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## Conference Paper

# A Literature-Based Qualitative Framework for Assessment of Socio-Economic Negative Impacts of Common Illicit Cross-border Freight Logistics Flows

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# A Literature-Based Qualitative Framework for Assessment of Socio-Economic Negative Impacts of Common Illicit Cross-border Freight Logistics Flows

Juha Hintsa and Sangeeta Mohanty

## **Abstract**

Global supply chains and freight logistics systems are commonly exploited in trafficking activities: for example cocaine may be shipped from Colombia to the Netherlands concealed in ocean liner structures while stolen cultural products may be hidden inside an air container, shipped for example by express courier from Egypt to Italy. In order to design effective and efficient governmental policies and corresponding regulations, enforcement priorities, inspection schemes and other countermeasures, one needs a clear picture of such common illicit flows - such an integrated research paper does not exist today.

The objective of this paper is to capture and summarize some of the key characteristics, in particular socio-economic negative impacts, of following six common trafficking flows: trafficking in cocaine and heroin; counterfeit products; ozone depleting substances; firearms; stolen cultural products; and endangered species. The negative socio-economic impacts in this paper fall ultimately into following six categories: Increasing health care and social security costs; Increasing environmental damages; Increasing human suffering; Increasing market place distortions and/or unfair competition; Losses in tax revenues regarding indirect border taxes; and Losses in cultural heritage. The main outcome of this paper is an integrated matrix derived from both practitioner and academic literature to map the socio-economic negative impact –categories per

each illicit flow-type. Finally, this qualitative paper suggests several quantitative research (sub-)topics for the future.

**Keywords:** trafficking, illicit trade, socio-economic impacts, FP7-CASSANDRA

## 1. Introduction

Freight logistics systems, a crucial layer of global trade and supply chains, are exploited for a variety of illicit activities, in particular for trafficking of prohibited and restricted goods. These imply heavy costs to several public institutions, including but not limited to the law enforcement bodies such as customs and police. In general terms, the socio-economic impacts of these illicit trade streams are many, while crucial information on them is dispersed across extant literature. This fragmented knowledge risks producing disjointed responses to the aforementioned crime category. A systematic compiling of this vital information would enhance a holistic understanding of the vicious acts, their linkages and societal implications. Thus the intent of our paper is to present a high level assessment of the various negative socio-impacts of the select cross-border illicit flows for the benefit of regulatory bodies, law enforcement agencies, supply chain practitioners, and academics alike.

We focus on six commonly occurring illegal trade flows, derived from the literature (see e.g. Männistö et al. 2014, Hintsu et al. 2012, Hintsu 2011, Hintsu et al. 2011). These flows are: Trafficking in cocaine and heroin; counterfeit products; ozone depleting substances; firearms; stolen cultural products; and endangered species.

## 2. Socio-economic impact assessment in the context of illicit activities

Socio-economic impact assessment (SEIA) is commonly considered as a yardstick for measuring the direct and indirect potential impacts of a proposed

development activity on social, economic and environmental welfare (Mackenzie 2007, pp. 6-7). It aims for a qualitative and quantitative analysis of the proposed development project or policy initiative, helping to optimize social and economic welfare, address social equity concerns and devise mitigation strategies against negative impacts (Tamborra 2002). However, in the context of illegal activities such as organized crime, SEIAs have been conducted to facilitate an evidence-based understanding of the related issues and to develop appropriate mitigation strategies (EP 2013, pp. 8- 11). In other words, SEIAs are used first to understand the situation as-is, with all the current negative socio-economic impacts of specific illicit activities; and afterwards the SEIA-outcomes may be used e.g. to facilitate work to enhance the criminal code.

On global scale, there have been a few socio-economic assessment reports on the illicit narcotics industry, paying particular attention to consequences on employment and productivity, inflation, income distribution, trade and balance of payments, finance and investment, family and community, poverty, public health, education, environment, corruption and other threats to civil society (UPDCP 1995 & UNDCP 1995b).

