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Toward a Multidimensional Framework for Identifying, Classifying, and Analyzing Hubs of Illicit Trade

RESEARCH

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ABSTRACT

Illicit trade hubs pose a significant challenge to global economic stability, security, and development, yet systematized knowledge in this area remains limited. This paper develops a multidimensional framework for identifying, classifying, and analyzing hubs of illicit trade. Drawing on a structured review of the interdisciplinary literature, the framework synthesizes existing definitions of illicit trade hubs, distinguishes their major types and enabling conditions, and integrates the analytical approaches used to study them. The paper situates this framework within the broader literature on illicit financial flows and illicit trade and moves the focus beyond commodity-specific analyses of illicit trade by enabling its comparative cross-sectoral study. The framework facilitates the systematic study of illicit trade agglomeration by capturing how hubs emerge, operate, interact, and evolve, and by examining their operational, relational, institutional, regulatory, and comparative dimensions. The paper concludes by identifying the main gaps that this framework helps to expose and by outlining directions for future research.

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INTRODUCTION

Globalization, increased population mobility, urbanization, and digitalization have propelled international trade. However, these trends have also led to the rapid expansion of illicit trade. Similar to licit economies, there is a growing concentration of illicit trade flows in specific trading hubs. As noted by Keefe (2013: 99), "in the same way Continental Airlines, Amazon.com, and United Parcel Service construct their delivery routes around a handful of critical hubs, black marketeers come to rely on some locations more than others." These locations are commonly described as hubs of illicit trade. However, researchers have also used a range of alternative terms, including "black market hubs" (Cochrane 2010); "illicit business hubs" (Idler 2021); "criminal hubs" (Keefe 2013); "geopolitical black holes" (Naím 2006); "black spots" (Brown & Hermann 2019); "hubs of deviant globalization" (Alvarez Calderón & Rodríguez Beltrán 2018); and "twilight zones" (Luke & Toal 1998), among others. All these locales provide enabling environments for actors engaged in various types of illicit trade, including drug trafficking, human trafficking, arms smuggling, counterfeit goods distribution, and wildlife trafficking.

In recent years, the risks associated with illicit trade hubs have been increasingly documented (see, for example, OECD 2016; TRACIT 2022). However, despite their significant impacts—on global economies, governance, and social structures—systematized knowledge in this area remains limited. While there is extensive literature on illicit trade, comparatively little attention has been paid to the specific phenomenon of illicit trade hubs. For instance, a preliminary search of scholarly articles mentioning "illicit trade" in their titles or abstracts, conducted on the ProQuest database for the period 2018–2023, yielded 653 results. In contrast, a similar search focusing specifically on hubs of illicit trade yielded only 11 results. Although incorporating the various synonymous terms used to describe illicit trade hubs would reduce this gap, it nonetheless points to the relative neglect of hubs as a distinct unit of analysis, and underscores the need for further exploration.

The majority of studies on illicit trade focus on specific commodities or activities, as reflected in the clustering of frequently co-occurring keywords in the literature. For example, a preliminary search using the Scopus database generated 1,339 articles, book chapters, and conference papers published between 2000 and 2023 in the fields of social sciences, economics, computer science, and environmental science. A connectivity analysis of co-occurring keywords in these sources (using a minimum threshold of ten occurrences) highlights key areas of focus, including drug trade, human trafficking, wildlife trafficking, illicit trade in tobacco products, and illicit logging (Figure 1). Colors represent three main thematic clusters: red—illicit trade and crime; blue—tobacco, commerce, and regulation; green—drugs, public health, and epidemiology. Among these 1,339 studies, only 21 sources also contained the term "hub" in their titles, keywords, or abstracts.

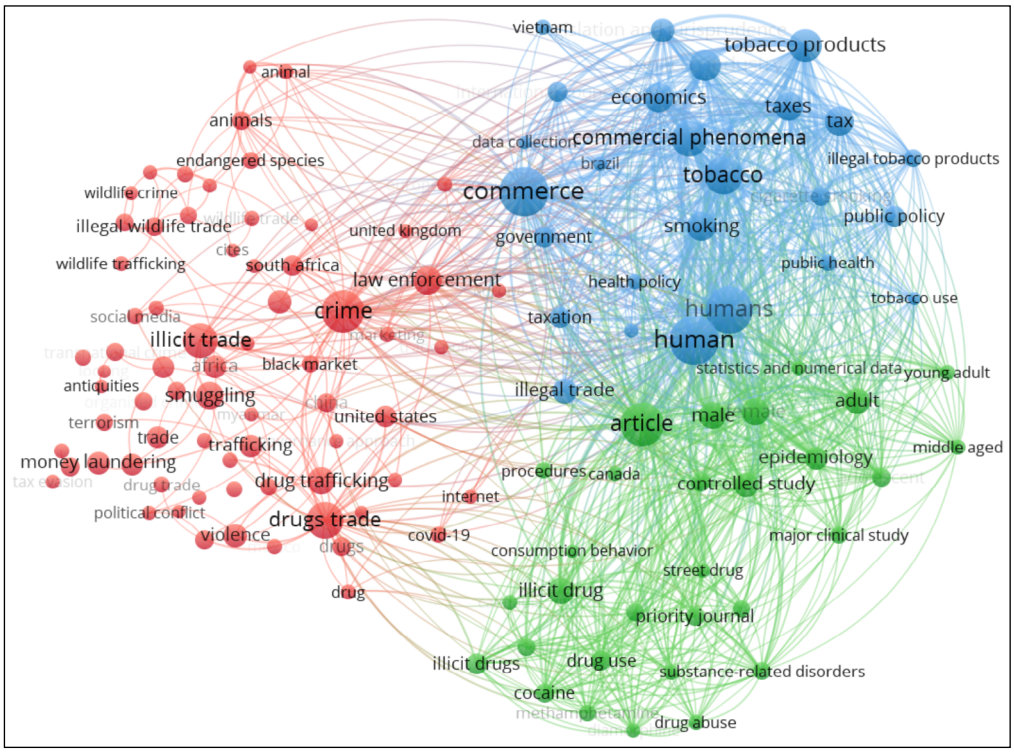


Figure 1 Connectivity among the most frequently co-occurring keywords in 1,339 sources containing illicit trade either in titles, abstracts, or keywords published in 2000–2023.

