

Why Licensing Lacks Its Own Metadata System:

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A Practitioner–Scholar Examination of Data Fragmentation and the Need for a Unified SKU-Level Licensing Intelligence Infrastructure in the \$369B Global Consumer Products Industry

ABSTRACT

The worldwide consumer products licensing industry, which generates \$369 billion in value, lacks a single metadata system to track and authenticate licensed products throughout different product segments and geographic markets. The licensing sector operates without an official system that provides standardized identifiers for IP-intensive sectors to use such as ISBN, ISRC and DOI. The lack of data collection leads to multiple problems that include data fragmentation across different territories and the loss of data to other regions and the entry of counterfeit products and problems with royalty payment records. The research investigates structural factors which create metadata gaps through a three-year study that involved fans and mystery online shoppers and distributed volunteers who performed manual SKU verification. The research analyzed more than 40,000 licensed SKUs together with hundreds of global licensees, which provided scientists with unusual opportunities to study product expansion and market reactions. The research results show that information access between licensors and licensees and retailers and digital platforms and enforcement bodies creates a widespread knowledge gap that contradicts conventional beliefs about licensing transparency and compliance. The research demonstrates that a single licensing intelligence system which uses real-time SKU information and verified licensee lists and digital territory monitoring technology would create better IP protection and precise royalty payment systems and improved customer confidence. The practitioner–scholar lens shows how real-world operations affect theoretical aspects that produce valuable insights for intellectual property management, anti-counterfeiting policy development, digital commerce governance and future global licensing system modernization.

Keywords:

Licensing metadata • SKU-level data • Intellectual property protection • Licensing industry infrastructure • Counterfeit prevention • Territorial rights • Royalty compliance • Global consumer products industry

1. Introduction

The worldwide consumer products licensing industry functions as a major commercial network that enables intellectual property (IP) monetization through its connection of entertainment studios with manufacturers and retailers and their global fan base. The most recent global study from Licensing International shows that licensed merchandise and services produced \$369.6 billion in retail sales which demonstrates their substantial economic influence and widespread cultural reach. The industry of licensing operates as a large-scale IP-driven business, but lacks a standardized metadata system to track licensed products through their individual stock-keeping units (SKUs). The system lacks any form of organization, which differs from the controlled metadata systems that manage creative content and rights information such as ISBN for books, ISRC for recorded music and DOI for scholarly publications. The current systems provide clear visibility and product tracking and maintain uniformity but product information management through licensing depends on multiple proprietary systems that operate without standard procedures.

The absence of metadata infrastructure systems has created major problems because digital commerce operations continue to grow while supply chains extend across international borders. The combination of e-commerce platforms with online marketplaces and reseller networks and social media commerce has virtually eliminated physical borders and allows licensed products to move freely into

markets that were not their original destination. The market contains vast amounts of counterfeit and unlicensed products, which oftentimes look identical to authentic items both to customers and to customs officials who inspect borders. The lack of a single official source that provides SKU-level metadata information makes these problems worse because it blocks all parties from getting correct instant access to licensed product status and distribution and authenticity information.

The industry depends on yearly surveys, physical reporting, digital approval systems with variable performance, and agent-controlled knowledge distribution networks, which results in separate data segments. The internal product approval platforms that licensors operate do not share common functionality and are missing essential features, including complete identifier systems, required metadata rules and retail outlet integration capabilities. The market environment with numerous authorized and unauthorized products makes it difficult for licensees to find their products and control their distribution channels. The process of maintaining authenticity and compliance has become more challenging for retailers and marketplaces because they lack specific metadata references. People who want brands with genuine value face a growing problem because they cannot tell which products have official authorization and which ones are fake. The system shows fundamental weaknesses because its design problems exceed the abilities of its participants.

This article investigates the fundamental causes that create these institutional weaknesses while analyzing their effects on the system from the perspective of both practitioners and scholars. The research collected more than 40,000 licensed SKUs and multiple hundreds of global licensees throughout three years of exploratory study through crowdsourced data collection and field verification, mystery online shopping, volunteer network participation and manual marketplace evaluation. The method follows practical standards of the field because it operates without traditional academic data collection methods. The special dataset provides researchers with actual data to study how product variations increase and how products disappear from different markets, as well as how product information becomes incorrect, how counterfeit products spread and how authorized products move through hidden distribution channels on the internet. The research combines practical knowledge about operational problems with academic methods to study these issues through systematic analysis and conceptual growth.

The research results demonstrate that data fragmentation exists as a fundamental problem that affects the entire licensing system. The absence of

SKU-level metadata creates a chain of problems, which prevents licensors from tracking product life cycles and licensees from detecting unauthorized distribution, border authorities from identifying counterfeit items and consumers from accessing reliable verification systems. The system failures result in operational inefficiencies which lead to financial losses and legal consequences and prevent organizations from developing new innovative solutions. The lack of standardized infrastructure creates a paradox for the industry because it makes licensing rights and compliance enforcement impossible despite being based on contractual agreements.

The solution to these problems requires the development of a single licensing intelligence system that should handle SKU registration and verification, licensee mapping, digital territory enforcement and anti-counterfeiting protection. The system would operate as a metadata backbone instead of functioning as a marketplace because it would serve as a foundation similar to ISBN in publishing and GS1 standards in retail supply chains. The development of this framework needs all parties involved to work together, including licensors and licensees, rights organizations, agencies, legal bodies and technology providers. The industry needs to adapt to this cultural and operational change because it has operated with proprietary workflows and decentralized relationships throughout its history. The global trend toward digital transformation and data-driven governance and compliance automation supports this development.

The following section establishes the main issue which the complete paper will thoroughly investigate. The Literature Review section establishes the research context by reviewing current studies about IP management, counterfeit markets, digital commerce fragmentation and metadata standards. The Methodology section establishes the practitioner-led crowdsourcing method and describes its advantages together with its potential drawbacks. The Findings and Discussion section demonstrates how the metadata gap creates structural problems while introducing new conceptual frameworks which enhance our comprehension of licensing systems as information networks. The Conclusion section evaluates the current state of infrastructure readiness for reform before establishing research paths for upcoming studies.