On European scale, an exploratory study has been carried out by the European Parliament in the year 2013. It focuses on the dynamics of the distribution and existence of various forms of organized crime, and provides a structured, analytical framework of the costs of organized crime as well as baseline estimates of the social and economic costs associated with these criminal rackets. The existing discrepancies across the EU in data collection approaches and data matching in the private and the public sectors, the priorities in practice by enforcement and other relevant agencies, the nature of the exposure of each Member State (MS) to different crime risks (with some MSs as points of origin and some as points of destination), varying legal systems and practices etc., made cross-comparisons and policy guidance quite difficult. Nevertheless broad estimates of the damage costs of several categories of organized crime in the EU have been provided in this report. These include human trafficking, cigarette smuggling, VAT fraud, fraud with agricultural and structural funds, fraud against

EU individuals, motor vehicle theft, payment card fraud and insurance fraud (EP 2013, pp. 8- 11). The study draws important distinctions between the direct harm caused by the activities themselves and the “criminal economies of scale”, where perpetrators exploit existing crime and social networks and existing technology. It deepens our understanding of the social and economic impacts of the crimes that are linked to the victim’s resources, and the nature and patterns of various forms of organized crime (EP 2013).

On national level, the UK undertook an extensive study aimed at an increased understanding of the scale and social and economic costs of some organized crime types. Illegal activities like theft, organized child sexual exploitation, counterfeit currency, drugs supply, organized environmental crime, firearms supply, organized fraud, organized immigration crime, organized intellectual property (IP) crime and organized wildlife crime, fall within its scope. The costs estimated are based on damages done within the UK only (Mills et al. 2013).

Regarding our paper, we consider the socio-economic impact assessment (SEIA) literature - in particular when in "illicit context" - as important reference information for us. In the next section of this paper, our intention is to identify a maximum number of instances of negative socio-economic impacts, in our research context of "six common illicit cross-border freight logistics flows".

### **3. Literature-based analysis of six common illicit cross-border freight logistics flows**

The purpose of this section is to review key literature - both practitioner and academic - in problem characteristics, market volumes and values, logistics routes etc.; and eventually the negative impacts of six common illicit cross-border freight logistics flows. The six illicit flows have been chosen by the study authors, based on previous work conducted by them (note: this list of six flows is not meant to be exhaustive, and it can and should be expanded in future research). In each of the sub-section below, the socio-economic impacts per illicit flow - paragraph comes as the last one.

### **3.1 Trafficking in illicit narcotics: cocaine and heroin**

Heroin and cocaine represent the largest share in the global illicit narcotics markets. According to experts, global drug use in terms of the number of drug dependent users or drug use disorders, has remained more or less stable during the past years (UNODC 2013, p. ix). Global estimates on the total amounts of cocaine manufactured range from 776 to 1,051 tons in 2011, expressed in quantities of 100% pure cocaine (UNODC 2013, p.x). The Andean region, including Colombia, Peru and Bolivia are the main suppliers. The annual market volume consumed in Europe is around 124 tons worth a value of 34 billion USD (UNODC 2010, p. 95). The chief entry points into Europe are Spain and Portugal, while the Balkan routes are increasingly being used for trafficking into South-East Europe (Europol 2011, p. 9). Trafficking mostly occurs via maritime routes and to a lesser extent by air traffic and postal services (UNODC 2010, p.96, Frontex 2012, p. 29). Heroin consumption in Western and Central Europe has been showing a declining trend but its use has been growing in parts of Asia and Africa (UNODC 2013, p.x & p.32). The annual flows into the global market are assessed to be between 430-450 tons. Afghanistan is the chief source followed by Myanmar and Laos (UNODC 2010, p.9). Europe appears to be the main market for Afghan heroin (UNODC 2010, p. 111). Around 87 tons are consumed on an annual basis mostly in Western and central Europe (UNODC 2010, p. 120). The annual consumption in Western Europe alone is worth approximately 20 billion USD (UNODC 2010, p. 110). Heroin is mostly trafficked into the EU via the Eastern Mediterranean route, at the Turkish borders (Frontex 2012, p. 28). However recent years have witnessed a remarkable proliferation of new, emerging routes such as the Black Sea and the Balkan routes (Europol 2011, p. 8). The bulk of the heroin flow enters Europe by sea and air, while the Balkan routes rely primarily on road transportation (UNODC 2010, p.120).

