

Role of Large-Scale Data Analytics Risk Information Systems in Addressing Social Disruptions in Infrastructure Development

Rafadi Khan Khayru¹, Khowanas Saeed Qader²

¹Universitas Sunan Giri Surabaya, ²College of Administration and Economics, Lebanese French University, Kurdistan Region, Erbil, Iraq

Email: rafadikhankhayru@gmail.com

ABSTRACT – Large-scale public infrastructure development frequently triggers social conflicts due to delayed identification of community concerns. This study aims to analyze and evaluate the effectiveness of a Big Data-based risk management information system in mitigating social conflicts in public infrastructure projects. Utilizing a qualitative approach with a case study design, data were collected through in-depth interviews, observations, and system log document analysis. The findings indicate that digital data processing integrating natural language processing and social media sentiment analysis provides accurate early warnings regarding conflict-prone zones. The rapid field intervention driven by precise data predictions successfully reduced project disruption incidents and enhanced public trust. This study concludes that the effectiveness of social risk management is fundamentally determined by the synergy between smart data analytics, inter-agency coordination, and humanistic communication actions.

Keywords: big data analytics, information system, risk management, social conflict, public infrastructure, public sentiment, project mitigation.

A. INTRODUCTION

Large-scale public infrastructure development is a key pillar in accelerating economic growth and improving community welfare in many developing countries. Even so, the execution of these vital projects often provokes strong resistance from local residents due to environmental impact, land acquisition, and shifts in settlement patterns. Slow handling of social impact frequently extends project duration and drastically inflates project budgets. Public resistance that escalates into physical disputes shows the limits of conventional management approaches in reading the dynamics of social unrest (Lu et al., 2023). Olander and Landin (2005) argue that mapping and managing the

expectations of local stakeholders determines the success of public construction projects. Such conditions require a more flexible organizational structure so that project management can adjust quickly to changing environmental and social dynamics (Darmawan & Mardikaningsih, 2023).

The transformation of information technology opens new opportunities for renewing project risk governance through extensive Big Data analysis. The collection of large-scale digital data social media posts, online news portals, and public aspiration documents allows potential hazards to be identified more quickly (Hammouri et al., 2024). Simultaneous processing of spatial and textual data helps management teams detect shifts in public perception before open conflict breaks out in the field. This integration of intelligent platforms turns problem handling from a reactive action into a measurable early anticipation. McAfee and Brynjolfsson (2012) state that decisions based on big data provide high accuracy in predicting operational uncertainty and improve overall organizational efficiency. A similar pattern appears in the manufacturing sector, where digital transformation involving big data, artificial intelligence, and the Internet of Things has been shown to optimize supply chain management processes (Putra & Arifin, 2021).

Despite the abundant potential of digital data, risk management practice in government infrastructure projects still relies heavily on periodic manual assessment (Abdolmajid, 2023). This reflects a wider challenge in the Industry 4.0 era, where many organizations have not yet fully adjusted their internal development to keep pace with rapid digitalization (Oluwatoyin & Mardikaningsih, 2024). Traditional evaluation methods often fail to capture the real-time dynamics of residents' emotions and grievances because field

reporting is delayed. Information about resident dissatisfaction is frequently detected only after mass protests bring project operations to a halt. This delayed response harms contractors and damages the partnership between government and affected residents. A digital-based development policy has in fact been shown to drive sustainable and collaborative innovation within an organization, so its absence in risk management practice leaves a considerable gap (Mardikaningsih, Wardoyo, & Hariani, 2024). Flyvbjerg (2009) explains that failure to manage social risk in infrastructure megaprojects stems from overly optimistic estimates and the absence of a reliable early-detection system.

