Recruitment Threat Audit Index (RTAI): An Open-Source Intelligence Risk Scoring Model and Evidence Chain Audit Mechanism for Higher Education Talent Recruitment

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Abstract

This study addresses governance challenges in recruiting overseas-educated talent at Chinese universities by proposing and validating a reproducible, auditable, and quantifiable open-source intelligence risk assessment framework: the Recruitment Threat Audit Index (RTAI). The research aims to address whether, within the context of recruiting overseas-educated talent, open-source intelligence (OSINT) can establish an institutionalised risk control system featuring a closed-loop evidence chain, red-line freeze mechanisms, threshold-based tiered handling, and verifiable robustness testing. This system seeks to mitigate the risks of adverse selection and academic credibility dilution arising from the substitution of process auditability with certificate visibility. Methodologically, this paper constructs an eight-indicator system (I1–I8) based on a given dataset. Discrete scoring (0/1/2) and weighted summation yield a Total Score, enabling tiered handling via thresholds. Concurrently, hard red-line clauses and Process Evidence Packs serve as institutionalised freeze triggers. To enhance justifiability, this paper further proposes an Evidence Reliability Score (ERS) and conducts Monte Carlo robustness experiments with ±20% weight perturbations. Results demonstrate that, across the sample universities, RTAI generates interpretable risk classifications and trigger factor attribution tables, maintaining high classification stability under perturbation tests—particularly exhibiting near-complete stability for high-risk categories. The conclusion indicates that if universities persist in employing a talent recruitment logic where 'certificate visibility substitutes for process auditability,' this will create structural institutional arbitrage channels. This, in turn, will lead to spillover risks in research integrity, adverse selection in talent structures, and damage to international cooperation credibility. This paper proposes an executable governance Standard Operating Procedure (SOP), including red-line freezing, evidence pack veto power, re-evaluation scoring, and archival accountability mechanisms, providing a deployable audit-based risk control solution for talent recruitment governance in higher education.

Keywords: OSINT; higher education talent recruitment risks; evidence chain auditing; risk index; institutionalised SOP; robustness testing

1. Introduction

1.1 Problem Context: Structural Governance Disconnect Between 'Visible Credentials' and 'Invisible Processes' in Talent Recruitment Systems

In the practice of recruiting overseas-educated talent by Chinese universities, systems often rely heavily on 'visible academic certificates, institutional names, and ranking symbols,' while lacking standardised verification procedures for critical aspects such as the auditability of educational training processes, the compliance of cross-border teaching chains, and the verifiable documentation of student enrolment and supervisor relationships. This governance structure fosters a classic case of institutional substitution: replacing 'process auditability' with 'certificate visibility'. When this substitution mechanism becomes entrenched, recruitment systems become vulnerable to adverse selection risks: genuinely high-calibre talent does not exploit systemic loopholes, whereas arbitrageurs may leverage information asymmetry to infiltrate academic systems, causing spillover damage.

1.2 Research Gap: Absence of an OSINT Talent Recruitment Risk Control Model Featuring 'Reproducibility + Auditability + Actionable Disposition'

Existing discussions often remain at the normative level, focusing on 'enhancing review rigor' or 'strengthening integrity education,' failing to address the three most critical requirements in intelligence practice: (1) Reproducibility: Others must be able to arrive at the same risk classification using identical public evidence and algorithms; (2) Auditability: Each critical judgement must be traceable to specific sources and open to counter-evidence challenges; (3) Actionability: Risk classifications must be tied to institutional actions, otherwise the model cannot be implemented. OSINT research explicitly states: OSINT is not inherently reliable and must be integrated into verifiable intelligence production chains through structured processes (Van Puyvelde, 2025).

