

AN INTELLIGENT MANAGEMENT INFORMATION SYSTEMS FRAMEWORK FOR DIGITAL PEACEBUILDING IN AFRICA: DEVELOPMENT AND CONCEPTUAL VALIDATION

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2. ABSTRACT

Digital technologies are increasingly influencing the ways conflicts emerge, spread and are addressed in Africa. Although artificial intelligence, social media, data analytics and digital communication platforms provide new opportunities for conflict early warning and peacebuilding, existing digital initiatives are often fragmented and insufficiently connected to local knowledge, institutional decision-making and peacebuilding outcomes. This study develops and validates an Intelligent Management Information Systems Framework for Digital Peacebuilding in Africa (IMIS-DPA). The study adopted a design science research approach supported by a review of literature on Management Information Systems, digital peacebuilding, conflict early warning, artificial intelligence, information systems success and positive peace. The framework was developed around six integrated dimensions: data and information infrastructure, intelligent analytics, peacebuilding decision support, human and local agency, ethical governance, and peacebuilding outcomes. The framework demonstrates that effective digital peacebuilding requires more than technological capability; it requires the integration of reliable information, artificial intelligence, human judgement, local knowledge, institutional capacity and responsible governance. The proposed framework provides a structured mechanism through which conflict-related information can be collected, analysed, interpreted and transformed into actionable peace intelligence. It further establishes positive peace, rather than only the absence of violence, as an important measure of digital peacebuilding effectiveness. The study concludes that an intelligent MIS framework can

strengthen conflict prevention and peacebuilding when technology is used to augment, rather than replace, human and community decision-making.

KEYWORDS: Artificial Intelligence, Digital Peacebuilding, Management Information Systems, Positive Peace, Conflict Early Warning, Africa.

4. INTRODUCTION

Africa is experiencing rapid digital transformation. Mobile communication, social media, cloud computing, artificial intelligence, geographic information systems and data analytics have become increasingly important in government, business, education, humanitarian action and social development. The African Union's Digital Transformation Strategy for Africa 2020–2030 identifies digital transformation as an important instrument for inclusive and sustainable development across the continent (African Union, 2020).

The digital transformation of African societies also has important implications for peace and security. Conflicts are no longer confined to physical spaces. Political narratives, misinformation, hate speech, mobilisation, recruitment and polarisation can spread rapidly through digital platforms. At the same time, digital technologies provide opportunities for conflict monitoring, early warning, dialogue, peace education, community participation and social cohesion.

The increased availability of digital information creates an important opportunity for peacebuilding institutions. Governments, civil society organisations, community organisations and international agencies can potentially access large amounts of information about conflict risks and community grievances. However, the existence of information does not necessarily result in better decisions. Information must be collected, assessed, processed and interpreted before it becomes useful intelligence.

This distinction is particularly important in conflict environments. Information may be incomplete, inaccurate, politically manipulated or generated by actors with competing interests. In addition, communities that have limited digital access may be poorly represented in online datasets. Consequently, an information system that relies exclusively on digital data may produce an incomplete or distorted understanding of conflict dynamics.

Management Information Systems (MIS) provide an appropriate conceptual foundation for addressing this challenge. MIS integrates people, processes, data and technology to support organisational information needs and decision-making. The DeLone and McLean Information Systems Success Model identifies system quality, information quality, service quality, use,

user satisfaction and net benefits as important dimensions of information systems success (DeLone & McLean, 2003).

However, conventional MIS models do not adequately address the distinctive requirements of peacebuilding environments. A peacebuilding information system must consider conflict sensitivity, local ownership, ethical use of artificial intelligence, community participation, data protection, human oversight and positive peace.

Digital peacebuilding research has increasingly recognised the importance of understanding technology as part of wider social and political systems rather than as a neutral instrument. This is important because the same technologies that can support peace can also facilitate misinformation, surveillance, polarisation and manipulation.

