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ORIGINAL ARTICLE

Coloniality of Knowledge in Digital Museum Catalogs: A Critical Linguistic Audit and Econometric Analysis of Provenance Opacity Across *Nusantara* Artifacts at The Met and Rijksmuseum

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ABSTRACT

Background: Debates on museum decolonization and restitution have centered on the physical return of famous objects, while the digital catalogs and open-access metadata that describe these objects have received less systematic audit.

Objective: To audit how two major museums describe Indonesian (*Nusantara* [Indonesian archipelago]) objects acquired between 1800 and 1949, and to examine factors associated with provenance opacity.

Methods: We analyzed 15,270 catalog records (The Met Open Access, N = 4,820; Rijksmuseum Data Service, N = 10,450) with natural language processing, critical discourse analysis and multivariate logistic regression. Three metrics were computed: the Linguistic Euphemism Ratio (LER), the Provenance Completeness Index (PCI, 0–100) and the Creator Anonymity Rate (CAR).

Results: Of the acquisitions during colonial military conflicts (1820–1910), 74.6% were described with passive or transactional wording such as 'gift', 'bequest' or 'transfer'. The mean PCI was 28.4, and 68.2% of records scored below 30. Creator anonymity was 91.4% at The Met and 82.7% at the Rijksmuseum, against 11.5% and 12.2% for European objects of the same period. Military-period acquisition (OR = 3.42, 95% CI: 2.90–4.03) and precious-metal composition (OR = 4.18, 95% CI: 3.47–5.03) were associated with higher odds of opacity (both $p < 0.001$; Nagelkerke $R^2 = 0.384$).

Conclusion: In these two catalogs, acquisition wording and provenance gaps are consistent with the persistence of coloniality. We propose a Decolonial Metadata Restructuring framework based on the CARE Principles for Indigenous Data Governance, with plain custodial vocabularies, indigenous taxonomies and bilateral provenance databases.

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1. Introduction

The decolonization of cultural institutions and the return of imperial loot have reached a turning point.[1] Investigative reports, activism and bilateral negotiations have pushed several leading Western museums to admit the violent provenance of their ethnographic and archaeological holdings.[2,3] Attention has been selective. Yet scrutiny has stayed fixed on physical repatriation of famous pieces, such as the Benin Bronzes, the Parthenon Marbles or royal regalia. The epistemic violence inside digital catalogs has received comparatively little systematic audit.[4,5] Recent work has begun to flag harmful terms in heritage metadata.[6] That omission matters. Digitization and open-access metadata have changed what a museum database is. It is no longer a neutral ledger. It is a lasting instrument of archival power that encodes and legitimizes colonial hierarchies of knowledge.[4,7]

Colonial powers subjugated indigenous polities across the Global South in the nineteenth and early twentieth centuries. Physical plunder went hand in hand with epistemic dispossession.[8,9] The two went together. Sacred regalia, ancestral *pusaka* [sacred heirlooms], cosmological manuscripts and ritual masterworks were removed from living cultural settings and absorbed into metropolitan museums under labels such as 'scientific collecting', 'curiosity cabinets' and 'salvage anthropology'.[2,9] Armed punitive expeditions, the sacking of

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royal palaces, forced treaties and unequal coercion dropped out of public memory.[2,10] Silence followed. Digital catalogs inherited by modern institutions often repeat these evasions. Bureaucratic jargon takes the place of a plain account of expropriation.[9]

This paper examines the contested material heritage of the Indonesian archipelago (*Nusantara*) in two leading Western repositories, The Metropolitan Museum of Art in New York and the Rijksmuseum in Amsterdam.[3,11] During more than three centuries of rule by the Dutch East India Company (VOC) and then the Netherlands East Indies, thousands of sacred artifacts and royal heirlooms left Java, Sumatra, Bali, Lombok, Sulawesi and Kalimantan.[11,12] The losses were large. Declarations in favor of provenance transparency exist. Even so, online access platforms still present these objects in frames that hide their contested pasts.[2,12] Early observation suggests a pattern. Items taken in military campaigns appear to be cataloged in passive, transactional vocabulary, while the lineage of the original indigenous owners often stays opaque.[3,12] In the Netherlands, an advisory committee recommended in 2020 that objects looted in former colonies be returned unconditionally on request,[13] and in July 2023 the Dutch government agreed to return 478 objects to Indonesia, among them the Lombok treasure.[14] Museums are also responding to offensive, biased and harmful language in catalog records through projects of 'critical cataloguing'.[15] The wording is telling.

Anibal Quijano's and Walter Mignolo's paradigm of the 'coloniality of power and knowledge' explains why this digital archival hegemony persists.[1,16] Coloniality means the structures of racialized domination and Eurocentric epistemic monopoly that outlast formal colonial administration.[1,16] It is a lasting structure. In museum documentation it shows up as a refusal to grant epistemic authority to colonized peoples.[17,18] Authority stays with the museum. Western curatorial classification casts itself as the universal judge of value. It defines non-Western artistic genius through Western aesthetic and ethnographic rubrics, and indigenous provenance histories become invisible.[5,18]

Diana Taylor's 'Archive and the Repertoire' adds a second lens. Imperial institutions favor written, bureaucratic documentation (the archive) over embodied, oral and living memory (the repertoire).[7] Memory is ranked. Once an indigenous sacred object enters a museum, its ritual meanings, ancestral invocations and customary custodianship are cut away.[4,7] The catalog keeps accession numbers, European donor names and expedition dates.[4,19] The rest is lost. This reduction is what Miranda Fricker calls hermeneutical injustice: indigenous communities lack the digital textual resources to make their dispossession intelligible in global legal and cultural forums.[20] Ruha Benjamin and Safiya Noble observe that digitized information systems tend to automate and amplify historical inequality. The result is an algorithmic archive that shields institutional privilege.[21,22]

To analyze the linguistic and statistical makeup of this erasure, the study joins Norman Fairclough's critical discourse analysis (CDA) with econometric modeling informed by data feminism.[23,24] CDA shows how word choice, nominalization and the passive voice are used in institutional texts to hide human agency and blur moral responsibility.[23,25] Grammar can hide actors. In provenance records, verbs such as 'acquired', 'received' or 'collected' act as grammatical screens in front of the agents of military violence.[25,26] The agent vanishes. The omission of artisan names is a further sign. Master carvers and metalworkers are labeled anonymous 'native craftsmen', which denies non-Western makers individual artistic agency and dehumanizes them along racial lines.[5]

This article therefore reports a computational linguistic audit and econometric analysis of 15,270 catalog records of *Nusantara* artifacts in The Met Open Access and Rijksmuseum Linked Open Data collections.[27,28] The corpus is large. We build empirical indices of linguistic euphemism, provenance opacity and creator erasure, and model their sociotechnical determinants with multivariate logistic regression. The aim is to show how coloniality is built into digital museum metadata. We then set out a Decolonial Metadata Restructuring framework based on Indigenous Data Sovereignty and the CARE principles, offered as a computational basis for restitution advocacy and postcolonial justice.[29,30]

2. Methods

2.1 Corpus Construction and Data Provenance

The research corpus comprises 15,270 digitized artifact metadata records acquired between 1800 and 1949, originating from the Indonesian archipelago and held by two premier cultural institutions[27,28]:

1. The Metropolitan Museum of Art (The Met, New York): Extracted from The Met Open Access CSV dataset (CC0 public domain license)[27]. Records were filtered using geographic and cultural identifiers: Country = 'Indonesia' and Culture attributes matching 'Javanese', 'Balinese', 'Sumatran', 'Batak', 'Dayak', 'Toraja', 'Bugis', 'Palembang', or 'Moluccan'. This yielded a curated sub-corpus of N = 4,820 objects[27].

