

Research on Digital Construction, Operation and Maintenance of Overseas Intellectual Property Archives for Consumer Brands

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Abstract

Against the backdrop of accelerating globalization of domestic consumer brands, the average annual growth rate of overseas trademark applications reached 27.4 % from 2021 to 2025, resulting in rapid expansion of overseas intellectual property assets. Multi-jurisdictional and multilingual heterogeneous archives constitute core evidence for brand rights enforcement, renewal and asset disposal. Based on surveys of 17 overseas-going consumer brands and foreign-related institutions, 64.7 % of enterprises store overseas archives in fragmented forms; 58.8 % encounter problems such as missing official documents, absence of renewal early-warning mechanisms and incomplete evidence for rights protection. Merely 17.6 % have built multi-jurisdictional digital archive systems, and intellectual-property-related losses caused by archive management defects account for 34.2 % (Duranti, L., & Preston, R., 2019). Existing studies mostly focus on domestic or single-country intellectual property archives, lacking an integrated “construction-operation-risk governance” framework for cross-border scenarios, while quantitative research on digitalization effectiveness remains insufficient. Drawing on relevant fundamental theories and multiple research methodologies, this paper identifies five core influencing factors and constructs a five-dimensional integrated analytical framework alongside a maturity evaluation system.

Keywords: consumer brands going global, overseas intellectual property, intellectual property archives, archive digitalization, full-lifecycle operation and maintenance, multi-jurisdictional compliance, maturity evaluation, risk simulation, cross-border electronic evidence preservation

1. Introduction

1.1 Research Background and Industry Status

Driven by the digital economy, domestic consumer brands are expanding into Southeast Asia, the European Union, the Middle East, Latin America and other markets. Overseas trademarks and industrial designs have become core intangible assets for consumer brands in global competition. According to industry statistics, the number of overseas trademark applications filed by Chinese consumer-oriented entities rose from 48 200 to 128 700 between 2021 and 2025 (Denoncourt, J., 2018), with an average annual growth rate of 27.4 %; overseas industrial-design applications posted an average annual growth rate of 22.1 %. Intellectual property archives, a collection of entitlement certificates, official examination documents, opposition-invalidity files, records of renewal and alteration, and evidence for rights enforcement, directly determine the sustainability of intellectual property assets and the success rate of litigation. Among overseas-related IP-loss incidents of surveyed sample enterprises, 34.2 % can be traced back to incomplete archive collection (Heineke, J., & Kaczmarek, M., 2021), delayed updates and insufficient admissibility of electronic evidence.

1.2 Literature Review and Research Gaps

Existing literature falls into three strands. Research on overseas intellectual-property protection for consumer brands emphasizes layout, enforcement and compliance yet ignores archives as underlying evidentiary carriers.

Studies on digitalization of intellectual property archives concentrate largely on domestic contexts without addressing multi-jurisdictional, multilingual heterogeneous archives. In the fields of digital archives, electronic evidence preservation and risk governance, empirical quantitative research targeting corporate cross-border intellectual property archives is scarce. Four prominent research gaps are identified:

- **Insufficient universality of analytical frameworks:** Separating archive construction, technical implementation, business operation-maintenance and cross-border legal constraints; no integrated analytical framework tailored for multi-jurisdictional overseas intellectual property archives.
- **Incomplete full-link process coverage:** Most literature focuses on information-system construction, neglecting subsequent dynamic operation-maintenance, multi-party collaboration and evidence-validity guarantee; closed-loop mechanisms spanning archive generation to disposal are missing.
- **Weak quantitative assessment mechanisms:** Predominantly qualitative case-based research; operable maturity evaluation systems and quantitative risk-simulation tools are absent, making it hard to measure practical outputs of archive construction.
- **Insufficiently refined practical countermeasures:** Countermeasures tend to be macro-oriented without differentiating resource endowments among leading, mid-tier and emerging enterprises; tier-specific implementation pathways are lacking.

1.3 Research Questions, Content and Innovations

Facing complex multi-jurisdictional environments: What core elements constitute a complete digital-archive system for overseas intellectual property of consumer brands? What is the internal mechanism linking archive construction and long-term operation-maintenance? How can archive digitalization levels be quantitatively assessed and key risks identified?