The central problem addressed by this study is therefore the absence of an integrated Management Information Systems framework that connects digital data, intelligent analytics, local knowledge, human decision-making and measurable peacebuilding outcomes within an African context.

Research Problem

Many digital peacebuilding initiatives focus on individual applications such as social media monitoring, online dialogue, digital early warning or peace education. These initiatives can provide valuable services, but their fragmented nature can limit their contribution to coordinated peacebuilding.

Three major gaps can be identified.

First, information relevant to peacebuilding is often distributed across different organisations and platforms.

Second, technological systems may identify conflict risks without adequately connecting those risks to appropriate human and institutional responses.

Third, digital peacebuilding systems may emphasise negative peace, such as reducing immediate violence, without sufficiently addressing positive peace, including justice, inclusion, trust and social cohesion.

There is therefore a need for a framework that integrates technological intelligence with human judgement and local knowledge.

Aim of the Study

The aim of this study is to develop and validate an Intelligent Management Information Systems Framework for Digital Peacebuilding in Africa.

Objectives of the Study

The specific objectives are to:

1. Examine the application of management information systems to digital peacebuilding;
2. Identify the information and technological requirements of digital peacebuilding in africa;
3. Examine the potential contribution of artificial intelligence and intelligent analytics to conflict early warning;
4. Develop an integrated mis framework for digital peacebuilding;
5. Incorporate local knowledge, human agency and ethical governance into the framework;
6. Establish validation criteria for the proposed framework; and
7. Examine the potential contribution of the framework to positive peace.

Research Questions

The study addresses the following questions:

1. What information-management requirements are necessary for effective digital peacebuilding in Africa?
2. How can artificial intelligence strengthen conflict early warning and peacebuilding decision-making?
3. What human, institutional and ethical factors should be incorporated into an intelligent MIS framework?
4. How can local knowledge be integrated into digital peacebuilding information systems?
5. What dimensions can be used to validate an intelligent MIS framework for digital peacebuilding?
6. How can the proposed framework contribute to positive peace?

5. MATERIALS AND METHODS

5.1 Research Design

The study adopted a **Design Science Research (DSR)** approach.

Design Science Research is appropriate where the purpose of research is not only to understand an existing problem but also to develop an artefact capable of addressing that problem. Hevner et al. (2004) explain that design science seeks to extend human and organisational capabilities through the creation and evaluation of innovative artefacts.

In this study, the artefact is the **Intelligent Management Information Systems Framework for Digital Peacebuilding in Africa (IMIS-DPA)**.

The research process consisted of five stages:

1. identification of the digital peacebuilding problem;
2. review and synthesis of relevant literature;
3. identification of framework requirements;
4. development of the IMIS-DPA framework; and
5. validation of the framework against theoretical, technological, institutional and peacebuilding requirements.

5.2 Literature Review Procedure

Relevant literature was examined across six thematic areas:

- Management information systems;
- Information systems success;
- Artificial intelligence;
- Digital peacebuilding;
- Conflict early warning; and
- Positive peace.

The review also considered policy and institutional documents relevant to African digital transformation, particularly the African Union Digital Transformation Strategy for Africa 2020–2030.

The literature was synthesised thematically rather than merely summarised. The objective was to identify the requirements that an intelligent information system must satisfy if it is to support peacebuilding in African contexts.

5.3 Framework Development

The framework was developed by combining established Information Systems concepts with peacebuilding requirements.

The DeLone and McLean model provided the foundation for system and information quality considerations (DeLone & McLean, 2003). Design Science Research provided the methodological basis for developing the framework as an information-system artefact (Hevner et al., 2004).

Peacebuilding theory contributed the concepts of conflict transformation, relationships, local agency and sustainable peace. Lederach (1997), for example, emphasises the importance of relationships and local capacities in sustainable peacebuilding.

Galtung's distinction between negative and positive peace was used to ensure that the framework did not define peace merely as the absence of violence (Galtung, 1969).