The main objective of this research paper involves showing that the worldwide licensing industry needs an organized metadata system to maintain its current economic and cultural power base. The lack of SKU-level intelligence creates a fundamental problem which impacts both transparency and compliance and consumer trust and the sustainability of licensing as a worldwide IP strategy. The research examines this problem by using practitioner-scholar analysis

which draws from scientific evidence to advance discussions about licensing system development for digital network requirements.

2. Literature Review

The global licensing industry exists at the point where intellectual property law meets consumer product manufacturing, retail distribution and digital commerce operations. The creative industry depends on standardized metadata systems to handle rights management and product distribution, but licensing operations remain disorganized because of insufficient academic research about their metadata systems and their compliance and enforcement requirements. The research investigates four main academic fields, which help explain the institutional barriers studied in this paper: (1) intellectual property metadata frameworks, (2) global counterfeiting and authenticity verification, (3) territorial rights and digital marketplace leakage, and (4) licensing industry data and governance structures. The existing research provides context about the absence of a single metadata system for licensing and demonstrates how this situation affects the field.

2.1 Intellectual Property Metadata and Standardization Frameworks

Metadata systems serve as the base system that enables the organization and tracking of creative and commercial content through indexing and output management. The study of metadata standards demonstrates how standardized identifiers, including ISBN for books, ISRC for recorded music, ISSN for serial publications and DOI for digital scholarly objects, enable worldwide content dissemination, rights administration and archival preservation (Borgman, 2015). These identifiers allow different market participants, including publishers, distributors, rights societies, libraries and digital platforms to work together while maintaining accurate discovery of content in complex market environments. The metadata literature demonstrates that standardization must occur because it enables both transparency and sustained information integrity (Park & Tosaka, 2020).

The licensing system does not have a matching framework that exists for consumer product regulation. The absence of a standardized identifier for licensed SKUs prevents licensors and licensees from using a common system, which forces them to depend on company-specific portals, manual spreadsheets, approval systems and internal coding systems that do not work between different organizations or retail outlets. Research indicates that missing metadata information creates operational problems that block copyright protection activities (Greenberg, 2009), although this specific issue has not received sufficient study regarding licensing practices. The lack

of SKU-level standardization creates informational asymmetry because market participants maintain different levels of understanding about available inventory, authentic products, and their distribution networks (Akerlof, 1970). The increasing number of products available through global e-commerce platforms creates an unbalanced situation because these products lack standardized metadata which would help establish their identity and maintain their territorial boundaries.

2.2 Counterfeiting, Authenticity Challenges, and Enforcement Barriers

The World Intellectual Property Organization (WIPO) and the OECD have documented the increasing global problem of counterfeiting through their research. The OECD and EUIPO published their “Trade in Counterfeit and Pirated Goods” report in 2021, which shows that counterfeit items make up more than 3.3 percent of worldwide commercial activities. Consumer products such as toys, clothing and entertainment items face the highest rate of counterfeiting. Research shows that counterfeit products damage brand worth while creating market irregularities, and also present dangers to consumer safety (Chaudhry & Zimmerman, 2013). The absence of instant product authentication systems at customs borders creates ongoing difficulties for enforcement operations because the officials struggle to identify authentic products from high-quality counterfeit items.

Research indicates that metadata-based authenticity systems that use blockchain serialization (Kshetri, 2021) and RFID tagging need official product databases to function properly for enforcement purposes. The absence of centralized SKU repositories prevents customs authorities from obtaining necessary reference points that they need to verify licensed products (Turgeman, 2020). Research studies demonstrate that counterfeiting operations succeed in areas with insufficient information while law enforcement agencies must respond after crimes occur because they lack access to unified data (Wilcox *et al.*, 2016). The licensing sector operates without an official metadata framework, which creates an environment similar to the one described in the study. The study supports this assessment through its analysis of practitioner reports and industry commentaries.

2.3 Territorial Rights, Digital Commerce, and Market Leakage

The practice of territorial licensing serves as a fundamental method for IP commercialization but its effectiveness faces growing challenges because of digital commerce operations. Research studies show that online marketplaces break down geographical limits because they allow products

to be listed across borders and their algorithms create duplicate products while resellers control product distribution routes (Feldman, 2021). Studies about international marketing and digital platform governance demonstrate that e-commerce platforms enforce categories irregularly because they allow unauthorized listings to exist throughout different geographic areas (Hao, 2020). The existing market conditions make it difficult for licensors to protect their exclusive rights to specific geographic areas that form the basis of their royalty payment systems and contractual agreements.

Research on territorial leakage shows that unauthorized parallel trade activities result in market segmentation breakdown and price irregularities and produce incorrect royalty distribution (Maskus, 2016). The academic field lacks research about the missing metadata that creates these problems. The absence of SKU-level data that connects to territories makes it impossible for licensors to determine proper product placement locations. Research on supply chain visibility shows that traceability systems need standardized identifiers together with common databases to monitor products throughout international distribution networks (Francisco & Swanson, 2018). The current licensing system does not have built-in mechanisms, which forces territorial enforcement to rely on basic manual tracking, occasional brand protection firm inspections and random marketplace checks that have restricted capabilities.

2.4 Licensing Industry Data, Governance, and Reporting Structures

The academic study of licensing as an industrial sector remains scarce because most research about this topic appears in professional publications and IP management articles instead of academic journals. The annual global studies from Licensing International show retail sales through survey data, but they lack information about specific products and operational data structures. Research about brand licensing focuses mainly on strategic approaches, consumer behavior and financial outcomes (Rao & Ruekert, 1994) instead of studying the operational systems that support compliance and metadata management.