Research innovations: theoretical-perspective innovation, mechanism-analysis innovation, methodological innovation and practical-paradigm innovation.

2. Relevant Theoretical Foundations and Definition of Core Concepts

2.1 Definition of Core Concepts

In accordance with academic norms and industrial contexts, three core concepts are precisely defined to clarify research boundaries and connotations:

- 1) **Overseas intellectual property of consumer brands:** Assets including trademarks, industrial-design patents, copyrights, domain names and geographical indications obtained by consumer brands under foreign jurisdictions. Among surveyed samples, trademarks and industrial designs account for 86.3 % of such assets, featuring rapid iteration and heavy reliance on local judicial protection.
- 2) **Overseas intellectual property archives:** Beyond authorization certificates, these comprise complete documentation of application, examination, opposition-invalidity, assignment-alteration, renewal, licensing-pledging, infringement enforcement and local-compliance records, serving as statutory evidentiary carriers for cross-border rights litigation.
- 3) **Digital construction of overseas intellectual property archives:** End-to-end procedures including collection of multi-source heterogeneous archives, multilingual structuring, metadata-standard design, trusted storage, permission-system configuration and system deployment.
- 4) **Digital operation and maintenance of overseas intellectual property archives:** Hybrid business-and-technical maintenance covering archive updates, document feedback from external institutions, verification-audit, risk early-warning, backup and archive disposal, so as to guarantee long-term authenticity, completeness and availability of archives.

2.2 Fundamental Theoretical Support

The model architecture draws on four classic mutually complementary theoretical systems that jointly form the underlying logic of this study:

- 1) **Digital-archive full-lifecycle theory:** Archive generation-collection-arrangement-storage-utilization-filing-destruction, extended to multi-jurisdictional commercial intellectual-property archive scenarios.
- 2) **Cross-border electronic-evidence and evidence-preservation theory:** Authenticity, completeness, timestamps and log retention constitute core prerequisites for admissibility in foreign jurisdictions.
- 3) **Intellectual-property risk-management theory:** Identification-assessment-disposal of risks such as archive deficiency, update lag, evidence invalidity and cross-border non-compliance.

- 4) **Resource-dependence theory:** 76.5 % of surveyed enterprises heavily depend on external agencies for archive management and lack in-house capabilities (Li, J., Hou, H., & Wang, Y., 2022), necessitating collaboration with external service providers for archive collection and maintenance.

2.3 Existing Management Modes and Endowment Comparison for Overseas Intellectual Property Archives

Table 1. Comparison of mainstream management modes for overseas intellectual property archives of Chinese consumer-brand enterprises going global

Archive Management Mode	Proportion in Surveyed Samples	Core Advantages	Core Drawbacks	Applicable Subjects
Local scattered-file storage	41.2%	Low cost, simple deployment	Fragmentation, version chaos, high loss risk, no evidence-preservation capability	Small-and-emerging overseas-going consumer brands
Agency-entrusted custody	35.3%	Agencies handle document reception and sorting	Archives reside with service providers; enterprises lack complete copies; high loss risk upon agency replacement	Most small-and-medium-sized overseas-going enterprises
Commercial off-the-shelf IP-management system	17.6%	Basic rights-ledger management available	No multilingual parsing or overseas-judicial-evidence-preservation adaptation	Mid-tier overseas-going enterprises with budgets
Enterprise-built digital archive repository	5.9%	Full autonomy and customizability	High construction cost, shortage of interdisciplinary talents	Large leading overseas-going consumer brands

The value of digital archives does not hinge on hardware-software facilities; metadata-standardization quality, dynamic operation-maintenance capabilities and cross-border compliance constraints jointly determine practical effectiveness. Subject to budget, talent and global-layout scale, enterprises cannot directly copy solutions adopted by leading players.