Socio-economic impacts: Drug addiction has consequences for public health and safety, employment and productivity, environment, criminal activities and other dangers for civil society. Cocaine, heroin and other opiates are strongly associated with drug-related deaths and the spread of blood-borne and sexually

transmitted diseases like AIDS and Hepatitis C, through needle sharing (less in cocaine) and prostitution, increasing healthcare costs (UNDCP 1995, pp. 31-33 & UNODC 2010, p. 109). Driving under the influence of drugs is a common cause of road accidents and resultant injuries and deaths. Drug abuse is linked to unemployment, destroying human capital and creating economic burdens to society. Drug addicts in the workforce have low rates of productivity and create significant costs to the business sectors, reducing the competitiveness (UNDCP 1995, pp. 16-17). School children will often have impaired psychological and social development which decreases their potential and future employment opportunities (UNDCP 1995, p. 35). Narcotics production has been known to cause inflation in countries like Afghanistan and Bolivia, where the cost of food articles rose due to increased narcotic cultivation (UNDCP 1995, p.25). It has profound effects on ecosystems: coca and opium poppy plantations are associated with massive deforestation, disappearance of rainforests (applies mainly for cocaine), soil erosion, improper disposal of toxic wastes, overuse of chemicals, overuse of land and so forth (UNDCP 1995, pp. 36-37). Moreover, drug users raise their likelihood of engaging in criminal activities like petty theft or burglary, in order to finance their addiction. A report on heroin addicts revealed some 90 percent to have resorted to shoplifting or burglary to finance their drug purchases (UNDCP 1995, p. 37). Further, the illicit drug industry frequently incites serious violence. A notable example is Colombia, where narcotics trade has been associated with a vast number of killings (UNDCP 1995, p. 38). Finally, drug trafficking has destabilizing effects on the economy. The “drugs-for-arms” trade, refers to the vicious circle where drug businesses financially support warlords and militants, who in turn are directly involved in drug trafficking. These activities have deleterious consequences on governance, security and the authority of the state (Ward and Byrd 2004, p.36).

### **3.2 Trafficking in counterfeit products**

Counterfeit products constitute a breach of Intellectual Property Rights (IPR). It refers to “contraband activities which are a form of theft and involve the illegal

production and sale of goods which are intended to pass for the real product” (FIA 2001, p.10). The problem of counterfeiting has escalated with the development of a free global market and the recent trend of outsourcing manufacturing activities to developing countries offering cheaper labor force but with weaker regulatory regimes, thus creating opportunities for unwarranted production (UNODC 2010, p. 173). Electronic products are one of the most common classes of counterfeited goods, while apparel - clothing, accessories and shoes - remains the most dominant category of counterfeits (UNODC 2010, pp. 173). Recent years have witnessed a surge in counterfeit pharmaceutical medicines and lifestyle drugs (Europol 2011, pp. 27-28). The International Chamber of Commerce (ICC) frequently cites counterfeiting to account for 5-7% of world trade that translates into 600 billion USD per year, whereas the Organization for Economic Cooperation and Development (OECD) estimated the value of counterfeit and pirated goods at 176 billion USD in 2007, accounting for 2% of the world trade in goods (UNODC 2010, p. 173). China is the main country of provenance for counterfeit products finding their way into the EU, particularly in the context of cigarettes, clothes, shoes, toys and pharmaceuticals. While sea is the main conveyance for larger volumes of imports, smaller consignments are being sent via air and by post (UNODC 2010, 179). The annual market volume entering the EU from East Asia has been roughly estimated as two billion articles per year, worth about 8.2 billion USD at destination (SANGEEETA16, p.175).

Socio-economic impacts: The negative impacts of counterfeiting are many. Counterfeit manufacturing directly hurts licit businesses as they suffer from IPR infringements. For example, the WHO estimates the annual losses to the pharmaceutical sector at 45 million EUR (UNICRI 2012, p. 34). Legitimate companies also tend to accrue losses through reputational damage as consumers unsuspectingly buy duplicate low quality products assuming them to be the bona fides (OECD 2007, p.18). As lawful businesses lose competitiveness, they cut down on retail and manufacturing jobs, ultimately leading to loss of innovation and reducing employment (Europol 2013, p.1). Counterfeit products put public health in jeopardy. Spurious drugs have reduced



