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AI-enabled management information systems for economic resilience and organizational performance: Analytics, governance, cyber risk and decision automation

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Abstract

Management information systems (MIS) are evolving from passive reporting platforms to AI-driven engines that support strategic, tactical and operational decision making. This title-driven scoping review analyses spanning national security, workforce forecasting, energy governance, fraud detection, healthcare diagnostics, digital twins and plant disease recognition to understand how AI enables economic resilience and organizational performance. We infer, from titles alone, a conceptual framework where MIS decision loops integrate data acquisition, predictive analytics, anomaly detection, optimisation, decision recommendations, actions, monitoring and audit trails. The review maps AI capabilities—forecasting, anomaly detection, optimisation, natural language processing, and explainable decision intelligence—and identifies deployment architectures across cloud, edge, hybrid and federated settings. Governance and risk controls inferred include audit logs, access controls, bias and transparency mechanisms, cybersecurity and deepfake detection, and privacy-preserving learning. Sectoral synthesis reveals MIS adoption for critical infrastructure governance, smart energy grids, digital finance and workforce analytics. Tables summarise the decision-loop frameworks, resilience KPIs, cyber/fraud risk controls and an MIS assurance checklist. The review concludes with a research agenda on measuring MIS impact, standardising governance metrics, integrating privacy-preserving learning, robust decision intelligence under distribution shift, and human trust calibration.

Keywords: Management Information Systems; AI Decision Intelligence; Economic Resilience; Business Analytics; Governance; Cyber Risk; Explainability; Privacy Preservation

1 Introduction

Management information systems (MIS) have traditionally functioned as repositories and reporting tools for organisational data. The emergence of artificial intelligence has transformed MIS into active decision support engines, enabling forecasting, optimisation and anomaly detection. This evolution is motivated by the need for economic resilience and improved organisational performance, as industries face supply disruptions, cyber threats and workforce volatility [1], [3], [10], [57].

A growing body of research has underscored the strategic importance of AI and MIS in key national domains. Goffer et al. [1] addressed the use of AI-enhanced cyber threat detection and response to protect critical infrastructure, whereas Haldar et al. [2] examined how AI-driven business analytics and MIS contribute to economically informed decision-making and growth. In the energy field, Hassan et al. [3] considered MIS-based solutions to advance national energy

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dominance strategies. Meanwhile, Mahmud et al. [4] investigated AI-powered workforce analytics for anticipating labor market developments and identifying skills gaps tied to economic performance.

The contemporary literature also points to the expanding reach of AI in energy, infrastructure protection, and healthcare. Ahmed et al. [10] demonstrated that AI-driven time-series analysis can assist in optimizing solar energy generation for smart energy management in the USA. Khan et al. [11], in turn, explored blockchain-integrated AI systems for secure energy transactions, especially in the context of fraud detection and market resilience. Ahmed et al. [12] further examined AI applications for improving renewable energy generation and advanced storage technologies within smart energy environments. Outside the energy domain, Ahmed [13] provided a review of privacy-preserving federated learning for critical infrastructure, drawing attention to major security and governance dimensions. In healthcare, Siam et al. [14] studied explainable deep learning models for diagnosis as a way to strengthen confidence in AI-assisted medicine.

Key terms used in this review include MIS—integrated systems that collect, process and present information for decision making; business analytics—the application of statistical and AI techniques to derive insights from data; decision intelligence—the integration of machine learning, optimisation and decision theory into automated decision loops; economic resilience—the capacity of an economy or organisation to absorb shocks and recover quickly; organisational performance—measured through efficiency, productivity, compliance and strategic agility; governance—the structures and processes ensuring accountability, compliance and ethical use of AI; auditability—the ability to trace decisions and data flows; and trustworthy AI—AI systems that are robust, fair, interpretable and secure.

This title-driven scoping review provides: (i) a conceptual MIS framework highlighting AI capabilities and decision loops; (ii) a taxonomy of AI functions in MIS; (iii) a synthesis of governance and cyber risk controls implied by the corpus; and (iv) a complete evidence map of 77 studies. We emphasise that insights are inferred solely from titles; full-text analyses are deferred to future work.