5.4 Framework Validation

Validation was conducted conceptually against five criteria:

1. **Technical validity** – whether the framework can accommodate digital technologies and intelligent analytics.
2. **Information validity** – whether the framework supports accurate, timely, relevant and reliable information.
3. **Human validity** – whether human judgement and local knowledge remain central.
4. **Institutional validity** – whether the framework can support organisational decision-making and response.
5. **Peacebuilding validity** – whether the framework is capable of supporting conflict prevention, social cohesion and positive peace.

The validation process was designed to prevent a purely technology-driven model.

5.5 Proposed Empirical Validation

A subsequent empirical phase should involve peacebuilding practitioners, information systems professionals, researchers, policymakers, civil society organisations and community representatives.

A structured questionnaire can be developed using the framework constructs and measured on a five-point Likert scale ranging from 1 = Strongly Disagree to 5 = Strongly Agree.

Potential constructs include:

- System quality;
- Information quality;
- Intelligent analytics;
- Decision-support effectiveness;
- Local knowledge integration;
- Human oversight;
- Ethical governance;
- Institutional readiness;
- User trust; and
- Peacebuilding effectiveness.

The empirical phase may subsequently employ Cronbach's alpha, exploratory factor analysis, confirmatory factor analysis and structural equation modelling to assess reliability, validity and relationships among constructs.

6. RESULTS AND DISCUSSION

6.1 Results

The design process produced the **Intelligent Management Information Systems Framework for Digital Peacebuilding in Africa (IMIS-DPA)**.

The framework consists of six major components:

6.1.1 Data and Information Infrastructure

The first component provides the foundation for the system.

Potential information sources include:

- Community reports;
- Conflict incident databases;
- Government records;
- News media;
- Social media;
- Humanitarian information;
- Surveys;
- Geospatial information;
- Peacebuilding programme data; and
- Expert assessments.

The framework recognises that no single data source is sufficient for understanding complex conflict environments.

6.1.2 Intelligent Analytics

The second component transforms information into peace intelligence.

Potential technologies include:

- artificial intelligence;
- machine learning;
- natural language processing;
- sentiment analysis;
- predictive analytics;
- anomaly detection;

- network analysis;
- geospatial analysis; and
- trend analysis.

The purpose of these technologies is to identify patterns and emerging risks that may not be immediately visible through conventional information processing.

6.1.3 Peacebuilding Decision Support

The third component transforms intelligence into decision-support information.

Possible outputs include:

- conflict-risk alerts;
- early-warning dashboards;
- risk maps;
- emerging narrative reports;
- stakeholder analysis;
- scenario analysis; and
- response options.

The system does not make autonomous peacebuilding decisions. Instead, it provides information to support human decision-making.

6.1.4 Human and Local Agency

The fourth component ensures that communities and peacebuilding practitioners remain central.

The framework provides for:

- community reporting;
- local validation;
- expert verification;
- local-language participation;
- feedback mechanisms; and
- human review of algorithmic outputs.

This component addresses the limitation of relying exclusively on digital data.

6.1.5 Ethical Governance

The fifth component addresses the risks associated with digital technologies and artificial intelligence.

It includes:

- privacy;
- data protection;
- cybersecurity;
- access control;
- algorithmic accountability;
- bias monitoring;
- transparency;
- explainability;
- data sovereignty; and
- human oversight.

6.1.6 Peacebuilding Outcomes

The sixth component links information-system performance to peacebuilding outcomes.

The framework identifies immediate outcomes such as:

- improved information availability;
- faster information processing;
- improved coordination;
- improved early warning; and
- improved decision-making.

Longer-term outcomes include:

- conflict prevention;
- social cohesion;
- trust;
- inclusion;
- institutional responsiveness; and
- positive peace.

