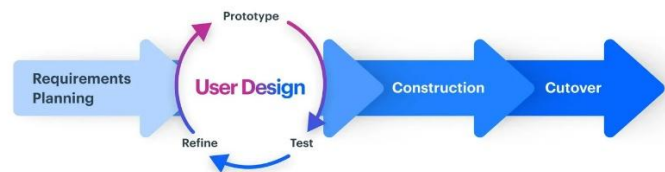


Figure 1 Stages of Rapid Application Development (RAD) Method

Position of This Study

Based on the literature synthesis above, it is evident that studies on public opinion monitoring systems have been widely conducted. However, most of them remain limited to general technical aspects or are explored in non-institution-specific contexts. This study occupies a unique position by focusing on the development of a system specifically tailored to the needs of the National Standardization Agency of Indonesia (BSN), incorporating features such as sentiment classification, data visualization, and automated news clipping. The RAD approach was chosen not only for its efficiency but also for its ability to accommodate user needs through rapid and targeted iterations. Therefore, this study reinforces and extends previous research by offering a more integrated, operational, and institutionally responsive approach.

METHOD

Type of Research

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This research is a software engineering study using a case study approach. The system development was carried out using the Rapid Application Development (RAD) method.

According to Stephen R. Schach, software engineering is a branch of science designed to produce reliable software, developed in a timely manner, and capable of meeting user needs and expectations (Naista & Hasibuan, 2022).

Software engineering can be defined as the process of modifying software with the goal of developing, maintaining, and rebuilding systems by applying engineering principles. The main objective is to produce software that functions optimally, efficiently, and effectively for users (Naista et al., 2022).

Research Object and Focus

The object of this research is news and public opinion related to the National Standardization Agency (BSN), which is disseminated through online media.

The focus of this research is to design and develop a web-based public opinion monitoring information system capable of identifying and classifying information from online media into positive, negative, or neutral categories automatically and in a structured manner. This focus encompasses the entire software engineering process, including user requirements analysis, interface design, prototyping, and system testing using the Rapid Application Development (RAD) method, so that the resulting system is error-free, timely delivered, and meets user needs and satisfaction.

Research Location and Duration

This research will be conducted at the National Standardization Agency (BSN) over a three-month period, starting from May to July 2025.

Data Sources

- Primary Data: Collected through interviews with BSN's public relations management and staff. Additional primary data was obtained through direct observation, including tracking, scanning, editing, uploading, and analysis of tracking data (Arianty, 2025).
- Secondary Data: This study also utilizes secondary data, including documents such as the Public Issue Monitoring Procedure and Weekly News reports (Arianty, 2025).

Data Collection Techniques

1. Observation of news monitoring activities conducted by BSN's Public Relations Team.
2. Interviews with relevant staff involved in managing information and public opinion.
3. Document study of Weekly News archives and other related internal documents.
4. Literature study through reviewing scholarly journals, books, and previous publications related to information systems, public opinion, and the Rapid Application Development (RAD) method.

Research Stages

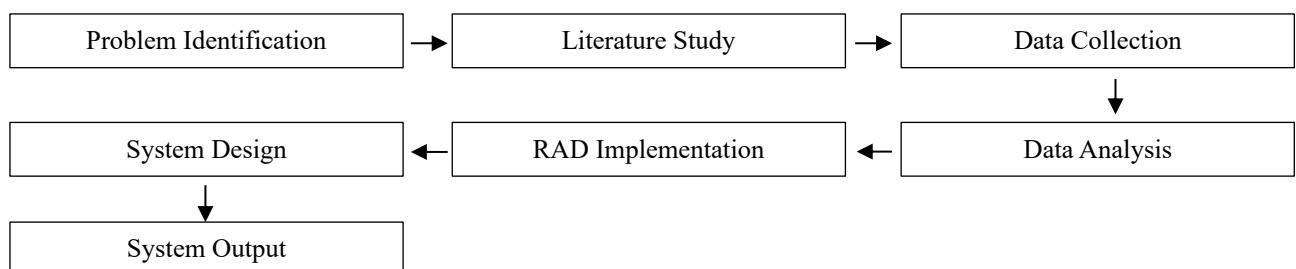


Figure 2 Research Flowchart using RAD Method (Pratama et al., 2023)

This study was conducted through several systematic stages as follows:

1. Problem Identification: The research begins by identifying the existing problems related to the need for a public opinion monitoring system at the National Standardization Agency (BSN), especially in addressing the challenges of public communication in the digital era.