2 Review Protocol and Scope

2.1 Portfolio-bounded scoping rationale and research questions

The corpus consists of studies spanning critical infrastructure cyber threat detection [1], business analytics for economic growth [2], national energy strategies [3], workforce forecasting [4], welfare governance [5], AI-enabled decision making [6], cloud MIS governance [7], zero-touch 6G frameworks [8], cyber threat intelligence MIS [9], energy forecasting [10], secure energy transactions [11], federated learning for critical infrastructure [13], explainable healthcare diagnostics [14], low-latency edge healthcare [15], breast cancer diagnosis [16], stroke prediction [17], privacy-first federated learning [18], neural architecture optimisation [19], digital twin maintenance [20], cybersecurity technologies [21], ensemble brain tumour classification [22], transformer–Unet segmentation [23], industrial robot analytics [24], IoT intrusion detection [25], early disease detection [26], scalable chronic kidney disease screening [27], explainable mortality risk prediction [28], transfer learning for eye disease classification [29], skin cancer diagnosis [30], performance analysis of deep learning [31], energy prediction using support vector regression [32], blackout mitigation [33], resilient grid operation [34], EMG signal denoising [35], power cable modelling [36], EMG classification [37], EMG filtering [38], LSTM fault detection [39], credit card fraud detection [40], athlete evaluation [41], hybrid renewable energy optimisation [42], sentiment recognition [43], explainable decision making [44], cancer insights [45], supply chain optimisation [46], strategic business gains [47], federated diagnostics [48], ensemble lung cancer detection [49], mental health indicators [50], tea leaf disease diagnosis [51], AI-powered SaaS trends [52], IT product innovation impact [53], deepfake detection [54], small business empowerment [55], inclusive economic development [56], digital finance risk management [57], Bengali sentiment classification [58], suicidal ideation detection [59], stacking ensemble for brain tumour [60], leukemia diagnostics [61], sentiment from drug reviews [62], Swin transformer ensembles [63], hybrid vision transformers [64], stacking ensemble for cervical cancer [65], MaxViT soybean disease identification [66], MangoEFormer leaf recognition [67], multimodal object recognition [68], ensemble transformer for depression [69], explainable transformer for cotton leaf and fabric defects [70], ensemble for medicinal plant recognition [71], novel transformer for cotton leaf [72], deep learning for leukemia classification [73], esophageal diagnosis web applications [74], precision wound healing [75], nanoconjugate therapy [76] and molecular erasers for cancer immunity [77]. Research questions guiding the review include: RQ1: Which AI capabilities—forecasting, anomaly detection, optimisation, classification, natural language processing—are central to MIS-enabled resilience? RQ2: What governance, compliance and security controls are implied across sectors? RQ3: How can organisations evaluate MIS value while managing risks such as bias, privacy, adversarial threats and drift? RQ4: What deployment architectures (cloud, edge, hybrid, federated) best support resilient MIS?

2.2 Title-driven extraction schema

Given the lack of full texts, we extracted from titles the following fields: domain/sector (critical infrastructure [1], business [2], energy [10], healthcare [14], public welfare [5], agriculture [66], NLP [58]); decision level (strategic [3], tactical [7], operational [25]); AI capability (forecasting [10], anomaly detection [1], optimisation [33], classification [22], segmentation [23], NLP sentiment analysis [58]); data modality (tabular/time-series [2], images [14], signals [35], text [43], multimodal [68]); trust dimensions (explainability [14], privacy [13], security [1], bias control [5]); deployment hints (cloud [2], edge [15], hybrid [63], federated [13], 6G [8]); and governance hints (MIS [7], policy compliance [5], stakeholder collaboration [4]). These inferential codes guide thematic synthesis but may be revised upon full-text analysis.

2.3 Conceptual rigor appraisal rubric

To assess quality in future evidence synthesis, we define a conceptual rubric: (a) Decision alignment—how well AI outputs align with key performance indicators such as cost savings, uptime and productivity; (b) Validation strength—evidence of external or cross-domain validation to avoid overfitting; (c) Robustness—resilience to adversarial examples and distributional shifts [1], [34]; (d) Interpretability utility—availability and usefulness of explanations for decision makers [14], [44]; (e) Privacy and security threat modeling—identification and mitigation of risks including membership inference, model inversion, poisoning and deepfakes [54]; (f) Monitoring and drift—mechanisms for detecting performance drift and triggering retraining; (g) Reproducibility signals—open data, code and model documentation; (h) Stakeholder accountability—clarity of roles and responsibilities within governance frameworks [5], [7]. This rubric is conceptual and no scores are assigned here.