6.2 Integrated IMIS-DPA Framework

The proposed framework operates through the following sequence:

Data Sources

Community Data + Government Data + Media + Social Media + Humanitarian Data +
Geospatial Data + Expert Knowledge



Data Governance and Quality Control

Verification + Privacy + Security + Data Protection + Bias Detection



Intelligent Analytics

Artificial Intelligence + Machine Learning + Natural Language Processing + Predictive
Analytics + Geospatial Analysis



Peace Intelligence

Conflict Trends + Risk Identification + Narrative Analysis + Early Warning + Scenario
Analysis



Decision Support

Alerts + Dashboards + Risk Maps + Stakeholder Analysis + Response Options



Human and Local Validation

Peacebuilders + Communities + Civil Society + Government + Local Institutions



Peacebuilding Action

Early Response + Dialogue + Mediation + Peace Education + Social Cohesion



Peace Outcomes

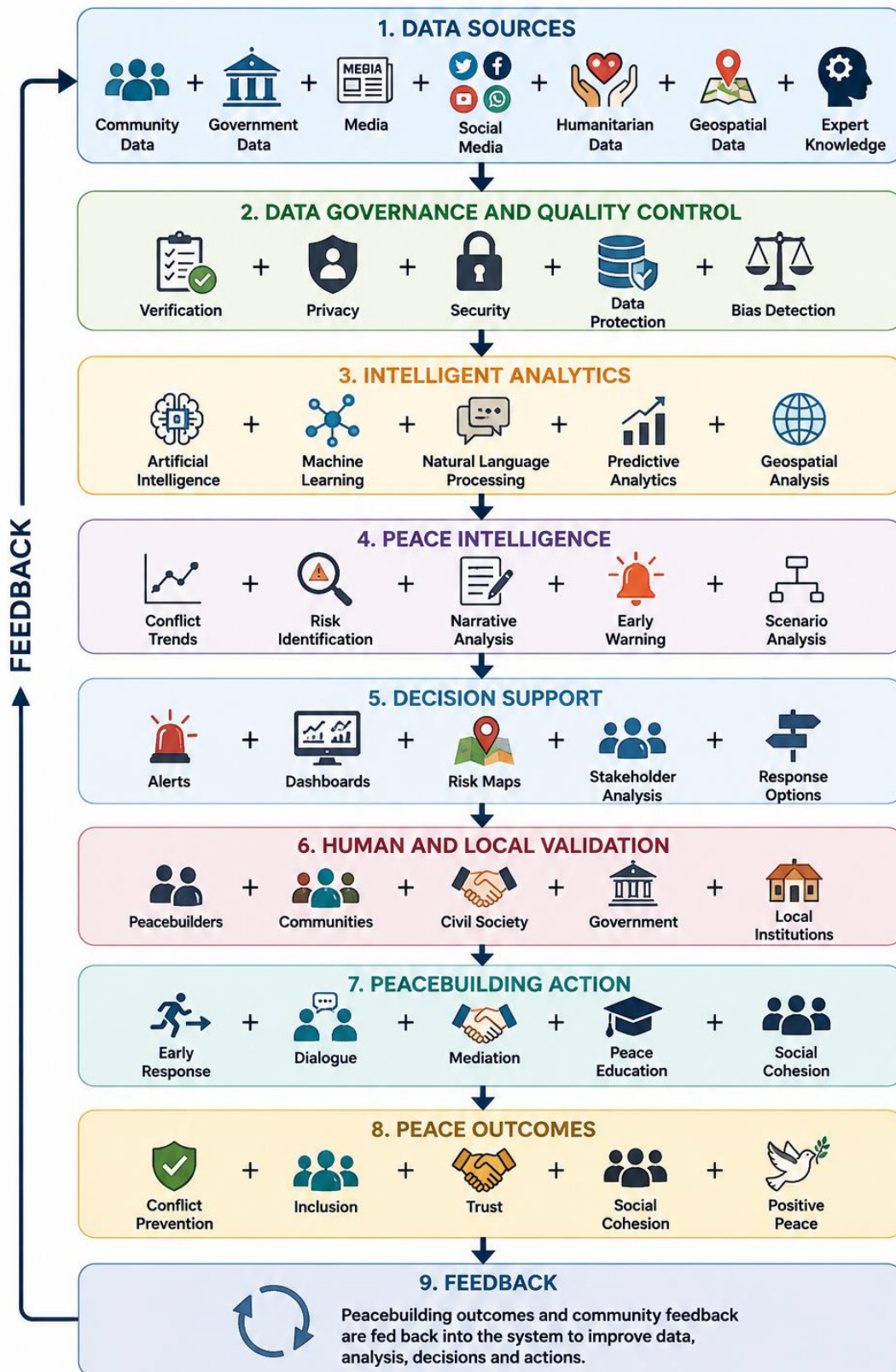
Conflict Prevention + Inclusion + Trust + Social Cohesion + Positive Peace