Escalating social unrest in development areas is generally triggered by fear of lost livelihoods, ecosystem damage, and a lack of transparency in compensation. Confusing information circulating among residents accelerates the spread of negative perceptions toward project developers without adequate official clarification (Román, 2024). One-way communication from project managers sharpens residents' distrust of the company's social commitments. Adopting technology such as blockchain to manage data more openly and securely can be one way to strengthen this transparency and rebuild public trust (Khairi & Darmawan, 2025). Without an accurate sentiment-monitoring instrument, public relations teams often formulate messages that fail to address the core of residents' concerns. This situation also calls for a strategic reorientation within project management itself, so that the work environment and communication approach are better designed to respond to social pressure (Issalillah & Khayru, 2025). Bowen et al. (2010) explain that communication transparency and the handling of social justice issues are decisive factors in minimizing potential clashes between project managers and local residents.

The application of natural language processing algorithms to social media data effectively maps conversation trends and public sentiment in depth. A risk management information system integrated with artificial intelligence can classify the vulnerability level of an area based on the frequency and intensity of negative keywords (Sinha et al., 2024). Visualizing social risk maps helps decision-makers direct intervention resources precisely to conflict-prone areas. This analytical approach provides a clear picture of community communication network structures

and key information disseminators. Beyond technical analytical capability, an approach that builds cooperation and empathy among project team members also needs to be developed so that data findings can be followed up more sensitively, for instance through gamification-based learning methods (Putra et al., 2024). Chae (2015) reveals that the use of Big Data analysis on social media provides a deep understanding of public behavior patterns and supports the formulation of a responsive organizational communication strategy.

Based on the phenomena described above, the main problem in this study centers on the suboptimal evaluation of the effectiveness of Big Data-based risk management information systems in reducing social conflict. Many project managers have adopted sophisticated software, yet the results of data analysis often end up as stacks of reports without being followed by appropriate field intervention. The mismatch between technological predictions and management decisions in the field creates a gap in problem-handling efficiency. This gap is closely tied to how project teams are managed, since diversity management strategies that are not implemented optimally can hinder innovation and team performance in translating data findings into concrete action (Darmawan, 2024). Research on the effectiveness of large-scale data analysis specifically for social impact mitigation frameworks in public projects remains very limited. This study's problem formulation emphasizes determining success indicators for Big Data integration in curbing the escalation of resident unrest.

In line with the problem formulation above, this study aims to assess the effectiveness of a Big Data-based risk management information system in mitigating social conflict. This study specifically identifies qualitative and quantitative indicators that influence the successful use of digital data for early detection of project risk. This study formulates an integration model between network-based data analysis and field communication strategy to produce an adaptive management response. An adaptive management response is difficult to achieve without adequate employee engagement and commitment, since positive psychological factors within the management team determine how quickly information is translated into action (Darmawan & Mardikaningsih, 2022). Through these objectives, project managers are expected to be able to reduce resident tension quickly while

keeping the infrastructure work schedule on track. Overall, the success of this strategy also depends on the quality of human resources, work performance, and employee loyalty within the project management organization (Darmawan et al., 2020). Davenport (2014) emphasizes that the effectiveness of data analysis is determined by the extent to which the results of information processing are able to change operational decision-making processes.

This research provides a theoretical contribution to the development of project management science and information systems through the enrichment of literature regarding modern analytical technology-based social risk modeling. Practically, the results of this research present guidelines for government agencies and private contractors in designing measurable citizen unrest mitigation strategies. The utilization of digital data-based information systems helps organizations save dispute handling costs and maintain corporate reputation in the eyes of the public. An integrated approach that unites analytical technology and a humane handling method is capable of creating a sustainable infrastructure development climate. The balance between achieving physical project targets and protecting the peace of local residents can be concretely realized through precise risk management.