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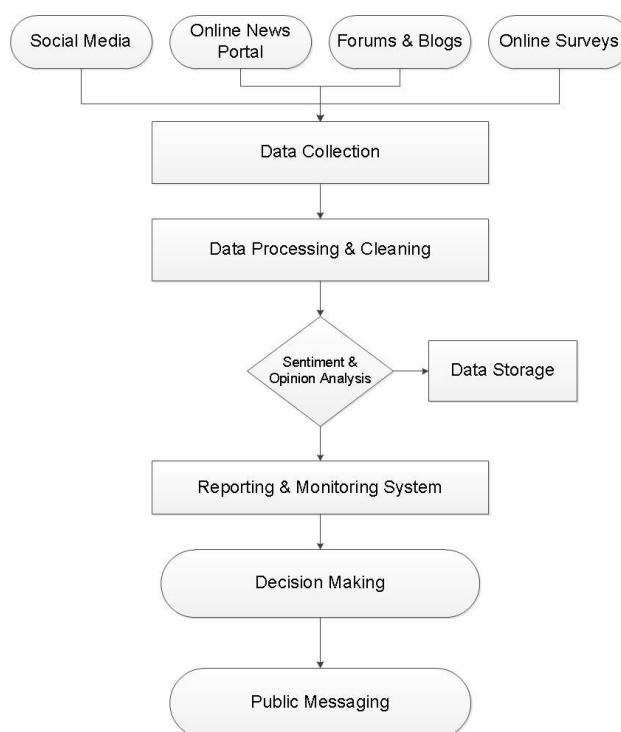
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2. Literature Review: References are reviewed from books, scientific journals, policy documents, and other credible sources related to public opinion, information systems, and the RAD method.
3. Data Collection: Data is collected through direct observation, interviews with BSN's PR staff, and documentation of internal reports and publications such as Weekly News to obtain a clear picture of the system requirements.
4. Data Analysis: The collected data is analyzed to identify user needs, system specifications, and classification of public opinion based on positive, negative, or neutral categories.
5. Implementation of RAD Method: The study applies the RAD method, which includes rapid prototyping, iterative testing, and evaluation based on user feedback.
6. System Design: Based on the analysis and RAD stages, the public opinion monitoring information system is designed, including interface design, database structure, and system workflow.
7. System Results: The final stage presents the results of the designed and developed system, including the tested prototype and initial performance evaluation based on user input. The system was developed using Visual Studio Code as the text editor, PHP as the web builder, Bootstrap for the interface design, HTML as the structural markup for web pages, and MySQL as the system's database.

RESULT

Flowmap

A flowmap is a visual representation that illustrates the movement of a process or information within a system. Depending on the context, it can depict data flow, workflow, or business process flow. This diagram serves to aid in understanding and visualizing the stages or changes that occur throughout a process. Flowmaps are commonly used in process analysis, project planning, and system design as a tool to show how information or tasks move from one stage to another (Rasiban, Septiansyah, Hasanah, Permatasari, & Yuliawati, 2024).



Public Opinion Monitoring System

Figure 3 System Flowmap

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The Public Opinion Monitoring Information System Diagram