Source: Author based on search results from the Scopus database, covering articles, book chapters, and conference papers published between 2000 and 2023 across four fields: social sciences, economics, computer science, and environmental science.

The geographic coverage of the 21 sources identified in the preliminary search on hubs of illicit trade spans a diverse set of countries, including Brazil, Türkiye, Mexico, Pakistan, India, China, Malaysia, Honduras, and Myanmar, among others. Similar to licit economies, these hubs are often involved in the simultaneous exchange of multiple illicit products and services, which move along supply chains from production sites to final consumers, frequently passing through numerous intermediary hubs. However, despite the importance of mapping these hubs and conducting comparative analyses, the number of such studies remains very limited. At the same time, understanding the multifaceted nature of illicit trade hubs is essential for developing effective policies and interventions to mitigate their adverse economic, governance, and security impacts.

This fragmentation constitutes an important conceptual limitation. Although existing research has generated valuable insights into specific forms of illicit trade, less attention has been devoted to understanding how illicit activities agglomerate within particular geographical and virtual hubs. As a result, concepts, typologies, and analytical approaches relevant to illicit trade hubs remain dispersed across criminology, political economy, economic geography, and sector-specific studies. Drawing on a structured review of the interdisciplinary literature, this paper synthesizes these perspectives and develops a conceptual framework for analyzing illicit trade hubs. The framework integrates existing conceptualizations, typologies, and analytical approaches, while identifying key gaps in the literature and priorities for future research.

A METHODOLOGY NOTE

The framework presented in this paper was developed through a structured, three-step review of the literature: a general database search, an additional search through references, and analysis (Webster & Watson 2002). In the first stage, a general database search was conducted using Web of Science, Scopus, and Google Scholar to identify key studies on illicit trade hubs. As research on illicit trade hubs is interdisciplinary, the search covered four areas: social sciences, economics, environmental science, and computer science. To ensure broad coverage, potentially relevant sources included the following search terms in the title, abstract, or keywords: hub and illicit; hub and illegal. The titles and abstracts of the studies were then screened manually, and irrelevant studies were excluded, resulting in a sample of 180 sources.

At the second stage, a forward and backward reference search was conducted using Google Scholar (Webster & Watson 2002). This process identified and included an additional 52 sources from related areas of research. The final dataset comprises scholarly articles (142), academic books and book chapters (31), and grey literature, including conference papers/proceedings (10), dissertations and theses (26), and research reports (23). Most sources cover more than one type of illicit trade. Among studies focusing on a specific trade, the majority examine wildlife trafficking, illegal drug trade, human trafficking, counterfeiting, and other forms of intellectual property infringement (Figure 2).

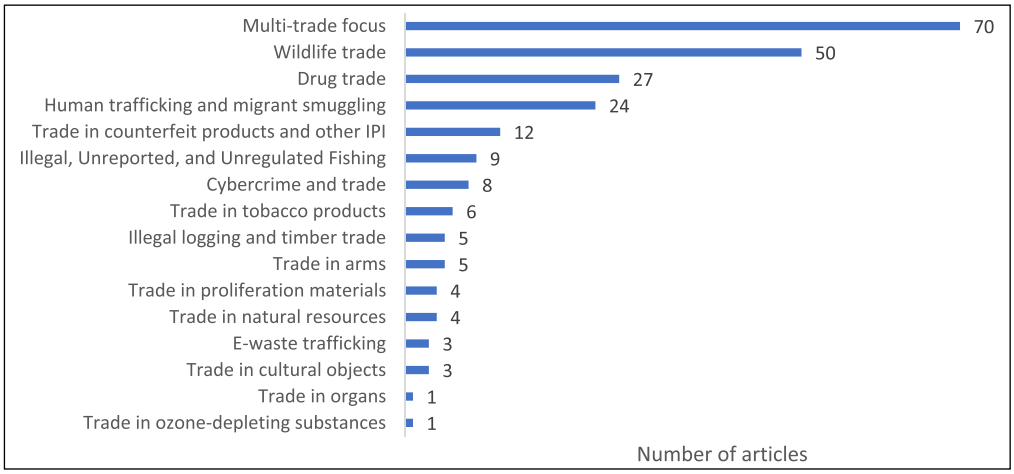


Figure 2 Number of articles focusing on specific illicit trades.

Source: Author.

The final stage of the review involved a qualitative thematic analysis of the selected literature organized around three areas of interest: definitions and conceptualizations of illicit trade hubs, typologies and functional classifications of hubs, and analytical approaches used in their study. The selected sources were reviewed using a structured coding protocol developed for this study to ensure consistency in the identification and classification of key themes, concepts, functions, spatial characteristics, and methodological approaches across the literature. Particular attention was given to areas of convergence and divergence in terminology, classifications, and explanatory frameworks across disciplines and illicit markets. The analysis also examined how different studies conceptualized the role of hubs within broader illicit trade networks and supply chains. NVivo was used to support thematic coding and qualitative categorization of the literature, while VOSviewer was employed for bibliometric mapping and visualization of keyword co-occurrence and thematic clusters.

