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Cargo Theft as a Systemic Risk in Global Supply Chains: Data, Modus Operandi and Emerging Trends (2019-2025)

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Abstract:

Purpose: *The purpose of this paper is to analyse contemporary trends in cargo theft between 2019 and 2025 and to assess how these developments reflect broader transformations in the risk environment of international logistics. The study focuses on geographical distribution, dominant operational typologies and emerging criminal patterns, including the growing convergence between physical and cyber-enabled thefts. It further aims to highlight the implications of these changes for insurance and supply-chain risk management, viewing cargo theft as a systemic rather than isolated phenomenon.*
Design/Methodology/Approach: *The research is based on longitudinal and comparative analysis of multi-source datasets from the Transported Asset Protection Association (TAPA EMEA), TT Club & BSI, IUMI, and Munich Re. These institutional reports were complemented by academic and industry studies covering criminological and operational dimensions of cargo crime. Descriptive and interpretive methods were applied to identify key spatial and temporal trends, while cross-referencing allowed the verification of recurring modus operandi and their correlation with market and technological shifts. The study is limited primarily to road-freight incidents but incorporates selected examples from maritime and air transport to demonstrate cross-modal convergence.*
Findings: *Results confirm a steady increase in both the frequency and sophistication of cargo theft incidents during 2019-2025. Three persistent structural tendencies are identified: (1) the geographical concentration of theft along major transport corridors, (2) the persistence of facility-based incidents linked to insufficient parking security, and (3) the expansion of cyber-enabled and fraud-based operations. Quantitative data show that in-transit thefts remain dominant (41% of global incidents in 2024), while fraud-based thefts rose by over 80% year-on-year, overtaking facility-based cases. The most frequently stolen commodities include food and beverages (21%), electronics (10%) and agricultural goods (10%). The findings further indicate that post-pandemic logistics reconfiguration and digitalisation have shifted cargo theft from opportunistic to intelligence-driven forms.*
Practical Implications: *The study highlights the urgent need for integrated preventive frameworks combining physical security, digital verification and insurance-based risk governance. Key recommendations include expanding certified secure parking, adopting multi-factor carrier verification, improving loss-data harmonisation, and strengthening cooperation between logistics operators, insurers and law-enforcement agencies. The results*

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have direct relevance for risk assessment, underwriting and claims management in the cargo insurance sector.
Originality/Value: *This paper contributes original value by consolidating fragmented cargo theft data and interpreting them through an interdisciplinary analytical framework bridging criminology, logistics and insurance studies. It demonstrates that cargo theft serves as an indicator of systemic fragility in global trade rather than a peripheral criminal concern. The study provides both empirical evidence and conceptual insight, forming a basis for further research on risk transfer mechanisms and insurance responses.*

Keywords: *Cargo theft, logistics risk, supply-chain security, insurance, fraud, cyber-enabled crime, transport security, risk management.*

JEL codes: *L91, G22, R41.*

Paper type: *Research paper.*

1. Introduction

Cargo theft remains a persistent and costly threat to the security and efficiency of global supply chains. Although frequently underreported, its economic and operational impacts continue to grow, affecting manufacturers, logistics providers, insurers, and ultimately end consumers.

The increasing complexity of transport networks, the use of subcontractors, and the fragmentation of responsibilities across multimodal systems create multiple points of vulnerability that are systematically exploited by organised criminal groups.

At the regional level, data from the Transported Asset Protection Association (TAPA EMEA, 2023a) illustrate the scale of the problem across Europe, the Middle East and Africa. During the first nine months of 2023, 49,366 cargo theft incidents were recorded across 67 countries in the region. Only 4.4% of those reports included an indicated loss value, yet these alone amounted to over €550 million.

Monthly data confirm the upward trend, with July 2024 showing an increase of approximately 17.7% in the number of reported incidents compared with the previous record month (TAPA EMEA, 2024). On a global scale, more than 157,000 incidents were recorded between 2022 and 2024, generating estimated losses exceeding €2.7 billion (IUMI, 2025).