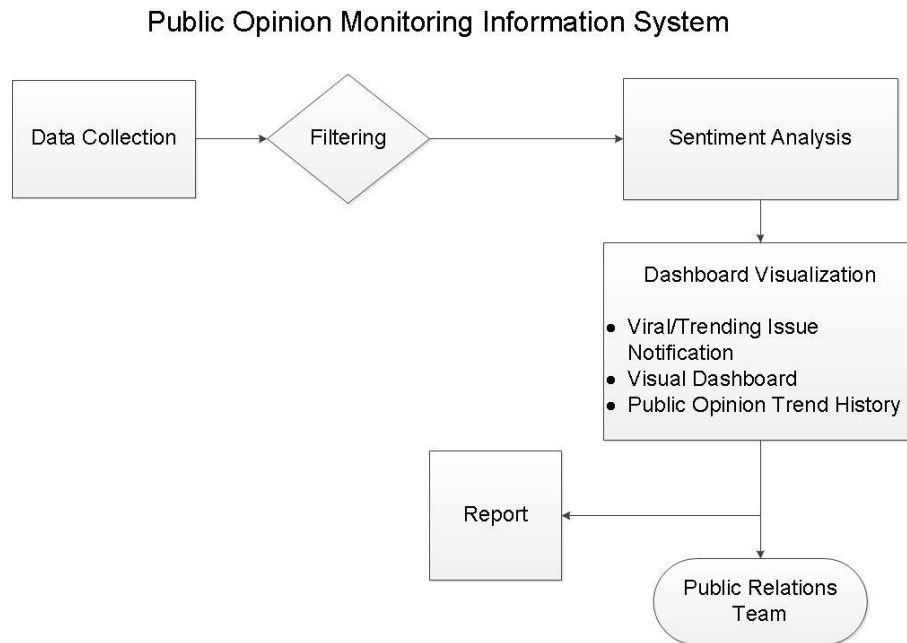


Figure 4 The Public Opinion Monitoring Information System Diagram

Diagram Use Case

A use case diagram illustrates the expected functionalities of a system. A use case is intended to represent the interaction between an actor and the system. An actor is a human entity that interacts with the system to perform specific tasks or activities (Rahmatuloh & Revanda, 2022).

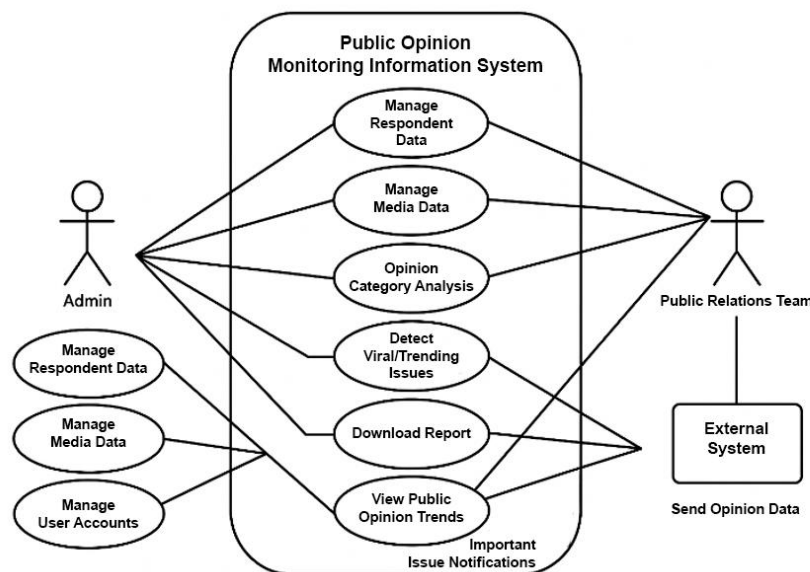


Figure 5 Use Case Diagram of the System

Activity Diagram

An activity diagram is a visual representation that illustrates the sequence of activities or workflows within a system or business process. It is important to note that this diagram focuses on the activities occurring within the system, rather than the actions performed by actors. Activity diagrams also support the representation of parallel processes. In general, an activity diagram maps how the flow of activities begins, the possible decision points along the process, and how the process concludes (Ari & Wahid, 2023).