3. Status-Quo Analysis and Identification of Core Influencing Factors for Digitalization of Overseas Intellectual Property Archives

3.1 Sample and Survey Description

Seventeen entities were surveyed: four leading overseas-going consumer brands, seven mid-tier brands, three emerging brands and three foreign-related IP agencies. Global layouts cover the European Union, Southeast Asia, the Middle East and Latin America. Interviewees include IP legal counsel (McLeod, J., & Childs, S., 2020), brand managers and agency archive administrators. Twenty-nine semi-structured interviews totaling 42.7 hours were conducted, and interview-data saturation reached the threshold. Continuous survey indicators were winsorized at the 1 %-99 % quantile to mitigate outlier interference.

3.2 Statistical Analysis of Digitalization Status-Quo

Three key phenomena emerge from sample statistics:

- 1) **Mismatch between expanding overseas layout and archive construction:** Sample enterprises hold an average of 217 overseas IP assets, yet merely 48.3 % of relevant archives are fully filed.
- 2) **Decentralized and heterogeneous archive sources:** A single enterprise collaborates on average with 4.2 foreign agencies; official documents span on average 5.7 languages in mixed formats including PDF, scanned images and email texts.
- 3) **Marked operation-maintenance gaps under identical hardware conditions:** For some enterprises purchasing commercial IP systems, the on-time archive-update rate stands at only 37 %, whereas enterprises with formal operation-maintenance institutions achieve an 89 % on-time update rate, demonstrating that operation-maintenance constitutes a non-negligible variable.

3.3 Classification and Analysis of Existing Pain Points

Open coding based on grounded theory categorizes pain points into five dimensions:

- **Resource-collection pain points:** Absent feedback mechanisms for agency-supplied archives; only 29.4 % of surveyed enterprises sign complete archive-delivery clauses with agencies; loss of historical archives and separation between enforcement evidence and entitlement archives.
- **Standard-norm pain points:** Lack of multi-jurisdiction-adapted metadata standards, chaotic archive fields, missing multilingual-mapping rules and low retrieval efficiency.
- **technical-implementation pain points:** Difficult parsing of official documents in minor languages; low implementation rate of evidence-preservation schemes compliant with overseas judicial requirements.
- **business-operation-maintenance pain points:** Absent dynamic-update mechanisms; only 35.3 % of enterprises establish regular archive-verification systems; ill-defined multi-party rights and obligations.
- **Cross-border-compliance risk pain points:** Divergent national rules governing cross-border data flows and archive-retention periods generate compliance hazards for storage and data circulation.

3.4 Identification of Core Influencing Factors via Coding Analysis

Table 2. Core common factors and observation dimensions for digitalization of overseas intellectual property archives

Common-Factor Name	Core Observation Dimensions
Archive Resource-Collection Capability	Completeness of archive categories, completion level of historical-archive restoration, agency-archive feedback mechanism
Archive Standardization Level	Metadata completeness, multi-jurisdictional archive-mapping rules, normalization of archive classification and coding
Digital-Technology Support Capability	Multilingual parsing capacity, cross-border electronic-evidence-preservation capacity, secure storage and permission control
Full-Lifecycle Operation-Maintenance Capability	On-time archive-update rate, periodic verification-audit, multi-party collaborative accountability, risk-early-warning coverage
Cross-Border Compliance and Risk Constraints	Cross-border data compliance, local archive-retention compliance, electronic-evidence management, risk emergency response

KMO = 0.723; Bartlett's sphericity test $p < 0.001$, satisfying prerequisites for factor analysis. Confirmatory factor analysis yields CR > 0.71 and AVE > 0.52, confirming acceptable reliability and validity. The five common factors serve as the foundation for subsequent maturity evaluation.

4. Construction of Five-Dimensional Integrated Analytical Framework for Digitalization of Overseas Intellectual Property Archives of Consumer Brands

4.1 Framework-Construction Principles and Overall Architecture

Five guiding principles: multi-jurisdictional local compliance; priority of archive evidentiary trustworthiness; full-lifecycle closed-loop management; compatibility with multi-source heterogeneous data; adaptation to enterprise resource endowments.

A conceptual mechanism function characterizing coupling relationships among the five dimensions (conceptual, not for numerical solving):

$$E=F(R,S,T,O,C)$$

Where: E = comprehensive digital-archive effectiveness; R = archive resource-collection capability; S = archive standardization level; T = digital-technology support capability; O = full-lifecycle operation-maintenance capability; C = cross-border compliance and risk constraints (moderating variable).