At the national level, a similar pattern has been observed. For example, in the United States, the number of reported cargo thefts increased by over 60% in 2024 compared with two years earlier, reflecting not only the growing sophistication of perpetrators but also wider economic pressures within the transport and logistics sector (TT Club, 2025).

These figures confirm that cargo theft represents a systemic risk rather than a series of isolated criminal events. It directly influences insurance exposure, operational costs, and the overall resilience of supply chains. In this context, the study aims to provide an evidence-based examination of cargo theft patterns between 2019 and 2025, with a focus on their geographical distribution, operational typologies, and implications for insurance and risk assessment in international logistics.

The research draws primarily on longitudinal data from industry sources such as TT Club & BSI, TAPA EMEA, IUMI and Munich Re, complemented by academic studies addressing spatial and criminological dimensions of cargo theft. Descriptive and comparative methods are applied to identify dominant trends and interpret their systemic drivers. Although the datasets analysed relate mainly to road-freight incidents, references to maritime and air transport are included where relevant to illustrate cross-modal convergence.

The novelty of this paper lies in the consolidation of multi-source cargo theft data and its analytical synthesis from both a logistical and insurance perspective. The research addresses three key questions:

1. What are the principal geographical and operational patterns of cargo theft between 2019 and 2025?
2. How have these patterns evolved in the post-pandemic and digitalised logistics environment?
3. What implications do these developments have for risk management and insurance practice?

By addressing these questions, the paper contributes to the theoretical and practical understanding of cargo theft as a systemic element of global supply-chain risk rather than a peripheral security concern.

2. Literature Review

Existing literature on cargo theft focuses on three main areas: (1) statistical trends and risk geography, (2) criminological approaches to modus operandi and offender networks, and (3) preventive frameworks including technological and organisational countermeasures.

Academic studies, such as Ekwall (2018), frame cargo theft within a supply-chain perspective, demonstrating how the use of violence and target selection are shaped by logistics structures and transport environments. Ekwall (2013) applies spatial and temporal analysis to European logistics networks, identifying recurring seasonality and the concentration of thefts along major corridors and at non-secure parking facilities. Complementary research by Aransiola *et al.* (2023) extends this perspective through a criminological lens, analysing the space–time dynamics of cargo theft in

São Paulo and illustrating how offender decision-making correlates with commodity flow intensity and enforcement gaps.
From a modelling and analytical standpoint, recent studies by Liang, Fan, Lucy and Yang (2024) employ a data-driven Bayesian network to assess cargo-theft risk across freight supply chains, identifying how variable interdependencies, such as route type, cargo value and driver behaviour, shape the probability of theft events. In a related contribution, Liang,

Fan and Yang (2025) propose a comprehensive preventive framework that integrates probabilistic risk modelling with organisational countermeasures, highlighting how predictive analytics can support decision-making in logistics operations. Together, these works contribute a methodological dimension to cargo theft research, moving beyond descriptive reporting toward quantitative risk assessment and prevention design.

Other applied studies, such as Urciuoli and Ekwall (2012) and TAPA EMEA (2023a), have examined preventive and organisational measures, focusing on technological solutions (including telematics and geo-fencing) and collaborative frameworks such as the TAPA Facility and Trucking Security Requirements (FSR/TSR).

These works suggest that effective mitigation requires multi-actor coordination, technological integration and standardised reporting mechanisms rather than isolated company-level responses. Recent industry analyses (TT Club & BSI, 2023; Munich Re & BSI, 2025; TAPA EMEA, 2024) provide quantitative evidence supporting these academic insights, indicating that cargo theft clusters spatially near unsecured parking sites and high-traffic corridors while increasingly incorporating elements of strategic fraud and cyber-enabled intrusion.

Nevertheless, research gaps remain: few comparative studies integrate post-pandemic data across multiple years, and limited attention has been given to the intersection of digital and physical theft typologies. The present study addresses these gaps through a longitudinal synthesis of available industry data and academic findings to capture the evolving nature of cargo theft and its implications for risk management and insurance practice.