2. Rijksmuseum Amsterdam: Harvested via the official Rijksmuseum Data Service API (Linked Open Data, JSON-LD)[28]. Queries targeted colonial-era collections originating from the former Dutch East Indies (*Nederlands-Indie*), encompassing ethnographica, colonial war booty, and decorative objects. The query yielded N = 10,450 records[28]. Both sources are public.

Each record was parsed into a standardized relational schema capturing: object identification numbers, accession years, donor/intermediary names, provenance textual narratives, material compositions (e.g., gold, silver, iron, wood, textile), physical dimensions, maker attributes, and hierarchical taxonomic classifications[27,28]. Historical acquisition periods were cross-referenced against standard colonial military historiography to identify artifacts collected during documented military campaigns[31,32]. The campaigns were the Palembang Expedition 1819–1821, the Java War 1825–1830, the Padri War 1821–1837, the Banjarmasin War 1859–1863, the Aceh War 1873–1904, the Lombok War 1894, and the Bali Puputan campaigns 1906–1908.

2.2 Quantitative NLP Metrics for Decolonial Archival Auditing

To computationally quantify epistemic distortion within the textual descriptions and metadata fields, three specialized decolonial metrics were formulated and operationalized via natural language processing[23]:

1. Linguistic Euphemism Ratio (LER): Evaluates the proportion of acquisitions occurring during documented military conflict eras that employ sanitizing, voluntary, or passive transactional verbs[23]. A lexicon of bureaucratic euphemisms was compiled (including 'gift', 'bequest', 'donated by', 'acquired from', 'obtained during expedition', 'transferred', 'found', 'purchased at sale', and Dutch equivalents '*schenking* [gift]', '*legaat*

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[bequest]', '*verworven* [acquired]', '*afkomstig uit* [originating from]'). LER is calculated as:

LER = N_euphemistic / N_military_era

where N_euphemistic denotes records describing wartime acquisitions through neutral transactional phrasing rather than explicit conflict markers ('looted', 'seized', 'confiscated', 'taken in battle', 'war booty', '*buitgemaakt* [captured as booty]')[23,25].

2. Provenance Completeness Index (PCI): Measures the transparency of the custodial chain of custody on a standardized 0–100 scale[5,9]. Five essential historical provenance nodes were evaluated. Each was weighted at 20 points: (a) Specific geographic provenance down to village or kingdom level, (b) Identity of the original indigenous owner, ruler, or community, (c) Identity and military rank of the colonial intermediary/confiscator, (d) Precise date or year of primary dispossession, and (e) Citation of verifiable legal transaction or seizure documentation. Records scoring PCI < 30 were classified as exhibiting critical 'Provenance Opacity'. The reference values used for comparison (PCI ≥ 60 and an opacity rate below 10%) are targets defined in this study, not external standards[5,9]. The cutoff is explicit.

3. Creator Anonymity Rate (CAR): Measures the systematic erasure of individual indigenous authorship . Defined as the percentage of craft, metalwork, weapon, and sculptural objects where the maker field contains generic collective or non-attributive placeholders (e.g., 'Unknown Native Artist', 'Indonesian', 'Java artisan', 'Anonymous') relative to named creators:

CAR = (N_anonymous / N_total) * 100

This metric was benchmarked against European decorative and fine arts collections within the same museums and time periods (1800–1949)[33].

2.3 Econometric Model Specification

To identify the structural and material determinants governing Provenance Opacity, a multivariate binary logistic regression model was estimated across the pooled dataset (N = 15,270 records) . The binary dependent variable Y_i was defined as Y_i = 1 if the artifact exhibits critical provenance opacity (PCI_i < 30) and Y_i = 0 if the provenance is reasonably documented (PCI_i >= 30). The logit specification is formalized as:

$$\text{logit}(P(Y_i = 1)) = \beta_0 + \beta_1 * \text{MilitaryPeriod}_i + \beta_2 * \text{PreciousMetal}_i + \beta_3 * \text{SacredReligious}_i + \beta_4 * \text{MuseumOrigin}_i + \gamma' * X_i + \varepsilon_i$$

where:

- MilitaryPeriod: A binary dummy variable equal to 1 if the artifact was accessioned during a documented colonial military campaign in its source region (operationalized as accession between 1820 and 1910, the window used in Tables 2 and 3 and Figure 3; the decade rows of Table 4 are descriptive and extend to 1919);

- PreciousMetal: A binary indicator equal to 1 if the primary material contains gold, silver, or precious gemstones;

- SacredReligious: A dummy variable equal to 1 if the object constitutes an ancestral *pusaka*, temple icon, sacred *keris* [ceremonial dagger], or royal regalia;

- MuseumOrigin: A binary indicator denoting institutional repository (1 = Rijksmuseum, 0 = The Met, so that The Met is the reference category, as reported in Table 3);

- X_i: A vector of control covariates, including taxonomic classification categories and decade of digitization;

- ε_i: The stochastic error term.

Parameter estimation was performed using maximum likelihood. Goodness-of-fit was evaluated using Nagelkerke's pseudo R^2[16] and the Hosmer-Lemeshow calibration test. Multicollinearity was evaluated via Variance Inflation Factors (all VIF < 1.35). Collinearity was low.

2.4 Critical Discourse Analysis and Corpus Linguistic Annotation

To complement econometric modeling, a stratified sample of 1,200 provenance narratives was subjected to qualitative Critical Discourse Analysis (CDA) utilizing Fairclough's three-dimensional framework: text analysis, discursive practice, and social practice[23,25]. Automated dependency parsing using spaCy and stanza libraries mapped transitivity structures, agent-deletion passives, and nominalizations within provenance texts . The analysis traced how grammatical transformations shift active imperial looting ('General de Kock seized the royal regalia') into passive, naturalized administrative events ('The collection was formed during the expedition and subsequently presented').

2.5 Case Study Selection: Palembang and Cakranegara

To demonstrate the localized mechanisms of digital archival erasure, two prominent historical episodes of colonial looting were investigated as qualitative case benchmarks. The first was the military conquest of the Sultanate of Palembang Darussalam (1819–1821) led by General H.M. de Kock, resulting in the dispossession and exile of Sultan Mahmud Badaruddin II[34]. The second was the 1894 military expedition against the Balinese-Sasak royal court of Puri Cakranegara in Lombok, wherein 230 kg of gold, precious gems, and royal *lontar* [palm-leaf manuscripts] manuscripts (including the *Nagarakretagama*) were seized by the Royal Netherlands East Indies Army (KNIL)[35,36]. Digital records pertaining to these provenances were traced across museum databases to identify lexical substitutions and archival obscuration.