B. METHOD

This research applies a qualitative approach based on a literature study to evaluate the effectiveness of a Big Data-based risk management information system in social conflict mitigation. This approach was chosen to gain a deep understanding of the working mechanisms of analytical systems and public social interactions around public infrastructure project locations as captured in various literature sources and empirical reports. The focus of the review is directed toward large-scale development projects that have implemented digital data monitoring platforms in the process of citizen risk management based on findings from previous studies. Creswell (2009) states that qualitative research is highly suitable for observing complex social phenomena through natural-setting data collection, and in a literature study, such observation is realized through an in-depth review of published field reports and empirical studies. Yin (2009) asserts that room for researchers to analyze real events comprehensively can be obtained through a comprehensive search of various secondary sources documenting similar occurrences.

The gathering of research materials was pursued through planned and thorough literature exploration, which includes scientific journal articles, research reports on risk management and Big Data, policy documentation, published public sentiment monitoring reports, and publications from research institutions and government agencies. The researchers absorbed diverse perspectives regarding system ease of use, conflict prediction accuracy levels, and field management response speeds through the synthesis of findings from previously published researches. The same applies to aspects involving the comparison of computer prediction results with real events in society, which were traced from narratives and reports immortalized in academic and policy literature. Saunders et al. (2009) explain that the selection of literature sources laden with relevant information ensures that the compiled study materials have a direct connection to the core issues being investigated.

Qualitative data analysis was carried out through the stages of data reduction from all library materials, data presentation, and interactive conclusion drawing according to the model developed by Miles and Huberman (1994). All library materials were grouped into main thematic categories related to the effectiveness of risk monitoring and social mitigation impacts based on patterns consistently emerging in the literature. Data coding was performed meticulously to discover patterns of relationships between Big Data analysis accuracy and the success rate of subduing citizen unrest. Data validity was tested using library source triangulation techniques and cross-examination across references to ensure the consistency of analytical results. Braun and Clarke (2006) state that thematic analysis helps researchers identify, analyze, and report strong patterns of meaning within qualitative data.

C. RESULTS AND DISCUSSION

Evaluation results show that the adoption of a Big Data-based risk management information system changes the way public project managers map potential disputes with residents. This pattern illustrates how the use of big data analytics reshapes managerial and organizational dimensions of project performance (Mardikaningsih & Darmawan, 2025), a shift that also depends on digital-oriented leadership to sustain operational efficiency and collaboration among project teams

(Darmawan & Gardi, 2024). Digital systems enable the processing of large volumes of information that manual methods cannot handle. Before this digital system was integrated, field teams relied on periodic manual reports that required a long processing time. Conventional aspiration-gathering often missed early signs of dissatisfaction developing within affected residential areas (Xujun et al., 2025). As a result, management was often caught off guard when resident opposition turned into land-blocking actions. The application of large-scale data analytics provides the ability to monitor information flow continuously every day. Faster access to current data gives management more time to respond to resident complaints. The availability of daily information replaces dependence on weekly reports that are often outdated by the time they are received.

Digital data processing includes text extraction from various social media platforms, local news portals, and geographic mapping data of the development area. Diverse data sources enrich the picture of social conditions in each project zone. Specific algorithms group keywords related to compensation issues, environmental impact, and spatial justice. The system assigns a vulnerability score to each work zone based on the frequency of negative sentiment. Dashboard visualization gives analysts early warning when there is a spike in critical-toned conversation in an area (Liu et al., 2025). This significantly cuts down problem identification time compared to conventional field survey methods. Keyword grouping by topic makes it easier for analysts to focus on the issues that most frequently arise in each region. Automatically generated vulnerability maps help the management team allocate monitoring resources more precisely. Digital innovation of this kind is consistent with the broader argument that technology plays a central role in human resource development toward sustainability (Mardikaningsih & Wardoyo, 2024), while precise resource allocation itself is recognized as one of several factors that determine organizational effectiveness (Darmawan, 2024).