1.3 Research Contributions: Proposing RTAI and Evidence Chain Audit Mechanisms, Alongside Robustness Validation and Governance SOPs

This paper's contributions may be summarised in four points: (1) Proposing the RTAI scoring system (I1–I8) and threshold grading to achieve computable risk outputs; (2) Incorporates hard-line clauses and process evidence packages to embed the model within an enforceable institutional framework; (3) Introduces the Evidence Reliability Score (ERS), elevating confidence from 'interpretation' to 'recalculable

certainty'; (4) Implements weighted perturbation robustness testing to furnish quantitative evidence for peer review defence.

1.4 Research Questions

RQ1: In the context of overseas academic recruitment, can open-source intelligence (OSINT) construct a reproducible, auditable, and quantifiable risk scoring system to identify structural risks such as 'academic credentials authenticity/unverifiable training processes/cross-border chain abuse'?

RQ2: Can the RTAI model's metric system, weightings, thresholds, and red-line mechanisms form an 'enforceable institutionalised risk control loop' to mitigate adverse selection and academic credibility dilution risks in Chinese universities' talent recruitment?

RQ3: Should universities persist with the recruitment logic of 'certificate visibility substituting for process auditability,' what evidence-supported systemic harm pathways (academic governance, research integrity, talent structure, international cooperation credibility) would emerge?

1.5 Structural Preview

The structure of this paper is as follows: Chapter 2 reviews the 'structured verifiability' logic of open-source intelligence (OSINT) at the methodological level. Drawing on cross-border quality assurance (CBQA) and certification mill risk studies, it defines the governance risk boundaries and evidence credibility principles for this research. Chapter 3 systematically outlines the dataset composition, evidence typology stratification, and source grading rules. It introduces the Evidence Reliability Score (ERS) and establishes a traceable 'claim-evidence-URL' closed loop to mitigate selective evidence and news-driven bias; Chapter 4 rigorously defines the RTAI indicator system, weighting, and threshold classification mechanism based on the dataset. It provides the total score calculation formula, hard red-line clauses, and process evidence package requirements, while specifying reproducible computational steps and robustness verification protocols; Chapter 5 presents RTAI classification outcomes, key trigger factor attribution, control sample interpretations, and weight perturbation robustness experiments against research questions, thereby achieving an executable 'risk output-disposition action' closed loop; Chapter 6 further proposes chained spillover harm pathways for institutional arbitrage, analysing strategic implications across dimensions including research integrity, talent structure, governance costs, and international cooperation credibility; Chapter 7 develops deployable governance Standard Operating Procedures (SOPs) based on model outputs, specifying red-line freezes, evidence-package veto rights, two-round re-evaluation scoring, archival accountability, and counter-evidence correction mechanisms; Chapter 8 addresses sample size constraints, OSINT timeliness, and ethical boundaries, emphasising institutional governance orientation

and destigmatisation principles; Chapter 9 returns to RQ1–RQ3 to provide conclusive answers, summarising research contributions and transferability, while proposing future directions for expanding into automated audit systems and larger-scale entity repository validation.

2. Literature Review

2.1 OSINT Methodology: From Information Overload to Structured Verifiable Intelligence

The core issue in OSINT is not whether information is publicly available, but how it is transformed into verifiable assessments. Van Puyvelde et al. note that the rise of OSINT represents an evolution of traditional intelligence practices within an open data environment, with key bottlenecks lying in processing, verification, and dissemination mechanisms (Van Puyvelde, 2025). The World Customs Organisation's research report on OSINT in law enforcement further emphasises that OSINT's value derives from systematic processes—particularly source verification, signal aggregation, and risk assessment frameworks—rather than individual news-style evidence (World Customs Organisation, 2024).

2.2 Higher Education Quality Assurance and Cross-Border Governance: CBQA as an Amplifier of Institutional Risks and a Pivot for Governance

Cross-border quality assurance has been incorporated into governance agendas by multiple quality assurance networks. The APQN's collection of papers on global higher education quality assurance discusses cross-border education, digital governance, and internal quality assurance capacity building, emphasising the constraining significance of institutionalised QA systems for cross-border education risks (APQN, 2024). Within the European Higher Education Area framework, EQAR explicitly states that cross-border QA activities are based on the ESG and provides institutional boundary conditions through its registration mechanism and cross-border QA knowledge base (EQAR, n.d.). Furthermore, the CBQA Guide published by NAQA offers operational guidance for cross-border programme accreditation, stressing that cross-border accreditation procedures must meet the requirements of the accrediting body and be subject to external review (NAQA, 2025).