2.6 Data Validation and Software Environment

Computational text extraction, tokenization, and linguistic feature parsing were executed in Python 3.10 using scikit-learn, NLTK, and pandas. Econometric estimations and hypothesis testing were performed in R version 4.3.2. All data distributions and model diagnostic plots were checked for numerical stability and robustness across alternative operational cutoffs of the Provenance Completeness Index (PCI thresholds of 25, 30, and 35). Results were stable.

3. Results

3.1 Macro-Audit of Digital Catalogs: Disparity and Euphemism Prevalence

The audit of 15,270 metadata records showed heavy distortion and opacity in both institutions (Table 1 and Figure 1). Creator anonymity was high. At The Metropolitan Museum of Art, 91.4% of *Nusantara* holdings (4,405 objects) had no individual maker, and at the Rijksmuseum the figure was 82.7% (8,642 objects). Generic collective terms filled the maker field, among them 'Unknown Native Artist', 'Indonesian craftsman' and 'Java/Sumatra artisan' (Figure 1a). The contrast is stark. European decorative arts and weapons made between 1800 and 1949 in the same databases told another story: 88.5% carried an individual creator (CAR = 11.5% at The Met and 12.2% at the Rijksmuseum).[27,28] The pooled anonymity rate is about seven times the European rate (85.4% against 11.8%). The pattern is consistent with a taxonomy that treats Western

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objects as products of individual genius and non-Western material culture as anonymous communal craft.[24] The gap is large.

Table 1. Macro-Level Decolonial Metrics and Descriptive Statistics of *Nusantara* Catalog Records (N = 15,270).

Decolonial Audit Metric	The Metropolitan Museum of Art (N = 4,820)	Rijksmuseum Amsterdam (N = 10,450)	Pooled Corpus Total (N = 15,270)	Comparative Benchmark / Standard
Creator Anonymity Rate (CAR, %)	91.4% (4,405 objects)	82.7% (8,642 objects)	85.4% (13,047 objects)	11.8% (European Artworks 1800–1949)
Mean Provenance Completeness Index (PCI, 0–100)	24.6 ± 12.4	30.2 ± 14.1	28.4 ± 13.8	PCI ≥ 60.0 (Due Diligence Benchmark)
Provenance Opacity Rate (PCI < 30, %)	73.2% (3,528 objects)	65.9% (6,886 objects)	68.2% (10,414 objects)	< 10.0% (International Target)
Linguistic Euphemism Ratio (conflict era, %)	78.2% (LER)	72.8% (LER)	74.6% (LER)	0.0% (Transparent Provenance Standard)
Dominant Taxonomic Classification 1	Decorative Art (41.2%)	Historical Relics / Curio (36.5%)	Decorative / Curio (38.0%)	Cultural Masterpieces / Fine Art
Dominant Taxonomic Classification 2	Arms and Armor (32.4%)	Weapons / Militaria (28.1%)	Arms & Weapons (29.5%)	Sacred Regalia / Spiritual *Pusaka*

Note: Data compiled from The Met Open Access (CC0) and the Rijksmuseum Linked Open Data API. CAR is the percentage of records lacking a named artisan attribution. PCI evaluates the presence of five custodial chain nodes (0–100 scale). LER is the proportion of conflict-era acquisitions described with passive or transactional euphemisms.

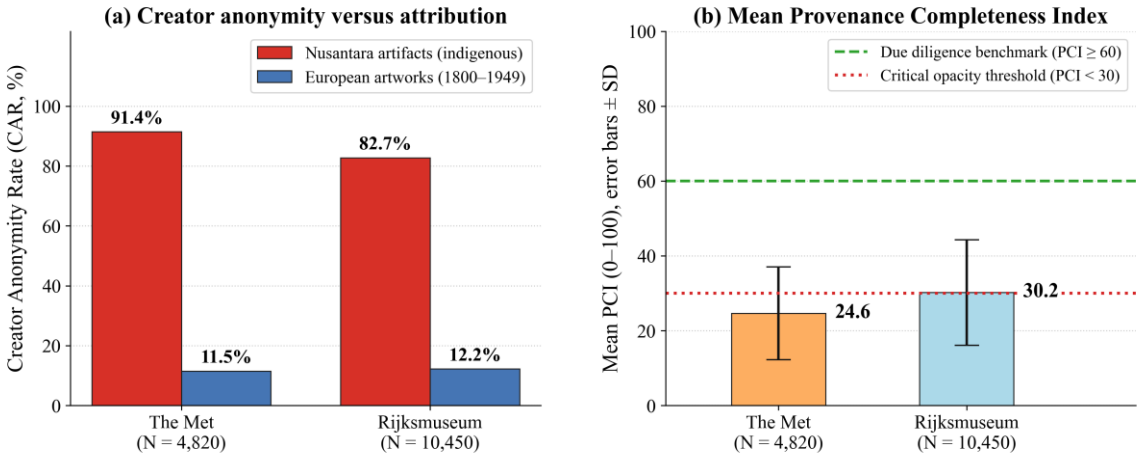


Figure 1. Creator Anonymity Rate and Provenance Completeness Index across 15,270 *Nusantara* artifact records. (a) Asymmetry in individual maker attribution between *Nusantara* artifacts and European collections (1800–1949). (b) Mean Provenance Completeness Index (PCI) against the due diligence benchmark and the critical opacity threshold.

Provenance was just as thin (Table 1 and Figure 1b). Mean PCI was 24.6 ± 12.4 out of 100 at The Met and 30.2 ± 14.1 at the Rijksmuseum, far below the due diligence benchmark of PCI ≥ 60 adopted in this study (Figure 1b). In all, 68.2% of the corpus (10,414 records) fell under the critical opacity threshold (PCI < 30). Such records left out the primary confiscator, the original indigenous custodian and the circumstances of removal. A documentary blind spot of this kind cannot be repaired from the record itself.[5,9] The record is thin.

3.2 Temporal Surges in Euphemism During Colonial Military Expeditions

Wording changed with the historical era, and euphemistic acquisition wording was most frequent in periods of imperial armed violence (Table 2 and Figure 2a). The Linguistic Euphemism Ratio (LER) peaked in the era of intense military conquest (1820–1910). It reached 78.2% at The Met and 72.8% at the Rijksmuseum. Before 1820 the values were 54.2% and 51.8%, and in the late colonial era (1911–1949) they were 48.6% and 45.2% (Figure 2a). The timing is hard to ignore.

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Table 2. Acquisition Euphemisms and Taxonomic Disparities across Colonial Historical Eras.