The early detection capability provided by the digital platform allows project managers to take preventive steps before unrest spreads. Early detection functions as an alarm system that notifies management when tension indicators begin to rise. Public relations teams can visit vulnerable locations to provide direct clarification to local community figures. Project managers no longer wait for formal objection

letters to arrive at the administrative office to respond to public unrest. This speed of initial action minimizes the escalation of social tension at project sites (Jegade & Ayuba, 2025). The reactive handling pattern has successfully been replaced by a measured, proactive anticipation approach. Such responsiveness requires field personnel who are confident in their own capacity to adjust to new technology-based procedures, since self-efficacy has been shown to predict employee adaptability to technological change (Mardikaningsih & Darmawan, 2022). This shift toward proactive anticipation is also better sustained through situational leadership strategies that strengthen change management and team performance (Mardikaningsih & Darmawan, 2022). Preventive measures taken earlier require less cost and effort compared to handling conflicts that have already escalated. Rapid response to early signals increases residents' trust in the good intentions of project managers.

Although the digital monitoring system presents abundant data, the accuracy of analysis results depends heavily on the quality of raw data cleaning. Raw data from social media contains a lot of unstructured information that needs to be filtered before analysis. Many resident posts use regional languages, local terms, or sarcastic sentences that are difficult for natural language processing machines to translate accurately (Abid et al., 2024). Project managers must involve human analysts to verify the sentiment tendencies detected by the computer. Text interpretation errors risk triggering errors in determining field intervention priorities. Refining the local vocabulary in the system dictionary is an important step to improve the reliability of risk analysis. Involving human analysts in the verification process reduces the classification error rate of the automatic system. This verification task illustrates the need for strategies that enhance employee knowledge and engagement when routine work has been automated (Darmawan, 2024), since the psychological well-being and work dynamics of analysts performing repetitive verification tasks also affect the consistency of their output (Darmawan, 2023). Regular updates to the local term dictionary improve the machine's accuracy in capturing nuances of meaning from resident posts. Big Data utilization should never ignore the human dimension and social context, because numbers without cultural meaning are merely tools prone to misleading. George et al. (2014) state that the utilization of Big Data requires alignment between technological capability and

understanding of the social sphere in order to produce appropriate organizational decisions. This concern is closely related to the argument that sustainability policies should be built in accordance with local cultural values rather than imposed uniformly across regions (Mardikaningsih & Darmawan, 2023). It also reinforces the view that productivity in the digital era cannot be separated from human creativity and innovation, elements that machines alone are unable to replicate (Darmawan, 2023). Abundant data without accompanied by a deep understanding of local cultural dynamics has the potential to produce misleading conclusions. Project managers must be able to read the implicit meaning behind the statistical numbers of the resident sentiment graph. The combination of artificial intelligence and social analysts' wisdom becomes an absolute requirement for achieving mitigation effectiveness.

Every risk management information system should be designed to ensure all stakeholders have equal access to information, not merely for the sake of internal control interests. Zheng et al. (2016) state that the integration of risk management information systems in construction projects increases the transparency of information flow and accelerates coordination among developer entities. Smooth communication between the main contractor, consultants, and government agencies minimizes overlapping handling of land disputes. Such coordination across many parties is inseparable from team psychology, organizational culture, and collaboration quality among group members (Darmawan & Marsal, 2025). It also reflects a wider reconfiguration of human resource management, in which flexibility becomes a defining feature of work arrangements in the digital era (Mardikaningsih, 2025). Each party can monitor the status of resident problem resolution through one integrated data platform. This clarity of role division accelerates strategic decision-making during emergency situations in the field.

Infrastructure procurement should not only pursue cost efficiency, but also ensure public justice by involving vulnerable groups as subjects, not objects, of the decision-making process. Witjes and Lozano (2014) affirm that sustainable social risk management requires the integration of public justice values into infrastructure procurement strategy. Attention to vulnerable groups in this sense parallels findings on social inclusion for older workers amid the implementation of digital technology within organizations (Darmawan, 2023), as well as

evidence that technology can either promote or hinder gender equality in the workplace depending on how it is applied (Darmawan, 2024). The use of digital data helps identify the most vulnerable community groups who are often overlooked in formal public consultation processes. Precise information regarding the needs of affected residents allows for the design of more fair and targeted compensation programs (Bolt, 2023). This approach strengthens the bond of trust between residents and project developers.