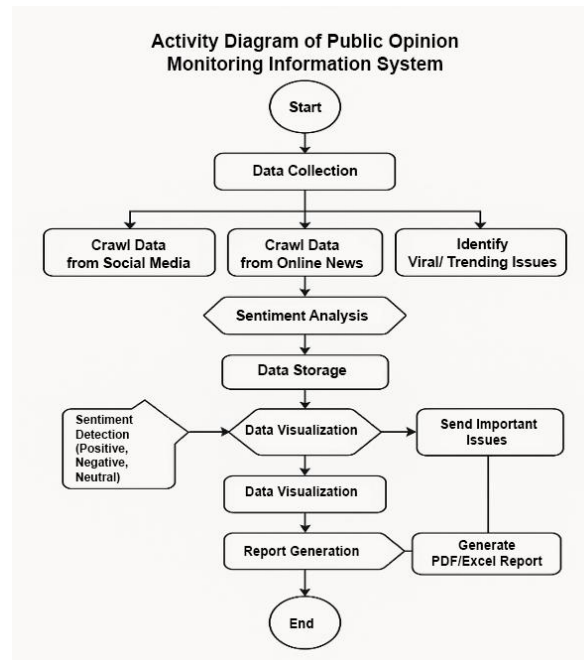


Figure 6 Activity Diagram of System Workflow

Database Design

At this stage, the implementation is carried out by realizing the database design into its physical form on external storage media, in accordance with the rules defined by the Database Management System (DBMS) being used. In this study, one of the DBMS employed is My Structured Query Language (MySQL) (Wijaya, Menteng, Surya, Julianto, & Utami, 2021).

Table 1 Opinion Table – Column Descriptions and Data Types

Nama Kolom	Tipe Data	Primary Key
PKid_opini	INT (PK)	Primary Key
PKid_responden	INT (PK)	Primary Key → Responden
PKid_media	INT (PK)	Primary Key → Media
PKid_kategori	INT (PK)	Primary Key → Kategori
Konten	TEXT	Isi opini atau komentar
Sentimen	VARCHAR	Nilai sentiment (Positif/Negatif/Netral)

Table 2 Respondent Table – Column Descriptions and Data Types

Nama Kolom	Tipe Data	Keterangan
PKid_opini	INT (PK)	Primary Key
Nama	VARCHAR	Nama Responden
Usia	INT	Usia Responden
Jenis kelamin	INT (PK)	Jenis Kelamin (L/P)
Lokasi	VARCHAR	Lokasi atau domisili

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Table 3 Media Table – Column Descriptions and Data Types

Nama Kolom	Tipe Data	Keterangan
PKid_media	INT (PK)	Primary Key
Nama_Media	VARCHAR	Nama Media
Jenis_Media	VARCHAR	Jenis Media

Table 4 Category Table – Column Descriptions and Data Types

Nama Kolom	Tipe Data	Keterangan
PKid_Kategori	INT (PK)	Primary Key
Nama_Kategori	VARCHAR	Nama kategori opini

Table Relationships

- Opinion → Respondent: Many-to-One (Many opinions can come from one respondent)
- Opinion → Media: Many-to-One (Many opinions originate from one media source)
- Opinion → Category: Many-to-One (Many opinions can fall under one category)

Application Design

The application design consists of:

Account Registration Page

Figure 7 User Registration Page

User Login Page

Figure 8 User Login Page

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Home Page (Dashboard)

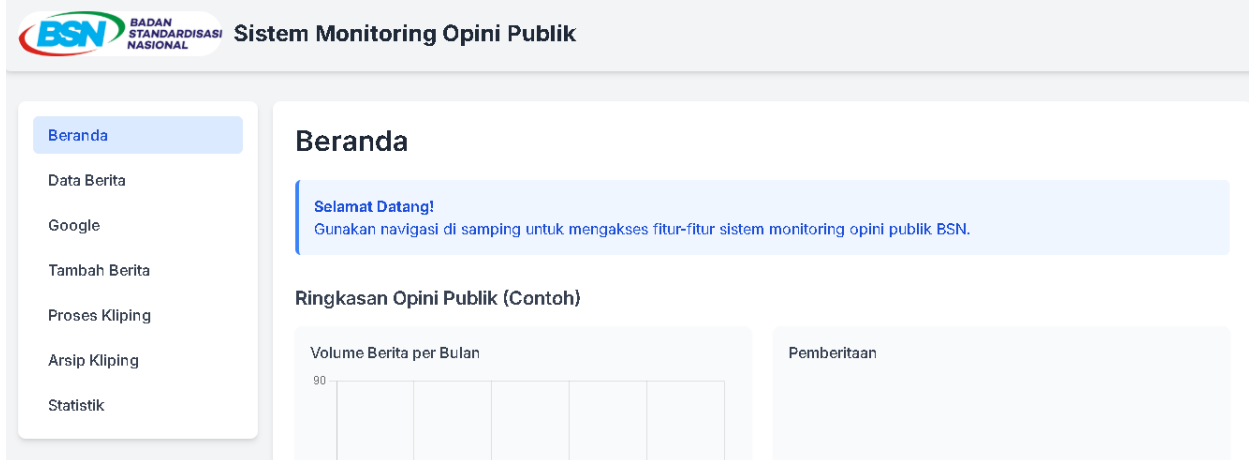


Figure 9 Home Dashboard

The Dashboard section displays:

- Public Opinion Summary Chart: Presents a visual summary of public opinion trends toward BSN, possibly in the form of line or area charts showing the volume of news over time, as well as bar charts visualizing the sentiment of coverage (positive, negative, neutral).
- Latest News: A snapshot of the most recent and relevant news articles.