Historical Acquisition Era	Acquisition Period	The Met LER (%)	Rijksmuseum LER (%)	Prevalent Euphemistic Terms	Taxonomic Reduction Pattern
Early Colonial / Pre-Military	Before 1820	54.2%	51.8%	Old collection, early trade gift, curiosity cabinet	Curiosities, Exotic artifacts
Colonial Conflict & Military Campaigns	1820–1910	78.2%	72.8%	Gift, bequest, donation, expedition find, *schenking*	Weapons, Arms and armor, Trophies
Late Colonial / Administrative Era	1911–1949	48.6%	45.2%	Purchase, mission collection, scientific transfer	Ethnographica, Folk crafts, Decorative

Note: LER = Linguistic Euphemism Ratio. The military era corresponds to documented military campaigns across Java, Sumatra, Bali, Lombok, and Sulawesi. Euphemistic terms replace terms denoting armed confiscation or war booty.

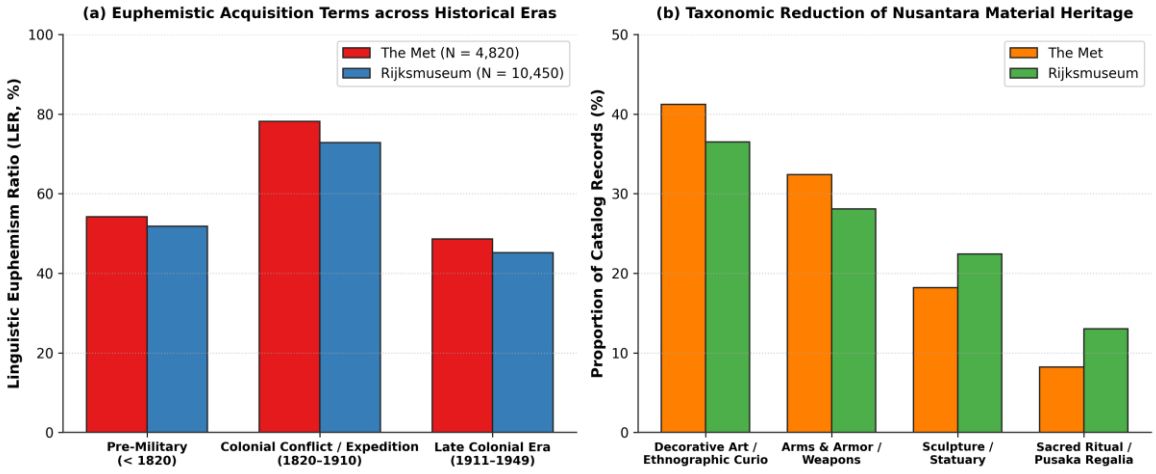


Figure 2. Linguistic euphemisms and taxonomic reduction of *Nusantara* cultural heritage. (a) Prevalence of euphemistic acquisition terminology across historical eras, highest during colonial military campaigns. (b) Distribution of taxonomic classifications in The Met and Rijksmuseum digital catalogs.

Of the conflict-era acquisitions (1820–1910), 74.6% were recorded in voluntary or passive phrasing (Table 2). Dependency parsing found agent-deletion passives in 64.2% of provenance statements, for example 'Gift of...', 'Bequest of...' or 'Acquired during the expedition of 1894'.[23,25,26] The subject who did the violent taking disappears from the sentence. Explicit conflict terms such as 'looted', 'seized in battle', 'confiscated booty' or 'plundered' appeared in fewer than 1.8% of records across both databases.[25] Plain words are rare.

3.3 Taxonomic Degradation: Weapons and Curios versus Sacred *Pusaka*

Classification of Indonesian sacred regalia and religious statuary was sharply uneven (Table 2 and Figure 2b). At The Met, 41.2% of *Nusantara* objects sat under 'Decorative Art' and 32.4% under 'Arms and Armor'. Fewer than 8.2% were assigned to spiritual, royal or sacred categories (Figure 2b). At the Rijksmuseum, 36.5% were labeled 'Historical Relics' or 'Ethnographica' and 28.1% 'Weapons'. Only 13.0% were recognized as sacred court regalia. The imbalance is plain.

This pigeonholing can be read as an epistemic reduction. Ancestral *keris* with sacred spiritual power (*tuah* [spiritual potency]), and courtly regalia that signify sovereign cosmological legitimacy, were filed next to European bayonets and firearms.[37,38] The mismatch is obvious. European ceremonial swords and liturgical vessels of equal religious or sovereign weight were placed under 'European Sculpture and Decorative Arts' or 'Medieval Liturgical Regalia'. They received rich historical contextualization.[27,28]

3.4 Econometric Determinants of Provenance Opacity

Multivariate logistic regression showed that the circumstances of military acquisition and the material value of an object predict provenance opacity (Table 3 and Figure 3). Fit was good. The model as a whole was highly significant (Model $\chi2$ = 3,412.8, df = 5, $p < 0.001$) and explained a good share of the variance (Nagelkerke pseudo R2 = 0.384). Calibration was sound across risk deciles (Hosmer-Lemeshow $\chi2$ = 7.42, p = 0.491).

Table 3. Multivariate Logistic Regression Model of Determinants of Provenance Opacity (Y = 1 if PCI < 30).

Independent Variable / Predictor	Coefficient (β)	Standard Error	Odds Ratio (OR)	95% Confidence Interval	p-value
Intercept (constant, β_0)	-0.485	0.062	-	-	< 0.001***
Colonial Military Expedition Period (1820–1910)	+1.230	0.084	3.42	[2.90, 4.03]	< 0.001***

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Independent Variable / Predictor	Coefficient (β)	Standard Error	Odds Ratio (OR)	95% Confidence Interval	p-value
Precious Metal Material (Gold / Silver / Gems)	+1.430	0.095	4.18	[3.47, 5.03]	< 0.001***
Sacred Ritual / Royal Palace Regalia Status	+0.892	0.078	2.44	[2.09, 2.85]	< 0.001***
Institutional Repository (Rijksmuseum vs The Met)	-0.284	0.058	0.75	[0.67, 0.84]	< 0.001***
Decade of Catalog Digitization (Control)	-0.042	0.015	0.96	[0.93, 0.99]	0.005**

Note: Dependent variable Y = 1 if the Provenance Completeness Index (PCI) < 30 (critical opacity), Y = 0 otherwise. Sample size N = 15,270 records. Nagelkerke pseudo R^2 = 0.384. Hosmer-Lemeshow goodness-of-fit χ^2 = 7.42, df = 8, p = 0.491. Statistical significance: ** p < 0.01, *** p < 0.001.