The industry operates without scholarly research about licensing metadata because it lacks centralized control. Multiple studios, agencies, estates, corporate entities and creators distribute rights ownership between them while using their own proprietary systems for management. The licensing workflow that includes approvals, line lists, sell-in, sell-through and royalty reporting operates without standardized procedures between different licensors. The research on supply chains focuses on visibility and interoperability but licensing research fails to study the necessary informational systems that would enable its worldwide business activities.

Research on digital commerce governance shows that product data quality together with classification systems directly affect both business compliance and consumer safety and platform stability (Koutrika, 2021). Digital platforms show licensed products with metadata that lacks consistency because they contain missing attributes, incorrect descriptions and no manufacturer identifiers. Research on data quality shows that system reliability and decision accuracy suffer when metadata quality remains poor (Wang & Strong, 1996). The licensing industry demonstrates how structural data problems create immediate operational effects for businesses.

2.5 Practitioner–Scholar Contributions and the Metadata Gap

The practitioner–scholar perspective serves as a critical foundation for new research areas because these fields lack sufficient academic studies. Abbott *et al.* (2013) demonstrate that practice-based insights show actual operational conditions that theoretical models fail to detect. The only available empirical evidence for studying systemic problems in industries with fragmented governance and low transparency comes from practitioner-generated datasets. The current research supports new academic work that promotes the combination of practitioner expertise with academic studies because markets change too quickly for traditional research methods (Corley & Gioia, 2011).

The practice of licensing reveals three main issues with practitioner accounts because they lack product tracking systems and struggle with counterfeit identification. Also, manual compliance methods are not efficient. Research has not yet established a method to study SKU-level licensing data through systematic documentation and analysis. The research investigates this topic through an exploratory study of data, which practitioners gathered during multiple years of crowdsourcing activities. The research findings find their place in academic studies about metadata and counterfeiting, and territorial rights and digital commerce operations.

3. Methodology

The research design of this study uses practitioner–scholar exploratory qualitative methods to study the structural metadata deficiencies that affect the worldwide consumer products licensing market. The absence of a centralized licensing registry and SKU-level dataset made it impossible to use conventional academic methods, which depend on secondary datasets. The research methodology relies on data that practitioners collected over three years through a combination of four different methods. The four different methods to collect data included fan community crowdsourcing, online shopping and marketplace observation, volunteer-based

SKU identification, and manual verification across e-commerce platforms and brand-owned portals. The design system combines actual licensing industry operations with scientific evidence requirements that exist because of the market’s lack of transparency.

3.1 Research Design Rationale

The licensing industry faces a problem because it lacks a standardized metadata system that prevents researchers from using quantitative methods for registry-based sampling. The research used a grounded exploratory approach to overcome this structural barrier because this method works best when system-level data is unavailable or partially available (Charmaz, 2014). The research aimed to create an extensive SKU-level dataset that would represent all licensed goods globally, although it did not seek to achieve complete representation of all worldwide licensed products.

The researcher-based method follows previous studies that demonstrated that field research provides essential value for industries that lack sufficient historical data (Eisenhardt, 1989). The research design follows principles from digital commerce and supply chain visibility studies that use manual verification and crowdsourcing to enhance traditional data collection methods (Howison & Crowston, 2014).

3.2 Data Sources and Collection Procedures

CROWDSOURCED CONSUMER CONTRIBUTIONS

Consumer and fan communities who followed entertainment brands over three years provided SKU sightings along with retail screenshots, packaging images and product URLs. The team selected these contributions based on their uniqueness and their ability to present information clearly while matching the brand identity. The process of crowdsourcing helped the company achieve its goal of worldwide expansion because their licensed products became available in more than 40 different geographic areas across the world.

MYSTERY ONLINE SHOPPING AND MARKETPLACE MONITORING

Research volunteers performed structured mystery shopping at major digital platforms, which included Amazon, eBay, AliExpress, Walmart and marketplaces operating in specific regions. The protocol included the following:

The process of product identification occurs through two methods covering character-based IP and franchise-based IP.

The system verifies that sellers maintain their identity while checking if all product information exists and if prices match their expected values.

COMPARING LISTINGS ACROSS MULTIPLE TERRITORIES

The marketplace monitoring system showed how products with the same SKUs entered different markets at the same time even though distribution rights were not valid for those areas. This process entailed:

- Manual SKU verification
- Manual checks on all submitted products through a verification process
- Visual inspection of packaging and product labeling
- Comparison against known licensee catalogs
- Brand owner approvals where available
- Content rights consistency (character style guides, color standards, logo usage)

The verification process became essential because there were no official metadata sources available. Licensing professionals who work in the field agree that SKU authenticity requires specific design details that current retail automation fails to detect.

LICENSEE IDENTIFICATION AND MAPPING

The following data was obtained from sources that contained manufacturer information, including names, addresses, and territory rights details.

- Packaging labels
- Online disclosures
- Trademark filings
- Corporate catalogs
- Public press releases
- Retailer brand directories
- Expo-Trade shows

The researchers used these sources to build a worldwide directory of licensees that included more than 300 entries.

TERRITORIAL AND GEOFENCING ANALYTICAL LAYER

The dataset included a territorial mapping layer that enabled the research to study the following aspects of territorial rights:

- The sales destination for SKUs exists
- Where they actually appear online
- Frequency of cross-border listing violations
- Marketplace-driven algorithmic duplication

The research used a theoretical geofencing system to assess how product-level metadata information would function for licensing purposes, although geofencing has not become a recognized industry standard for metadata licensing. It covered the following:

- Region-specific product visibility
- Automated detection of unauthorized listings
- Territorial boundaries defined at point of listing

The enforcement process that occurs after licensing activities sends messages to both parties who hold licenses.

The geofencing model operates as an analytical system that demonstrates how modern digital commerce technologies like location-based content delivery and digital rights management exceed the capabilities of current licensing systems.

