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A THREE-LEVEL MODEL OF MEDIA MONITORING SYSTEMS IN THE LANDSCAPE OF MODERN TECHNOLOGIES: INFRASTRUCTURAL, ANALYTICAL AND STRATEGIC APPROACHES

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Abstract:
This thesis analyzes the role of media monitoring systems in the ecosystem of modern technologies on the basis of a systematic approach. In the context of digital transformation, the increasing volume, speed and complexity of information flows are turning media monitoring programs from a simple control tool into a strategic management instrument. The study substantiates a three-level model of monitoring systems: data collection infrastructure, analytical layer and strategic management level.

Keywords: Media monitoring programs, communication, data collection infrastructure, analytical layer, natural language processing (NLP), sentiment analysis, machine learning, trend detection, reputational risk, data-driven management, communication KPI, information security, media intelligence, strategic communication.

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Introduction: Every second, thousands of news items, posts, comments and media materials are published in the global information space. In a situation where the speed of digital communication has surpassed the speed of human decision-making, the greatest risk for organizations is not a lack of information, but an excessive and unmanaged flow of data. As the volume, speed of dissemination and network complexity of information continue to increase, issues of reputational stability, communication effectiveness and strategic management require new approaches. In such conditions, media monitoring systems are becoming a central component of the digital management architecture rather than a simple observation tool.

Main part

If we systematically analyze the communication environment, the role of media monitoring programs in it can be seen at three levels. At the first level, these programs appear as a data collection infrastructure. The effectiveness of media monitoring systems depends, first of all, on the breadth of their coverage of information sources and their ability to collect data continuously and systematically. Therefore, modern monitoring platforms rely on a multilayered technological infrastructure. This infrastructure includes open and authorized application programming interfaces (API), automated web indexing mechanisms (web crawling), content scraping algorithms, RSS/Atom feeds, as well as data aggregation and normalization modules.

The process of data collection through API makes it possible to obtain data in real time from official and structured sources — social networks, news platforms, video hosting services and other digital services. This method ensures the reliability and technical stability of the data, as it is based on a standardized format provided by the platform. However, since not all sources provide API, monitoring systems also

use web crawling technologies. In the crawling process, special bots continuously scan Internet pages, identify updated content, index it and transfer it to the database.

At the stage of data aggregation, content obtained from various formats and sources is brought into a single standard form. Here, technical processes such as normalization, deduplication, language identification, adjustment of timestamps and attachment of metadata are carried out. As a result, a scattered, unstructured and large-scale information flow is transformed into a manageable data warehouse. In addition, modern monitoring infrastructure relies on cloud technologies and distributed server architecture to process large volumes of data. This ensures the uninterrupted operation of the system even under high load and makes it possible to receive information coming simultaneously from thousands of sources. Especially in situations where information spreads rapidly on social networks, such infrastructure is an important factor for the early detection of reputational risks.

Thus, the data collection level forms the technological foundation of the media monitoring system. It is precisely at this stage that the breadth of coverage, accuracy and speed of data are ensured. If this infrastructure is not sufficiently developed, the subsequent analytical and forecasting stages will also not function fully. Therefore, when assessing monitoring systems in the technology landscape, their data collection architecture and integration capabilities should first be considered as the main indicators.

At the second level, this system appears in the analytical layer. If the data collection infrastructure constitutes the technological foundation of the monitoring system, the analytical layer is its intellectual core. It is precisely at this stage that the collected raw data undergo semantic, statistical and algorithmic processing and is transformed into analytical indicators that can be meaningfully understood and serve as a basis for management decisions.

At the center of the analytical layer are natural language processing (Natural Language Processing — NLP) technologies. NLP algorithms analyze the text linguistically: processes such as tokenization, lemmatization, identification of syntactic and semantic relations, and named entity recognition (Named Entity Recognition — identification of names of persons, organizations and places) are carried out. This enables the monitoring system to understand not only the superficial appearance of the content, but also its semantic structure and context.

Sentiment analysis is aimed at identifying the emotional tone in the text. Algorithms classify content into positive, negative or neutral categories on the basis of linguistic units, contextual indicators and machine learning models. In modern systems, this process is carried out not on the basis of simple keywords, but with the help of contextual semantic models, for example, artificial intelligence based on transformer architecture. As a result, the general picture and dynamics of the reputational background around an organization or topic are determined.