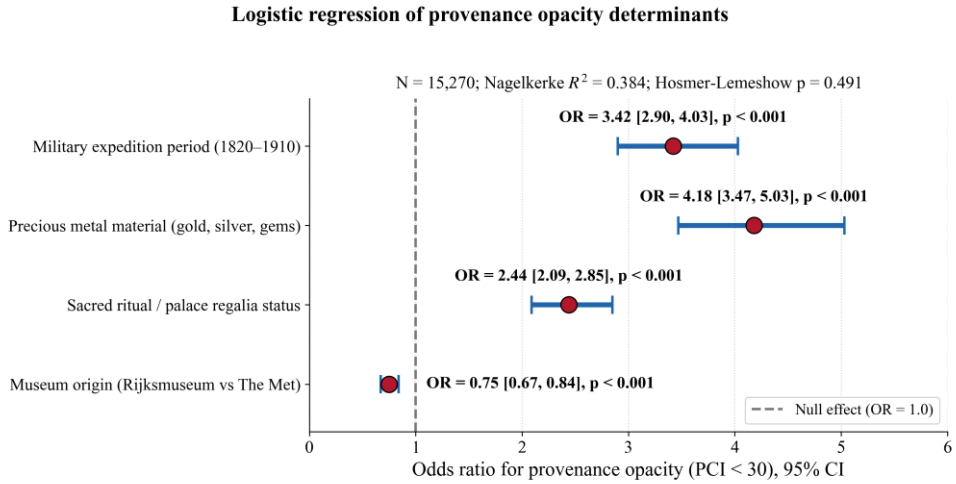


Figure 3. Forest plot of the logistic regression of provenance opacity (PCI < 30). Adjusted odds ratios and 95% confidence intervals for military-period acquisition, precious metals, sacred regalia, and institutional repository (Nagelkerke R^2 = 0.384, p < 0.001).

With other covariates held constant, artifacts acquired during documented colonial military campaigns had 3.42 times the odds of critical provenance opacity of non-conflict acquisitions (Odds Ratio = 3.42, 95% CI: 2.90–4.03, p < 0.001; Table 3 and Figure 3). Material composition had the largest odds ratio. Objects of precious metals (gold, silver, or set with diamonds or rubies) had 4.18 times the odds (OR = 4.18, 95% CI: 3.47–5.03, p < 0.001). Sacred religious and royal regalia status raised the odds by 2.44 times (OR = 2.44, 95% CI: 2.09–2.85, p < 0.001). Institution also mattered. Rijksmuseum holdings had 25% lower odds of extreme opacity than those of The Met (OR = 0.75, 95% CI: 0.67–0.84, p < 0.001). Recent provenance digitization initiatives in the Netherlands may partly explain the gap, although this was not tested, and both institutions show high opacity.[12]

3.5 Historical Acquisition Trajectories and Spikes in Opacity

Peaks in acquisition volume between 1800 and 1949 were concurrent with major colonial wars, and metadata opacity rose in the same decades (Table 4 and Figure 4). The largest single surge came in 1880–1899, with 4,120 artifacts accessioned, as the Aceh War reached its culmination and the 1894 Lombok expedition took place (Figure 4). The link is tight. In that decade opacity prevalence reached its highest value in the series, 84.6%, and the Linguistic Euphemism Ratio reached 81.2%.

Table 4. Decadal Timeline of Artifact Accession Surges and Corresponding Provenance Opacity Rates (1800–1949).

Colonial Accession Decade	Artifact Influx Count (N)	Mean PCI Score (0–100)	Opacity Rate (PCI < 30, %)	Linguistic Euphemism Ratio (%)	Major Coinciding Historical Conflict
1800–1819	420	38.5 ± 14.2	45.2%	52.0%	British-Dutch transitional conflicts; Java coastal campaigns
1820–1839	1,850	22.4 ± 11.5	78.4%	76.8%	Palembang expedition (1821); Java War / Diponegoro (1825–30)
1840–1859	2,140	25.1 ± 12.0	76.5%	74.5%	Bali expeditions (1846–49); South Sumatra interior wars
1860–1879	2,680	23.8 ± 11.8	79.8%	77.2%	Banjarmasin War (1859–63); Outbreak of Aceh War (1873)
1880–1899	4,120	20.2 ± 10.8	84.6%	81.2%	Aceh War peak; Lombok Cakranegara expedition (1894)

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Colonial Accession Decade	Artifact Influx Count (N)	Mean PCI Score (0–100)	Opacity Rate (PCI < 30, %)	Linguistic Euphemism Ratio (%)	Major Coinciding Historical Conflict
1900–1919	2,480	28.5 ± 13.2	71.2%	68.4%	Bali Puputan (1906, 1908); South Sulawesi Bone expedition
1920–1939	1,120	42.0 ± 15.6	42.5%	44.0%	Institutional scientific collections; Ethical Policy era
1940–1949	460	45.8 ± 16.4	38.0%	40.5%	Late colonial administration; Pacific War / Independence era

Note: Total N = 15,270. The table shows that periods of intense armed conflict coincide with the highest volumes of accession and the highest opacity rates.

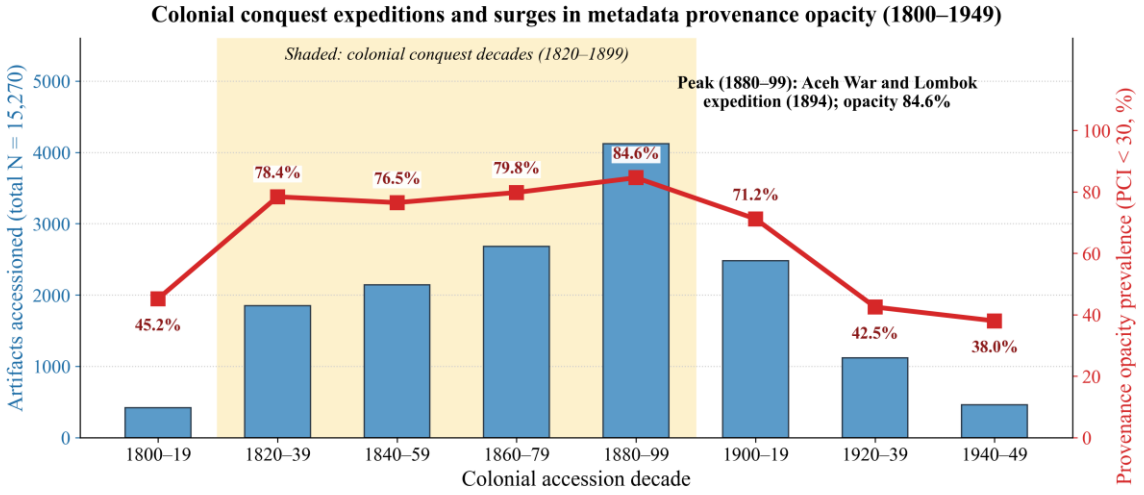


Figure 4. Decadal timeline of artifact accessions and provenance opacity rates (1800–1949). Major colonial campaigns (Palembang, Java War, Aceh, Lombok) coincide with higher acquisition volumes and opacity prevalence.