3. Data and Methodology

The analysis presented in this paper is based primarily on secondary data drawn from recognised industry and institutional sources. The main datasets include annual and quarterly reports from the Transported Asset Protection Association EMEA (TAPA EMEA), TT Club and BSI, Munich Re, and the International Union of Marine Insurance (IUMI).

These sources provide the most comprehensive and up-to-date intelligence on cargo theft incidents between 2019 and 2025, including reported event counts, geographical distribution, and indicative loss values. Additional reference material has been incorporated from national and regional logistics associations, insurance bulletins, and law-enforcement summaries, where data consistency and reliability were deemed sufficient for comparative purposes.

The study adopts a longitudinal and descriptive approach. Data from multiple years are reviewed to identify directional trends rather than precise statistical changes, given the heterogeneity of available reporting systems. The analysis focuses on incident frequency, dominant modus operandi, and spatial concentration across key transport corridors and logistics nodes. Where comparable data were accessible, relative changes over time were calculated to illustrate overall dynamics within and across regions.

Several methodological limitations must be acknowledged. Cargo theft remains significantly underreported, and available statistics often rely on voluntary submissions from industry stakeholders rather than mandatory disclosures. Reporting criteria also vary between data providers, which complicates aggregation and cross-regional comparison.

Furthermore, valuation data are only available for a small proportion of recorded incidents, creating uncertainty in the estimation of total losses. These constraints limit the precision of quantitative conclusions but do not diminish the analytical value of identifying structural and temporal patterns.

Overall, the methodological framework aims to combine empirical evidence with interpretive analysis, linking descriptive data on theft incidents with qualitative insights from insurance and logistics practice. This mixed-source approach enables a holistic assessment of the scale, evolution, and implications of cargo theft within international supply chains. The principal data sources referenced throughout the analysis include TAPA EMEA (2023a, 2024), TT Club & BSI (2023), Munich Re & BSI (2025), and IUMI (2025).

Although the analysis considers all transport modes, it must be noted that the primary datasets (TAPA EMEA, TT Club, BSI) relate predominantly to road freight. Consequently, the quantitative findings refer mainly to the overland segment of supply chains, whereas examples from maritime and air transport are used for contextual illustration.

4. Research Results and Discussion

4.1 Regional Patterns of Cargo Theft

Cargo theft shows significant geographical variation, reflecting differences in transport infrastructure, regulatory enforcement, and economic pressures across regions. While the available data are fragmented, consistent regional tendencies can be observed from 2019 to 2025, with earlier TT Club & BSI reports already indicating a gradual upward trajectory across all major regions, particularly in EMEA and the Americas, well before the post-pandemic escalation. These longitudinal patterns highlight both spatial concentration and the progressive diversification of theft typologies.

Europe, the Middle East and Africa (EMEA) remain the most comprehensively documented region, largely due to the Transported Asset Protection Association's long-standing data collection framework (TAPA EMEA, 2023a; TAPA EMEA, 2024).

The majority of incidents are reported along major road corridors and logistics clusters in Western and Central Europe, including the Benelux countries, Germany, France, and Poland. Facility-based thefts, particularly from unsecured parking areas and distribution centres, remain the dominant category.

The persistence of this pattern suggests that crime prevention in the region is constrained more by the uneven implementation of security standards than by a lack of regulatory guidance. Eastern and Southern Europe continue to show lower absolute numbers of reported incidents, which may reflect underreporting rather than lower criminal activity (IUMI, 2025).

In the Americas, theft dynamics are shaped by a combination of high-value cargo flows and persistent socio-economic disparities. In North America, data from TT Club and its partners indicate a marked increase in fraudulent practices such as fictitious pick-ups and identity-based theft (TT Club, 2025). Similar findings are confirmed by CargoNet (2025), which recorded a steady rise in theft frequency across the United States during 2023–2024, with food, electronics, and household goods among the most targeted categories.