News Data



Figure 10 News Data

The News Data section displays a list of collected news articles. Each article's details can be viewed by clicking on it.

- News Table: Displays news articles in a tabular format with columns such as:
 - News Title
 - Media
 - Date
 - Sentiment
 - Category
- Search and Filter Features: Allow users to search for news based on keywords, date range, media outlet, or category.

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Google

The screenshot shows the 'Google' section of the 'Sistem Monitoring Opini Publik' interface. On the left is a sidebar menu with options: Beranda, Data Berita, Google (highlighted), Tambah Berita, Proses Kliping, Arsip Kliping, and Statistik. The main area is titled 'Pencarian Google' and contains a search input field with the placeholder text 'Masukkan kata kunci pencarian Google...'. To the right of the input field is a blue button labeled 'Cari di Google'. Below the input field, a small note reads: 'Klik tombol "Cari di Google" untuk membuka hasil pencarian di tab baru.'

Figure 11 Google Search Box

Google Search Box:

This serves as a direct interface to access the Google search menu. You can enter keywords, and the system will redirect you to relevant Google search results. This is useful for searching news outside the internal database or conducting quick research.

Add News

The screenshot shows the 'Tambah Berita Baru' form in the 'Sistem Monitoring Opini Publik' system. The left sidebar menu is identical to Figure 11, with 'Tambah Berita' highlighted. The form fields include: 'Judul Berita' (Title), 'Media' (News Outlet), 'Tanggal' (Date) with a date picker set to 'mm/dd/yyyy', 'Pemberitaan' (News Sentiment) with a dropdown menu showing 'Pilih Pemberitaan', 'Halaman (Opsional)' (Optional Page), 'Pokok Berita' (Main Points), 'Ringkasan' (Summary), and 'Kategori' (Category) with a dropdown menu showing 'Pilih Kategori'.

Figure 12 Add News Form Interface

This is a form that allows Public Relations personnel to manually enter news articles into the system.

Form Fields:

- Title: Full title of the news article.
- Media: Name of the news outlet or publication.
- Date: Date of publication (using a date picker).
- News Sentiment: Dropdown selection (Positive, Negative, Neutral).
- Page: Page number (if from print media).
- Main Points: A brief summary or key points of the news.

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- Summary: A more detailed summary of the article.
- Category: Dropdown options (e.g., BSN, SNI Development, SNI Implementation, Standardization, Accreditation, and SNSU).
- PR Recommendation: Text field for public relations action recommendations related to the news item.