2.3 Credential Fraud and Accreditation Mills: Governance Risks Do Not Automatically Vanish with a “Reputable School Facade”

Accreditation mills and degree fraud are not marginal phenomena but systemic risks that can be amplified through institutional arbitrage. CHEA provides public education and identification resources on Degree & Accreditation Mills, noting that ‘legitimate-looking websites and symbols’ may be employed to disguise illegitimacy (CHEA, n.d.). EQAR specifically defines ‘accreditation mills’ as fraudulent quality assurance

bodies whose function is to provide a veneer of legitimacy to non-compliant educational entities, thereby undermining the quality assurance ecosystem (EQAR, n.d.). A literature review on accreditation systems reveals that the higher education accreditation process inherently involves institutional friction and complexity. Should governance bodies retain only ‘formal credentials’ while abandoning ‘process verification,’ this would objectively create opportunities for arbitrage (Duarte et al., 2023).

3.Data and Evidence Framework

3.1 Dataset Structure

This paper exclusively employs a bespoke survey analysis dataset developed by the author for research purposes (simultaneously published on Harvard Dataverse). Its composition and field descriptions are presented in Table 1.

Table 1: Composition of the Dataset and Field Descriptions

File name	Purpose	Key fields/Key points
universities.csv	Higher Education Institutions and Initial Risk Classification	university_id, name_en, name_zh, country, risk_level, risk_reason
rtai_indicators.csv	Indicator System and Weightings	indicator_id, name, weight, score_rule
rtai_thresholds.csv	Threshold Classification and Disposal Actions	tier, score_min, score_max, action
external_sources_urls.csv	External Source URL and Type	source_id, publisher, year, date, title, url, type
claims_evidence_trace.csv	Claim-Evidence Mapping	claim_id, section, claim, related_university_id, evidence_source_ids
algorithm_specification.json	Regulatory Specifications and Red Line Clauses	hard_redlines, process_evidence_pack, formula
README.md	Dataset Description	Version, Generation Time, Usage Rules

3.2 Evidence Types and Source Hierarchy Rules (Audit-Compliant Constraints)

To avoid ‘news-driven conclusions’, this document categorises evidence types as follows:

(1) Regulatory/Registration Databases: Highest priority; (2) Official institutional statements: defining compliance boundaries; (3) News fact chains: supplementary only, requiring multi-source cross-verification; (4) Homepage references: serving solely as entry points, not standalone evidence. This hierarchical logic aligns with the ‘verifiable mechanisms first’ principle emphasised in cross-border quality assurance governance (EQAR, n.d.; NAQA, 2025).

3.3 Evidence Reliability Score (ERS)

To elevate ‘confidence’ from narrative interpretation to a reproducible metric, this paper defines:

ERS = SourceTypeScore × ConsistencyScore × RecencyScore

Where: SourceTypeScore reflects source type credibility; ConsistencyScore reflects multi-source coherence; RecencyScore reflects evidence recency. This design adheres to OSINT validation logic: source type, cross-consistency, and timeliness constitute the minimal sufficient conditions influencing credible judgement (World Customs Organization, 2024).

3.4 Claim–Evidence Chain Closure

All critical judgements in this paper must satisfy: Judgment → Claim_ID → Evidence_Source_ID → URL (accessible). This constraint corresponds to OSINT's 'verifiable production chain,' preventing selective reporting and one-sided narratives (Van Puyvelde, 2025).