These forms of "strategic theft" have partly replaced traditional in-transit robberies, reflecting the growing role of information manipulation and digital access to freight data. In South America, particularly in Brazil, the theft of food, beverages, and consumer goods remains closely linked to organised networks operating along national highways (FreightWatch International, 2023). Here, the concentration of incidents around major urban centres mirrors structural inequalities in law enforcement and logistics security investment.

The Asia-Pacific region (APAC) presents a more heterogeneous landscape. Cargo crime is most visible in industrialised hubs with dense logistics activity, such as India, China, and parts of Southeast Asia (BSI, 2024). The diversity of reporting mechanisms complicates regional comparison, but recurring patterns include pilferage of electronics, pharmaceuticals, and automotive components.

In emerging economies, the prevalence of informal logistics and subcontracted carriers contributes to weak traceability and limited incident documentation. At the same time, several countries, most notably Singapore and Japan, maintain low incident levels, largely due to stringent customs controls and the integration of security certification schemes into national logistics policies (Munich Re, BSI, 2025).

In Africa, available data remain limited, but trend evidence points to increasing risk along trade corridors in South Africa, Kenya and Nigeria.

South Africa is consistently highlighted as the principal hotspot, with hijackings and warehouse burglaries targeting food, metals and automotive goods; methods include police-impersonation "blue-light" hijackings and deception-enabled interdictions. Data paucity and a high share of informal logistics constrain comparability and coordinated prevention (TT Club, 2025).

Although available datasets vary in granularity, cross-regional comparison suggests that cargo theft correlates strongly with three structural variables: the intensity of road transport flows, the density of logistics infrastructure, and the degree of regulatory coordination between law enforcement and industry. The observed disparities between regions therefore reflect not only criminal opportunity structures but also the uneven maturity of supply-chain governance systems.

These patterns underline the need for region-specific preventive strategies. In EMEA, further harmonisation of parking security standards remains a key challenge; in the Americas, mitigating fraud-based thefts requires stronger verification protocols and information security; while in Asia-Pacific, efforts should focus on data transparency and the professionalisation of informal logistics segments. Taken together, these tendencies illustrate that cargo theft is a global but geographically differentiated phenomenon shaped by regional transport structures as much as by criminal innovation.

The diversity of regional contexts complicates direct comparison. However, consistent thematic patterns emerge when incident types, targeted goods, and structural factors are examined together. A comparative synthesis of regional characteristics is presented in Table 1. These regional variations collectively confirm that cargo theft, while global in scope, remains highly context-dependent in its manifestation.

Table 1. *Comparative overview of regional cargo theft patterns (2019-2025)*

Region	Dominant Theft Types	Main Targeted Goods	Structural/Contextual Factors	Data Reliability
EMEA	Facility-based thefts, parking-lot incidents, pilferage from trucks	Food & beverages, consumer goods, electronics	High logistics density; uneven enforcement of parking and facility security standards	High (systematic TAPA EMEA reporting)

North America	Fraud-based and identity thefts (“strategic theft”), fictitious pick-ups	Electronics, household goods, food products	Digitalisation of freight data; fragmented carrier verification; organised crime adaptation	Medium-high (TT Club, CargoNet data)
South America	Armed in-transit thefts, facility attacks	Food, beverages, fast-moving consumer goods	High-value road corridors; socio-economic inequality; limited law enforcement capacity	Medium (FreightWatch data; underreporting likely)
Asia-Pacific	Pilferage, warehouse theft, internal collusion	Electronics, pharmaceuticals, auto parts	Informal logistics networks; subcontracting; variable national security frameworks	Medium-low (uneven reporting)

Source: *Author’s synthesis based on TAPA EMEA (2023a, 2023b, 2024); TT Club (2025); BSI (2024); FreightWatch (2023); CargoNet (2025); IUMI (2025); Munich Re & BSI (2025).*

The synthesis highlights that incident typologies and commodity profiles differ substantially across regions. While EMEA and North America show a gradual shift towards fraud-based and facility-related incidents, South America and parts of Asia-Pacific remain dominated by conventional in-transit thefts. Data quality also varies markedly, with systematic reporting available only in a few regions, reinforcing the methodological challenge of constructing consistent global comparisons.