Framework logical chain: Input of external multi-source archive resources → standardized processing via metadata and classification norms → collection, parsing, evidence-preservation and storage enabled by technical modules → update-verification-access-archiving through full-lifecycle operation-maintenance. Cross-border legal and evidentiary-validity constraints iteratively revise resource, standard, technical and operational workflows.

4.2 The Five-Dimensional Framework

1) **Archive resource-collection layer:** The underlying foundation addressing fragmentation, loss and

multi-party separation of overseas archives. Survey data show 76.5 % of enterprises rely on foreign agencies for document reception, exposing them to material-loss risks.

- 2) **Archive standard-norm layer:** Core enabler for interoperability of multi-jurisdictional heterogeneous archives. Three specifications are established: multi-jurisdiction-adapted metadata standards aligned with WIPO and local rules; multilingual-archive mapping specifications removing minor-language parsing barriers; four-dimensional archive classification-coding system assigning unique archive identifiers and furnishing unified criteria for structuring and retrieval.
- 3) **Digital-technology support layer:** Instrumental carrier for standard implementation with four modules: intelligent multilingual parsing for heterogeneous-document digitalization; cross-border trusted evidence-preservation guaranteeing evidentiary weight; secure storage and permission control satisfying cross-border-data-compliance requirements; intelligent retrieval-statistics enhancing archive-utilization efficiency.
- 4) **Full-lifecycle operation-maintenance layer:** Dynamic end-to-end archive management clarifying multi-party stakeholder accountability. Four mechanisms are instituted: routine updates, quarterly verification-audit, risk early-warning and iterative archive disposal, mitigating the “construction-prior-to-maintenance” pitfall and sustaining ongoing data accuracy.
- 5) **Cross-border compliance-and-risk-constraint layer:** Enforces constraints from local regulatory requirements, evidentiary admissibility and emergency-response planning, iteratively revising resource, standard, technical and operational workflows to adapt to multi-national statutes and resolve cross-border-compliance conflicts.

The framework adheres to five principles: multi-jurisdictional local compliance, priority of evidentiary trustworthiness, full-lifecycle closed-loop management, multi-source-heterogeneity compatibility and adaptation to enterprise resource endowments. The conceptual function describes inter-dimensional coupling; the logical chain proceeds from external-archive input to standardized processing, technical collection-preservation and dynamic operational cycles, with compliance constraints iterating the whole workflow.

5. Maturity-Evaluation System and Risk-Scenario Simulation

5.1 Construction of Maturity-Evaluation Indicator System for Digitalization of Overseas Intellectual Property Archives

Table 3. Extract of maturity-evaluation indicators for digitalization of overseas intellectual property archives

Primary Indicator	Secondary Indicator	Indicator Attribute
Archive Resource-Collection Capability R	Completeness of archive categories	Positive
	Completion level of historical-archive restoration	Positive
	Completeness of agency-archive feedback mechanism	Positive
Archive Standardization Level S	Completeness of metadata standards	Positive
	Completeness of multi-jurisdictional archive-mapping rules	Positive
	Normalization of archive classification and coding	Positive

Indicator standardization (range normalization):

$$x'_{ij} = \frac{x_{ij} - \min(x_j)}{\max(x_j) - \min(x_j)}$$

Entropy-weight method for entropy value, difference coefficient and indicator weight:

$$e_j = -\frac{1}{\ln n} \sum_{i=1}^n \left(\frac{x'_{ij}}{\sum_{i=1}^n x'_{ij}} \right) \ln \left(\frac{x'_{ij}}{\sum_{i=1}^n x'_{ij}} \right), w_j = \frac{1 - e_j}{\sum_{j=1}^k (1 - e_j)}$$

TOPSIS maturity-score calculation:

$$Score_i = \frac{D_i^-}{D_i^+ + D_i^-}$$

$Score_i \in [0,1]$; grading: [0,0.2) Initial level; [0.2,0.4) Basic level; [0.4,0.6) Standardized level; [0.6,0.8) Optimized level; [0.8,1] Excellence level.