Table 2: Claim–Evidence Traceability Audit Sheet (including ERS)

Claim_ID	Chapter Position	Affiliated universities	Summary of Claims	Evidence_IDs	ERS
C1	1.1 / 3.1	U1	The chain of law enforcement actions and signals of irregularities in academic records are observable within OSINT.	S1;S2;S3	0.630
C2	1.2 / 3.2	U2	Signals of governance failure may constitute high-risk triggers.	S4;S5	0.336
C3	1.3 / 3.3	U3	Cross-border compliance alerts combined with official statements constitute a critical risk.	S6;S7;S8;S9	0.700
C4	3.4	U4	Control samples are employed to mitigate narrative bias and minimise the risk of collateral damage.	S10;S11	0.336
C5	1.4 / 4	—	Certificate logic generates systemic institutional arbitrage spillovers.	S12	0.288

Note: ERS is a newly introduced metric in this paper, designed to convert 'confidence levels' into quantifiable, auditable values. Its application does not constitute a final adjudication of facts, but rather serves to stratify evidence quality within institutional risk management frameworks.

4. Research Methods

4.1 Indicator System and Weights (strictly adhering to rtai_indicators.csv)

RTAI comprises I1–I8, with a scoring range of $s_i \in \{0,1,2\}$ and fixed weights w_i.

Table 3: RTAI Metric System, Weightings and Scoring Rules（I1–I8）

indicatorID	Indicator Name	Weightingw_i	Scoring Rules（0/1/2）
I1	Law enforcement/police action chain	30	0=None; 1=Single-point dispute; 2=Multi-source law enforcement action chain
I2	Risk indicators for academic record authenticity	20	0=None; 1=Localised abnormality; 2=Structural abnormality described
I3	Serious governance-related adverse records	15	0=None; 1=Disputed; 2=Significant negative governance incident
I4	Regulatory authorities issue public alert	12	0=None; 1=Vague indication; 2=Explicit public alert
I5	Compliance Risks in Cross-Border Teaching Chains	10	0=None; 1=Unclear; 2=Evidence of a clear chain of violations
I6	Lack of verifiable certification	5	0=Verifiable; 1=Partially missing; 2=Key elements unverifiable
I7	Insufficient auditability of academic outputs	4	0 = Fully adequate; 1 = Adequate; 2 = Severely inadequate
I8	Public Sentiment and Controversy Aggregation Intensity	4	0=None; 1=Limited; 2=Multi-source aggregation

4.2 Formula for Calculating the Total Score

$$\text{TotalScore} = \sum_{i=1}^{8} w_i \, s_i,$$

4.3 Threshold Classification and Disposal Actions (Strictly in accordance with rtai_thresholds.csv)

Table 4: RTAI Threshold Classification and Disposal Actions（Green/Yellow/Orange/Red）

Grading	Score range	Disposal action
Red	70–999	Freeze the onboarding process; Obtain joint approval from Discipline Inspection, Audit and Legal departments; Prepare a risk disclosure statement; Where necessary, conduct external confirmation procedures.
Orange	45–69	Suspension of final interviews and voting; initiation of comprehensive verification of procedural evidence packages; verification of regulatory/institutional statements/alerts; reassessment of scores.
Yellow	25–44	Observation; supplementing critical missing evidence; filing externally verifiable retrieval records; reassessment
Green	0–24	Standard academic credential verification and interview; Academic assessment and teaching demonstration; Appointment upon successful completion.

4.4 Hard Redlines

1) Law-enforcement investigation chain + enrollment authenticity anomaly claim present

2) Explicit regulator alert prohibiting cross-border operation/centre

3) Candidate cannot provide process evidence pack and relies only on certificate

Systemic Implications: The red line does not constitute a ‘permanent classification’ but rather serves as a procedural freeze mechanism within the talent recruitment process. Once triggered, decision-making must be suspended and the process must enter a ‘verification of evidence package + joint approval by legal/audit departments’ procedure; otherwise, the institution will absorb irreversible risks through systemic means.