Clipping Process

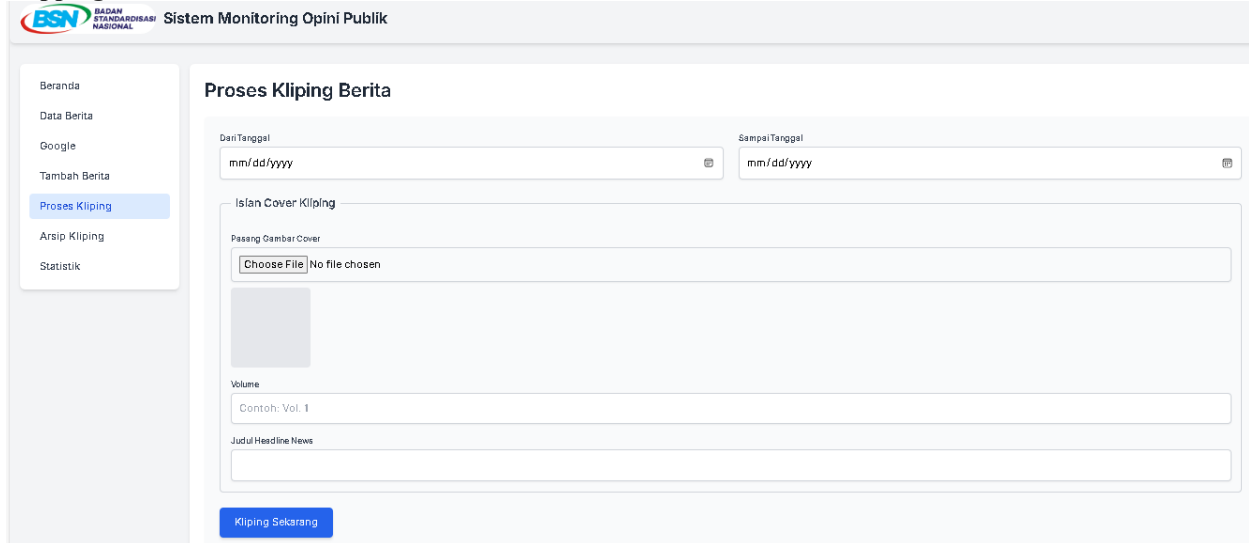


Figure 13 Automated Clipping Feature Form

This feature helps Public Relations personnel create bundled news clippings automatically.

Clipping Form:

- From Date: Start date for the clipping.
- To Date: End date for the clipping.
- Cover Fields:
 - Upload Image: Button to upload a cover image (e.g., BSN logo or other relevant image).
 - Volume: Clipping volume number (e.g., Vol. 1, Vol. 2).
 - Headline News Title: Main title for the clipping cover.
- “Clip” Button: Once the form is filled out, click this button to automatically generate the clipping bundle. The system will gather all news articles within the specified date range and compile them into a digital clipping bundle format.

Clipping Archive

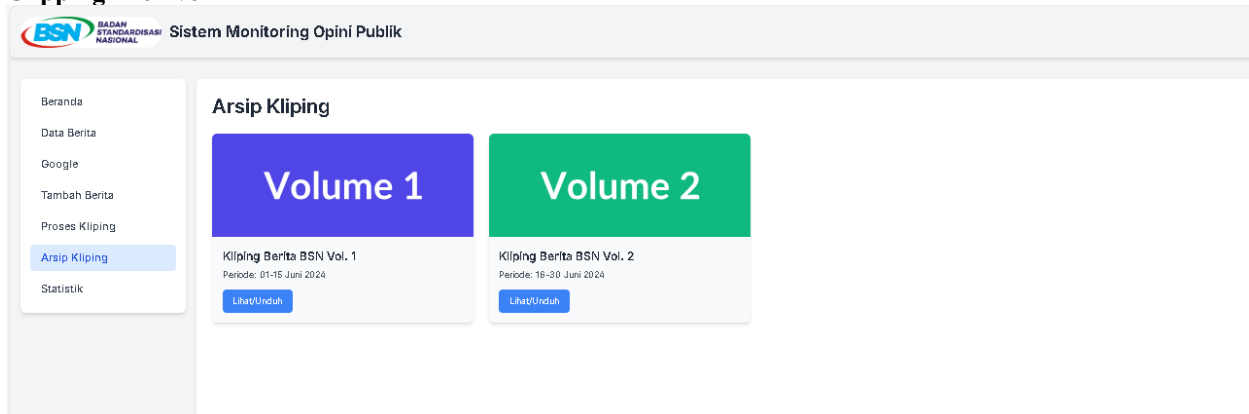


Figure 14 Archive Page for Clipping Bundles

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This section displays the archive of all clipping bundles that have been created.

- Clipping Volume List: Shows the titles of the clipping volumes along with their respective cover images.
- Download Clipping: Users can click on a volume to download the clipping bundle in PDF or other digital formats.