5.2 Empirical Maturity Evaluation via Multiple Cases

Three typical samples are selected: Enterprise A (leading), Enterprise B (mid-tier), Enterprise C (emerging), for model computation.

Table 4. Maturity-score results for three sample enterprises

Sample Enterprise	Archive Resource-Collection	Standardization	Technical Support	Operation-Maintenance Capability	Compliance Constraints	Composite Score	Maturity Level
A (Leading)	0.81	0.63	0.76	0.58	0.54	0.664	Optimized level
B (Mid-tier)	0.57	0.41	0.48	0.39	0.43	0.452	Standardized level
C (Emerging)	0.32	0.22	0.26	0.18	0.24	0.231	Basic level

Quantitative interpretation: The leading enterprise exhibits weaknesses chiefly in operation-maintenance and compliance-constraint dimensions (scores 0.54-0.58). The mid-tier enterprise's principal bottlenecks are standardization (0.41) and operation-maintenance (0.39). The emerging enterprise displays overall deficiencies across resources, standards and operation-maintenance. Results confirm heterogeneous enterprise bottlenecks and preclude one-size-fits-all construction schemes.

5.3 Risk-Scenario Simulation Analysis for Archive Operation-Maintenance

Expected archive-risk-loss model:

$$L = \sum_{k=1}^m P_k \cdot Loss_k$$

Where: L = expected asset losses attributable to archives; P_k = occurrence probability of the k^{th} risk event; $Loss_k$ = asset losses triggered by risk events (right extinction, litigation losses). Improved operation-maintenance quality reduces P_k , thereby lowering expected loss L .

Three simulation scenarios are configured with parameters derived from survey statistics.

Table 5. Parameter setting for risk-simulation scenarios

Parameter	Scenario 1: Weak Operation-Maintenance (System Deployment Only)	Scenario 2: Basic Operation-Maintenance	Scenario 3: Complete Closed-Loop Operation-Maintenance
On-time archive-update rate	0.40	0.70	0.92
Archive-verification-audit execution frequency	No periodic verification	Annual verification	Quarterly verification
Cross-border-evidence-preservation completeness	0.25	0.60	0.88
Agency-archive-feedback execution rate	0.30	0.65	0.90

Key simulation outputs:

- 1) Comparing Scenario 1 and Scenario 3, expected archive-related asset losses drop by 62.7 %.
- 2) Sensitivity analysis identifies metadata standardization, routine operation-maintenance and cross-border-evidence preservation as the top-three sensitive variables.
- 3) Heterogeneous output: For every additional 10 jurisdictions in an enterprise's overseas layout, risk-mitigation

benefits from sound operation-maintenance rise by 18.4 %.

Simulations verify that merely procuring archive systems without supporting operation-maintenance yields very limited risk-reduction effects. Enterprises operating across more overseas jurisdictions derive higher marginal benefits from digital-archive-and-operation-maintenance systems.

6. Tier-Specific Implementation Pathways for Digitalization of Overseas Intellectual Property Archives for Consumer Brands

Based on maturity evaluation and simulation outputs and addressing the observed misconception (70.6 % of enterprises blindly purchase systems while neglecting historical-archive restoration and operation-maintenance-system building), a five-step tier-specific implementation pathway is constructed.

1) Step 1: Enterprise archive-status diagnosis and maturity positioning

Identify weaknesses against maturity indicators; assess overseas-IP quantity, number of layout jurisdictions, budget and IP-staff allocation.

- **Emerging brands (fewer than 100 overseas IP assets):** Prioritize archive sorting and historical-archive restoration; avoid blind in-house-system construction. Surveys show such enterprises achieve merely a 0.28 input-output ratio for self-built systems.
- **Mid-tier brands (100-500 overseas IP assets):** Focus on metadata standardization, institute agency-archive feedback mechanisms and establish basic operation-maintenance workflows.
- **Leading brands (> 500 overseas IP assets):** Deploy the complete five-dimensional system; strengthen multilingual parsing, cross-border evidence-preservation, auditing and compliance governance.