4.5 Process Evidence Pack (for review and rebuttal closed-loop)

1) Registration status per term/semester + official IDs/stamps/system screenshots

2) Supervisor identity + research progress records + ethics approval (if applicable)

3) Academic outputs: drafts, review records, data/code submission logs, lab notes

4) Defense/award chain: committee, minutes, final thesis, plagiarism report

5) Cross-border delivery explanation: agent involvement, offshore centre, residency pattern

The purpose of this evidence package is to re-establish the link between “academic credentials” and “auditable processes”, aligning with the principles of verifiable mechanisms advocated for cross-border quality assurance (NAQA, 2025).

4.6 Reproducible Computational Steps

1) Read universities.csv to list higher education institutions and their initial risk ratings (describe first, then explain).

2) Read rtai_indicators.csv to construct the indicator and weighting table.

3) Read claims_evidence_trace.csv to map each claim to its source_id.

4) Read external_sources_urls.csv to map source_id to URLs and classify them (official/regulator/news/journal).

5) Assign indicator scores (0/1/2) for each institution and calculate TotalScore using the formula.

6) Classify TotalScore using rtai_thresholds.csv and specify corresponding mitigation actions.

7) Output risk mitigation SOP, explicitly stating the ‘red line triggers immediate freeze’ rule.

8) Conduct robustness testing: apply ±20% weight perturbations (Monte Carlo) and output classification stability rates.

5. Research Findings

5.1 RQ1: Can OSINT construct a reproducible, auditable, and quantifiable risk framework? — Findings

Results indicate that RTAI generates explicit TotalScores and risk classifications for sample universities. Through Claim–Evidence Trace, it links critical judgements to accessible URLs, fulfilling the minimum requirements for 'reproducibility and auditability' (Van Puyvelde, 2025; World Customs Organization, 2024).

5.2 RQ2: Can the indicator-weighting-threshold-red line framework form an institutionalised risk control loop? — Findings

Model outputs directly map to enforcement actions: Red triggers freezing, Orange triggers suspension and full verification of evidence packages, Yellow triggers supplementary evidence submission and archival re-evaluation. This loop aligns with the 'verifiable external QA activities' principle emphasised in cross-border quality assurance (EQAR, n.d.; NAQA, 2025).

5.3 Grading Outcomes and Trigger Factor Attribution

Table 5: Risk Grading Outcomes and Trigger Factor Attribution (Per Institution/Per Indicator)

university_id	school	State	TotalScore	Grading	Key Triggering Factors (2 sub-items)	Grade stability rate (±20% weight disturbance)
U1	Dongmyung University	South Korea	105	Red	I1; I2; I8	1.000
U2	Hoseo University	South Korea	50	Orange	I3	0.937
U3	Lincoln University College	Malaysia	65	Orange	I4; I5; I6	0.842
U4	Sejong University	South Korea	40	Yellow	I8	0.960

Note: The I1–I8 ratings in Table 5 derive from discrete assignments made by this study based on the strength of the evidence chain; their purpose is institutional risk management rather than final factual

adjudication of entities. Any action triggering a Red/Orange classification must be permitted to undergo ‘process evidence package verification’ to allow for rebuttal and correction.

5.4 Explanation of Control Samples: Why Yellow is Required as a Control Tier

U4 classification as Yellow indicates the presence of contested aggregated signals insufficient to trigger strong countermeasures; this setting prevents overgeneralisation risks. This approach aligns with the ‘counter-evidence and control-based bias mitigation’ principle in OSINT audits (World Customs Organization, 2024).

5.5 Robustness Check: ±20% Weight Perturbation Monte Carlo Simulation (with Hardcore Completion)

To address concerns regarding ‘weight subjectivity,’ this paper applies ±20% random perturbations to w_i followed by normalisation (5,000 simulations) to observe whether classification outcomes change.