This process has several limitations that are important for interpreting findings. First, the review is conceptually scoped to literature that explicitly frames illicit trade through the lens of "hubs." This design choice reflects the review's focus on the spatial concentration and agglomeration of illicit flows and enabling functions, analogous to hub-based perspectives in licit trade and supply-chain research. Restricting the search to the concept of "hubs" helps preserve conceptual coherence and maintain consistency between the research question, analytical framework, and literature reviewed. Although related terms such as "nodes," "corridors," "gateways," or "routes" appear in adjacent literatures, these concepts often refer to different analytical dimensions of illicit trade networks. Expanding the search to include all possible synonyms would have substantially broadened the scope of the review and risked incorporating highly heterogeneous bodies of literature not directly concerned with the conceptualization of illicit trade hubs. At the same time, this methodological choice may have resulted in the exclusion of some relevant studies that discuss similar phenomena using alternative terminology. Second, the review relied primarily on published academic and grey literature, which may reflect publication biases and uneven geographical or sectoral coverage. Certain illicit markets, such as drug trafficking, and major transit locations are substantially more studied than others, while emerging digital hubs, cryptocurrency-related infrastructures, and less visible regional markets remain underexplored.

This paper develops the framework in three interrelated stages. First, it establishes the framework's definitional foundations by examining how illicit trade hubs are conceptualized in the literature. Second, it develops a typology of illicit trade hubs based on their principal functions within illicit trade systems. Third, it integrates the main analytical approaches used to explain the emergence, evolution, and persistence of illicit trade hubs into a multidimensional comparative framework. Building on these components, the paper presents this framework as a common analytical structure for studying illicit trade hubs as a comparative unit of analysis across illicit markets, locations, and scales of operation. The concluding section identifies key gaps in the literature and outlines priorities for future research.

DEFINING HUBS OF ILLICIT TRADE

There is no single universally accepted definition of an illicit trade hub. Various research streams conceptualize them in different ways, focusing on particular units of analysis, ranging from localized hotspots (such as free trade zones and freeports) to broader country- and region-level analyses. Among lower-level hubs, researchers have examined a wide variety of units, including border crossing points, free trade zones, ports, mines, straits, areas controlled by terrorists, criminals, or insurgents, and even refugee camps.

Recent research on free trade zones and freeports provides insights into their illicit trading operations and enabling activities, such as trade-based money laundering, tax evasion, and counterfeiting (e.g., Economist Intelligence Unit 2018; OECD & EUIPO 2018; Moiseienko *et al.* 2020; Gilmour 2022; Stryszowski 2021; Diang *et al.* 2022). The term "free trade zones," also known as free zones and special economic zones, refers to physical locations with special customs regimes. In this sense, they represent "trading hubs that provide platforms … where businesses can enjoy several economic concessions" (Moiseienko *et al.* 2020). Free trade zones also serve as key transshipment and distribution hubs, with a high concentration of illicit logistics activity (e.g., Economist Intelligence Unit 2018). Freeports are warehouses within free

trade zones at major transit hubs, such as airports, railway hubs, and seaports that benefit from a special customs regime (Gilmour 2022). While free trade zones can specialize in production, transit, sales, and trade facilitation, freeports are primarily used as transit and illicit trade–enabling hubs. Studies of free zones and freeports show how actors seeking to expand illicit operations exploit structural vulnerabilities, including simplified inspection procedures, self-declaration practices, and regulatory arbitrage.

The Mapping Global Insecurity Project conducted at the Daniel Patrick Moynihan Institute of Global Affairs identified other hotspots "capable of breeding and exporting" a wide range of illicit goods and services, including drugs, conventional weapons, weapons of mass destruction, dual-use technology, people and human body parts, cultural objects, natural resources, wildlife, household goods, illicit financial flows, and strategic know-how (Brown & Hermann 2019). The project refers to these areas as black spots, defined as physical "areas governed by transnational criminal, terrorist, and insurgent organizations that are outside effective state-based government control and are sustained by illicit economic activities" (Brown & Hermann 2019: 1). Analysis of 80 such black spots indicates that most are located at the level of administrative regions or broader geographic areas within countries. Two-thirds of these areas perform multiple functions across production, transit, and distribution, while a smaller subset performs all three, effectively functioning as hubs of the global illicit economy. These hubs are further divided into two types: (1) black markets located in ports and free trade zones (mainly in Europe and Latin America) and (2) hubs operated by ethnic groups seeking autonomy (primarily in Africa and Asia).

Another mapping effort by the West Africa Observatory of the Global Initiative against Transnational Organized Crime conceptualizes hubs as crime zones, defined as "areas with a high concentration of various types of criminal activities and actors" (Bird & Tagziria 2022: 14). This broad category encompasses lower-level units such as hotspots and transit points. Hotspots are described as places with a strong presence of criminal actors engaged in multiple illicit markets, sometimes supported by political actors, while transit points refer to locations through which illicit commodities are trafficked, including border crossings, ports, airports, and trafficking corridors. This approach similarly emphasizes weak institutional capacity, fragmented governance, and social or political cleavages as key characteristics of higher-level illicit hubs.

Although this hierarchical approach distinguishing between hubs, hotspots, and transit points allows for a more nuanced understanding of illicit activity, overlaps between categories can complicate classification. For example, the ports of Bonny and Port Harcourt in Nigeria are categorized as hotspots, yet they also function as transit zones. Moreover, while political influence is highlighted as a key factor, this framing may understate the importance of economic inequality, social dynamics, and transnational linkages. It also tends to emphasize criminal actors while overlooking the role of legitimate firms in facilitating illicit trade.

An alternative approach offers a broader conceptualization, defining illicit trade hubs as "geographic areas with a high concentration of illicit flows of commodities and services and a strong presence of criminal actors, as well as a wide range of enablers (often from the legitimate economy) who support illicit transactions" (Krylova 2023; TraCCC 2023). The role of legitimate companies in illicit trade is well documented in prior research (e.g., Keefe 2013; Shelley 2017; Brown & Hermann 2019), with evidence indicating that many major hubs of the illicit global economy overlap with major hubs of legitimate trade (Keefe 2013: 103).