Statistic

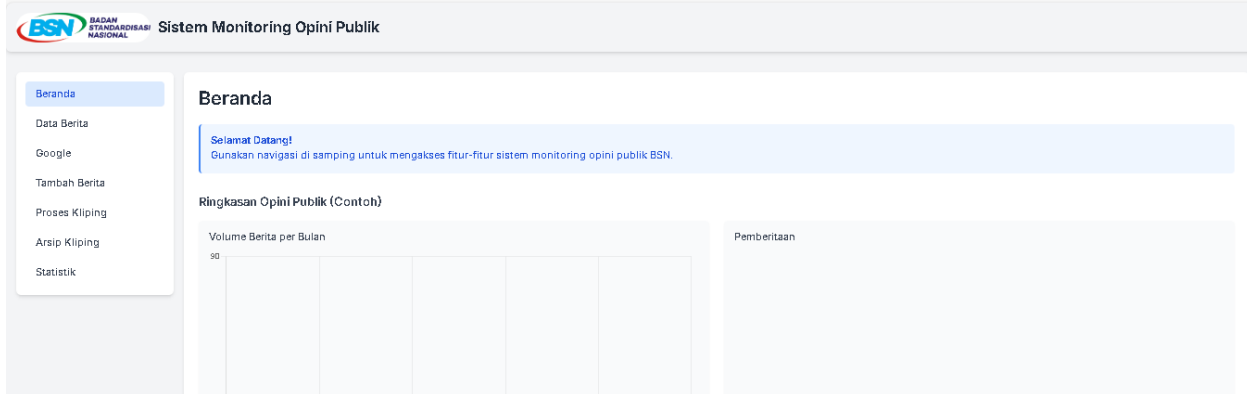


Figure 17 Statistics Page

This section is for viewing visual statistical reports of news coverage.

- News Trend Chart: Displays the volume of news over time (line chart).
- News Sentiment Chart: Pie or bar chart showing the proportion of positive, negative, and neutral news.
- News by Media Chart: Bar chart showing the number of news articles from each media outlet.
- News by Category Chart: Bar chart showing the distribution of news based on categories.
- Detailed Report: Ability to download statistical reports in CSV or PDF format.

System Evaluation Results

To assess the performance and practical usability of the developed public opinion monitoring information system, a series of evaluation measures were conducted. These evaluations included technical performance metrics, sentiment classification accuracy, and user usability testing involving staff members from the BSN Public Relations Division.

1. System Performance Testing

Internal testing was carried out to measure the system's response speed under standard usage scenarios. The average response time for loading the dashboard interface was recorded at 1.3 seconds, while the average time required to retrieve sentiment-classified news entries was approximately 2.1 seconds. These results indicate that the system performs efficiently within expected operational parameters for web-based applications.

2. Sentiment Classification Accuracy

To evaluate the accuracy of the system's sentiment classification, a comparison was made between the system-generated sentiment labels and manual assessments conducted by BSN PR staff. A sample of 50 news articles was analyzed. The classification accuracy reached 86%, with most misclassifications occurring in articles containing neutral or ambiguous language. These results demonstrate that the system is sufficiently reliable for initial sentiment detection and further manual verification if needed.

3. Usability Testing

A limited formative usability test was conducted with three staff members from BSN's Public Relations Division. The participants were chosen based on their roles in daily media monitoring and public opinion analysis. They interacted with key modules of the system, including sentiment classification, news data filtering, and clipping creation.

Following the test, participants provided qualitative feedback on their experience using the system. Overall, users found the interface intuitive and the sentiment filtering functionality helpful for summarizing public narratives. While no major usability issues were reported, participants suggested minor improvements such as simplifying the news entry form and providing a help tooltip on the dashboard.

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Although limited in scale, this early-stage usability feedback supports the system's alignment with user needs and highlights areas for refinement prior to full deployment.

DISCUSSIONS

The development of a public opinion monitoring information system for BSN using the RAD method has successfully addressed the three main research questions and fulfilled the objectives of this research.

First, regarding the design of a system tailored to the needs of BSN's Public Relations Division, the project produced a web-based application aligned with the institution's workflow. The system was structured based on user needs analysis, incorporating features such as real-time data access, structured storage, and flexible interfaces to support effective decision-making. The modular architecture enables BSN to manage large volumes of online media content efficiently and to respond more quickly to emerging public opinion trends.

Second, to meet the need for essential features and components, the system integrates several core functionalities that facilitate the filtering, storing, and analyzing of public opinion. These include:

- Real-time news input forms with Google search integration
- Sentiment classification (positive, negative, neutral)
- Keyword search and filtering tools
- Statistical dashboards visualizing sentiment trends
- Automated news clipping and archiving modules
- Downloadable reports for documentation and analysis

These features were intended to replace the previous manual monitoring process that relied on weekly news clippings and lacked the capacity for dynamic search, visualization, and analytical insight.