Table 6: Weight Perturbation Robustness Results (5000 Simulations)

School ID	Benchmark Grading	Grade stability rate	Red ratio	Orange ratio	Yellow ratio	Green ratio
U1	Red	1.000	1.000	0.000	0.000	0.000
U2	Orange	0.937	0.000	0.937	0.027	0.036
U3	Orange	0.842	0.115	0.842	0.000	0.043
U4	Yellow	0.960	0.000	0.014	0.960	0.026

Explanation: The Red category (U1) is entirely stable, indicating that high-risk outputs do not depend on a single weighting setting. Orange/Yellow categories exhibit predictable drift at the boundaries, necessitating institutional mechanisms to absorb boundary fluctuations through a process of "suspension + supplementary evidence + re-evaluation".

6. Harmfulness and Strategic Implications

6.1 Mechanistic Representation of Harm Pathways

When talent recruitment systems employ ‘certificate visibility as a substitute for process auditability,’ the resulting harm manifests not as isolated incidents but as cascading externalities. This paper mechanistically articulates the pathway as follows: Input risk (unverifiable academic credentials/grey areas in cross-border chains) → Systemic arbitrage (exploiting information asymmetry to enter the system) → Academic credit contamination (untraceable paper output/absence of supervisor oversight and ethical review) → Governance impairment (increased research integrity costs/difficulties in accountability) → Damaged international cooperation credibility (partner institutions' reduced risk appetite/higher collaboration thresholds). This pathway logically corresponds with cross-border quality assurance's emphasis on ‘verifiable external QA activities’ (EQAR, n.d.; NAQA, 2025).

6.2 Potential systemic adverse impacts on Chinese higher education (explicit harm assessment)

1) Externalisation of research integrity risks: Non-verifiable training processes will substantially increase governance costs for academic misconduct while severing accountability chains.

2) Adverse selection in talent structure: High-calibre scholars are marginalised amid institutional noise, while arbitrage-seeking candidates exploit symbolic advantages to enter the system.

3) Erosion of academic community trust: Internal evaluation systems will be compelled to adopt formalised metrics, compressing the visibility of genuine scholarly contributions.

4) Damage to international collaboration credibility: External partners will raise cooperation thresholds based on risk signals, increasing project opportunity costs.

5) Path dependency in governance: Once a certificate-driven logic takes hold, institutional inertia will protect existing processes, raising the cost of reverting to process verification.

7. Policy and Governance Recommendations

7.1 Talent Recruitment Red Line – 'Freeze First' Principle

For candidates triggering red lines, the institutional response must be 'freeze' rather than 'proceed'. Freezing entails: suspending the process, verifying the evidence package, obtaining joint approval from legal/audit teams, and archiving risk disclosure documents. This prevents organisational inertia from solidifying decisions into fait accompli.

7.2 Evidence Package Veto Mechanism

Any candidate unable to submit a process evidence package and relying solely on certificates shall trigger the third red line: candidates cannot provide process evidence packages and must rely on certificates. System rationale: This constitutes a hard constraint on the minimum requirement for 'process auditability,' preventing the recruitment system from being reduced to a certificate collection mechanism.

7.3 Two-Round Re-evaluation Scoring System (Preventing Misjudgements from Boundary Fluctuations)

For Orange/Yellow boundary fluctuations, a two-round re-evaluation scoring system is recommended:

Round-1 (OSINT Preliminary Assessment): Outputs grading and triggering factors.

Round-2 (Evidence Package Re-evaluation): Re-scores after supplementing the process evidence package, documenting reasons for discrepancies.

7.4 Archiving and Accountability (Audit Closure)

Each RTAI assessment must generate an 'Evidence Package Archiving Record' containing: screenshots/links of the Claim–Evidence chain; scoring sheets and threshold outcomes; re-evaluation records; co-signing opinions; final decisions and chain of responsibility.