Feedback

Pictorially shown as:

INTELLIGENT MANAGEMENT INFORMATION SYSTEMS FRAMEWORK FOR DIGITAL PEACEBUILDING IN AFRICA (IMIS-DPA)



Peacebuilding outcomes and community feedback are fed back into the system to improve subsequent analysis and decision-making.

6.3 DISCUSSION

The results demonstrate that an intelligent MIS for peacebuilding should be understood as a **socio-technical system**, rather than merely an artificial intelligence platform.

This finding is consistent with the broader Information Systems perspective that organisations operate through interactions among people, technology and processes. Hevner et al. (2004) similarly position Information Systems research at the intersection of people, organisations and technology.

The framework also extends conventional Information Systems success thinking. DeLone and McLean (2003) emphasise system quality, information quality, use, user satisfaction and net benefits. The IMIS-DPA framework adds dimensions that are particularly important in peacebuilding: local knowledge, human oversight, conflict sensitivity, ethical governance and positive peace.

The inclusion of local knowledge is particularly important in African contexts. A digital system may process thousands or millions of digital records and still fail to understand the actual dynamics within a community. Community actors may possess knowledge about grievances, relationships and tensions that is not available through social media or formal databases.

The framework therefore proposes a combination of:

Artificial Intelligence + Human Intelligence + Local Intelligence = Peace Intelligence.

This does not imply that all local information is automatically accurate. Community-generated information must also be assessed, triangulated and verified. However, excluding local knowledge altogether creates an equally serious risk.

6.4 Artificial Intelligence and Early Warning

Artificial intelligence can potentially strengthen conflict early warning by processing large quantities of information more rapidly than conventional manual methods.

For example, natural language processing can be used to examine large volumes of textual material, while machine learning can identify patterns in historical data.

However, the framework rejects the idea that AI should independently determine whether conflict will occur or prescribe the appropriate response.

Conflict is socially and politically complex. A statistical correlation does not necessarily establish causation, and an algorithmic prediction does not necessarily identify the appropriate intervention.

Human peacebuilders therefore remain responsible for contextual interpretation and decision-making.

6.5 From Early Warning to Early Response

A major contribution of the proposed framework is the explicit connection between early warning and early response.

An early-warning system has limited value if institutions cannot or will not respond to the information generated.

The framework therefore places decision support between early warning and peacebuilding action.

This creates a continuous process:

Information → Analysis → Warning → Interpretation → Decision → Response → Learning.

This process transforms the information system from a passive reporting mechanism into an active decision-support infrastructure.

6.6 Ethical Considerations

The use of AI in conflict environments requires particular caution.

An inaccurate algorithmic assessment can potentially contribute to inappropriate intervention. Similarly, poorly governed data can expose vulnerable communities to surveillance or retaliation.

The framework therefore places ethical governance within the architecture rather than treating ethics as an external requirement.

The principle adopted is:

No intelligent peacebuilding system should operate without human accountability.

This principle is particularly important when the information being processed concerns vulnerable populations or politically sensitive conflict environments.

6.7 Positive Peace as an Outcome

Another important contribution is the inclusion of positive peace as a long-term outcome.