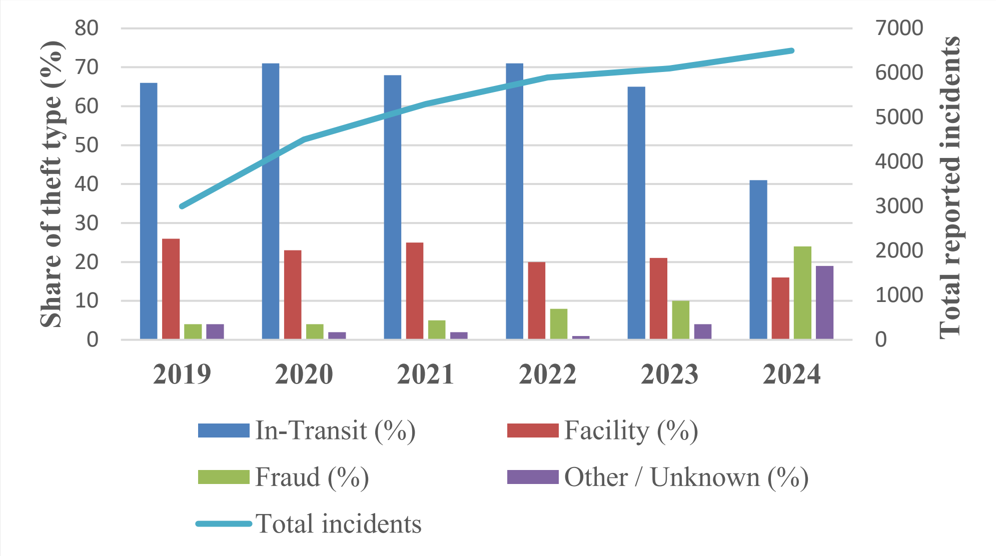
4.2 Typologies of Cargo Theft and Modus Operandi

Cargo theft demonstrates a wide spectrum of operational methods that evolve in parallel with logistics digitalisation and the diversification of transport modes. While the datasets analysed in this paper predominantly reflect road-freight incidents, similar criminal mechanisms have also been identified in maritime and air-cargo environments.

The period preceding the pandemic (2019-2020) was characterised mainly by conventional in-transit and facility-based thefts, whereas subsequent years saw the emergence of more complex, fraud-driven and hybrid methods. The following section outlines the principal modus operandi observed between 2019 and 2025, with selected examples illustrating their practical manifestations.

The figure below (Figure 1) visualises the evolution of cargo theft modalities during this period, combining the total number of reported incidents with the proportional distribution of theft types (data coverage up to 2024, as full-year 2025 data were not yet available at the time of writing).

Figure 1. *Global cargo theft trends and distribution by theft type, 2019-2024*



Source: *Author's synthesis based on TT Club & BSI Cargo Theft Reports 2019-2025; Munich Re & BSI, 2025; IUMI, 2025.*

As shown in Figure 1, the structure of cargo theft has become increasingly diversified. The relative dominance of in-transit thefts has gradually declined, while other categories, including fraud-based and hybrid incidents, have expanded, reflecting the growing intersection between physical and digital crime.

This diversification marks a turning point in the global risk landscape: traditional roadside attacks are now accompanied by data-driven fraud and multi-stage diversion schemes. Building on these general tendencies, data from consecutive TT Club & BSI reports provide a more detailed view of how theft modalities have evolved since 2022, illustrating both quantitative shifts and regional variations in operational methods.

According to consecutive TT Club & BSI cargo theft reports (2023–2025), the structure of theft modalities has shifted noticeably since 2022. In 2022, thefts occurring in-transit - that is, incidents taking place while goods are being transported by road, rail or sea, including hijackings and thefts from vehicles or containers - accounted for nearly 71% of all recorded events worldwide.