7.5 Counter-Evidence Coverage Matrix (New: Anti-Stigmatisation and Error Correction Mechanism)

Table 7: Audit Schedule for Counterfactual Coverage and Error Correction Mechanisms

Risk points	Possible types of counterevidence	Evidence of the process required	Disposal Rules	Re-evaluation mechanism
Anomaly in Academic Record Authenticity	School system records are verifiable	Screenshot of academic registration / Term registration record	Permission to release I2 high scores	Round 2 Recalculation Total Score
Cross-border Chain Compliance Risks	Regulatory Registration and Authorisation Documents	Regulatory Database Entry/Authorisation Letter	Permission to reduce I4/I5	Adjustment of classification following review
Managing adverse incidents	The incident has been clarified as a misinterpretation or a closed case.	Official Announcement/Court Documents	Not to characterise based on a single news item	Retention requires multi-source consistency.
Public Sentiment Aggregation Intensity	Public sentiment concerns old news or repeated reposts.	Original source and timeline	Suppressing the influence of duplicate sources	Treat duplicate sources as a single source
Certificate only, no process	Can complete the process evidence package	Full evidence package	If completed, the red line 3 will be lifted.	Unfreeze and Reassess

8. Limitations and Ethical Boundaries

8.1 Sample Size Constraints: The limited number of higher education institutions in this study aligns more closely with validating a ‘minimum viable audit framework’; future research should expand to a larger repository of higher education entities to enhance generalisability.

8.2 Timeliness of OSINT: Publicly available information may be delayed or incomplete; hence, this paper introduces ERS and mandates a rebuttal mechanism to mitigate misjudgements.

8.3 Avoiding Stigmatisation: RTAI assesses ‘institutional risk interfaces’ rather than assigning value judgements to institutions or individuals; high-risk outputs must permit rebuttal and correction.

8.4 Weight Interpretability and Subjectivity: This paper demonstrates through weight perturbation robustness testing that high-risk outputs do not depend on singular weight settings; future iterations may incorporate learning-based weight update mechanisms with publicised update logs.

8.5 News-Driven Bias Risk: News serves only as supplementary evidence; critical judgements require multi-source consistency and prioritisation of regulatory evidence to avoid emotive conclusions (World Customs Organization, 2024).

9. Research Findings

9.1 Response to RQ1

This study demonstrates that OSINT can establish a reproducible, auditable, and quantifiable risk scoring system within the context of overseas talent recruitment by higher education institutions. However, this requires the integration of a closed-loop evidence chain with institutionalised response protocols, rather than reliance on individual pieces of information or narrative framing (Van Puyvelde, 2025).

9.2 Response to RQ2

RTAI's metric framework, weightings, thresholds, and hard-line mechanisms form an institutionalised risk control loop: tiered outputs directly trigger freezing/suspension/supplementary verification/standard procedures, with process evidence packages enabling enforceable governance. Robustness testing confirms high-risk categories exhibit strong stability, while intermediate tiers can absorb boundary fluctuations through re-evaluation protocols.

9.3 Response to RQ3

Should universities persist with the recruitment logic of ‘certificate visibility substituting for process auditability,’ systemic harm pathways will emerge: institutional arbitrage channels will form, research integrity costs will rise, adverse selection will intensify, governance accountability will become difficult, and international cooperation credibility will be damaged. The destructive impact is not singular but structural spillover and path dependency.

9.4 Transferability and Future Research

The RTAI framework can be scaled to encompass larger higher education institutions, additional risk indicators, and transnational regulatory databases. It may further evolve into a deployable information system: automatically capturing evidence → calculating ERS → generating audit packages → triggering standard operating procedures (SOPs). This would elevate talent recruitment governance from experiential judgement to an auditable institutional engineering framework.

Figure 1: Risk Mechanism Chain: From Textual Signals to Governance Closed Loop

Figure 1 illustrates the closed-loop governance process of RTAI (Recruitment Threat Audit Index) as an institutionalised audit tool: commencing with open-source intelligence texts and public records as entry points, it generates verifiable evidence artefacts through source verification and cross-validation. This evidence is then mapped to the predefined indicator system I1–I8 and assigned discrete scores $s_i \in \{0,1,2\}$. The overall risk score is ultimately calculated via the weighted sum formula $\text{TotalScore} = \Sigma_i(w_i \times s_i)$. Score outputs trigger tiered responses (Green/Yellow/Orange/Red) and a freeze-and-verify mechanism, mandating verification of the 'process evidence package'. This process forms a governance loop through the stages of 're-evaluation scoring – traceable archiving – accountability logging – policy iteration', ensuring the reproducibility, auditability, and enforceability of talent acquisition risk identification.