Third, the application of the RAD methodology demonstrates how rapid prototyping, iterative feedback, and close collaboration with users can streamline the development of complex systems. The RAD approach allowed the system to evolve based on real-time input from BSN personnel, ensuring that the resulting application aligned closely with user expectations and institutional objectives. Through several development cycles involving planning, design, construction, and evaluation, the system was completed within a relatively short timeframe while maintaining high usability and functionality.

The developed system was built using open-source technologies including Visual Studio Code, PHP, Bootstrap, HTML, and MySQL. This combination provided the flexibility, scalability, and cost-efficiency required for digital development in government environments.

Compared to BSN's earlier approach, which involved manual documentation and limited accessibility, the new system delivers a centralized database, streamlined workflow, and real-time monitoring capabilities. These enhancements significantly increase the speed and quality of public opinion analysis and contribute to BSN's overall strategic communication and reputation management practices.

However, certain limitations remain. The current news input process still requires manual entry, which may limit real-time performance during periods of high media activity. Future development should consider integrating application programming interfaces (APIs) with online news aggregators or deploying web crawlers to enable automated data collection and large-scale sentiment analysis.

The findings confirm that the implemented system aligns with the operational needs of BSN's Public Relations Division. It incorporates key functionalities for filtering and analyzing online media data and highlights the practical advantages of the RAD methodology in government system development. The solution developed here may also serve as a replicable model for other public institutions seeking to modernize their media monitoring and reputation management functions.

In comparison with previous research, the implementation reflects similar strengths identified in other RAD-based system development initiatives. For example, Pratama and Ikhwan (2023) developed a sentiment monitoring system using RAD in a regional government communication office. While their system focused on sentiment detection and data storage, the current solution offers more advanced features such as automated news clipping and interactive data visualization, which are customized to BSN's operational context. This suggests that RAD is not only suitable for rapid prototyping but is also adaptable to institution-specific complexities.

Mulyati et al. (2024) similarly applied RAD to develop an educational information system and emphasized the methodology's ability to accelerate development cycles and incorporate user feedback efficiently. Unlike their school-oriented implementation, the system presented in this research focuses on national-level public opinion monitoring. This demonstrates that RAD can be effectively scaled across different public service sectors. Moreover, the integration

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of sentiment analysis and usability testing in this work addresses gaps found in prior RAD-based studies, many of which lacked formal user validation or measurable performance indicators.

By situating this research within the broader context of RAD-based development in the public sector, the results contribute to a deeper understanding of how agile methodologies can support institutional responsiveness in dynamic information environments. This implementation not only delivers technical efficiency but also reinforces strategic alignment with organizational communication priorities.

CONCLUSION

This study successfully designed and implemented a public opinion monitoring information system tailored to the operational needs of BSN. Using the RAD methodology, the system was developed through iterative cycles involving close user collaboration, which enabled the alignment of system features with institutional workflows and communication objectives. Key functionalities such as sentiment classification, news filtering, data visualization, and automated news clipping significantly improve the agency's ability to monitor, analyze, and respond to public opinion in a timely and data-driven manner.

The system development demonstrated that the RAD approach is well-suited for government institutions operating in dynamic information environments. Through performance testing, sentiment accuracy evaluation, and usability feedback from BSN staff, the system proved effective in supporting public relations tasks, offering improvements in speed, accuracy, and decision-making support compared to previous manual methods. The integration of user feedback at each development stage further confirmed the importance of agile, user-centered methodologies in digital government initiatives.

However, the study is not without limitations. The current version of the system still relies on manual input for news entries, which may hinder real-time responsiveness during high-volume media coverage. In addition, the usability testing was conducted with a limited number of participants, which restricts the generalizability of the feedback. Future research should explore the integration of automated data collection technologies such as web crawlers or APIs connected to news aggregators, enabling broader and faster sentiment capture. Further development should also include comprehensive usability testing involving more diverse user groups and the use of standardized usability measurement instruments such as SUS (System Usability Scale) or heuristic evaluations.

In summary, the public opinion monitoring system developed in this study provides a replicable and scalable solution for other government agencies seeking to modernize their media monitoring capabilities. By combining technical robustness with operational relevance, the system represents a strategic advancement in digital public sector communication.

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