A system that identifies violent incidents but ignores structural inequalities, exclusion, lack of trust and social fragmentation provides only a partial picture of peace.

Galtung's (1969) concept of positive peace provides a broader foundation for assessing whether conditions supporting sustainable peace are being strengthened.

Consequently, the proposed framework moves beyond:

"Did violence decrease?"

to broader questions such as:

- Has community trust improved?
- Has participation increased?
- Are marginalised groups included?
- Has institutional responsiveness improved?
- Are relationships between conflicting groups improving?
- Are underlying grievances being addressed?

This creates a stronger basis for assessing the contribution of digital systems to sustainable peace.

6.8 Validation Summary

The framework satisfies the five proposed validation dimensions as follows:

Validation Dimension	IMIS-DPA Response
Technical validity	Incorporates AI, analytics, geospatial technologies and digital platforms
Information validity	Provides mechanisms for collection, verification, processing and analysis
Human validity	Maintains human judgement and community participation
Institutional validity	Connects information intelligence to decision support and response
Peacebuilding validity	Links information management to conflict prevention, social cohesion and positive peace

The framework is therefore theoretically coherent and sufficiently structured for subsequent empirical testing.

It should, however, be emphasised that conceptual validation does not replace statistical empirical validation. A future field study should test the proposed constructs with actual users and peacebuilding stakeholders.

7. CONCLUSION

This study developed an Intelligent Management Information Systems Framework for Digital Peacebuilding in Africa (IMIS-DPA) in response to the growing need for more integrated, intelligent and locally grounded approaches to peacebuilding information management.

The framework brings together six major components: data and information infrastructure, intelligent analytics, peacebuilding decision support, human and local agency, ethical governance and peacebuilding outcomes.

The study demonstrates that technology alone cannot produce sustainable peace. Artificial intelligence can process information, identify patterns and support early warning, but human judgement, institutional capacity and local knowledge remain essential.

The proposed framework therefore places people at the centre of digital peacebuilding while using technology to strengthen their ability to understand conflict and respond effectively.

The framework also moves beyond the traditional focus on negative peace by incorporating positive peace indicators such as inclusion, trust, social cohesion and institutional responsiveness.

The study contributes to Management Information Systems research by extending information systems concepts into the peacebuilding field. It also contributes to peacebuilding scholarship by providing an integrated technological and organisational framework for digital peace intelligence.

The framework provides a foundation for future empirical research. Subsequent studies should test the proposed constructs with peacebuilding practitioners, information systems professionals, policymakers and community actors across different African countries. Such research can establish the reliability, validity and predictive capability of the framework and determine the extent to which intelligent information systems can contribute to more timely, inclusive and sustainable peacebuilding.

Ultimately, the purpose of intelligent digital peacebuilding should not be to replace peacebuilders with machines. It should be to provide peacebuilders and communities with better information, better analysis and better opportunities to make timely and responsible decisions for peace.

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9. REFERENCES

1. African Union. (2020). *The digital transformation strategy for Africa (2020–2030)*. African Union Commission.
2. DeLone, W. H., & McLean, E. R. (2003). The DeLone and McLean model of information systems success: A ten-year update. *Journal of Management Information Systems*, 19(4), 9–30. <https://doi.org/10.1080/07421222.2003.11045748>
3. Galtung, J. (1969). Violence, peace, and peace research. *Journal of Peace Research*, 6(3), 167–191.
4. Hevner, A. R., March, S. T., Park, J., & Ram, S. (2004). Design science in information systems research. *MIS Quarterly*, 28(1), 75–105. <https://doi.org/10.2307/25148625>
5. Lederach, J. P. (1997). *Building peace: Sustainable reconciliation in divided societies*. United States Institute of Peace Press.
6. United Nations. (2021). *Our common agenda: Report of the Secretary-General*. United Nations.
7. World Bank. (2020). *Digital economy for Africa initiative*. World Bank.