therapeutic value, cause patients to develop microbial resistance, or even lead to deaths through a complete therapeutic failure (UNICRI 2010, pp. 27-28 & 184). Other fake commodities like cigarettes, cigarette lighters, mobile phones, batteries, toys, and clothing may contain toxic substances and other elements endangering human health. Counterfeit alcoholic drinks are known to have caused several deaths in Europe and beyond. (UNODC 2010, p. 173 & Europol 2013, p.2). Counterfeit production has been associated with serious labor rights violations, negligence of workplace safety, environmentally unsound practices, illegal labor and underpayment (UNODC 2010, p.174 & UNODC 2010, p. 176). This unscrupulous practice implies fiscal losses to the state as legitimate companies experience a reduction in sales, and fake commodities undermine the tax base by evading customs duties and sales tax / VAT through smuggling and informal retailing (UNODC 2010, p.176, UNICRI 2012, p.35). Other indirect losses to the states and governments may arise from this illegitimate activity. The presence of counterfeits can be a deterrent to foreign investors. Further, legitimate companies may raise the price of drugs to offset their losses, implying additional economic burden to national health services (UNICRI 2012, pp. 34-35). Law enforcement authorities face logistical challenges from the increasing volumes of seized counterfeit goods, in terms of storage capacities and disposal which can be a technically complex and costly operation. Finally, counterfeit businesses can contribute to political unrest as the illicit profits fuel other criminal networks like terrorist organizations (OECD 2007, p. 15).

### **3.3 Trafficking in ozone depleting substances**

Ozone depleting substances (ODS) primarily include chlorofluorocarbons (CFCs), hydrochlorofluorocarbons (HCFCs) and halons, which are used for various purposes like refrigeration, air-conditioning, fire-fighting and crop protection (UNODC 2012, p.115). They are one of the worst pollutants linked to soil, water and air contamination, the most worrying possibly being the thinning of the ozone layer. The public concern over this alarming phenomenon led to the establishment of the Montreal Protocol on substances that deplete the ozone

layer, in 1987. Several controls were put in place in the EU and the USA on the production and trade of these harmful chemicals (UNEP 2011, p. 3). Despite all efforts the controlling mechanisms appear to be easily circumvented and the illicit trade of ODS continues to thrive (UNEP 2011, p.3).

Socio-economic impacts: Illicit imports and use of ODS lead to a series of problems. The thinning of the ozone layer results in increased ultra-violet (UV) radiation reaching the earth surface. Stronger UV rays harm human health by attacking the immune, respiratory and digestive systems. They cause significant damage to eyes and raise the risk of skin cancer. Marine ecosystems are destroyed when increased UV radiation reduces the productivity of small organisms like plankton that form the basis of the marine food chain. Strong solar UV radiation impacts agriculture and forest ecosystems. It destroys crops leading to a reduction in plant yield and also damages trees. Thus, illegal imports of ODS pose multiple challenges and problems to public health, environment, agriculture and food security (UNODC 2012, pp. 114- 115).

### **3.4 Trafficking in small arms and light weapons**

Small arms and light weapons (SALW) refer to the category of weapons that can be operated and transferred by single persons, as opposed to “heavy weapons”. Small arms include revolvers, self-loading pistols, rifles and carbines, sub-machine guns, assault rifles, and light machine-guns. Light weapons consist of heavy machine-guns, grenade launchers, small mortars, mobile anti-aircraft and anti-tank guns, mobile rocket launchers, shoulder-fired anti-aircraft missile launchers, and mortars of calibers under 100 mm (Council of the EU 2006, p.4).The illicit SALW circulation exploits mainly the maritime and land freight modes rather than the air freight, most likely since surface transport is marked by fewer detection mechanisms and is less costly. Experts estimate around 639 million SALW to be in circulation around the globe, produced in 90 countries with 1500 companies involved in the SALW trade. The illicit SALW market is estimated at 1 billion USD (Council of the EU 2006, p. 4).

Socio-economic impacts: It is estimated that SALW are exploited in 500,000 killings each year, including 300,000 in armed conflicts. Since 1990 SALW has cost the lives of approximately 4 million people globally, and have forced over 18 million people to leave their homes and countries (Council of the EU 2006, pp.2-3). SALW related violence keeps robbing communities of scarce public health and natural resources, and impedes opportunities for investment and rebuilding after conflict (Council of the EU 2006, p. 4 & p.10). In conflict ridden areas access to education for children is limited and other economic opportunities are reduced, exacerbating poverty for millions of families. Children are often abducted to serve as child soldiers (Council of the EU 2006 2006, p. 4). Many rebel groups in possession of illegally obtained SALW are frequently involved in other illicit trade to fund their operations (Council of the EU 2006, p. 10). Violent conflicts cause internal displacement contributing to the spread of diseases like malaria, tuberculosis, AIDS etc., putting pressure on medical resources (Council of the EU 2006, p. 14). The proliferation of illicit SALW is undeniably an immense threat to global security, peace, stability, global health and economic development.