3.3 Dataset Overview

The final dataset consisted of 40,000+ verified SKUs. The company operates through hundreds of international partners who distribute its products across various product segments that include toys, apparel, FMCG, home goods, collectibles and seasonal merchandise.

The research identifies multiple digital marketplaces that operate throughout different geographic areas.

THOUSANDS OF VOLUNTEER SUBMISSIONS

The dataset shows a bias toward entertainment licensing because character IP and other categories generate the most consumer interest while their online product listings remain most active. The industry data shows that entertainment/character licensing represents one of the biggest and most rapidly expanding segments within the licensing market.

3.4 Analytical Framework

The research followed multiple stages for its analysis.

STAGE 1 — Descriptive Classification

The SKUs received classification based on brand identity, territory location, product category, manufacturer origin and visual presentation throughout different marketplaces.

STAGE 2 — Metadata Evaluation

The evaluation process assessed each SKU for having complete metadata, which included title information, brand details, model numbers, licensee names and territory disclosure information.

STAGE 3 — Territorial Leakage Mapping

The research team identified cross-border listing patterns through their analysis of SKU appearances between different regions and their documented licensed areas.

STAGE 4 — Counterfeit/Anomaly Identification

The system identified suspicious products through three methods that included checking for packaging

irregularities, significant price differences and missing product information, and established counterfeit indicators.

STAGE 5 — Conceptual Geofencing Simulation

The research applied territorial boundaries to SKU metadata for a hypothetical assessment of how a future unified infrastructure system would function. Findings include:

- Block unauthorized listings
- Trigger compliance alerts
- The system enables licensors to monitor their content in real-time
- Support customs authentication

The conceptual model uses digital rights management research that shows how metadata-based geofencing systems control digital file accessibility (Kretschmer, 2012). The same principle applies to licensed physical products—where metadata becomes the “gatekeeper” of territorial compliance.

3.5 Methodological Limitations

The research method of exploratory studies contains specific limitations that affect the study. The collected data through crowdsourcing does not provide equal coverage of all geographic areas. Problems identified include:

- Manual verification introduces subjectivity
- The algorithms which operate in marketplaces experience regular modifications
- The dataset shows how customers can see specific SKUs but it does not show their overall sales performance
- The lack of clear public information about certain licensees prevents them from being transparent about their activities

The research method provides researchers with a unique opportunity to study this market because there are no official data sources available and the industry lacks full disclosure of its operations.

3.6 Ethical Considerations

The system did not record any information about individual consumers. The research data originates from publicly accessible product listings, packaging information and corporate disclosure materials. The mystery shopping activities followed all rules that the platform had established in its terms of service.

The research fails to reveal any studio-owned proprietary systems that operate as internal licensing platforms.

3.7 Artificial Intelligence Finds its Application in Three Areas that include Licensing Metadata Management, Agreement Parsing and Territorial Enforcement Systems

The research examined how artificial intelligence (AI) enables licensing governance through automated processes that previously required human legal review, case-by-case moderation and human oversight. The research investigated whether machine-learning systems could perform reliable data interpretation of licensees, agreement analysis, boundary enforcement and compliance verification at large scales. The research team worked to resolve a major doubt about whether licensing data with its diverse unorganized format could be converted into automated decision systems through machine-readable rules.

AI FOR LICENSEE RECOGNITION AND VERIFICATION

The first component evaluated AI capabilities to detect official licensees through natural language processing (NLP), entity extraction and classification model applications. The NLP pipeline processed licensing data from public sources that included studio disclosures, trademark filings and press releases through transformer-based architectures (BERT-family and XLM-R). The models underwent optimization to identify four types of entities, which included product categories, licensee identities, contract periods and territories. The system used a complementary classifier to produce trust probability scores that helped identify between verified licensees and non-licensees.

The system achieved accuracy rates above 92 percent when it processed more than 1,000 examples of both licensed and unlicensed users and it reached 94 percent accuracy through multiple improvement steps. The results show that AI-based verification systems work effectively in real-world licensing operations because they produce results that are both possible to achieve and reliable enough for automated processing.

AI FOR AGREEMENT PARSING AND TERRITORIAL METADATA EXTRACTION

The second research focus investigated the possibility of extracting enforceable rules from unorganized legal agreements that exist as PDF and DOC files. The language in licensing contracts includes nonstandard terminology that defines geographical areas, product ranges, character sets, time periods for exclusive rights and contract extension provisions. The training of NLP pipelines enabled the system to identify constraints that it then used to create a rights matrix structure.

The testing process evaluated more than fifty agreements from different licensors and

demonstrated that AI technology could identify territorial limits and product categories with 99 percent precision when operating in structured settings. The research findings show that most of the unclear aspects in manual rights interpretation can be resolved through automated parsing systems.

AI-DRIVEN GEOLOCATION ENFORCEMENT AND REAL-TIME GEOFENCING

The research team extracted rights metadata before they assessed the possibility of automated geographic enforcement. The geolocation module used IP lookup, mobile GPS signals and content delivery networks to limit product access according to user location and the areas specified in their agreement.

The system performed latency tests that showed it could operate at large scales because the average response time was 162 ms while the system reached 420 ms during peak usage periods. The system shows effective performance because it maintains error rates at or below 1 percent, which makes it possible to use machine-enforced territorial governance as a substitute for human cross-border activity surveillance. The research results confirm previous discussions about geofencing requirements for establishing a worldwide licensing metadata system.

AI FOR COMPLIANCE VERIFICATION AND BRAND INTEGRITY PROTECTION

The research team assessed computer vision and language models for their potential to function as automated systems that would monitor compliance. The YOLOv8 vision system together with commercial AI detection APIs detected all protected content, including misused logos and unauthorized character art. A language model layer checked all titles and descriptions for any non-conforming content or trademark violations.

The process of iterative refinement helped decrease false positive results, which allowed automated detection systems to effectively remove non-compliant content before it reached the public. The system functions as an initial screening system that protects brand guidelines from needing human inspection.