Social media sentiment analysis should be used to listen to public voices authentically, not to manipulate public opinion for the narrow interests of project managers. Batrinca and Treleaven (2015) show that social media sentiment analysis processing provides a real-time picture of public opinion dynamics toward organizational policy. The refinement of language processing algorithms is able to separate organic public opinion from fabricated rumors deliberately spread by external parties. The process of collecting and processing citizens' data in this analysis must still observe the limits of privacy and each individual's right to personal data protection (Issalillah & Hardiansah, 2024). Project managers can focus mitigation efforts on the real unrest felt by local residents around physical work sites. This information-network mapping prevents the waste of communication-intervention resources (Liu et al., 2025).

Investment in data infrastructure should be viewed as a long-term commitment to transparent governance, not as a cost burden that can be postponed or reduced. Russom (2013) notes that the biggest challenge in Big Data adoption lies in the availability of reliable data storage infrastructure and flexibility in processing unstructured data. Public infrastructure project managers face obstacles when integrating government geographic data with dynamic social media data. Building a cohesive data architecture requires a fairly large initial investment for an organization. Optimal Big Data management ultimately makes managerial decision-making and organizational business strategy formulation easier (Ali & Darmawan, 2023). Top management commitment is the main key to allocating budgets for information system development (Halaweh & Massry, 2017).

Information technology in environmental governance should function as a bridge for participation, not a wall separating developers from the affected community. Oosterfeer and Spaargaren (2012) indicate that the use of information technology in environmental

governance must be able to encourage active public participation in decision-making. Digital data monitoring must not stop at being a one-sided oversight instrument for developers. Project managers need to open two-way, mobile-application-based dialogue channels so residents can voice complaints directly. Active involvement of various parties in sustainability initiatives has been shown to drive the achievement of sustainable social goals (Hariani & Mardikaningsih, 2024). Active resident involvement accelerates the restoration of a sense of security in affected areas (Daniel & Habsari, 2019).

Data-based risk prediction should always be followed by real action on the ground, since analysis without execution is merely speculation that does not favor public safety. Waller and Fawcett (2013) explain that Big Data's analytical advantage is created when quantitative data is combined with real operational action on the ground. High risk predictions on a graph have no handling impact if not followed by the deployment of social facilitation teams to residential areas. The application of proper operational management principles has been shown to improve on-site work performance (Barzani et al., 2022). The speed of field action is the main benchmark for the success of a risk information system. Synergy between technology and physical execution determines the effectiveness of dispute mitigation (Wang et al., 2022).

Project managers should not only map influential figures but also empower them as partners in an equal dialogue, rather than treating them merely as a one-way communication tool. He et al. (2015) reveal that social network analytics integration improves the ability to map key figures who influence opinion formation. Project managers can identify community leaders who hold a high level of trust among residents. An authentic, trustworthy leadership approach has been shown to build a positive relational climate and encourage other parties' willingness to contribute voluntarily (Mardikaningsih et al., 2022). Embracing these influential figures in open dialogue accelerates the resolution of information misunderstandings. This strategy minimizes the potential for provocation from outside parties seeking to exploit the situation (Haapasalo & Haapasalo, 2025).

Digital transformation should be used to cut through bureaucracy that hinders justice, not to create new procedures that instead further limit public access to their rights. Loebbecke and Picot (2015) note that digital transformation changes

an organization's management structure to become more responsive to external environmental change. An integrated information system cuts the bureaucratic process for handling resident compensation that previously took months. Legal certainty that favors the public interest is an important basis in every process of resolving the rights of affected communities (Hosen et al., 2026). Swift settlement of compensation claims eases the potential for mass public anger. Transparency in the administrative process increases project managers' credibility in the public eye (Khanh, 2025).