Trend detection mechanisms analyze changes in the intensity of information over time. A sharp increase or decrease in the volume of content on a certain topic, keyword or object is automatically recorded as a signal. In this process, time series analysis, dynamic coefficients and anomaly detection models are used. Thus, the monitoring system not only reflects the current situation, but can also identify unusual changes in the information flow.

Clustering of key topics makes it possible to group large volumes of texts thematically. On the basis of machine learning algorithms, for example, unsupervised learning models, materials with similar semantic units are grouped together. This makes it possible to identify the main discourses in the information flow, distinguish the topics shaping the agenda and adapt the communication strategy.

In this respect, the analytical layer transforms the monitoring system from a simple data collection mechanism into a strategic analysis tool. It interprets data not only as a set of indicators, but on the basis of semantic content and reputational context. As a result, organizations gain the opportunity to assess communication effectiveness through empirical indicators, identify risk zones and form a targeted information policy.

Thus, the analytical layer is the main component determining the intellectual level of the media monitoring system, and it represents a clear example of the integration of artificial intelligence and data analysis in the technology landscape.

The third level is manifested at the level of strategic management. It is precisely at this stage that monitoring results serve as a basis for decision-making, correcting the communication strategy and assessing KPIs.

The highest functional stage of a media monitoring system is determined by its integration into strategic decision-making processes. If the data collection level is the technological foundation and the analytical layer is the mechanism of intellectual processing, then the strategic management level ensures the application of monitoring results in real management practice.

At this stage, the indicators developed by the monitoring system — the dynamics of reputational background, share of voice, intensity of media coverage, sentiment coefficient, structure of the thematic agenda, speed of audience reaction — are linked with the organization's overall communication strategy. Here, monitoring data are not merely a statistical report, but serve as an empirical basis for strategic planning, risk management and optimization of communication policy.

At the level of strategic management, monitoring results are used in several directions. First, in the process of assessing and revising communication KPIs. For example, a decrease in the share of negative content or an increase in positive media coverage may indicate the effectiveness of a targeted information policy.

Second, in developing a strategy for managing reputational risks. On the basis of critical topics identified through monitoring, a decision is made on providing a prompt response, issuing an official comment or launching a proactive information campaign. Third, in allocating communication resources — in determining which platform should receive more attention and which audience segment should be worked with more actively.

In addition, at the strategic level, monitoring results serve to form the organization's long-term image policy. On the basis of historical data collected over time, reputational trends, the dynamics of audience trust and the stability of the communication position are analyzed. This makes it possible to create a systematic and forecast-based communication model, unlike short-term reactive measures.

Especially in the activities of state bodies and large institutional structures, raising monitoring to the strategic level strengthens the principle of data-driven governance. Decisions are based not on subjective assessment or intuitive conclusions, but on the real information flow and measurable indicators. In this respect, media monitoring systems are being formed as an integral component of the management architecture in the landscape of modern technologies.

Thus, the strategic management level is the highest functional stage of the monitoring system, completing the processes of data collection and analytical processing and ensuring their integration into real institutional decisions and communication policy. This transforms media monitoring programs from a simple technical tool into a strategic management instrument.

From this point of view, media monitoring programs perform the function of a "digital sensory system" in the technology landscape. They make it possible to detect changes in the information space at an early stage, forecast reputational risks

and assess communication effectiveness. This is especially important in the activities of information services of state bodies and large organizations.

In the conditions of the digital management paradigm, decisions are required to be made not on the basis of subjective assessment, but on the basis of a data-driven decision-making model. Media monitoring programs are emerging as a tool that ensures this very process. They make it possible to measure communication effectiveness through digital indicators: reach, engagement, share of voice, media index, sentiment coefficient and others.

However, it is not sufficient to interpret monitoring only as a technical tool. It is located in the strategic layer of the technology landscape and is directly connected with communication security and information stability. In the conditions of increasing disinformation, fake news and information attacks, monitoring systems serve as a warning mechanism. Therefore, they can be assessed as a component of the modern information security architecture.