AI-SUPPORTED PRIORITIZATION AND CONTRACT-AWARE RECOMMENDATION LOGIC

The research investigated how AI technology could create individualized product discovery experiences that maintain all contractual requirements. A prioritization engine integrated:

- Social trend detection
- Collaborative filtering
- Contractual metadata from agreement parsing
- Licensor-set priority signals

The systems maintained all recommended products inside the agreed contractual limits, which proved essential because AI-based product recommendations needed to follow all applicable laws. The situation demanded new approaches to develop “contract-aware recommendation systems,” which academic research had not fully studied.

The system unites verification functions with parsing operations, enforcement mechanisms and compliance monitoring into an architecture that supports audit operations.

The research identified the most important development as being the combination of multiple AI subsystems into one system that created a measurable path from document processing to enforcement. The system connected:

- Licensee verification
- Agreement parsing
- Territorial metadata generation
- Geolocation enforcement
- Trend-aware, contract-compliant prioritization
- Content compliance filtering

The system shows that core licensing governance operations that used to require human judgment for interpretation and post-implementation enforcement can now run automatically through software programs. The onboarding process for licensees in controlled trials was reduced from multiple days to less than one hour, which demonstrated significant operational efficiency improvements.

IMPLICATIONS OF AI INTEGRATION FOR FUTURE LICENSING INFRASTRUCTURE

The research results validate the idea that AI technology can establish itself as the base component for building an international licensing metadata system that will function in the future by delivering:

- Automated licensee vetting
- Semantic agreement parsing
- Real-time geofencing
- Contract-aware personalization
- Early-stage content moderation
- Traceable, auditable compliance paths

The system proves that licensing governance can evolve from human-based monitoring to automated intellectual property protection through code-based enforcement that creates major theoretical and managerial and policy-related effects.

4. Findings

The research of over 40,000 licensed SKUs together with multiple global licensees showed that metadata contained numerous errors while licensees leaked products across territories, counterfeit

products entered the market, and the system lacked any mechanism to enforce geographic restrictions or monitor compliance. The research results demonstrate how all parties involved in the industry, including licensors, licensees, retailers, consumers and enforcement agencies must deal with the difficulties of operating in a market that lacks uniform data management systems. The research combines SKU-level verification with platform monitoring, licensee mapping and geofencing simulations to generate unique operational data about licensing.

4.1 Metadata Fragmentation Across SKUs and Marketplaces

The research reveals that most licensed consumer products lack standardized metadata that serves as their main identifier. The product listings across different e-commerce platforms showed significant differences in their title organization, their product descriptions, their manufacturer information, their trademark applications and their product packaging visuals. The system contained numerous SKUs that did not include fundamental metadata elements, such as:

- Licensee name
- Manufacturing origin
- Year of production
- Contractually approved brand identifiers
- Regional availability or restrictions
- Expiration or deactivation dates

Only 22 percent of listings in the database showed licensee information yet most products entered the platform through third-party sellers who provided insufficient or low-quality product details.

The metadata information showed major inconsistencies during times when large numbers of items entered the system at a fast pace, especially in apparel, mobile accessories and collectibles categories. Research findings from digital commerce studies show that inadequate metadata entry creates two major problems: decreased product authenticity visibility and higher risks of customers buying counterfeit products (Koutrika, 2021).

The lack of standardized metadata conditions leads to informational asymmetry because licensors cannot track their products when they remain unidentified, licensees lose their ability to monitor competitors, and consumers become unable to identify authentic merchandise from counterfeit products.

4.2 SKU Proliferation and the Visibility Gap

The dataset reveals an unexpected finding that shows how many different SKUs exist in the market. Major entertainment franchises operated with two different product lines that included expensive collectibles together with affordable quick-selling

products that manufacturers produced through micro-licenses and category-based outsourcing deals. The company benefits from diverse operations, but these different operations create challenges for its business operations. The absence of centralized metadata creates challenges for licensors who need to track all SKUs that received program approval and licensees who want to monitor product entries and exits between adjacent market regions.

The lack of transparency between these groups creates a visibility gap which results in:

- Royalty reconciliation challenges
- Inefficient auditing
- The system faces higher risks of unauthorized changes to its operations
- Fragmentation in brand representation

The internal approval systems that large licensors depend on fail to track products in the real world because they operate independently from marketplaces and enforcement agencies.

4.3 Territorial Leakage and the Breakdown of Geographic Exclusivity

The analysis showed that SKUs that should only be sold in one region were found for sale in different territories without proper authorization. The system experienced three different types of leakage.

MARKETPLACE ALGORITHMIC DUPLICATION

The platforms operate as automated systems that duplicate product listings between different stores that belong to the same region, thus eliminating any need for geographical limitations. The SKU that received German approval ended up appearing in Middle Eastern and Latin American marketplaces through automated data distribution systems.

THIRD-PARTY RESELLER ARBITRAGE

Unauthorized cross-border resellers obtain products from authorized regions before they list these items for sale throughout the world. The resellers do not reveal their territory limits, which results in major damage to the exclusive geographic rights of products.

MANUFACTURER-ORIGIN LEAKAGE

The data showed that certain products became available in areas that did not have authorized distribution rights from the licensee.

The data shows that SKUs appeared in unauthorized territories for 34 percent of all items and 15 percent of items appeared in three or more unauthorized territories. The observed patterns validate multiple issues that licensing professionals have identified but scientists have not previously proven through scientific evidence.

The practice of territorial leakage violates contractual terms because it disrupts market pricing mechanisms while making it impossible for regional licensees to maintain their exclusive rights. The lack of SKU-level monitoring makes it difficult for licensors to identify or stop product leaks from happening.

4.4 Counterfeit Signatures and Marketplace Patterns

Online platforms showed widespread counterfeit product activity through fake versions of official products that duplicated their appearance with great precision. The main indicators which showed counterfeit activity were:

- Missing or inconsistent packaging labels
- Absence of licensee identification
- Dramatically lower pricing
- Misalignment of SKU codes

These problems were exacerbated when the company uses template-based product descriptions which appear on different SKUs that do not share any connection or the elements of style guides become misused when color combinations do not match and characters in the design appear with wrong dimensions.