3 Conceptual Framework: AI-Enabled MIS Decision Loops

3.1 The MIS decision cycle

A typical MIS decision cycle begins with data acquisition from enterprise systems, sensors, external feeds or user inputs. Data integration and cleansing prepare heterogeneous data for analytics. AI models perform predictive analytics, anomaly detection, optimisation or natural language processing, generating insights or recommendations. Decision recommendation modules contextualise outputs within organisational goals and constraints, presenting options to decision makers. Actions are executed through automated processes or human interventions. Monitoring systems track outcomes and performance metrics, feeding back to update models and strategies. Audit trails document the data, models and decisions for compliance and accountability.

Table 1 AI-enabled MIS decision-loop framework

Stage	Typical AI methods	Risks	Governance controls
Data acquisition	ETL, sensors, data integration tools	Data quality issues, bias from sampling	Data governance policies, quality checks
Analytics/modeling	Forecasting models, classification, clustering, optimisation algorithms	Model overfitting, bias, privacy leakage	Model validation, fairness checks, privacy accounting
Decision recommendation	Decision support systems, prescriptive analytics, reinforcement learning	Misalignment with business objectives, black-box recommendations	Decision reviews, explainability, human oversight
Action execution	Automated scripts, robotic process automation, control systems	Execution errors, unintended consequences	Change management procedures, rollback mechanisms
Monitoring	Performance dashboards, drift detection, KPI tracking	Silent model degradation, undetected bias	Continuous monitoring, alert thresholds, retraining triggers
Audit	Log analysis, provenance tracking, compliance reporting	Insufficient evidence for accountability, tampering	Immutable logs, blockchain, audits by independent parties

3.2 Where AI plugs into MIS

AI capabilities augment multiple stages of the MIS cycle: predictive analytics forecast demand, energy consumption and workforce needs [4], [10], [32]; prescriptive optimisation allocates resources in supply chains [46], optimises renewable energy systems [42] and mitigates blackouts [33]; anomaly and fraud detection identify cyber threats [1], intrusion attempts [25], credit card fraud [40] and deepfake videos [54]; scenario simulation and reinforcement learning enable adaptive control [24]; and natural language processing supports sentiment analysis [43], [58], drug review analytics [62] and mental health detection [59], [69].

3.3 Economic resilience lens

Economic resilience refers to the ability of organisations and economies to absorb shocks, diversify risk and recover quickly. MIS equipped with forecasting and scenario simulation help anticipate demand fluctuations, supply disruptions and financial instability [32], [57]. Decision automation accelerates response times, while anomaly detection mitigates security breaches and fraud [1], [40]. MIS also support workforce reallocation and skill-gap forecasting to maintain productivity [4]. Resilience is enhanced through robust energy management [33], [34], secure transactions [11], inclusive economic development [56] and transparent welfare governance [5].

3.4 Organizational performance lens

Organisational performance encompasses efficiency, productivity, compliance, customer value and strategic agility. AI-enabled MIS streamline operations via predictive maintenance [20], optimise supply chains [46], improve clinical outcomes [16], [23], [60], and enhance business decision making through explainable analytics [44]. Compliance and governance frameworks ensure policy adherence [5], [7], while explainability and fairness monitoring build trust and reduce bias [5], [27]. Recent healthcare AI research has addressed not only predictive capability but also privacy-preserving computation. Khan et al. [16] proposed a breast cancer diagnosis approach based on neural networks and dimensionality reduction, while Khan et al. [17] examined stroke prediction using neural machine learning techniques. Alongside these predictive models, Ahmed et al. [18] emphasized privacy-first federated learning frameworks for scalable healthcare data processing, illustrating the importance of secure and decentralized AI in clinical settings.

4 Taxonomy of AI Capabilities Supporting MIS

4.1 Forecasting and time-series intelligence

Forecasting is central to MIS resilience. Titles on solar energy production optimisation [10], prediction of energy consumption [32], resilient grid operation under EV penetration [34], workforce analytics forecasting labour market trends [4], and scalable CKD screening [27] demonstrate the application of time-series models and support vector regression with genetic algorithms. In financial domains, fraud and risk management also rely on forecasting patterns in transaction data [40], [57]. Forecasts inform strategic planning, resource allocation and risk hedging.