### **3.5 Trafficking in stolen cultural property**

This criminal activity is fuelled by the demand from the art market, the opening of borders, the improvement in transport infrastructures and the existing political instability in certain countries. The regions particularly affected by this criminal activity are Europe, Latin America, Middle East, North and Sub-Saharan Africa and South-East Asia. The most common targets are private homes, museums and places of worship. The types of objects stolen greatly vary from country to country but generally speaking, paintings, sculptures, statues and religious items are some of the most coveted artefacts. Quantifying the value of trafficking in cultural property is not an easy matter due to the clandestine nature of this activity and where illegal items are often mixed with legal ones, making it difficult to distinguish between legitimate and illegitimate trade.

Socio-economic impacts: Apart from economic damage, the most obvious impact of stealing and trafficking cultural property is a loss of cultural heritage, stripping

a country of its memory, history and identity. Looting and pillaging become rampant in times of war and crises, such as recently in Iraq, Egypt, Mali and Syria. Private owners can experience a great sense of sorrow and loss of cultural identities and values. Illegal excavations pose a threat to future archaeological research of the sites by ruining the scientific and historical context of the single finds. Lastly, criminals rackets engaged in this illicit trade are frequently connected to other forms of organized crime, backing other illegal operations.

### **3.6 Trafficking in endangered species: wildlife and timber**

Trafficking in endangered species- particularly in wildlife and timber- ranks among the most profitable illicit businesses across the globe. Weak regulatory capacity, political conflicts, corruption and extensive poverty in source countries along with lucrative foreign markets and the abnormally high profit margins are large contributors to the overall problem (UNODC 2010, p. 152). The low risk of detection and weak penalties for perpetrators do not successfully thwart these criminal operators (IFAW 2013, p. 5).

The scale of poaching activities has reached unprecedented heights and three large wildlife species - elephants, rhinos and tigers - face the most immediate threat of extinction. These mammal species are mainly hunted for their skins, bones, horns and other body parts for medicinal, decor, household use and other purposes. (UNODC 2010, p. 153). Sub-Saharan Africa and South-East Asia are the principal source regions of illicit wildlife products, including elephant ivory, rhino horn and tiger parts, whereas China, the USA and the EU are the largest consumers (Haken 2011, p. 12). The annual value of ivory entering the global market is estimated at 100 million USD. A kilogram of raw ivory could fetch about 850 USD. The price of one kilogram of powdered rhino horn can reach almost 30,000 USD. Tiger parts also carry exorbitant prices with skins selling for as much as 20,000 USD and a kilogram of bones fetching up to 1,200 USD.

For timber, trafficking from South-East Asia to the EU and other parts of Asia represents one of the largest illicit flows (UNODC n.d., p.2). The annual value of the illegally felled timber passing through this route was estimated at 3.5 billion

USD, with an annual market volume of 10 million cubic meters. The primary source is Indonesia and the government claims to be losing 4 billion USD annually due to this unlawful activity. The use of fraudulent documents – either forged or bought from corrupt officials in source countries - is the most common means to facilitate smuggling timber across borders.

Socio-economic impacts - wildlife: Apart from causing undue suffering to animals, wildlife trafficking is associated with a multitude of problems. The most visible impact is the potential threat of extinction. There are now an estimated 3,200 tigers, 50,000 elephants and 16,000 rhinos surviving in the wild (UNODC 2010, p.55 & Haken J. 2011, p. 11). The annihilation of animal species causes major losses to the global ecosystem and biodiversity. The loss of exotic wildlife hurts the tourism industry of source regions, including hotel, restaurant and rental businesses. A smaller inflow of tourists also means less air traffic implying losses to the airline industry. National parks incur significant economic losses through poaching activities in their premises as in the case of Namibia. For destination countries cross-border wildlife trade poses threats to public health where illicit flows prevent national health authorities from investigating the health risks posed by some animal species (Haken J. 2011, pp. 13-14). Profits accrued from wildlife trafficking are used to fund militant operations, fuelling civil conflicts in politically unstable states. (Lawson and Vines 2014, pp. 8-9 & Haken J. 2011, p. 14). This has serious implications for national and global security. Illicit wildlife trade puts human lives at stake and presents perils to communities surrounding wildlife habitats. Criminals terrorize and exploit people in rural communities, lure poachers and exacerbate corruption in enforcement offices and are responsible for killing many park rangers (IFAW 2013, p.10). Further, illegal wildlife trade has linkages with other forms of organized crime, including drug trafficking and money laundering. Drugs get smuggled within wildlife consignments and wildlife products are bartered for drugs or weapons. Highly sophisticated money-laundering tools are used by wildlife traffickers to camouflage their activities (IFAW 2013, pp. 14-16).