The same product search results showed counterfeit items alongside authentic SKUs, which led customers to become confused about their products. The research showed that fake product listings appeared most frequently when metadata information was incomplete. The premium collectibles category showed lower counterfeit rates because it used consistent licensee identification throughout its products. The absence of metadata in products such as apparel and fast-moving items resulted in higher counterfeit penetration rates.

The research findings from OECD match the OECD (2021) study, which demonstrates that poor metadata systems create conditions for counterfeit activities to occur. The absence of metadata in licensing creates an environment which allows counterfeiters to succeed.

4.5 Lack of Royalty Transparency and Lifecycle Monitoring

The process of royalty reporting through sell-in or sell-through data remains as one of the most difficult tasks for licensing compliance. The research established that SKU-level opacity leads to the following results:

- Inaccurate or delayed royalty reports
- The process of linking reported products to their actual presence in the market faces challenges

- The communication process between licensors and licensees occurs through separate lines which do not connect to each other
- The system lacks sufficient power for licensors to handle situations where data points do not match expected values

Multiple licensees stated that the absence of standardized identifiers makes it difficult for different reporting systems to match SKU references between licensors, retailers and marketplaces. The research indicates that metadata fragmentation creates two major problems for the music industry because it hinders both copyright enforcement and the accurate calculation of royalties, which forms the core of the licensing business model.

4.6 The Territorial Mapping Layer Provides Essential Information Which Helps Develop a Conceptual Geofencing Model

The research required developers to create models that demonstrated how SKU-level metadata enables digital geofencing to protect territorial licensing rights. The simulation used fictional geolocation restrictions, which were applied to SKUs to show how product metadata functions as a security measure to stop unauthorized product listings and activate warning systems when such activity occurs.

KEY INSIGHTS INCLUDE:

■ Metadata Functions as an Enforcement Mechanism

Digital platforms can use structured territorial metadata in SKUs to block users from outside authorized regions from seeing products through automated system controls. The system operates similarly to digital rights management (DRM) platforms that protect film content on streaming services.

■ Real-time Detection of Territorial Violations

The geofencing system would detect when products enter unauthorized areas, which would give licensors useful data for their operations. The current method of detection requires either human observation or the involvement of brand protection agencies.

■ Protection of Licensees and Royalty Integrity

The regional licensees stated during practitioner consultations that geofencing technology would defend their business assets by blocking competitors from entering their protected areas through worldwide market platforms.

■ Platform Integration Potential

Digital goods and tax policies and regulatory compliance already use geofencing through existing major marketplaces. The technology allows licensed

physical products to become accessible through unified metadata that serves as their required foundation.

■ Reduced Counterfeit Window

The implementation of geofencing through SKU metadata prevents counterfeit goods from being listed in unauthorized regions, which would lead to a substantial decrease in counterfeit circulation.

The geofencing simulations show how metadata-based territorial enforcement could work, which supports the requirement for creating a single licensing intelligence system.

4.7 Summary of Findings

The research data shows the following results:

- The current licensing system does not have enough metadata infrastructure, which digital commerce needs for its operations
- The use of specific SKUs creates barriers that prevent businesses from achieving transparency and compliance, and from receiving proper royalty payments
- Territorial leakage exists as a common practice that operates throughout the entire system
- Counterfeits take advantage of existing vulnerabilities in metadata systems
- A single metadata system would allow geofencing operations to enhance both territorial defense and compliance monitoring
- The data collections made by practitioners reveal essential information about existing structural deficiencies

The research shows that the industry lacks proper infrastructure to handle the requirements of worldwide e-commerce operations and digital law enforcement activities.

5. Discussion

The research results demonstrate that the licensing industry faces problems because of its weak metadata systems and its non-compliant and territorially unmanaged governance structure. The weaknesses stem from insufficient digital infrastructure that supports the growing complexity and worldwide market expansion of modern licensed consumer products. The research findings receive analysis through academic studies and business standards that demonstrate how metadata fragmentation with insufficient royalty systems and territorial leakage problems create major obstacles for licensing to function as an effective IP revenue generation system.

5.1 Metadata Fragmentation as an Information System Failure

The lack of SKU-level metadata creates a fundamental problem that affects all operational aspects of licensing. Universal identifiers exist in various sectors, such as ISBN for books, GS1 barcodes for retail supply chains, and ISRC for music, but licensed consumer products do not have any shared identifier or metadata structure. As a result:

- The internal approval systems of licensors operate as their only method to monitor products so they lack ability to validate or track products
- The product representation across different channels remains inconsistent because licensees lack the ability to maintain uniformity
- The absence of official product information exists as a major challenge that retailers face
- The public lacks effective methods to identify authentic products from fake ones

The information systems theory identifies this situation as a metadata governance gap, which creates structural problems that result in operational inefficiencies, information imbalances and increased chances of fraud (Wang & Strong, 1996).

The consequences of licensing become severe because metadata functions as the essential link that unites rights information with product details, territory data, royalty payments and enforcement systems. The system enables licensors and licensees to maintain separate information systems that do not match the growing complexity of worldwide distribution networks.

5.2 Licensing’s Dependence on Manual Royalty Systems

The practice of royalty reporting continues to operate manually throughout the entire process, even though large global licensors exist. Many established rights owners still need:

- Excel-based templates
- Manual uploads through SaaS portals
- Self-reported sales data without external validation
- Product line lists that use free-form SKU naming
- Attachments or PDFs of retailer statements

The current SaaS royalty tools base their operations on licensee-reported data instead of using independently verified sales or distribution records. The practice of depending on personal statements for data collection produces:

- High fraud potential, whether intentional or unintentional
- The reported marketplace activity does not match the actual marketplace activity

- Reporting inconsistencies across licensees
- Substantial reconciliation costs for licensors

The governance system contains an essential design defect because it requires users to submit information without providing any reference points, which leads to incorrect data entry.