Facility-based thefts represented about 23%, with the remainder taking place in other settings such as ports and depots. By 2023, the share of thefts from facilities had fallen to 21%, and in 2024 further declined to 16%, while in-transit incidents remained dominant, comprising around 41% of global cases.

This continuing shift reflects the growing vulnerability of moving cargo and the expansion of digital coordination points within transport networks, which have become attractive targets for both physical and fraud-enabled attacks (TT Club & BSI 2023; TT Club 2025; Munich Re & BSI 2025).

The composition of stolen commodities has also remained relatively consistent, although minor shifts are visible across reporting years. Food and beverages have consistently represented the largest share of reported incidents, accounting for 21% of all recorded thefts in 2023 and 20 % in 2024, followed by electronics (10%), agricultural products (10%), fuels (8%) and metals (7%) (TT Club & BSI 2023; TT Club 2025).

These categories dominate partly because they are easily resold, move in high volumes through unsecured road corridors, and are difficult to trace once removed from packaging. In the EMEA region, TAPA EMEA (2024) additionally reports a notable increase in thefts of construction materials and vehicle components, reflecting shifting demand and price volatility in post-pandemic markets.

Comparative data from the 2023 and 2024 TT Club & BSI reports indicate a notable transformation in the composition of cargo theft types. Between these two years, fraud-based thefts - including fictitious pick-ups and identity deception - rose by more than 80%, becoming the fastest-growing category globally and surpassing facility-based thefts for the first time.

At the same time, thefts from facilities declined from 20% to 16%, while hijackings and vehicle thefts together accounted for over 40% of all incidents in 2024 (TT Club 2025; Munich Re & BSI 2025). This evolution demonstrates a shift from opportunistic physical attacks toward more coordinated, intelligence-driven operations, reflecting both the digitalisation of logistics and the adaptability of organised crime networks.

Facility-based thefts (including parking-lot incidents): These events involve break-ins at warehouses and distribution centres or thefts from trucks parked at unsecured rest areas. They remain among the most frequent types of cargo crime in Europe (TAPA EMEA, 2023a; Ekwall, 2013). Repeated attacks at the same motorway parking facilities indicate that offenders exploit predictable driver routines and insufficient site certification. A representative case occurred in the United Kingdom in 2024, where organised gangs systematically targeted lorries at motorway service areas, stealing electronics and consumer goods worth several million pounds (The Times, 2024).

In-transit armed robberies and road interdictions: These incidents typically occur in regions with limited policing of road corridors and high-value commodity flows. Offenders intercept vehicles in transit, often using weapons or coercion. Such events remain concentrated in South America, where thefts of food and beverages dominate (FreightWatch International, 2023). In 2023, a series of violent hijackings near São Paulo resulted in losses exceeding US $3 million and underscored the continuing risk of physical attacks on drivers.

Strategic frauds and fictitious pick-ups: This modus operandi involves the use of forged documentation, identity theft, or digital manipulation to obtain legitimate control of cargo. Criminals increasingly pose as carriers, brokers, or consignees. One widely reported case in 2024 concerned the theft of approximately US $1 million worth of tequila in California, where offenders posed as authorised freight contractors and diverted shipments to a false warehouse (People, 2024). Comparable identity-based fraud has also appeared in maritime trade, where cyber intrusions at European ports enabled unauthorised release of containers (The Maritime Executive, 2024).

Insider collusion and employee-enabled theft: The involvement of internal staff or subcontracted drivers provides offenders with privileged access to cargo information and timing. Such collusion is difficult to quantify, as cases often remain unreported or are classified as operational losses. Nonetheless, investigations at Hong Kong International Airport in 2022 revealed a coordinated warehouse theft ring involving ground-handling employees who removed high-value electronics over several months (South China Morning Post, 2022). Similar patterns are described in logistics and insurance reports (Cope *et al.,* 2023; Glowka, 2020).

Pilferage and low-value repeated thefts: Small, repeated thefts of easily portable goods - typically electronics or spare parts - constitute a substantial share of total cargo-related losses. Such incidents rarely appear in official datasets but cumulatively erode margins and disrupt supply continuity (Ekwall, 2015). In 2025, European logistics associations reported a marked increase in this category, especially in cross-docking operations where high shipment volume reduces control accuracy (Trans.INFO, 2025).