Socio-economic impacts - illicit timber. Similarly, the illegal trade of timber has deleterious consequences. First and foremost, it is linked to massive deforestation. The most heavily impacted region is South-East Asia that provides habitat for rare animal species. Lost forest cover can wipe out animal species in incredibly short time spans, destroying entire ecosystems (UNODC 2010, p. 163). Soil erosion, increased risk of landslides and floods, accelerated global warming caused by higher carbon stock, are other environmental repercussions. Extensive timber operations by powerful interest groups have been largely responsible for displacing communities from their ancestral lands, leading to loss of livelihood and aggravating poverty (UNODC 2010, p.166). Moreover, local inhabitants are plainly exploited by illegal logging companies who make massive profits from the timber acquired from them at throwaway prices. Like many other organized crime types, illicit revenues from timber trafficking contribute to funding insurgent groups, aggravating political instability (Haken J. 2011, p.42). Finally, the practice of illegal logging and trade in timber without the payment of duties and taxes drives down world market prices of timber. As market prices fall, other loggers are tempted to follow the same practice. The global market losses are estimated to be around 10 billion USD and governments losses 5 billion USD in revenues, per annum.

#### **4. Summarizing the socio-economic negative impacts of the various illicit flows**

Building on the findings from the previous section, the purpose of this section is to summarize the negative socio-economic impacts of the various illicit flows, starting with following two perspectives:

- 1. Negative impacts at the destination country / region (Table 1)
- 2. Negative impacts at the source country / region (Table 2)

Both of these tables have now seven illicit flows, instead of the original six, as endangered species has been split to wildlife and timber, due to the differences in the socio-economic impacts between the two.

After these two tables, as the last step of summarizing our findings in previous section of this paper, an integrated matrix is presented to map the negative socio-economic impact categories per illicit flow type.

Below in Figure 1 is the mapping between the socio-economic negative (SEN) impact -categories against each illicit flow type, combining the findings from origin and destination countries / regions, as presented separately in tables 1 and 2 above.

Illicit flow	Negative socio-economic impacts at the destination
Trafficking in cocaine and heroin	Impacts public health, employment, productivity, drives up social welfare costs, triggers criminal activities and violence, fuels other organized crime types.
Trafficking in counterfeit products	Hurts licit businesses, loss of tax revenue, impacts public health, deters foreign investment, puts pressure on healthcare services, puts pressure on law enforcement authorities (storage and disposal).
Trafficking in ozone depleting substances	Environmental damage, climate change, impact on human health, impact on agriculture and food security.
Trafficking in firearms	Widespread killing, robbing of natural resources, impedes investment and rebuilding, deters education, worsens poverty, impacts public health through spread of diseases.
Trafficking in stolen cultural products	na
Trafficking in wildlife	Threats to public health through spread of animal-borne diseases, fuels other organized crime types and fraud.
Trafficking in timber	Losses in tax revenues, environmental damage

Tab. 1: Negative socio-economic impacts at the destination country / region



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Illicit flow	Negative socio-economic impacts at the origin
Trafficking in cocaine and heroin	Human suffering, environmental damage, causes inflation (some cases), incites violence, fuels other organized crime types and political stability.
Trafficking in counterfeit products	Hurts licit businesses, violates labor rights, causes environmental damage.
Trafficking in ozone depleting substances	Environmental damage, climate change, impact on human health, impact on agriculture and food security.
Trafficking in firearms	na
Trafficking in stolen cultural products	Loss of national cultural heritage, economic loss to state, damage and destruction through looting and pillaging, sorrow and economic loss to private owners, threatens archaeological research.
Trafficking in wildlife	Animal cruelty, ecosystem and biodiversity loss, feeds corruption, impedes economic growth (losses to tourism and aviation sector), creates unemployment, losses to national parks, fuels other crime types and fraud, causes exploitation of local communities and triggers violence (e.g. killing park rangers).