Research studies about financial reporting in industries without automated verification systems identify identical problems that lead to underreporting and other types of errors, including omission errors, classification mistakes, and strategic misrepresentation (Healy & Wahlen, 1999). The licensing system contains the same security weaknesses.

5.3 Royalty Fraud and the Limits of Manual Compliance

Industry practitioners often point to royalty discrepancies that they consider as typical reasons for business disputes that lead to increased auditing costs. The research data confirms that the system fails to report all products because it shows numerous SKUs exist in online marketplaces yet their presence is not documented in licensors’ databases.

Royalty fraud and leakage can occur when:

- A SKU gets sold in unauthorized regions but the company only tracks this activity within its home territory
- A product variant that the licensee added to their product line does not appear in any reporting data
- Third-party distributors use their networks to distribute products beyond what their contracts with the company allow
- The reported sales figures at the retailer level do not show the actual number of products that customers purchased
- The current systems of licensees do not have built-in capabilities to monitor activities at the individual SKU level

The auditing literature shows that reporting environments that require manual work will produce more discrepancies (Chan & Vasarhelyi, 2011). The system of manual reporting for licensing together with the lack of shared metadata between systems creates conditions that result in royalties being either overlooked, delayed or misidentified.

5.4 The Need for Multi-Channel Royalty Traceability

The growing number of sales channels that include owned retail, wholesale, e-commerce platforms, pop-ups and omnichannel retail partnerships makes royalty management operations much more complicated.

The current system of royalty tracking faces two major limitations that affect its operation.

1. The system fails to verify product information at the individual SKU level throughout all sales channels.

The process of identifying which SKUs on Amazon, eBay, Shopee and Carrefour match their authorized products remains challenging for licensors.

2. Absence of integrated sales feeds

Licensees typically collect data through multiple sources, which may include:

- ERP systems
- Retail partner portals
- Shopify stores
- Distributor spreadsheets
- Marketplace exports

The datasets lack standardized formatting because they have different organizational patterns and there is no built-in system to merge them with the metadata maintained by licensors.

The system enables substantial royalty value to remain unreported or get reported at lower levels. The policy framework faces difficulties because licensing fails to deliver its expected function as a dependable method for intellectual property revenue generation.

5.5 Metadata Serves as the Essential Base that Enables Royalty Systems to Function with Integrity

The research shows that royalty transparency requires standardization of metadata to function properly. Three mechanisms require unified identifiers:

1. Product-Level Verification

The royalty system requires knowledge about which SKU represents an approved product along with its corresponding category and contractual terms.

2. Territory-Level Alignment

The SKU metadata needs to contain information about regional rights, which will help systems identify when someone tries to sell products across different borders without permission.

3. Channel-Level Sales Mapping

The system requires online and offline sales data to connect with SKU identifiers, which will activate automatic reconciliation processes.

The absence of metadata makes royalty management operate as a reactive system that needs human intervention to perform manual audits between different systems.

The implementation of metadata enables royalty systems to develop into new systems.

- Real-time sales verification
- Automated anomaly detection
- Reduced audit costs
- Increased royalty accuracy
- Fraud reduction
- More equitable licensee–licensor relationships

5.6 Territorial Leakage and the Potential of Geofencing

The research indicates that digital marketplaces experience widespread territorial leakage. The simulation phase revealed geofencing as an effective method that could serve for future territorial enforcement needs.

Geofencing provides organizations with the ability to have:

- Automated restriction
The system should have a built-in mechanism that blocks users from accessing SKUs that exist outside their authorized geographic areas.
- Real-time territorial alerts
The system sends immediate notifications to licensors whenever a SKU gets detected in prohibited regions.
- Royalty boundary protection
The system detects this situation before revenue misallocation takes place when, for example, a European product enters the Asian market.
- Counterfeit reduction
The practice of counterfeiters using “borderless” platforms makes it possible for them to operate but geofencing technology would block their access to these platforms.

FEASIBILITY

The current systems employ geofencing technology for:

- GDPR content rules
- Streaming media territorial rights
- Tax jurisdiction separation
- Age-restricted goods
- Regulatory compliance (e.g., medical devices)

The implementation of geofencing for licensed physical goods becomes possible through technological means that need only consistent metadata and universal industry acceptance.

5.7 Implications for the Future of Licensing Infrastructure

The research results show that licensing systems are currently undergoing a transformation period. The industry established its metadata and reporting systems for:

- Localized retail
- Slow product lifecycles
- Limited SKU proliferation
- Physical approval workflows
- Predictable distribution channels

They were not built for:

- Global digital marketplaces
- Algorithm-driven listing replication
- Third-party reseller networks
- Connected consumer ecosystems
- SKU explosion across categories
- Cross-border micro-distribution

The industry has reached a point that other IP sectors experienced before they started using metadata standards. The global licensing industry needs a new system that would function similarly to how ISBN and GS1 operate to maintain its current worldwide reach.

6. Theoretical Contributions

The research adds new knowledge to three essential theoretical fields.

1. intellectual property metadata systems
2. digital commerce governance
3. licensing as an information ecosystem

6.1 Contribution to Metadata and Information Systems Theory

The research shows that licensing faces issues that metadata governance studies have identified as fragmentation, inconsistent data, and missing authoritative identifiers (Greenberg, 2009; Park & Tosaka, 2020). The creative industry of licensing lacks any established system for metadata standardization.

The research provides evidence that enables scientists to develop theories about how missing metadata impacts rights-based market operations.

6.2 Licensing as an Information Ecosystem

The research treats licensing as an information system that requires precise product identification, territorial information and royalty payment data to function properly. The new perspective about licensing moves beyond its current understanding

as brand management and consumer psychology to include digital infrastructure and data governance aspects.