The complexity of global trade networks facilitates the blending of licit and illicit activities. Legitimate shipping companies, for instance, may unknowingly transport illicit goods due to the scale and velocity of global trade. As Brown and Hermann (2019: 40) note, Dubai exemplifies such dynamics, where the intermingling of licit and illicit activities is reinforced by extensive transportation networks. In this context, "piggybacking" refers to the use of legitimate trade channels to conceal and transport illicit goods by exploiting weaknesses in oversight and regulatory systems (Basu 2013).

The use of complex corporate structures, shell companies, and trade-based money laundering often involves legitimate businesses in obscuring illicit financial flows (e.g., Brown & Hermann 2019; Alonso & Van Uhm 2023). This is especially common in sectors such as real estate and luxury goods (D'Amato & Papadimitriou 2013; Boles 2017). Legitimate actors may also actively

facilitate regulatory evasion. For example, operators of free trade zones and port authorities with connections to illicit networks may resist reforms aimed at strengthening oversight (Storti *et al.* 2023).

Within global supply chains, firms may inadvertently or negligently facilitate illicit production and trade (Bisschop 2012; Cho *et al.* 2015). Evidence from the tropical timber trade highlights the legal–illegal interface across production, transit, and destination stages, with some firms knowingly cooperating with illicit actors and others failing to exercise due diligence (Bisschop 2012: 210). Similarly, studies of wildlife trafficking indicate that a significant proportion of actors involved are registered traders (Van Uhm & Moreto 2018). In addition, some goods have both legitimate and illicit uses, such as chemical precursors that can be used in pharmaceutical production or in the manufacture of illegal drugs (Anzoom *et al.* 2021). These dynamics underscore the need for stronger oversight of legitimate firms to prevent their incorporation into illicit supply chains.

Despite the absence of a universally accepted definition, a review of existing conceptualizations of illicit trade hubs reveals several common features: the concentration of illicit flows of goods and services in specific locations; the involvement of both criminal and legitimate actors; and the intermingling of licit and illicit supply chains. Examining classifications of illicit goods and services further helps clarify the range of activities concentrated at these hubs.

According to the World Economic Forum (WEF), illicit trade "involves the process of gaining money, goods, or value from illegal and generally unethical activity" (WEF 2012). This definition is intentionally broad and encompasses a wide spectrum of activities, but its reference to "generally unethical activity" introduces an element of subjectivity that may vary across legal and cultural contexts. Building on this definition, the World Customs Organization (WCO) defines illicit trade as encompassing a range of illegal trading activities, including environmental crime, human trafficking, illegal trade in natural resources, intellectual property infringements, trade in harmful substances, smuggling of excisable goods, drug trafficking, and illicit financial flows (WCO 2013: 2).

Existing classifications of illicit trade generally follow two main approaches: product-based and characteristic-based. Most academic studies and reports by international organizations, including the WCO, adopt the former by categorizing illicit trade according to specific goods or sectors. In contrast, alternative frameworks classify illicit trade based on the nature of regulatory violations. For example, Staake *et al.* (2009) identify four categories: (1) contraband trade, (2) illicit trade in controlled goods, (3) trade in stolen goods, and (4) intellectual property infringements, further subdivided into digital piracy, counterfeiting, illicit parallel imports, and patent violations. However, the inclusion of illicit parallel imports within categories related to intellectual property infringements may be ambiguous, as such practices can sometimes result from decisions or market structures shaped by intellectual property rights holders themselves.

Similarly, Beckert and Wehinger (2013) distinguish between prohibited goods, legal goods whose exchange is restricted, stolen goods (including counterfeiting), and violations of regulatory requirements along production chains. While analytically useful, combining stolen and counterfeit goods may obscure important differences between them. Theft followed by resale typically operates through localized and fragmented supply chains, whereas counterfeiting often involves large-scale, transnational production and distribution networks. Their impacts also differ: theft primarily harms individual victims, while counterfeiting has broader economic, social, and regulatory implications.

Addressing these distinctions, Anzoom *et al.* (2021) separate fencing and counterfeiting into distinct categories, alongside contraband and illicit imports. However, the category of contraband may remain conceptually broad, as it can include both prohibited goods and those subject to regulatory restrictions. In this respect, distinguishing between prohibited and regulated goods, as suggested by Beckert and Wehinger (2013), appears analytically sound. In addition, Anzoom *et al*. focus exclusively on physical and virtual products, leaving illicit services outside the scope of their classification. A more comprehensive framework would therefore incorporate both products and services, whether physical or digital, to better capture the full range of illicit economic activities associated with trade hubs (Table 1).

CATEGORY	DEFINITION	EXAMPLES OF PHYSICAL GOODS AND SERVICES	EXAMPLES OF DIGITAL GOODS AND SERVICES
Prohibited goods and services	Items and activities banned by law due to their harmful nature, potential for abuse, or ethical concerns	Illegal drugs, counterfeit currency, sexual exploitation, forced labor	Child sexual abuse material, DDoS-for-hire services, malicious applications
Regulated goods and services (including excise-regulated goods)	Items and activities legally controlled and monitored by government authorities to ensure safety, quality, and compliance with regulatory requirements	Industrial chemicals, guns and ammunition, cigarettes, alcohol	Illicit online healthcare services, illegal online gambling
Counterfeit or other intellectual property infringements	Goods replicated to imitate genuine products or distributed without proper authorization or payment of applicable rights or taxes	Pharmaceuticals and medical devices, textiles, fashion and luxury goods, food, toys	Digital piracy, unauthorized distribution of movies, music, and other media; modified software distributed without authorization
Stolen goods	Items unlawfully obtained through theft, burglary, robbery, or other criminal activities	Stolen cars, car parts, jewelry, mobile phones	Sale of stolen activation keys, credit card information, social security numbers, or other sensitive data

Table 1 Physical and virtual goods and services traded in hubs of illicit trade.

Source: Author.