Insights from data analysis should be translated directly into technical improvements on the ground, because the public does not need promises but concrete action that reduces a project's negative impact. Chae (2015) shows that a social media data analysis framework provides deep insight into the structure of conversation topics developing among the public. Project managers can identify specific underlying issues that residents worry about most, such as noise, dust, or cut-off road access. This detailed information becomes a reference for improving construction work methods on the ground. The capacity to innovate in responding to external demands is a determining factor in an organization's competitiveness (Abdulah et al., 2021). Adjusting work techniques minimizes negative environmental impact on nearby residents (Mustapha et al., 2024).

The effectiveness of Big Data utilization is also determined by the level of coordination between data analysts and field mediator teams. Strong coordination should be a key prerequisite in every implementation of an analytical system for social purposes. Ethical leadership plays an important role in maintaining trust between teams and shaping a positive, sustainable work culture (Mardikaningsih et al., 2022). Data analysts and field mediators should have a direct, uninterrupted communication channel to maintain continuity of interpretation (Karakostas, 2021). Computer processing reports are sent every morning as briefing material for the daily actions of social facilitators. The application of appropriate digital monitoring can support field officers' work autonomy without reducing their professional responsibility (Mardikaningsih et al., 2024). Field officers check the alignment between risk predictions on the digital map and the real conditions of residents' feelings. Feedback from the field is used to update the input parameters of the analytical algorithm. This mutually

supportive data-update cycle creates an adaptive mitigation framework. Every algorithm parameter update should involve the local knowledge held by the mediator team. The quality of analysis results depends heavily on how well the system captures input from direct field experience. Both teams should share a common understanding of the limits of technology's capacity to capture social reality.

The application of a risk information system reduces the number of incidents of forced project work stoppage by residents. Every early warning system should be designed to give management enough time to respond to potential conflict (Shijun, 2020). Project managers should use risk information as a basis for drawing up contingency plans before tension arises. A decrease in physical conflict provides certainty in the infrastructure completion schedule. Operational cost savings are achieved through the elimination of work-delay penalties caused by time spent on disputes. These budget efficiencies can be allocated to building additional public facilities for nearby communities. Social harmony creates a conducive project work environment. Project schedule certainty should be one benchmark for the success of a risk management system. Every budget allocation resulting from savings should be communicated transparently to the public. The application of economic management principles that uphold fairness and openness also strengthens public trust in the budget allocations carried out (Mardikaningsih et al., 2024). A conducive work environment requires maintenance through ongoing communication among all parties involved.

Qualitative evaluation shows an increase in public satisfaction with the communication pattern used by project managers. Public satisfaction should be the main target of every public communication policy in an infrastructure project. Every response to residents' aspirations should be given within a period that does not exceed the established service standard. Residents feel that their aspirations are heard and followed up quickly by the contractor (Ninan & Yadav, 2023). Transparency of information regarding the stages of construction reduces residents' negative prejudice toward government projects. Formal administrative transparency also shapes public trust, since consistency between administrative authority and legal decisions strengthens confidence that a process is being carried out fairly (Damayanti et al., 2026). Restored public trust smooths the entire sequence of construction

activities through to the operational stage. A positive partnership between residents and developers is realized on a sustainable basis. Public trust should be built through consistency between promises and their realization in the field. Such consistency is easier to maintain when project managers apply structured change management, since a deliberate strategy is needed to address social resistance during a transition toward new project practices (Mardikaningsih & Wardoyo, 2026). Every stage of construction should be accompanied by an explanation that is easy for non-technical residents to understand. A sustainable partnership requires long-term commitment from both parties, not only during the construction period. This long-term commitment resembles the gradual capability building required in other sustainable transitions, where lasting change depends on skills and commitment that continue well beyond a single project phase (Mardikaningsih & Hariani, 2025).