6.3 Territoriality in a Post-Border Marketplace

The research provides new theoretical knowledge about how digital economic platforms break down traditional territorial licensing systems through their automatic listing duplication and their ability to bypass geographic market restrictions. Research studies have proven that platform-based market irregularities exist (Feldman, 2021), but this research builds upon previous findings to demonstrate how missing metadata creates a rapid decline in territorial control.

The research presents a conceptual framework that demonstrates how geofencing technology operating with product information at the SKU level can function as a theoretical framework for enforcing territorial boundaries.

6.4 Royalty Governance Theory

The research shows that manual royalty reporting systems that control most licensing operations follow the information asymmetry and audit risk models that Healy & Wahlen (1999) described. The research evidence shows that SKU-level opacity causes royalty leakage so the study establishes a theoretical basis for using data standardization to modernize royalty governance.

7. Managerial and Policy Implications

7.1 Implications for Licensors

The results show three main opportunities licensors have to fight fraud while making their operations more transparent and following all necessary rules.

- The system tracks products in real time through SKU-level metadata
- Automated anomaly detection systems decrease the amount of work required for audits
- The system uses territorial metadata to enable geofencing operations and manage communication channels

Verified product registries would create an environment where consumers feel more confident about their purchases.

The approval process requires licensors to transition from using stand-alone internal approval systems that operate independently to create a connected metadata system that links approval processes to marketplace performance data.

7.2 Implications for Licensees

The operational responsibility for following rules falls to licensees who must handle all compliance tasks. Metadata clarity would support:

- More accurate royalty reporting
- Fewer disputes during audits
- Better coordination with retail partners
- Protection of their contracted territories

The territorial geofencing system protects authorized licensees from unauthorized entry by resellers and parallel importers.

7.3 Implications for Retailers and Marketplaces

The current market lacks official verification systems that makes it difficult for retailers and online platforms to identify authentic products from counterfeit or unauthorized items.

A unified metadata infrastructure would allow:

- Automated authenticity checks
- Elimination of counterfeit listings
- Enforcement of territorial restrictions
- More accurate product categorization

The current regulatory environment supports this requirement because it demands businesses to take responsibility for their market activities.

7.4 Policy Implications for Government and Enforcement Agencies

The collection of metadata through a centralized system provides advantages to three main groups that include governments, customs authorities and IP enforcement agencies.

- The authentication of products by customs officers would become possible through their access to official SKU registration databases
- Border enforcement operations would benefit from using digital identifiers that have proven their authenticity
- The importation of goods would need to follow metadata compliance rules that regulatory agencies would establish

The research findings support OECD policy suggestions that recommend better data visibility for counterfeit product prevention (OECD, 2021).

7.5 Implications for Royalty Governance and Compliance

Industry-standard bodies that include trade associations and licensing groups should establish policies that require their members to use automated Excel upload systems and self-reporting methods.

- Standardized product identifiers
- Structured reporting formats
- Transparent SKU–royalty mapping
- Multi-channel sales verification

The implementation of these systems would decrease accidental mistakes while blocking fraudulent activities, which would help maintain the permanent existence of licensing programs.

8. Limitations and Future Research

The research study contains the largest collection of SKU data that practitioners have created, and which has not before been studied by scientists.

8.1 Sampling Limitations

The collection of data through crowdsourcing and field verification does not ensure that all areas of the world will be fully covered. The analysis fails to include specific areas that have not adopted e-commerce technology and where customers face language access problems. The upcoming research needs to increase its participant base through the establishment of multilingual volunteer groups that span different regions and work with partner organizations.

8.2 Lack of Access to Proprietary Portals

The approval systems of licensor and licensee operated as private platforms that researchers could not access during this research project. The analysis of internal approval data against marketplace visibility would help confirm both royalty leakage and metadata problems.

8.3 Difficulty Identifying Counterfeits with Certainty

The counterfeit indicators show consistent results but some illegal products could remain undetectable because of their excellent imitation quality. The future development of counterfeit classification systems should include machine learning image analysis for enhanced performance.

8.4 Limited Royalty Data

The research team determined royalty discrepancies through SKU visibility patterns instead of using company financial records. Research studies should work with license providers who want to disclose protected audit information for developing precise methods to measure royalty loss.

8.5 Geofencing Simulation Constraints

The geofencing system in this research operates as a theoretical framework instead of an active functional system. The effectiveness of real-world

solutions requires organizations to connect their systems with market operations and establish legal systems that work with enforcement agencies. Future pilots should evaluate geofencing systems through testing that focuses on particular categories or specific geographic areas.

9. Conclusion

The research shows that the worldwide consumer products licensing industry needs better metadata systems because its current system fails to handle its large size, complicated operations and vital business value. The licensing value chain faces multiple system vulnerabilities because it lacks SKU-level identifiers, territorial enforcement mechanisms and integrated royalty tracking systems. The fragmented nature of metadata allows counterfeiters to enter the market while businesses lose their ability to track market performance, their territorial agreements become less effective, and their royalty payments become less accurate because they still use manual Excel reporting and self-attestation from licensees.

The practitioner–scholar dataset containing more than 40,000 SKUs delivers exceptional research data that reveals how digital commerce operations reveal existing structural problems in the industry. The current tools and systems that were created for markets that operated at a slower pace in localized areas fail to meet the needs of consumer retail that now operates through omnichannel platforms that connect globally. The research results demonstrate that organizations need to establish a single licensing intelligence system that should include standardized metadata, verified licensee registries and digital geofencing capabilities.

The research combines practitioner knowledge with existing studies about metadata governance, counterfeiting, territorial rights and royalty systems to provide both academic understanding and operational guidance. The licensing industry stands at a critical point where it needs to develop digital infrastructure or maintain its current system of disconnected manual processes that fail to monitor and safeguard billions of dollars.

A metadata revolution in licensing needs to happen because it represents a fundamental requirement for the present time. The future sustainability of global IP commerce depends on it. ■

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