Conclusion. The above analyses show that media monitoring systems are being formed in the landscape of modern technologies not as a peripheral or auxiliary tool, but as a central component of the communication management architecture. Their evolution covers the process from the analog clipping model to an integrated analytical platform based on artificial intelligence, Big Data and machine learning. Therefore, the study and improvement of media monitoring systems not only as a technical instrument, but also as an important institutional element of the digital management paradigm, remains an urgent scientific and practical task.

REFERENCES:

1. Aggarwal, C. C., & Zhai, C. (2012). Mining Text Data. Springer. https://www.researchgate.net/publication/268183036_Mining_Text_Data

2. Cambria, E., Schuller, B., Xia, Y., & Havasi, C. (2013). New Avenues in Opinion Mining and Sentiment Analysis. IEEE Intelligent Systems, 28(2), 15–21. https://www.researchgate.net/publication/260305031_New_Avenues_in_Opinion_Mining_and_Sentiment_Analysis
3. Chandola, V., Banerjee, A., & Kumar, V. (2009). Anomaly Detection: A Survey. ACM Computing Surveys, 41(3), 1–58. https://www.researchgate.net/publication/220565847_Anomaly_Detection_A_Survey
4. Coombs, W. T. (2015). Ongoing Crisis Communication: Planning, Managing, and Responding. Sage. https://us.sagepub.com/en-us/nam/ongoing-crisis-communication/book270207
5. Devlin, J., Chang, M.-W., Lee, K., & Toutanova, K. (2019). BERT: Pre-training of Deep Bidirectional Transformers for Language Understanding. NAACL-HLT. https://www.semanticscholar.org/paper/BERT:-Pre-training-of-Deep-Bidirectional-for-Devlin-Chang/df2b0e26d0599ce3e70df8a9da02e51594e0e992
6. Erl, T., Puttini, R., & Mahmood, Z. (2013). Cloud Computing: Concepts, Technology & Architecture. Prentice Hall. https://www.semanticscholar.org/paper/Cloud-Computing%3A-Concepts%2C-Technology-%26-Erl-Puttini/ee850df92f3ed2de0c3589b073edc802b3a2fcab
7. Fielding, R. T. (2000). Architectural Styles and the Design of Network-Based Software Architectures (Doctoral dissertation). University of California, Irvine. https://www.semanticscholar.org/paper/Architectural-Styles-and-the-Design-of-Software-Fielding/49fc9782483bc311c2bd1b902dfb32bcd99ff2d3

8. Hyndman, R. J., & Athanasopoulos, G. (2021). Forecasting: Principles and Practice (3rd ed.). OTexts (open access). https://www.amazon.com/Forecasting-Principles-Practice-Rob-Hyndman/dp/0987507133?crid=2KZIZII16ANWS&keywords=Forecasting:+Principles+and+Practice&qid=1673561096&s=books&sprefix=forecasting+principles+and+practice,stripbooks,73&sr=1-1&linkCode=sl1&tag=freecomputerbooks-20&linkId=891772f68910f3967636ea26435eacda&language=en_US&ref_=as_li_ss_tl
9. Janssen, M., & Kuk, G. (2016). Big and Open Linked Data (BOLD) in Government. Government Information Quarterly, 33(1), 5–7. https://link.springer.com/article/10.1007/s10796-017-9746-2
10. Jurafsky, D., & Martin, J. H. (2023). Speech and Language Processing (3rd ed.). https://www.scirp.org/reference/referencespapers?referenceid=3970727
11. Marz, N., & Warren, J. (2015). Big Data: Principles and Best Practices of Scalable Real-Time Data Systems. Manning Publications. https://ieeexplore.ieee.org/document/10279852
12. Marr, B. (2012). Key Performance Indicators (KPI): The 75 Measures Every Manager Needs to Know. Pearson. https://discovered.ed.ac.uk/discovery/fulldisplay?vid=44UOE_INST:44UOE_VU2&search_scope=UoE&tab=Everything&docid=alma9925333062002466&context=L&isFrbr=true
13. Olston, C., & Najork, M. (2010). Web Crawling. Foundations and Trends in Information Retrieval, 4(3), 175–246. https://dn721908.ca.archive.org/0/items/lecture-01_20240614/9781601983237-summary.pdf