2) Step 2: Archive-resource collection and standard-system construction

Inventory all overseas-IP archive categories and restore historical archives; formalize regular archive-feedback regimes with external agencies; implement adapted archive-classification and metadata standards aligned with target-market jurisdictions and complete normalization of existing archives.

3) Step 3: Technical-solution selection and system deployment

Select appropriate modes according to enterprise resources: modified third-party SaaS IP systems, custom-built archive repositories or third-party archive-custody services. Prioritize multilingual-document processing, overseas-judiciary-compliant electronic-evidence preservation, fine-grained permission control and cross-border-data-storage compliance, avoiding pursuit of excessive comprehensive technical functionalities.

4) Step 4: Establish full-lifecycle routine operation-maintenance closed-loops

Clarify accountability among legal departments, IT teams, overseas branches and external service providers; formulate full-process regulations governing archive addition, alteration, access, filing and disposal; implement periodic archive-verification, risk-early-warning, backup-recovery and audit-review mechanisms. Integrate archive operation-maintenance into routine corporate IP workflows to prevent systems from remaining un-maintained post-launch.

5) Step 5: Continuous iterative optimization guided by risk constraints

Track updates to data-compliance and electronic-evidence statutes in target markets; conduct periodic archive-compliance self-inspections; iteratively revise archive standards, technical configurations and operation-maintenance workflows responding to archive-related problems exposed in rights-enforcement and renewal practices.

Supplementary Recommendations for Service-Provider and Public-Service Stakeholders

Surveys reveal that only 17.6 % of foreign-related IP agencies deliver standardized archive-delivery services.

- 1) **Foreign-related IP service agencies:** Incorporate complete archive delivery and archive verification into service packages, moving beyond pure application-oriented business models.
- 2) **Overseas-going-IP public services:** Release construction guidelines for digital overseas-IP archives and provide reference metadata templates to lower implementation thresholds for small-and-medium-sized brands.

7. Case Study

The case investigates a leading domestic overseas-going consumer-electronics brand operating across 32 global jurisdictions, holding 624 overseas IP assets including patents, trademarks, industrial designs and copyrights. As global-business activities expanded, fragmented legacy overseas-IP-archive and operation-maintenance systems failed to satisfy multi-jurisdictional compliance and risk-control requirements. The enterprise therefore carried out

holistic system upgrades grounded in the five-dimensional maturity framework to realize standardized, digitalized and compliant overseas-IP management.

7.1 Pre-Upgrade Weaknesses

Prior to upgrading, the enterprise registered a maturity score of only 0.471 (lower bound of the standardized level), featuring coarse-grained management, deficient digitalization and missing compliance closed-loops:

- 1) **Decentralized archive custody and ambiguous asset inventories:** The 624 overseas-IP assets were archived independently by six foreign agencies with disconnected datasets. The enterprise maintained only simple right-ledgers recording basic application information without full-cycle documentation for examination, renewal and compliance, creating disconnections between asset ledgers and real-world entitlement status.
- 2) **Absent unified-data standards and low digital structuring:** No unified metadata or classification-coding existed; divergent agency-archiving standards hindered cross-jurisdictional linked retrieval and statistics. Minor-language official documents from Southeast Asia and the Middle East existed largely as paper or scanned materials without structuring, impeding access-screening and driving high manual-operation-maintenance costs.
- 3) **Deficient operation-maintenance mechanisms and severe archive-update delays:** Legacy workflows depended on passive manual maintenance without regular inventory-verification regimes. Cross-border communication, staff turnover and agency-feedback issues resulted in merely a 42 % on-time archive-update rate; frequent omissions in official-document filing and deadline-recording undermined data accuracy and completeness.
- 4) **Weak compliance risk-control with material-loss incidents:** Two archive-management-related risk events occurred in three-year observation window:
 - First: Missing trademark-renewal archives and delayed deadline records in Southeast Asia triggered trademark lapse and competitor squatting, generating market losses and litigation expenses.
 - Second: Incomplete compliance archives for IP-data storage and circulation in the EU triggered regulatory inspection alerts, incurring rectification costs and brand-reputation damage.

The two incidents combined caused approximately 1.28 million RMB in direct and indirect losses, highlighting severe systemic vulnerabilities.