Importantly, the licit or illicit status of certain goods often depends on their geographical location and movement within the supply chain. For example, heroin (diamorphine) can be legally prescribed in the United Kingdom for severe pain management in specific medical conditions such as cancer. Cannabis is legal in countries such as Canada and Uruguay but remains prohibited in others, including Japan and Singapore. Similarly, cannabis that is legally produced and sold in one U.S. state may become illegal if transported across state lines into a state where its use is prohibited. Tobacco products are generally legal to produce and consume; however, smuggling cigarettes from low-tax jurisdictions into high-tax markets constitutes an illegal activity. Likewise, some medications available over the counter in one country may require a prescription in another or may be entirely prohibited without special authorization. Cultural artifacts provide another example. In countries such as Egypt, Iraq, and Greece, the export of certain antiquities is heavily regulated or prohibited to prevent looting and preserve cultural heritage. As a result, artifacts may be legally owned and traded domestically but become illegal once smuggled abroad and sold without authorization. These examples illustrate the difficulty of drawing a clear distinction between licit and illicit activities across different national and regulatory contexts. Consequently, some scholars (e.g., Hall 2013: 372; Maihold 2022: 55) conceptualize licit and illicit activities as part of a continuum that encompasses both legal and criminal practices and "spans the licit/illicit spectrum."

TYPES OF ILLICIT TRADE HUBS

Hubs of illicit trade can take different forms depending on their functions, locations, and specializations. Understanding these variations is essential for developing effective strategies to disrupt illicit networks. The most common classification in product- and service-based studies distinguishes between source, transit, and consumption (or destination) hubs; however, many hubs do not fit neatly into a single category (OECD 2016: 31). For example, Mexico is a significant producer of illicit drugs such as methamphetamine, marijuana, and heroin, while also serving as a major transit country for drugs entering the United States through multiple smuggling routes across the U.S.–Mexico border, and simultaneously maintaining a growing domestic market (e.g., Brouwer *et al.* 2006).

Beyond production, transit, and consumption roles, some researchers identify a distinct category of illicit trade–enabling hubs (Gilmour 2022; Krylova 2023). These hubs specialize in facilitating illicit activities through logistics and transport services, offshore business structures, financial systems, cryptocurrency exchanges, and informal money transfer networks. Subcategories include logistical hubs (Keefe 2013) and money-laundering hubs (Gilmour 2022). Some

locations, such as Dubai and Panama, perform multiple enabling functions, combining both logistics and financial intermediation (Krylova 2023). Figure 3 summarizes the definitions and key characteristics of the main types of illicit trade hubs.

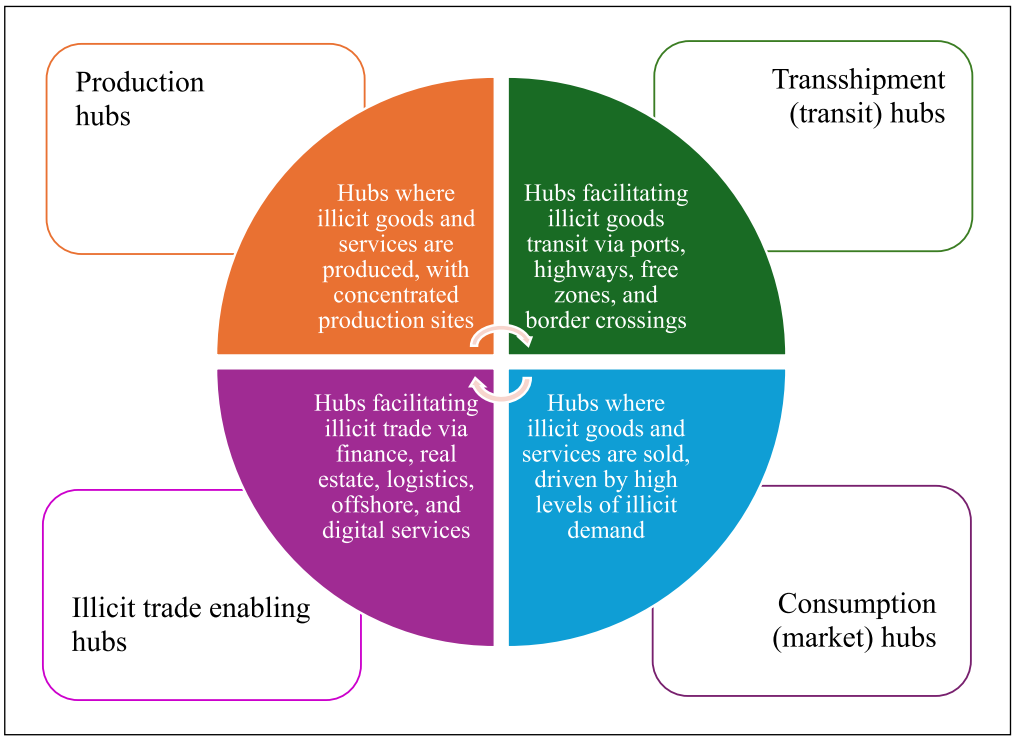


Figure 3 Types of illicit trade hubs based on their major functions.

Source: Author.

Since most illicit goods are consumed outside their production locations, cross-border smuggling (whether domestic or transnational) represents a critical component of illicit supply chains. Movement across jurisdictions often marks a shift in the licit or illicit status of goods as they travel from one hub to another. The role of smuggling in facilitating these flows is well documented (see, for example, Aguiar 2013; Basu 2013; Shelley 2014; Idler 2021). Smuggling involves the illegal transportation of raw materials, goods, or people across borders, bypassing formal regulatory and legal frameworks to evade taxes, tariffs, and other restrictions. It enables prohibited or restricted goods to reach consumption hubs where demand exists, often without effective oversight by regulatory authorities. In doing so, smuggling also circumvents trade restrictions, sanctions, and embargoes imposed by governments or international organizations. This is particularly relevant in contexts of economic sanctions, where smuggling can serve as a mechanism for accessing otherwise restricted goods (Strategic Trade Research Institute 2023). As Basu (2013: 321) defines it, smuggling is "the clandestine conveyance of goods and services from one jurisdiction to another," encompassing both the movement of prohibited goods and the evasion of customs duties and taxes.