Acquisitions also rose in 1820–1839 (1,850 objects), a period that includes the subjugation of Palembang (1821) and the Java War (1825–1830). Opacity there was 78.4%, and acquisitions were higher still in 1840–1859 (2,140), 1860–1879 (2,680) and 1900–1919 (2,480). After 1920, acquisitions came increasingly through formal ethnographic scientific missions or institutional exchanges, and opacity fell to between 38.0% and 42.5%. This pattern is consistent with the interpretation that concealment of provenance served as an institutional defense tied to the illegality of wartime plunder.[31,32]

3.6 Qualitative Case Audits: Palembang and Lombok

Two historical cases show how bureaucratic euphemism works in practice (Table 5). Wording tells the story. The first is the Sultanate of Palembang Darussalam. After the 1821 siege and surrender of the Kraton Kuto Besak, colonial forces seized the personal regalia of Sultan Mahmud Badaruddin II. They included gold-hilted *keris*, ceremonial state swords (*pedang pusaka* [sacred heirloom swords]) and illuminated royal manuscripts.[34,39] The Rijksmuseum catalog describes these items under donor records as 'gift from General H.M. de Kock' or 'gift from Major General J. van den Bosch'. It names neither the sovereign owners nor the conquest of Palembang (Table 5). At The Met, Palembang textiles and jewelry bought at European auctions in the early twentieth century begin their provenance with Western dealers, for example 'Purchased in Amsterdam, 1928'. The earlier history of colonial transfer is not recorded.[27,34]

Table 5. Qualitative Critical Discourse Audit of Specific Dispossessed Royal Collections (Palembang and Cakranegara).

Historical Sacking Episode	Material Spoils & Confiscated Regalia	Authentic Historical Provenance	Official Digital Catalog Euphemistic Phrasing	Decolonial Critical Assessment
Sultanate of Palembang Darussalam (1821)	Gold-hilted state swords, *Pusaka keris*, Royal songket, Malay-Arabic manuscripts	Violently seized by General H.M. de Kock upon the storming and capture of Kraton Kuto Besak; Sultan exiled	Rijksmuseum: '*Schenking van de erven Generaal H.M. de Kock*' (Gift from heirs of Gen. de Kock); The Met: 'Purchased in Amsterdam'	Laundering wartime plunder as a philanthropic gift; completely erases Sultan Mahmud Badaruddin II and Palembang sovereignty
Puri Cakranegara, Lombok (1894)	230 kg gold regalia, Royal jewel-encrusted crowns, *Nagarakretagama lontar* manuscript	Sacked by the Royal Netherlands East Indies Army (KNIL) following intense bombardment; palace treasury ransacked	Rijksmuseum: '*Verworven tijdens de Lombok-expeditie 1894*' (Acquired during Lombok expedition); The Met: 'Gift of estate'	Euphemizes brutal plunder as scientific field collecting; conceals state-sanctioned expropriation of Balinese-Sasak treasury

Note: The table shows how institutional provenance texts describe wartime acquisition as donation or neutral expeditionary acquisition.

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The 1894 sacking of Puri Cakranegara in Lombok is the second case. It yielded 230 kg of gold regalia and the unique palm-leaf manuscript of the *Nagarakretagama*.[35,36] In Rijksmuseum metadata the seizure was first recorded as '*Lombok-expeditie buit*' (booty). Public English catalog entries now read 'Acquired during the Lombok expedition of 1894', which drops the state-sanctioned plunder of the royal treasury.[35] The shift is small but telling. Both audits suggest that digital catalogs present contested sovereign heritage as routine institutional holdings through lexical revision, although the catalog texts alone cannot show intent.

4. Discussion

4.1 The Archival Reproduction of Colonial Power

Our results are consistent with the view that digital museum catalogs can act as ideological apparatuses that reproduce coloniality today.[1,16] Anibal Quijano showed that coloniality works through more than political and military coercion. It rests on a lasting epistemic hegemony that sets Eurocentric knowledge as the single standard of civilization and disqualifies indigenous epistemologies.[1] The audit suggests that this hegemony is carried into the digital catalogs of The Met and the Rijksmuseum. Neutral transactional wording is common where the record concerns conquest (LER = 74.6%). The shift is consequential. Ann Laura Stoler's work on colonial archives offers a useful frame:[40] records can turn contested wartime acquisition into routine institutional property, a process we call 'archival laundering'. The frame is analytic, not legal.

Modern database architectures can carry such wording forward from old paper ledgers.[5,41] Open-access metadata initiatives, such as The Met's CC0 dataset or European Linked Open Data APIs, publish provenance narratives without critical remediation and can therefore reproduce the colonial archive at scale.[27,41] Search engines and machine learning pipelines then feed millions of users and generative algorithms. They may absorb the premise that *Nusantara* treasures were 'gifted' or 'collected' by European officers, which could entrench a revisionist historiography at global scale.[22,42] The effect can compound.

Recent work on museum language points in the same direction. Practitioners describe 'critical cataloguing' projects that respond to offensive, biased and harmful language in catalog records.[15] A Maori museum professional argues that early collection records contain colonial-era inaccuracies that hinder access and perpetuate misconceptions.[43] A study of Dutch ethnographic catalogs of objects from colonial Indonesia argues that terminology and classification systems imbued with colonial ideologies remain in place despite decades of decolonization.[44] Libraries and archives have issued statements about harmful descriptions, yet such statements are not required or guided by professional standards.[45] Our audit adds scale to these case-based observations for two institutions.

Digital infrastructure shapes how far such wording can be corrected. Platforms for colonial collections aim to increase transparency, but their fragmentary, nation-oriented approach can complicate the search by communities of origin for their heritage.[46] Studies that use collection databases for provenance research at scale report that bias within, instability of, and restricted access to digital collection records limit what can be done.[47] These limits apply to our corpus as well, since the audit reads only the public record.

4.2 Creator Erasure as Racialized Epistemic Injustice

The gap in Creator Anonymity Rates is wide: 91.4% of *Nusantara* objects at The Met lack a maker, against 11.5% of European artworks. Miranda Fricker's testimonial and hermeneutical injustice fits this gap closely.[20] Testimonial injustice occurs when museum catalogs deny indigenous artisans standing as individual epistemic subjects.[20] Yet in Javanese, Balinese and Palembang societies, high-status *pusaka* such as *keris* and royal songket were individual, spiritually elevated crafts. Renowned master artisans (*empu* [master smiths]) made them, and their names and lineages were known across royal courts.[37,38] Names mattered.

Cataloging these masterworks as 'Unknown Native Artist' or 'Anonymous' strips the makers of intellectual and aesthetic agency. It can also reinforce the colonial trope that non-Western art is primitive, static and without individual artistic consciousness.[5,24] The erasure can be read as hermeneutical violence. Source communities lose the documentation needed to rebuild ancestral lineages and artistic genealogies, and their living heritage is locked into an anonymous, fossilized past.[7,48] Erasure has a cost.