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Illicit flow	Negative socio-economic impacts at the origin
Trafficking in timber	Environmental damage (landslides, floods, soil erosion, global warming), threatens survival of animal species, exploitation of local communities, loss of livelihood, fuels other organized crime types, contributes to political instability.

Tab. 2: Negative socio-economic impacts at the origin country / region

In total there are six categories of SEN, presented as columns in the matrix, first explained in the list below:

- SEN1: Losses in tax revenues regarding indirect border taxes
- SEN2: Increasing health care and social security costs
- SEN3: Increasing market place distortions and/or unfair competition
- SEN4: Increasing environmental damages
- SEN5: Increasing human suffering
- SEN6: Losses in cultural heritage

Type of illicit cross-border flow	SEN1	SEN2	SEN3	SEN4	SEN5	SEN6	Notes
Trafficking in cocaine and heroin		YES		YES	YES		na
Trafficking in counterfeit products	YES	YES*	YES	YES*	YES*		*Note1
Trafficking in ozone depleting substances		YES		YES*	YES		*Note2
Trafficking in firearms		YES			YES		na
Trafficking in stolen cultural products						YES*	*Note3
Trafficking in wildlife		YES*	YES*	YES			*Note4
Trafficking in timber	YES		YES	YES			na

Fig. 1: Integrated matrix mapping the socio-economic negative (SEN) impact - categories against each illicit flow type

The four pieces of notes, as indicated on the rightmost column of the matrix above, are explained next:

- Note1: With counterfeit products one may face five of the six categories of negative socio-economic impacts (excluding SEN6, losses in cultural heritage), depending on the product type; counterfeit pharmaceutical products being an extreme example.
- Note2: Trafficking in ozone depleting substances may have negative impacts for the future agriculture and food production.
- Note3: Next to the loss of actual cultural products, this illicit flow may disturb / threaten archeological research activities.
- Note4: May lead to increasing unemployment rates in the tourism sector at the origin countries, as less tourists travel there to see the wildlife.

Lastly, following four aspects were excluded purposefully from this summary matrix:

- 1. One could consider that each illicit flow may lead to losses in tax revenues regarding indirect border taxes, while consumers ultimately purchasing these illicit products have then less money to buy licit products.
- 2. One could consider increased regulatory, law enforcement, judicial and penitentiary costs for each of the illicit flows.
- 3. One could consider increased organized crime activities as a "side cost" for each of the illicit flows, e.g. when illicit economic gains are reinvested into parallel criminal activities.
- 4. One could consider increased petty / opportunistic crime activities as a "side cost" in particular for illicit narcotics trafficking, as drug users commonly fund their purchases via petty theft etc.

## **5. Conclusions and topics for future research**

The objective of this paper has been to provide a clear, robust picture of common illicit cross-border flows of goods, including their socio-economic negative impacts both at destination and at source; particularly in order to facilitate

enhancements in governmental policies and corresponding regulations, enforcement priorities, inspection schemes and other countermeasures in fight against illicit, in the context of global supply chains and freight logistics systems. The main outcome of this paper has been the integrated matrix to map the socio-economic negative impact –categories (in total six) per each illicit flow type (in total seven, following splitting endangered species into two). The most common impact categories were following two, both with five “illicit flow matches”: Increasing health care and social security costs; and Increasing environmental damages. On third position is increasing human suffering (four matches); followed by Increasing market place distortions and/or unfair competition (three matches). The last ones were Losses in tax revenues regarding indirect border taxes (two matches) and Losses in cultural heritage (one match). Ultimately, it is left for politicians on both national levels as well as on international agreement levels to set weights and priorities within the various illicit flows, in terms of future policy and regulatory development, enforcement priorities and actions and so forth.

Finally, several sub-topics call for future research, including the following five:

- With all flows: Quantification of both the illicit market sizes (value, volume etc.) and the socio-economic negative impacts (monetary and non-monetary, whenever feasible).
- With all flows: Distinguishing between import “freight logistics flows versus other modalities (e.g. passenger luggage and inside body)”.
- With some flows, e.g. counterfeit products: Distinguishing between “domestic production versus 3rd country imports”, while assessing the problem size etc.
- With some flows, e.g. firearms: Distinguishing between “legally versus illegally imported” products, while assessing the problem size etc.
- Beyond the illicit flows presented in this paper: Expanding the analysis to cover various forms of fiscal fraud, quota violations, trafficking in human beings, currency export / import violations etc.

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