Smugglers may participate in illicit supply chains at multiple stages, including early phases, where they facilitate the movement of raw materials from suppliers to manufacturers located in production hubs (depicted by dotted arrows in Figure 4). For example, gold used in electronics, aerospace, and jewelry manufacturing is often extracted in conflict-affected regions and trafficked to finance armed groups (Krylova 2023). Another example includes chlorofluorocarbons (CFCs), banned substances still used in refrigeration and air-conditioning systems (Liu *et al.* 2016). Smugglers also play a role at later stages by enabling the clandestine transport of manufactured goods to distributors and retailers. As illustrated by a check-marked arrow in Figure 4, some direct-to-retailer smuggling routes bypass traditional distribution networks, complicating efforts by authorities to detect and intercept illicit goods. For instance, illegally manufactured firearms may be transported directly to retailers who sell weapons without proper licensing or background checks (Squires 2021).

Building on Basu (2013: 323), smugglers can be categorized into three primary roles: international smugglers responsible for cross-border transportation, stash managers overseeing storage and warehousing, and transport runners distributing goods within domestic markets. However, illicit trade involves a broader set of interconnected roles beyond smuggling itself. These include logisticians managing procurement, aggregation, transportation, financing, and

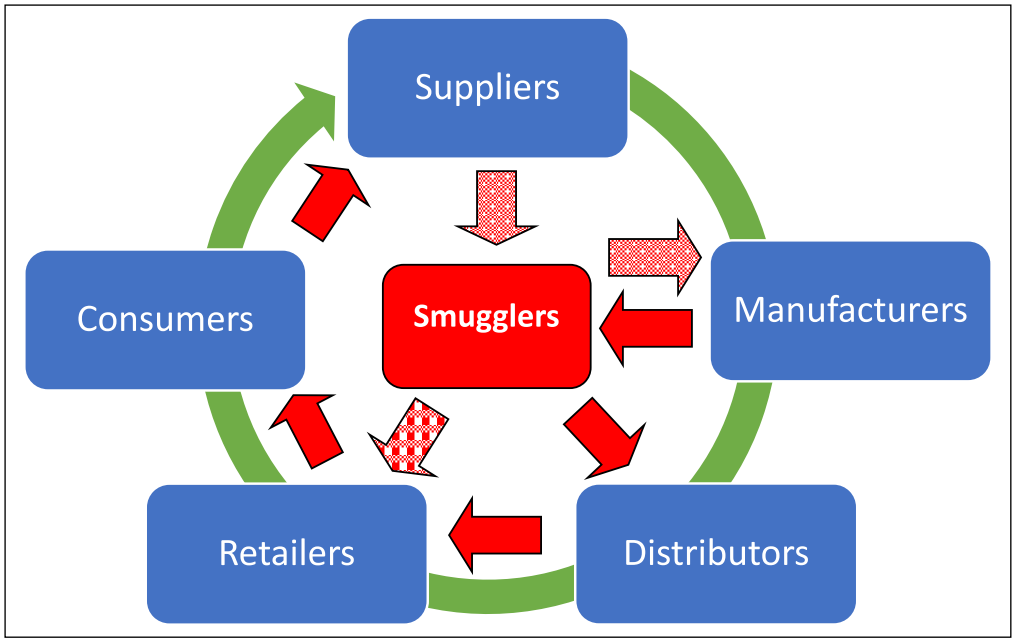


Figure 4 Role of smugglers in illicit supply chains.

Source: Author.

trade planning; specialists adept at evading detection and securing access; collusive actors within state institutions facilitating illicit flows; unwitting third parties providing logistical or financial support; processors transforming goods; and launderers integrating illicit proceeds into legal supply chains (Maihold 2022: 59). These actors and functions frequently converge within illicit trade–enabling hubs.

Illicit trade hubs can also be distinguished based on their physical or virtual locations, reflecting the diverse environments in which illicit activities occur (Table 2). Physical hubs include countries, regional clusters, and cities characterized by extensive underground economies, as well as specific hotspots such as free trade zones, ports, border crossings, and urban neighborhoods. In parallel, virtual hubs operate in cyberspace, contributing to what has been described as the emergence of "bad neighborhoods" online (Brown & Hermann 2019: 170). Dark web marketplaces (encrypted platforms not indexed by conventional search engines) function as interconnected sales hubs for a wide range of illicit goods and services, including drugs, weapons, stolen goods, counterfeit currency, fraudulent identification documents, and financial data (e.g., credit and debit card information) (Office of the U.S. Trade Representative 2023). Beyond marketplaces, virtual hubs include underground forums, hacking collectives, and botnet operators engaged in illicit trade (Brown & Hermann 2019). Cryptocurrency exchanges also play a role by facilitating transactions; while primarily used for legitimate purposes, they can be exploited by illicit actors to enable anonymous or difficult-to-trace financial flows (Krylova 2023: 22). Together, these physical and virtual hubs illustrate the evolving and interconnected nature of illicit trade ecosystems.

TYPE OF HUB	GEOGRAPHIC OR OPERATIONAL FORM	EXAMPLES
Physical hubs	Countries or regional clusters	Production, transit, or distribution hubs spanning one or more countries
	Cities	Cities with extensive illicit markets or underground economies
	Transport and logistics nodes	Ports, airports, border crossings, and major transport corridors
	Special economic areas	Free-trade zones and special economic zones vulnerable to illicit activity
Virtual hubs	Surface-web platforms	Online marketplaces, social media, and messaging applications
	Dark-web platforms	Darknet marketplaces and specialized forums
	Digital financial infrastructure	Cryptocurrency exchanges, mixers, wallets, and payment services facilitating illicit transactions

Table 2 Types of illicit trade hubs by geographic or operational form.