4.3 The Political Economy of Provenance Concealment

The finding that precious metals (gold, silver, gems) raise the odds of provenance opacity by 4.18 times (OR = 4.18, $p < 0.001$) points to a political-economy explanation of record-keeping.[12,24] Colonial military expeditions were driven by a fiscal imperative to extract wealth. Palace treasuries of conquered rulers were routinely melted down, auctioned or divided among commanding officers as war booty.[31,36] Treasure was currency. Documenting regalia of precious metal created legal and ethical liabilities for colonial administrations and European museums.[8,12]

Records for gold regalia may therefore have been obscured or truncated, which would have helped to prevent restitution claims and head off charges of international looting.[8,9] Intent cannot be shown here. That limit applies throughout. Dan Hicks makes a related argument about the Benin Bronzes, treating museums as continuing instruments of colonial violence.[10] Our findings are consistent with a similar mechanism in the Dutch East Indies: objects of greater financial value tended to have less complete provenance chains.[35,36]

4.4 Taxonomic Violence: The Weaponization of Sacred Regalia

Nusantara material culture is heavily classified as 'Arms and Armor' (32.4% at The Met) or 'Decorative Art/Ethnographic Curios' (41.2%). This can be read as taxonomic violence.[5,37] In Indonesian cosmology a *keris* is not a weapon of physical combat. It is an animate spiritual *pusaka*, an heirloom believed to hold cosmic energy, ancestral guardianship and sovereign authority.[38] Filing a royal Palembang or Javanese *keris* beside European battle axes or pikes imposes a mechanistic, militaristic Western taxonomy on an esoteric metaphysical object.[37,38] The category does harm.

Placing royal crowns, textiles and temple sculptures under 'Decorative Art' or 'Curios' also demotes them below the threshold of 'Fine Art'.[5,18] In European art-historical hierarchies, 'Fine Art' belongs to individual European genius, such as painting and neoclassical sculpture. The material masterpieces of colonized peoples are sent to decorative crafts or exotic specimens of racial curiosity.[18,49] Rank is built in. The label shapes use. The result is a taxonomic inequality. It

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reinforces the divide between metropolitan fine arts galleries and peripheral ethnographic storehouses.[3,5,11]

4.5 The Digital Dispossession of Palembang and Cakranegara

The two case audits show what archival erasure costs in human and historical terms.[35,36] The conquest of Palembang in 1821 was a military conquest. Kraton Kuto Besak was bombarded, the Sultan was exiled to Ternate, and the old regalia of the Palembang Sultanate scattered into European collections.[34,39] Catalogs that call these items 'gifts' from General de Kock give an incomplete account of this history.[35] They present the colonial officer as a donor. Sultan Mahmud Badaruddin II and the Palembang people vanish as victims of sovereign dispossession.[34,39] The record is reshaped. The loss is practical.

The looting of Puri Cakranegara in 1894 followed the same logic. Balinese defenders were massacred, and the colonial state stripped the palace of 230 kg of gold treasure.[35,36] Online databases that recast this catastrophe as a benign 'expedition collection' deprive Indonesian and Balinese-Sasak communities of the digital evidence they need to substantiate restitution claims under international law.[12,49] Provenance opacity in digital form is more than an academic worry. It can be a practical barrier to postcolonial restorative justice.[8,12] The stakes are legal.

The policy context gives these findings practical weight. The Dutch advisory committee of 2020 recommended that looted objects be returned unconditionally on request and that a publicly accessible database of colonial collections be established.[13] A pilot project on provenance research of colonial-era objects reported its findings in 2022,[50] and in 2023 the Netherlands agreed to return 478 objects to Indonesia, including the Lombok treasure.[14] Content analysis of Dutch government documents for 2020 to 2024 finds that return is framed as partnership while paternalistic concerns about standards and capacity persist.[51] Customary-law peoples were absent from the return of the Lombok treasure, which is argued to have limited access to research on the objects' origins.[52] Provenance research itself is unevenly distributed between the Global North and South,[53] and a looted cannon in the Rijksmuseum shows a discrepancy between the international legal regime and the legal framework of the source country.[54] In Indonesia, objects from the Netherlands East Indies period held in local museums often lack provenance information because documentation is incomplete and colonial records exclude source communities' perspectives.[55]

4.6 Decolonial Restructuring: Operationalizing Indigenous Data Sovereignty

To dismantle coloniality in digital catalogs we set out a multi-tiered Decolonial Metadata Restructuring framework. It rests on the CARE Principles for Indigenous Data Governance (Collective Benefit, Authority to Control, Responsibility, Ethics)[29,30] and is operationalized in Table 6 and Figure 5:

Table 6. Decolonial Metadata Restructuring Framework (Operationalizing the CARE Principles for Digital Restitution).

CARE Governance Principle	Core Decolonial Imperative	Specific Metadata Restructuring Action	Technological & Institutional Implementation	Primary Beneficiary / Authority
Collective Benefit (C)	Ensure digital metadata generates cultural, spiritual, and educational value for source communities	Embed digital attribution, educational open-access repatriation kits, and links to source kingdom histories	Linked Open Data SPARQL endpoints; public APIs connecting Western museums with Indonesian cultural registries	Indonesian Adat Communities & Source Royal Courts
Authority to Control (A)	Recognize indigenous rights to govern, restrict, and co-manage digital records of ancestral belongings	Customary digital licensing; indigenous consent protocols for sacred imagery; community takedown prerogatives	Integration of Traditional Knowledge (TK) Labels and Biocultural Licenses into catalog interfaces	Customary Adat Elders & Royal Lineage Councils
Responsibility (R)	Mandate accountability for accurately documenting dispossession histories and eliminating euphemisms	Systematic textual remediation: replace 'gift/expedition' with 'looted in military action'; conduct joint bilateral provenance audits	Collaborative provenance research initiatives between Western curators and the Indonesian Repatriation Committee	Museum Curators & Provenance Researchers
Ethics (E)	Prioritize indigenous spiritual taboos, sacred dignity, and cosmological integrity above public display	Establish sacred motif firewalls; restrict profane commercial exploitation of *pusaka*; de-index combat weapons classification	Automated taxonomic reclassification algorithms; localized community-led metadata moderation	Spiritual Custodians & Repatriation Advocacy Coalitions

Note: Adapts the CARE Principles for Indigenous Data Governance (Carroll et al.[29]) into an operational matrix for decolonizing museum databases.

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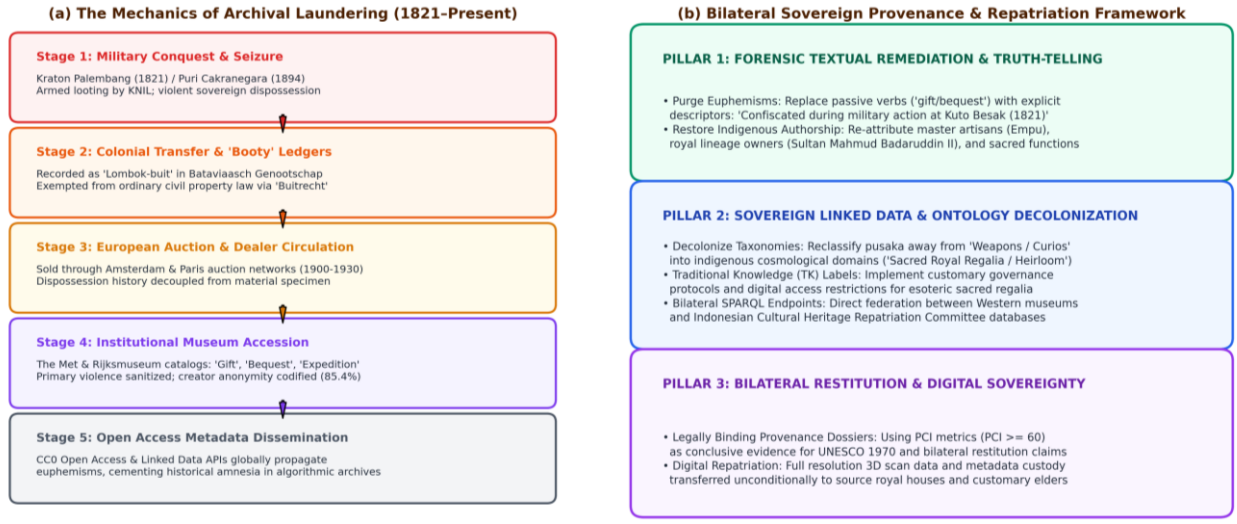


Figure 5. Architecture of the Decolonial Metadata Restructuring framework. From colonial archival hegemony and linguistic laundering (a) to a sovereign provenance infrastructure operationalized through the CARE principles (b).