7.2 Upgrade-Implementation Process Grounded in the Five-Dimensional Framework

Maturity-diagnosis and positioning preceded implementation:

- 1) **Resource layer:** Mandate bulk historical-archive feedback from six agencies and complete restoration of legacy archives.
- 2) **Standard layer:** Establish multi-jurisdiction-adapted metadata and classification-coding systems.
- 3) **Technology layer:** Secondary development of the existing IP system adding multilingual parsing, cross-border electronic-evidence preservation and graded permission-audit modules.
- 4) **Operation-maintenance layer:** Issue internal regulations clarifying accountability for legal, IT, overseas-subsidiary and external-agency stakeholders; institute quarterly archive-verification and risk-early-warning closed-loops.
- 5) **Risk-constraint layer:** Revise storage-and-circulation strategies for EU GDPR and Southeast-Asian data statutes and conduct annual compliance self-inspections.

7.3 Implementation Outcomes

Post-upgrade maturity score rose to 0.702 (optimized level). Archive completeness increased from 51.2 % to 90.7 %; the on-time archive-update rate climbed from 42 % to 88.3 %; average archive-retrieval time decreased by 71 %. Simulations estimate a 57.4 % reduction in expected archive-related risk losses. No major archive-related risk events occurred in the subsequent 24 months. Meanwhile, bottlenecks persist: high costs for minor-language-document parsing and ongoing-maintenance pressure stemming from evolving foreign-local statutes. This confirms that archive digitalization constitutes continuous iterative engineering rather than a one-off project.

8. Conclusions, Limitations and Future Research Prospects

8.1 Main Research Conclusions

- 1) Overseas intellectual-property archives for consumer brands exhibit multi-jurisdictional, multilingual, heterogeneous-source and evidence-intensive characteristics; domestic-archive solutions cannot be directly

transplanted. Five dimensions — archive resources, standard norms, technical support, operation-maintenance mechanisms and cross-border risk constraints — jointly determine comprehensive effectiveness through coupling interactions.

- 2) Archive digitalization is not equivalent to software procurement; long-term operation-maintenance constitutes the core link. 70.6 % of surveyed enterprises prioritize construction while neglecting maintenance; missing agency-archive feedback and absent periodic-verification regimes represent major pain points.
- 3) Maturity evaluation and simulation demonstrate that metadata standardization, routine operation-maintenance and cross-border-evidence compliance control represent the three most sensitive factors. Enterprises active across more overseas jurisdictions achieve higher risk-reduction returns from archive systems. Leading, mid-tier and emerging enterprises display heterogeneous bottlenecks mandating tier-specific construction instead of copying leading-player models.

8.2 Theoretical Contributions and Practical Implications

Theoretical contributions: This paper constructs a five-dimensional integrated framework for multi-jurisdictional overseas-IP archives of consumer brands, extends digital-archive full-lifecycle theory to cross-border commercial-IP contexts and supplements the archival-evidence perspective for overseas-going-IP-protection research.

Practical implications: Enterprises should balance digital-construction investment and operation-maintenance expenditure. Service providers shall improve archive-delivery collaboration. Public-service bodies may release reference metadata specifications lowering thresholds for small-and-medium-sized enterprises.

8.3 Research Limitations

This study suffers from certain limitations. Empirical evidence draws upon merely 17 domestic overseas-going-consumer-brand entities, constraining sample coverage and representativeness. Scattered local-archive-norm and compliance documentation for emerging markets such as Southeast Asia and Latin America hinders region-differentiated analysis. Risk-simulation parameters are adjusted from survey averages and contain minor deviations. Moreover, the enabling potential of AIGC technologies for cross-border archive management remains unexplored, leaving room for technical-dimension improvement.

8.4 Future Research Prospects

Follow-up research may expand enterprise samples of varied sizes and overseas-target regions to refine the research framework and evaluation system. AIGC technologies may be introduced for empirical testing of their enabling effects in multilingual-archive parsing and risk early-warning. Region-differentiated research for emerging markets may be pursued; cross-border-archive metadata specifications may be refined against international standards to develop generalizable digital-operation-maintenance solutions.

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