Source: Author.

Virtual hubs enable illicit trade actors to operate across borders without requiring a physical presence. However, research shows that dark web marketplaces are not purely virtual; rather, they exhibit sophisticated organizational structures and remain closely connected to physical hubs in several important ways. First, as noted by Brown and Hermann (2019), the infrastructure supporting online criminal activity relies on Internet Service Providers located in physical jurisdictions, sometimes referred to as "cybercriminal havens." For example, the Russian Business Network (RBN) in Saint Petersburg and McColo Corporation in San Jose have both been identified as providers of server infrastructure to illicit actors (Brown & Hermann 2019: 158). Second, virtual marketplaces trading in physical commodities (such as drugs, ammunition, or weapons) remain embedded in physical supply chains. These markets depend on production hubs as well as postal and logistics systems to deliver goods to end users. As highlighted in a RAND Corporation study, "recent research suggests that cryptomarket users identify these 'offline' activities of dark web transactions as the primary source of risk of detection and apprehension by law enforcement" (Persi Paoli *et al.* 2017: 21).

Illicit supply chains operating through virtual marketplaces demonstrate a high degree of resilience and adaptability. In response to enforcement actions and market shutdowns, these networks can rapidly reorganize and shift to alternative platforms. This feature is also characteristic of physical illicit trade hubs, where disruptions in one location frequently result in the relocation or displacement of illicit activities to alternative hubs, thereby maintaining the continuity of operations despite enforcement pressures. This phenomenon is consistent with the "balloon effect" identified in the organized crime and illicit market literature, whereby suppression efforts in one jurisdiction displace criminal activities geographically rather than eradicate them (e.g., Mora 1996; Friesendorf 2005; Guerette & Aziani 2022).

FROM STAND-ALONE ANALYSES OF ILLICIT TRADE HUBS TO A MULTIDIMENSIONAL COMPARATIVE FRAMEWORK

Existing studies have generated valuable insights into particular illicit markets, trafficking routes, criminal networks, regulatory environments, and social impacts. However, as discussed earlier, research on illicit trade hubs has largely evolved through separate analytical traditions. Sector-specific studies focus on particular illicit markets and supply chains, identifying production, transit, consumption, and enabling hubs associated with specific commodities and services. Network-based approaches examine relationships among actors and organizations, emphasizing patterns of connectivity, centrality, and brokerage within illicit systems. Other studies focus on regulatory and institutional environments, exploring how governance arrangements, enforcement capacities, and legal frameworks shape the emergence and operation of hubs. A further stream of research assesses the economic, social, environmental, and security impacts of illicit trade, often relying on risk assessments, composite indicators, and other comparative tools. While each of these approaches generates valuable insights, they typically examine only one aspect of illicit trade hubs and are often applied within specific sectors or geographical contexts. As a result, opportunities for systematic comparison across different forms of illicit trade agglomeration at the hub level remain limited.

Building on the preceding review, the diverse approaches to studying illicit trade hubs can be organized within a multidimensional comparative framework consisting of five interrelated dimensions: operational, relational, institutional, regulatory, and comparative. Together, these dimensions capture the roles that hubs perform within illicit trade systems (operational), their position within broader networks (relational), factors and conditions that enable their emergence (institutional), the policy consequences and risks they generate (regulatory), and the ways in which they can be systematically compared across all dimensions, different illicit markets, locations, and scales of operation (cross-cutting comparative). By integrating perspectives that have often been examined separately, the framework provides a common analytical structure for comparative analyses of illicit trade hubs. The framework is summarized in Figure 5.

As depicted in Figure 5, the operational dimension focuses on the roles performed by hubs within illicit trade systems, including production, transit, consumption, and enabling functions, drawing on sector-specific analysis and supply chain mapping. The relational dimension examines how hubs are connected to other actors and locations through networks and supply chains, typically using network analysis. The institutional dimension emphasizes the socioeconomic

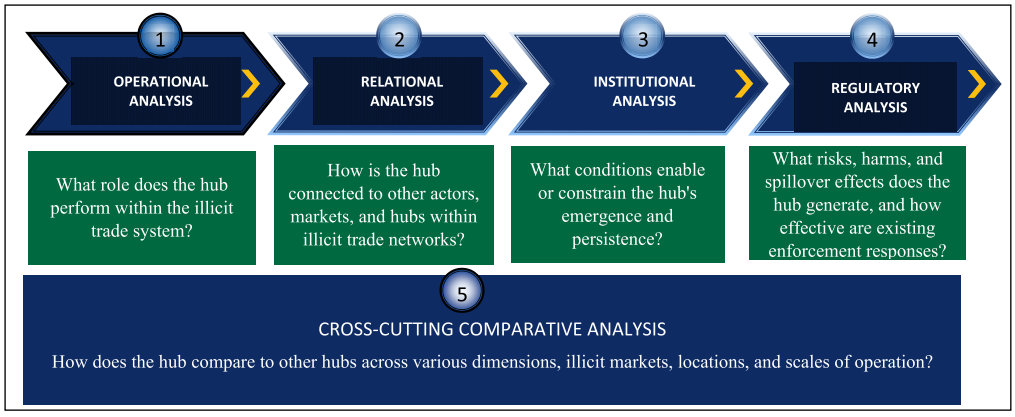


Figure 5 Multidimensional Framework for Analyzing Hubs of Illicit Trade.