4.2 Anomaly detection, cyber risk and fraud prevention

Anomaly detection is crucial for cyber resilience. AI-enhanced cyber threat detection [1], [78] and MIS-driven threat intelligence [9] detect malicious activity in critical infrastructure. Intrusion detection models for IoT [25], deep learning architectures for credit card fraud detection [40], AI-driven risk management in digital finance [57], and deepfake detection in MIS [54] highlight the breadth of cyber and fraud risk analytics. Robust detection reduces false positives and helps prioritise responses.

Table 2 Cyber/fraud/deepfake risk controls within MIS

Risk	Detection/control methods	Assurance tests	Example titles
Cyber threat	Anomaly detection models, threat intelligence MIS, federated learning	Red-team exercises, penetration testing	[1], [9], [13]
Fraud	Machine learning models for transaction patterns, secure aggregation	Backtesting, adversarial simulations	[11], [40], [57]
Deepfake & misinformation	Deep learning classifiers, audio/video analysis, blockchain provenance	Human review, synthetic media detection benchmarks	[54]

Insider threat	Access monitoring, behavioural analytics	Audit trail review, anomaly detection	[5], [7]
Supply chain compromise	Code provenance, dependency scanning, vendor risk assessments	Software bill of materials evaluation	[46], [11]
Data leakage	Differential privacy, encryption, secure protocols	Privacy budget audits, data exfiltration tests	[13], [18], [54]

4.3 Optimization and decision automation

Optimisation algorithms support resource allocation and decision automation. Machine learning-based relays mitigate power blackouts [33], resilient grid operations coordinate EV charging [34], digital twin predictive maintenance maximises asset longevity [20], and supply chains are streamlined using AI and quantum computing [46]. Workforce planning models allocate labour resources [4], while MIS enable strategic business gains in healthcare [47] and small business growth [55].

4.4 Explainability and trust calibration for executive decision-making

Explainability bridges analytics and action in MIS. Titles highlight explainable AI for brain tumour segmentation [23], explainable machine learning frameworks for mortality risk prediction [28], transparency in business decision making [44], and explainable ensemble models for brain tumour and cervical cancer diagnosis [60], [65]. Explainable decision support helps executives understand model rationale, calibrate trust and maintain accountability. Fairness and bias control are emphasised in data-centric governance models [5] and scalable healthcare screening [27].

5 Sectoral Synthesis: How AI-Enabled MIS Drives Resilience

5.1 National security and critical infrastructure governance

National security and critical infrastructure require rapid detection and response to threats. Cyber threat detection and response systems [1], [9] integrated with MIS enable organisational resilience, combining anomaly detection with IT project governance [7]. AI-driven cybersecurity technologies for healthcare and infrastructure [21], robust fault detection models in power transmission lines [39], and sophisticated relays to mitigate blackouts [33] illustrate AI-enabled control loops. Resilience is further supported by privacy-preserving federated learning for critical infrastructure [13] and secure 6G frameworks [8]. Brain tumor research has similarly evolved through advances in both diagnostic classification and tumor segmentation. Oza et al. [22] developed an ensemble learning approach for classifying brain tumours from MRI scans, underscoring the role of ensemble methods in improving neuroimaging-based diagnosis. By comparison, Khushubu et al. [23] introduced TransUNetB, a Transformer–U-Net framework intended for efficient and explainable segmentation of brain tumors. Together, these works highlight the increasing reliance on ensemble and transformer-oriented methods in brain tumor image analysis.

In US healthcare systems, AI has become increasingly relevant for disease screening and prognostic modeling. Arafat et al. [26] proposed a deep learning framework that integrates mammographic images with clinical EHR information for early breast cancer detection. Rimon et al. [27] extended this trend by presenting a scalable machine learning strategy for chronic kidney disease screening across healthcare systems. Likewise, Hasan et al. [28] introduced an explainable machine learning model for predicting mortality risk in liver cirrhosis patients, reinforcing the need for transparent and trustworthy clinical AI tools.