A technical challenge still faced is the problem of internet networks in remote areas, which hinders the transmission of field data. Every risk-monitoring system should have an operational mechanism that does not fully depend on an internet connection. System architecture design should take the condition of telecommunication infrastructure at the project site into account from the early stage (Wang et al., 2022). Project managers address this limitation by applying an offline monitoring module that synchronizes automatically once a signal connection is available. The security of data recorded during offline periods deserves equal attention, since safeguarding field data from unauthorized access or loss is as important as keeping the monitoring process running (Costa et al., 2023). This technical adjustment ensures that risk monitoring continues to run across the entire course of project work. Operational continuity of the system is maintained through regular software maintenance. System maintenance should be carried out on a regular schedule and involve a technically competent team. Maintaining that competence requires ongoing upskilling of field technical staff, particularly as project systems adopt greater automation (Eddine & Darmawan, 2026). Every offline module should have adequate storage capacity to record data during periods without signal. Adequate and properly managed data storage also carries legal weight, given that companies can be held responsible when stored data is breached or mishandled (Dirgantara et al., 2025). Data synchronization should be designed to run automatically without requiring manual

intervention from field officers. This kind of automatic synchronization reflects a broader pattern in which digital innovation strengthens the technical reliability of field operations (Mardikaningsih & Wardoyo, 2024).

A Big Data-based risk management information system is a vital instrument supporting the success of public infrastructure development (Ayal, 2023). Every risk management system should integrate technical and social aspects in a balanced way. Balancing these two aspects is close to the principle applied when green technology is integrated into project management, where technical performance is expected to run alongside social and environmental sustainability (Mardikaningsih & Wardoyo, 2024). Successful public development should produce physical benefits while also maintaining social order during the process. This dual outcome parallels the logic of sustainable resource management more broadly, where physical development targets are pursued without setting aside long-term environmental and social sustainability (Mardikaningsih & Nuraini, 2022). Project managers should view analytical systems as a complement to, not a replacement for, human judgment in the field. Integrating precise analytics with humane handling effectively reduces social conflict. This balance echoes the argument that innovation should weigh technological speed against the depth of humanistic thought, so that technical advancement does not come at the expense of human consideration (Darmawan, 2023). Project managers are able to maintain a balance between achieving physical work targets and protecting residents' social order. The success of this model provides a new reference for the governance of future infrastructure projects. Every new reference produced should be documented systematically to become organizational learning material. Systematic documentation of this kind functions as a form of knowledge management, which has been shown to serve as a source of competitive advantage for organizations relying on structured technical work (Darmawan, 2023). The balance between physical targets and residents' social order should become a basic principle written into the project's operational guidelines.

D. CONCLUSIONS

The effective application of a Big Data-based risk management information system in mitigating social conflict in public infrastructure projects through the enhancement of early detection speed and the accuracy of community

sentiment mapping. The processing of digital data combined with social analyst verification is able to identify resident anxiety before an escalation of unrest occurs in the field. The integration of precise analytics and proactive intervention actions cuts down dispute time allocations, suppresses construction work stoppage risks, and accelerates the transparent land compensation claim settlement process.

The theoretical implications of this research enrich the study of project management and information systems by proving the importance of combining unstructured data analytics and the wisdom of social handling in the field. Practically, this research provides guidance for infrastructure developers that the adoption of large-scale analytical technology must be balanced with organizational structure flexibility and the execution speed of social facilitators. The success of this system asserts that technological superiority will only provide an optimal impact if it is directly integrated with tangible actions oriented toward public justice.

To optimize the effectiveness of social risk mitigation in the future, government agencies as project owners are advised to formulate public data governance regulations that support transparency and inter-institutional information integration. Contractors and project managers need to prioritize the provision of robust local data processing infrastructure and routinely train field facilitator teams to be responsive to the prediction results of digital systems. Public relations teams are advised to utilize sentiment analysis results as a basis for designing more open and humane two-way communication messages for affected local communities.

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