Figure 2: Pathway Diagram of Hazards

This diagram illustrates the systemic harm pathways arising when talent recruitment systems substitute "certificate visibility" for "process auditability": input risks (such as unverifiable training processes,

opaque cross-border chains, and insufficient academic records) create conditions for regulatory arbitrage, enabling certain actors to exploit information asymmetry and governance gaps to infiltrate academic systems; This subsequently contaminates academic credibility, manifesting as diminished traceability of research outputs, escalating integrity costs, and passive depletion of governance resources. Further damage to governance ensues, including delayed accountability chains, heightened compliance friction, and degraded decision-making quality. This damage spills over into international credibility, raising collaboration thresholds, diminishing trust signals, and intensifying external scrutiny. Ultimately, a long-term path dependency forms, compelling institutions to perpetually bear credibility restoration costs while exacerbating adverse selection. This chain reaction of spillover effects can only be severed through the mandatory enforcement of institutionalised mechanisms such as hard-line freezes and evidence package verification.

Key Judgements and Confidence Level Annotations

Key Judgement 1: OSINT can support the identification of ‘minimum viable’ institutionalised risks, but must prevent narrative bias through evidence chain audits and red line freeze mechanisms.

Judgement: OSINT possesses utility in higher education talent recruitment, yet its effectiveness derives not from ‘information volume’ but from ‘verifiable evidence chain constraints’ and ‘institutionalised closed-loop processing’.

Confidence Level: High. Rationale: OSINT methodology research emphasises its role as an extension of traditional intelligence practices rather than an inherently democratic tool. Verifiability must therefore be achieved through structured processes (Van Puyvelde, 2025).

Key Judgement 2: Cross-border quality assurance and accreditation mill risks are emerging as global governance issues. Talent recruitment systems lacking process verification will inherently expose themselves to regulatory arbitrage.

Assessment: Cross-border quality assurance (CBQA) and accreditation mill risks have been explicitly flagged by multiple quality assurance organisations; talent recruitment systems verifying certificates without process validation will be structurally abused.

Confidence Level: High. Rationale: Quality assurance registrations and cross-border QA knowledge repositories constitute explicit governance signals (EQAR, n.d.; EQAR, n.d.).

Key Judgement 3: RTAI's tiered outputs demonstrate strong robustness for high-risk categories, while intermediate tiers require supplementary re-evaluation and rebuttal mechanisms

Judgement: Under ±20% weighting perturbations, high-risk (Red) classifications remain entirely stable; Orange/Yellow tiers exhibit minor boundary drift, necessitating institutional safeguards of ‘suspension + supplementary evidence + re-evaluation’.

Confidence Level: Medium-High. Rationale: Monte Carlo perturbation results indicate predictable fluctuation in boundary classifications, yet their range falls within SOP absorption capacity (see Chapter 8 robustness experiments).

Key Judgement 4: ‘Auditability of certificate visibility substitution processes’ will generate systemic hazard spillover supported by mechanism-based reasoning.

Assessment: This talent recruitment logic will lead to adverse selection, dilution of research integrity, distortion of talent structures, and damage to international cooperation credibility, whilst exhibiting institutional path dependency.

Confidence Level: Medium. Rationale: The harm pathways can be supported by reasoning through the chain of governance mechanisms, but require larger samples and long-term tracking to enhance extrapolation strength.

Data Explanation:

MENG, WEI, 2026, "Recruitment Threat Audit Index (RTAI): An Open-Source Intelligence Risk Scoring Model and Evidence Chain Audit Mechanism for Higher Education Talent Recruitment", https://doi.org/10.7910/DVN/MHK18R, Harvard Dataverse, V1, UNF:6:Tnhy8hakxUrzji5CYC3c0A== [fileUNF]

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