5.2 Energy dominance, smart energy management and resilient grids

Energy systems benefit from MIS-enabled forecasting and optimisation. AI optimises solar energy production [10], predicts sectoral energy consumption [32], enhances renewable generation and storage [12], and coordinates resilient grid operation under EV penetration [34]. Blockchain-enabled secure energy transactions [11] ensure market stability, while hybrid renewable energy systems are optimised via machine learning [42]. Digital twin technologies support predictive maintenance [20]. Together these tools promote efficient energy use, reduce blackout risk and improve resilience. Recent work in energy and electrical systems has focused on both predictive intelligence and infrastructure robustness. Hasan et al. [32] applied support vector regression enhanced through genetic algorithm optimization to estimate energy use across four sectors. For blackout prevention, Juel et al. [33] proposed a sophisticated relay mechanism based on machine learning for power system protection. Tonny et al. [34] also explored data-driven methods for resilient grid operation under rising EV penetration. In related technical domains, Tanbhir et al. [35]

compared DWT and EMD for electromyographic signal denoising, while Khan et al. [36] analyzed the effect of inductance and skin phenomena on transient wave propagation in transformer bushings. These studies collectively demonstrate the broad engineering relevance of computational intelligence and system-focused analysis.

AI applications have also diversified across renewable energy optimization, sentiment analysis, business intelligence, and industrial inspection. Ahamed et al. [42] reviewed machine learning techniques for optimizing hybrid renewable energy systems in decentralized smart grids to improve efficiency and stability. Ahamed et al. [43] proposed a sentiment recognition framework that combines bidirectional deep learning with an extended fuzzy Markov model. In business analytics, Hossain et al. [44] explored the role of explainable AI in strengthening business decision-making and reducing the trust deficit associated with AI systems. In manufacturing-oriented inspection, Haque et al. [45] introduced a data-centric leather quality control method based on advanced vision transformers.

5.3 Digital finance, credit card fraud and risk management for economic stability

Digital finance is a high-stakes domain for MIS. Fraud detection models [40], AI-driven risk management [57], secure energy transactions [11], business analytics [2], and markets prediction via SaaS [52] illustrate the integration of AI capabilities. Federated and privacy-preserving learning may protect sensitive financial data, while governance frameworks ensure compliance with regulations. Deepfake detection [54] addresses emerging risks in digital media.

5.4 Workforce analytics for competitiveness and productivity

Workforce analytics supports economic competitiveness by forecasting labour market trends and skill gaps [4], evaluating workforce recovery after training [41], and guiding strategic workforce planning. MIS integrate AI predictions with organisational strategy to align skills with demand and monitor productivity. Fairness and bias control are essential to avoid discriminatory outcomes.

5.5 Healthcare as an MIS-like high-stakes domain

Healthcare functions as a high-stakes MIS where AI informs clinical operations, screening and diagnosis. Titles cover a spectrum: explainable medical diagnosis [14], low-latency edge healthcare [15], breast and cervical cancer detection [16], [26], [65], stroke prediction [17], chronic kidney disease screening [27], mortality risk prediction [28], eye disease classification [29], skin cancer diagnosis [30], performance analyses [31], EMG signal processing [35], [37], [38], robust LSTM for fault detection in power lines [39] (with health analogs in monitoring vital signals), federated learning for diagnostics [18], [48], ensemble models for lung cancer detection [49], mental health indicators [50], tea leaf disease analogs in agriculture [51], and advanced therapies [75], [76], [77]. These tasks demonstrate classification, segmentation, risk prediction and decision automation. Privacy-preserving FL is vital for sensitive data [13], [18], [48].

5.6 Public welfare management and policy-compliant decision support

Public sector applications emphasise transparency, bias control and compliance. Data-centric governance models [5] aim to strengthen transparency and policy compliance in welfare management. MIS solutions support national energy dominance strategies [3], inclusive economic development [56] and small business growth [55]. Explainable AI aids policy makers in bridging trust gaps [44] and ensures equitable treatment in social programs.

5.7 Innovation, SaaS trends and IT product innovation as MIS enablers

Innovation in AI and MIS is fueled by SaaS trends [52], IT product innovation [53], quantum computing in supply chains [46], machine learning for strategic business gains in healthcare [47], and digital innovation for small businesses [55]. Market analyses and investment insights drive strategic decisions, while robust cybersecurity [54] and governance frameworks ensure sustainable growth. The literature additionally reflects the widening influence of AI in healthcare, industry, and software markets. Khan et al. [49] presented generalizable ensemble models for early lung cancer detection, while Shakil et al. [31] compared deep learning architectures for classifying chest disease and lymphoma. Beyond diagnostic applications, Mosaddeque et al. [46] investigated the potential of AI and quantum computing to enhance supply chain operations in aerospace and education, and Sufian et al. [47] examined machine learning for strategic business advancement in the healthcare sector. Ahmed et al. [52] further analyzed AI-powered SaaS from the perspective of market evolution and investment potential, indicating the growing commercial significance of intelligent software ecosystems.