Cargo diversion and sophisticated interception (route manipulation): These cases combine elements of logistics fraud and digital compromise. Criminals reroute shipments by altering waybills, intercepting tracking data, or creating false delivery instructions. The 2024 investigation "Hackers, Crime Rings Team Up on Cargo Theft" described coordinated attacks in which hackers collaborated with physical theft crews to redirect loads in transit, particularly within the U.S. Midwest (TT News, 2024). In maritime logistics, similar tactics were used at the Port of Rotterdam, where cloned access codes allowed removal of full containers directly from terminals (The Maritime Executive, 2024).

Cyber-enabled theft and data compromise: The growing reliance on digital booking, tracking, and documentation platforms has created new vulnerabilities. Cyber-enabled theft involves unauthorised system access, phishing, or data manipulation to gain control of cargo flows. Notably, the 2023 Toronto Pearson Airport gold heist demonstrated the intersection of cyber and physical methods: counterfeit documentation generated via a compromised cargo-system account enabled the removal of gold valued at CA $20 million (CBC News, 2023). Such incidents illustrate how data breaches can directly translate into large-scale material losses (FreightWaves, 2025; Munich Re & BSI, 2025).

These examples confirm that cargo theft increasingly blurs the line between physical and digital crime. While road-based theft remains numerically dominant, similar operational logics now extend across maritime, air, and multimodal environments. Understanding these typologies is therefore essential for integrating supply-chain security, cyber-risk management, and insurance response frameworks.

Taken together, these findings demonstrate how cargo theft typologies evolve alongside market dynamics and technological change, underscoring the need for a multidimensional preventive framework. Table 2 summarises the main types of cargo theft discussed above, highlighting their defining characteristics, operational indicators, and regional prevalence across 2019-2025.

Table 2. *Modus operandi – comparative summary*

Modus Operandi	**Core Characteris-tics**	**Typical Targets/ Commodities**	**Key Operational Indicators**	**Primary Preventive Measures**	**Regional Prevalence (2019-2025)**
Facility-based thefts	Break-ins, thefts from parked trailers and warehouses	Food & beverages, consumer goods, electronics	Repeat incidents at same sites; night-time patterns; CCTV gaps	Certified facility security (TAPA FSR), guarded parking, access control	High in EMEA; medium in APAC; medium in Americas
In-transit armed robberies	Road interdiction, use of force or weapons	High-value, easily resold goods	Vehicle damage; driver injury reports; cluster along highways	Convoying for high-risk loads; route risk assessment; driver training	High in parts of South America; medium in some APAC corridors
Strategic frauds/ fictitious pick-ups	Identity theft, forged documents, falsified orders	Electronics, household goods, food	Mismatched PODs, irregular carrier credentials, unexpected releases	Robust carrier verification, two-factor pickup authorisation, document validation	Increasing in North America and EMEA
Insider collusion	Employees or subcontractors enabling theft	Variable; often same commodities as regionally common	Unexplained inventory discrepancies; patterns linked to staff rota	Vetting, rotation of duties, transactional audits, whistleblower channels	Ubiquitous but under-reported globally
Pilferage (small-scale)	Repeated small thefts	Small high-value items (electronics, parts)	Inventory shrinkage, small quantity losses over time	Tamper-evident packaging, random checks, sealed containers	Common across all regions; higher in informal logistics

Cargo diversion/ interception	Route manipulation, re-routing, fake stops	High-value consignment groups	Telemetry anomalies, unexpected waypoint changes	Secure telematics, geofencing alerts, pre-verified waypoints	Noted in digitised corridors in NA, EMEA
Cyber-enabled theft/data compromise	Hacking, phishing, system manipulation	Any cargo relying on digital booking/ tracking	Unauthorised access logs, changed consignee details	IT security integration, encryption, access controls	Growing concern in all regions with digital adoption