Source: Author.

and political conditions that facilitate or constrain the emergence of illicit trade hubs, drawing on policy and institutional analysis. The regulatory dimension assesses the economic, social, environmental, and security consequences associated with illicit trade hubs, as well as the effectiveness of regulatory and enforcement responses in mitigating them, through impact and risk assessment. Together, these dimensions provide a foundation for the cross-cutting comparative analysis, which seeks to integrate evidence across multiple perspectives and enable systematic comparisons among hubs operating in different illicit markets, geographical settings, and scales of operation, drawing on composite indicators and comparative studies.

Comparative approaches to illicit trade hubs frequently rely on composite methods that integrate multiple data sources to generate a more comprehensive view of hub dynamics. Such methods enable the triangulation of findings and facilitate comparisons across locations and illicit markets. One example is the Global Organized Crime Index, which assesses the scale and reach of illicit markets across 193 United Nations member states (GI-TOC 2023). The index assigns criminality scores based on the monetary and non-monetary impacts of different illicit markets and draws on open-source research, multiple rounds of expert assessment, and regional validation processes. While this approach enables cross-country comparison, it remains subject to limitations, including potential bias in expert assessments, uneven data availability, and differing interpretations across contexts.

Comparative studies also employ risk-based approaches to assess the relative significance and vulnerability of illicit trade hubs. For example, multidimensional assessments have been applied to locations such as the Tri-Border Area in South America; Panama, Belize, and Guatemala in Central America; Dubai; and Ukraine. These have combined indicators of governance quality, illicit trade vulnerability, and financial secrecy to classify hubs along a continuum of risk (Krylova 2024). Such approaches provide a more holistic understanding of hub characteristics but also face challenges associated with integrating diverse indicators and capturing interactions among different dimensions of illicit trade.

Another example is the Illicit Economies and Instability Monitor (IEIM), which examines the relationship between illicit markets and instability across 280 hubs in West Africa (Bird & Tagziria 2022). By combining information on illicit activities and security conditions, the IEIM illustrates how multidimensional approaches can reveal patterns that may not be visible through single-sector analyses alone. At the same time, it highlights continuing methodological challenges related to data reliability, complexity, and the adaptive nature of illicit activities.

More broadly, the comparative analysis remains one of the least developed areas in the study of illicit trade hubs. Although existing studies provide valuable foundations, further methodological innovation is needed to support systematic comparison across different forms of illicit trade agglomeration, geographical settings, and levels of analysis. Such efforts are essential for moving beyond stand-alone studies toward a more integrated understanding of how illicit trade hubs emerge, operate, interact, and evolve at the hub level.

CONCLUSION

Despite the growing body of research on illicit trade hubs, the literature remains fragmented across commodities, sectors, disciplines, and geographical contexts. Existing studies have generated valuable insights into specific illicit markets, criminal networks, trafficking routes,

regulatory environments, and the impacts of illicit trade. However, these strands of research have often evolved independently, limiting opportunities for systematic comparison across different forms of illicit trade. This paper sought to address this limitation by bringing together existing conceptualizations, typologies, and analytical approaches into a multidimensional comparative framework for analyzing illicit trade hubs.

Building on the literature, the paper proposed a framework organized around five interrelated dimensions: operational, relational, institutional, regulatory, and comparative analyses. Together, these dimensions provide a common analytical structure for examining the roles that hubs perform within illicit trade systems, their position within broader networks, the institutional and regulatory conditions that enable their emergence and persistence, the consequences they generate, and the ways in which they can be compared across different illicit markets, locations, and scales of operation. By integrating perspectives that have often been studied separately, the framework shifts attention from stand-alone, commodity-specific analyses toward a more systematic and comparative understanding of illicit trade hubs.

The framework also highlights the diversity of illicit trade hubs and the need to analyze them across multiple levels. Hubs range from localized hotspots, such as free trade zones, ports, and border crossings, to cities, countries, and regional clusters characterized by broader concentrations of illicit activity. They can perform different functions, occupy different positions within networks, and operate under diverse governance environments. In this respect, comparative perspectives help identify common patterns that transcend individual illicit markets while also recognizing important differences among hubs.

At the same time, there are a number of challenges for future research. A major constraint remains the limited availability of reliable data on illicit activities, which complicates efforts to assess the scale, dynamics, and impacts of illicit trade. The clandestine nature of these activities makes them inherently difficult to observe and measure, particularly when evaluating spillover effects that extend beyond individual hubs. These challenges are especially evident in assessing environmental harms, illicit financial flows, and other transnational impacts that cross political and geographic boundaries.

The framework also points to several areas in which further comparative research is needed. While some illicit markets, such as drug trafficking, wildlife trafficking, and human trafficking, have received substantial scholarly attention, emerging forms of illicit trade linked to digital technologies remain less developed. The growth of virtual and hybrid physical–virtual hubs raises new questions about the role of online marketplaces, cryptocurrencies, encrypted communications, and digital platforms in facilitating illicit trade. Understanding how these technologies reshape hub dynamics is likely to become an increasingly important area of research.

More broadly, illicit trade hubs should be understood as dynamic rather than static phenomena. They evolve in response to enforcement pressures, technological change, market demand, and geopolitical developments. Hubs may change functions, relocate geographically, or adapt through new forms of organization while continuing to perform similar roles within broader illicit trade systems. Understanding these processes requires analytical approaches capable of examining interactions among hubs and tracing changes across diverse operational environments. Future research could expand the framework by systematically comparing alternative conceptualizations of hubs across adjacent literatures, incorporating broader sets of search terms, and exploring the growing role of digital infrastructures, online platforms, and hybrid physical–virtual hubs in facilitating illicit trade.

In this context, future research would benefit from developing more robust comparative measures of hub characteristics, improving the integration of data across the different dimensions of the framework, and strengthening analysis of relationships among interconnected hubs. By providing a common structure for identifying, classifying, and comparing illicit trade hubs, the multidimensional framework proposed in this paper offers a foundation for more systematic research on the geography, dynamics, and governance of illicit trade in an increasingly interconnected world.

COMPETING INTERESTS

The author has no competing interests to declare.

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