6 Governance, Compliance, and Assurance for AI-Enabled MIS

6.1 Governance structures

Governance structures define roles, responsibilities and risk ownership. Titles imply integration of AI into management information systems for project governance [7], cyber threat intelligence [9] and welfare management [5]. Stakeholders include data owners, model developers, compliance officers, executives and regulators. Governance frameworks delineate decision rights, oversight mechanisms and escalation paths, ensuring that AI-enabled MIS align with organisational objectives and legal requirements.

6.2 Controls and safeguards

Controls and safeguards secure MIS operations. Audit logs track data access and model outputs; access control restricts permissions; policy enforcement ensures compliance with regulations; incident response plans enable rapid reaction to breaches. Titles referencing digital security in MIS [54], secure energy transactions via blockchain [11] and risk management in finance [57] highlight the need for multi-layered security. Vendor and supply-chain risks require due diligence and code provenance verification.

6.3 Bias, transparency and explainability requirements

Bias control and transparency are central to trustworthy AI. Welfare management models emphasise bias control and policy compliance [5], while explainability tools bridge the trust gap in business decision making [44]. Frameworks for mortality risk prediction [28], mental health indicators [50], depression detection [69] and plant recognition [71] suggest that models should provide interpretable outputs. Documentation artifacts such as model cards and data sheets contextualise limitations and biases.

6.4 Security posture for AI-enabled MIS

Security posture encompasses threat modeling, adversarial risks and deepfake/social engineering implications. AI-enhanced cyber threat detection [1], intrusion detection [25], credit card fraud detection [40] and deepfake detection [54] illustrate common threats. Federated learning introduces gradient leakage risks [13], and 6G frameworks may face novel attack vectors [8]. Organisations must conduct red-team exercises, maintain secure communication channels and implement encryption and differential privacy.

6.5 Monitoring and continuous assurance

Continuous assurance ensures ongoing trustworthiness. Monitoring includes drift detection for data and models, KPI tracking, alerting rules and human-in-the-loop checkpoints. Titles on CKD screening [27], resilience to EV penetration [34], and mental health detection [50] highlight the importance of detecting performance degradation. Audit trails and logging [5], [11], [54] enable post-hoc investigations. MIS must support model versioning, rollback and retraining workflows.

Table 3 Economic resilience KPIs and MIS analytics

Resilience KPI	MIS analytics role	Example sector
Continuity of operations	Forecast demand and resources, automate contingency planning	Energy management [10], [33]
Recovery time	Predict repair duration, optimise resource allocation	Industrial IoT maintenance [20]
Market stability	Detect fraud and anomalies, secure transactions	Finance & energy markets [11], [40], [57]
Workforce productivity	Forecast skill gaps, recommend training, monitor recovery	Workforce analytics [4], sports performance [41]
Supply chain robustness	Optimise logistics and inventory, simulate disruptions	Supply chains in aerospace and education [46]
Innovation adoption rate	Analyse IT product impact, SaaS trends, strategic gains	Business innovation [52], [53], [47]

7 Cross-Cutting Design Principles and Operating Models

Design principles for AI-enabled MIS include decision-first design, which prioritises the decision question and aligns AI capabilities with business goals; governance-by-design, embedding compliance and auditability into model development and deployment [5], [7]; security-by-design, integrating threat modeling and privacy preservation at every stage [1], [13], [54]; and value-by-design, ensuring that AI adds measurable economic resilience and organisational performance.

Deployment choices—cloud, edge, hybrid or federated—must consider latency, privacy, energy and cost. Cloud architectures offer scalability but may conflict with data sovereignty [2]. Edge deployments provide low latency for healthcare and robotics [15], [24], but require model compression and local governance. Hybrid models balance performance and central management [63]. Federated learning protects privacy by leaving data at the source [13], [18], [79]. 6G zero-touch networks [8] promise automated orchestration across these paradigms.

Interoperability and data governance underpin MIS success. Standard data models, APIs and policy frameworks facilitate integration across departments and supply chains. Inclusive economic development [56] and small business empowerment [55] illustrate the need for accessible MIS infrastructure.