Source: *Author's synthesis based on Ekwall (2013); Ekwall (2015); Ekwall (2018); Aransiola et al. (2023); Urciuoli & Ekwall (2012); TAPA EMEA (2023, 2024); TT Club (2025); CargoNet (2025); FreightWatch (2023); WTW (2024); FreightWaves (2025); SDCEExec (2025).*

As shown in Table 2, the diversity of cargo theft typologies reflects both operational and systemic factors, linking individual incidents to broader patterns of vulnerability within supply chains. The subsequent section builds on this typological synthesis to examine regional dynamics and the evolving implications for risk management and insurance practice.

5. Conclusions, Proposals, Recommendations

The study confirms that cargo theft remains a global and evolving challenge that transcends regional, sectoral, and modal boundaries. Analysis of 2019-2025 data reveals a steady increase in both the frequency and sophistication of incidents, with the most pronounced growth in strategic and fraud-based thefts (TT Club & BSI, 2023; TAPA EMEA, 2024).

Three recurring structural tendencies are evident: the geographical concentration of thefts along major transport corridors, the persistence of facility-based crimes linked to insufficient parking security, and the expanding intersection between physical and cyber-enabled methods (IUMI, 2025; Munich Re & BSI, 2025). The findings confirm that the post-pandemic reconfiguration of logistics networks and accelerated digitalisation have significantly influenced this evolution, shifting the focus of criminal activity from purely physical interception to increasingly data-driven and fraud-based operations.

From a methodological perspective, the research was constrained by the heterogeneity and partial availability of data. Cargo theft reporting remains largely voluntary and uneven across regions, with detailed loss valuations available only for a minority of incidents. These limitations hinder strict quantitative comparability but do not diminish the relevance of longitudinal and qualitative insights derived from multi-source analysis.

The originality of this paper lies in consolidating fragmented datasets and interpreting them through an integrated analytical framework. Rather than reproducing existing reports, the study identifies cross-cutting mechanisms linking regional dynamics, operational typologies, and systemic vulnerabilities within international supply chains. This interdisciplinary perspective bridges criminological, logistical, and insurance-oriented approaches, offering a more holistic understanding of cargo theft as both a criminal phenomenon and a measure of resilience in global trade.

From an applied standpoint, the findings indicate that current preventive frameworks remain reactive rather than anticipatory. Efforts to standardise parking security, certification systems, and data-sharing protocols have progressed unevenly, often relying on voluntary adoption (BSI, 2024). Enhanced cooperation between shippers, carriers, insurers, and law-enforcement bodies is therefore essential.

The insurance dimension of cargo theft has become particularly significant. Complex modus operandi—including identity-based fraud, insider collusion, and cyber-enabled theft—blur the boundaries between insured perils, contractual breaches, and cybercrime (Allianz Commercial, 2024; WTW, 2024). This underscores the need for integrated policy wording, harmonised loss reporting, and closer data exchange between logistics operators and insurers to refine underwriting models and claims-handling practices (TT Club, 2025).

Effective mitigation will require combining technological investment with organisational and policy-level coordination. Recommended measures include:

- expanding the network of certified secure parking and access-controlled facilities across high-risk corridors (TAPA EMEA, 2023);
- implementing multi-factor carrier verification and digital identity management;
- using post-incident analytics to identify recurrent vulnerabilities; and
- integrating cargo-theft resilience metrics into insurance risk assessments (Munich Re & BSI, 2025).

In summary, this research contributes to the academic and professional understanding of cargo theft as a systemic risk rather than an isolated operational issue. It highlights the value of cross-sectoral data interpretation and provides a conceptual foundation for further inquiry.

Future research should focus on two areas: (1) the integration of cyber and physical loss databases to capture hybrid crime patterns; and (2) assessing how insurers translate evolving theft trends into risk modelling and policy structures.

Although the insurance dimension will be examined in greater depth in future research, the findings presented here already underscore its central role in shaping preventive strategies and in defining the future architecture of cargo-risk transfer within global supply chains.

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