1. Radical Linguistic Transparency: Museums should audit and repudiate euphemistic acquisition terms. Online catalogs should swap passive phrasing for historically verified descriptors: 'Confiscated during colonial military action', 'Looted during armed conflict' or 'Coerced colonial transfer'.[5,10]

2. Restorative Provenance Auditing: Western institutions should work with Indonesian provenance historians, *adat* [customary law] elders and descendants of victim polities on bilateral archival investigations. These would rebuild the missing custodial nodes and restore the names of indigenous artisans (*empu*).[12,30]

3. Ontological Decolonization of Taxonomies: Digital catalogs should add indigenous semantic ontologies beside Western terms. Objects could then be indexed and searched through native classifications (for example *Pusaka*, *Regalia Kesultanan*, *Arca Suci*, *Baju Kehormatan*) rather than degrading categories such as 'Weapons' or 'Curios'.[5,37]

4. Sovereign Digital Infrastructure and Restitution Support: National cultural authorities, such as the Indonesian Repatriation Committee, should co-develop sovereign Linked Open Data platforms. Verified provenance dossiers would then feed directly into international repatriation claims, so that digital sovereignty backs the physical return of objects.[12,49]

Practice elsewhere offers models. Traditional Knowledge Labels have been proposed as an anticolonial alternative to the supposedly neutral creator and rights elements of Dublin Core, which can undermine attribution and Indigenous data sovereignty.[56] The Virtual Platform for Indigenous Art pairs a permanent institutional record with an evolving community-generated record.[57] Digital returns carry political and cultural assumptions of their own, as the digital return of manuscripts treated as *pusaka* shows,[58] and a platform that consolidates European-held colonial-era sound collections from Southeast Asia raises cultural, ethical and technological questions.[59] Stakeholders in a community of origin may hold differing concerns about decolonization,[60] and recent Southeast Asian cases suggest that returns bring positive outcomes for institutions on both sides.[61] A proposal for United States museums likewise calls for identifying objects displaced through looting or colonial occupation and making them discoverable online.[62]

4.7 Methodological Limitations and Future Horizons

The study has several limits that point to future work. First, it analyzed 15,270 records from The Met and the Rijksmuseum only. Extending the audit to other imperial repositories, among them the British Museum, the Tropenmuseum/Wereldmuseum and the Musée du Quai Branly, would give a pan-European comparison.[3,10] Scope is a limit. Second, NLP and logistic regression found macro-level patterns well. Individual battlefield confiscation records still need cross-checking through qualitative research in Dutch and Indonesian military archives.[31,32] That work is still to do. Last, future work should ask how emerging artificial intelligence systems, such as LLMs and vision-language foundation models, take in and repeat these biased catalog texts. Digital humanities methods should counter the algorithmic amplification of colonial knowledge.[22,63]

Further limits concern measurement. The euphemism lexicon was not validated against a hand-coded sample, and no inter-coder agreement is reported, so words such as 'gift' or 'purchased' may sometimes describe genuine transactions; the pre-1820 baseline of about 50% shows that these words are common outside conflict as well. The analysis is observational, records rather than objects were the unit, and clustering by donor or collection was not modeled. Both museums publish catalog text in English (with Dutch terms at the Rijksmuseum), so the findings may not hold for catalogs in other languages. Natural language processing for archives remains sensitive to context, transparency and maintenance,[64] which argues for human review of any automated flagging. Related computational work traces colonial discourse in Dutch newspapers[65] and applies machine learning to colonial photographic archives while stressing human oversight.[66,67] Natural language processing can also convert free-text museum provenance records into linked open data,[68] and a machine-learning model applied to texts on the antiquities trade has been used to detect donation patterns described as reputation laundering,[69] an approach that could be adapted to validate and extend the present audit for colonial-era donations.

5. Conclusion

This study is a computational linguistic audit and econometric analysis of coloniality, linguistic euphemism and provenance

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opacity across 15,270 digitized records of *Nusantara* artifacts at The Metropolitan Museum of Art and the Rijksmuseum Amsterdam. Our findings indicate that, in these two catalogs, acquisition wording and provenance records are not neutral. They are consistent with a pattern in which digital catalogs sustain historical amnesia and epistemic dispossession. The evidence is consistent across both museums.

Of the artifacts acquired during colonial military conflicts, 74.6% were described through passive transactional wording ('gift', 'bequest', 'transfer'). The Provenance Completeness Index fell to an average of 28.4 out of 100, and 68.2% of objects stayed in critical provenance opacity. The gap is wide. Creator anonymity ran between 82% and 91%, and so master artisans were left without attributed authorship. Sacred *pusaka* regalia were frequently classified as 'weapons' and 'decorative curios'. Sacred meaning was lost. Multivariate modeling showed that military-period acquisition (OR = 3.42) and precious metal composition (OR = 4.18) were associated with higher odds of provenance opacity. These are associations. The result is sobering.

Museum decolonization cannot end at the selective return of famous artifacts while digital catalogs keep wording that obscures acquisition histories. Plain linguistic transparency, rebuilt indigenous provenance lineages and Indigenous Data Sovereignty through the CARE principles are a way forward. Cultural institutions should review the coloniality of knowledge in their catalogs, so that digital catalogs support historical repair and epistemic justice. The task is urgent.

Declarations

Ethical Approval. Not applicable: the study analyzed publicly released museum catalog metadata (The Met Open Access, CC0; Rijksmuseum Data Service) and involved no human participants, animals or personal data.

Consent to Participate. Not applicable.

Consent for Publication. Not applicable.

Use of Artificial Intelligence. None.

Author Contributions. A.M.: Conceptualization, Methodology, Software, Validation, Formal analysis, Investigation, Resources, Data curation, Writing – original draft, Writing – review & editing, Visualization, Supervision, Project administration.

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Competing Interests. None declared.

Data Availability. The source catalog records are publicly available from The Met Open Access dataset and the Rijksmuseum Data Service. The derived dataset, the euphemism lexicon and the analysis code are available from the corresponding author on reasonable request.

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