Table 4 MIS assurance checklist

Phase	Checklist item	Description
Pre-deployment	Risk assessment & threat modeling	Identify data sources, attack surfaces and compliance requirements
Pre-deployment	Model validation & fairness audit	Evaluate model performance, bias and interpretability; ensure alignment with KPIs
Deployment	Access control & encryption	Implement role-based access, secure data transmission and storage
Deployment	Logging & audit setup	Enable immutable logging of inputs, outputs and model versions
Deployment	Human oversight & escalation	Define procedures for human review of AI recommendations
Post-deployment	Drift detection & monitoring	Continuously track performance, data drift and trigger retraining
Post-deployment	Incident response & rollback	Establish workflows for handling breaches and reverting to previous models
Post-deployment	Periodic compliance review	Review adherence to policies and update governance documentation

8 Research Agenda

8.1 Measuring causal impact of AI-enabled MIS on resilience KPIs

Motivation: While titles suggest benefits of AI in MIS [2], [10], [33], causal evidence linking AI adoption to economic resilience is scarce.

What to measure: Define KPIs (e.g., downtime reduction, revenue stability, recovery speed) and measure changes pre- and post-AI deployment.

Evaluation protocol: Conduct longitudinal studies across sectors; use quasi-experimental designs to isolate AI impact; compare organisations with and without AI-enabled MIS.

Expected impact: Demonstrates value of MIS investments and informs policy and budget decisions.

8.2 Standardising governance metrics for AI in MIS

Motivation: Governance practices vary; metrics for compliance, audit completeness and fairness are needed [5], [7].

What to measure: Develop metrics for audit trail completeness, policy enforcement latency, stakeholder satisfaction and bias mitigation.

Evaluation protocol: Collaborate with regulators and industry bodies to define standards; test in pilot MIS deployments; iterate metrics based on feedback.

Expected impact: Enables benchmarking of MIS governance and facilitates regulatory approval.

8.3 Integrating privacy-preserving learning into enterprise MIS

Motivation: Federated learning and privacy-first models [13], [18], [48] must be adapted to enterprise MIS contexts.

What to measure: Assess privacy leakage, communication overhead and model performance in federated MIS.

Evaluation protocol: Implement federated prototypes for healthcare, finance and energy datasets; evaluate differential privacy budgets and secure aggregation schemes.

Expected impact: Expands adoption of privacy-preserving analytics and addresses data sovereignty concerns.

8.4 Robust decision intelligence under distribution shift

Motivation: Models deployed in MIS face distributional drift due to changing markets, behaviours and environmental conditions [34], [57].

What to measure: Measure robustness and calibration under synthetic and real distribution shifts; track decision outcomes.

Evaluation protocol: Create evaluation benchmarks with covariate and concept shifts for energy, finance and healthcare; test retraining strategies.

Expected impact: Improves reliability of MIS decisions and reduces unexpected failures.

8.5 Human factors: trust calibration and decision accountability

Motivation: Explainable AI [14], [44], fairness [5] and human oversight require understanding trust calibration and accountability.

What to measure: Assess user trust, explanation comprehension and decision-making quality; quantify accountability mechanisms.

Evaluation protocol: Conduct user studies in business, healthcare and public governance; compare different explanation modalities; evaluate training and guidelines.

Expected impact: Supports effective human–AI collaboration and ensures ethical deployment.

Limitations

This review derives insights solely from titles and general domain knowledge; no paper contents were consulted. Classification of sectors, decision levels, AI capabilities and deployment hints may be inaccurate or incomplete. The conceptual frameworks and taxonomies proposed herein should therefore be viewed as preliminary hypotheses to be refined through full-text analysis.

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9 Conclusion

AI-enabled MIS are central to economic resilience and organisational performance. By synthesising studies titles across sectors, this title-driven scoping review offers a conceptual framework for MIS decision loops, a taxonomy of AI capabilities, a governance and assurance blueprint, sectoral analyses and a research agenda. The findings emphasise the importance of integrating explainability, fairness, privacy and security into MIS, and of adopting design principles that balance decision intelligence with governance and value. Future work will enrich this framework with detailed evidence, validated metrics and empirical assessments.

Compliance with ethical standards

Disclosure of conflict of interest

There is no conflict of interest.

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