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Call for Papers

Annals of Operations Research

Special Issue: Applications of Operations Research and Data Science in Disrupting Illicit Markets

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Full paper submission deadline: 31 August 2022

Background

We live in an interconnected world; what happens in one place on our planet can impact us all. Over the past 30 years, globalization has created many opportunities and great wealth. But some of the biggest winners have been criminal groups. Organized criminal groups have taken advantage of opening new markets, supply chains, and technologies while exploiting weak regulation in financial markets and cyberspace. This has generated enormous wealth for the corrupt and criminals. A global problem like organized crime through illicit markets needs a multilateral solution. However, despite this convention, illicit activities have changed beyond recognition, growing exponentially worldwide in the past two decades. The global illicit activity boom has also become a threat to peace, development, the environment, health, and justice worldwide.

So what factors have enabled illicit markets to flourish?

Technology has been a great accelerator, and **innovation** has outpaced regulation. **The Internet** has also enabled expanding illegal economies, helping smugglers sell guns, drugs, or humans on **social media** and **communications apps**. The Internet is also a goldmine of data used for corruption, extortion, and carrying out other crimes. More **traditional types of connectivity** have also facilitated illicit markets, like a massive increase in the number of containers, moving goods around the world, more flights, and better infrastructure. Illicit activities are destroying our ecosystem and profiting from it. **Illicit logging** is cutting out the lungs of our planet, and **illicit fishing** is emptying our oceans. The **poaching of protected species** is throwing delicate ecosystems out of balance. **Unregulated mining and illicit drug cultivation** are destroying forests, polluting water supplies, and depleting finite resources that belong to us all.

Demography and mobility are also major drivers of illicit markets. As more people move into cities, many municipalities are unable to provide public services and public security. This has led to the **growth of slums** where criminal groups are stepping in to provide their kind of governance, protection, and services. Because of **wars, poverty, and climate change**, millions of desperate people are on the move. Building **fences and walls** merely create greater incentives for smugglers to get around these barriers. **Inequality** is also a major factor. The rich have become richer, leaving the rest of the world behind. Opportunities for legal work have been decreasing. This has played into the hands of criminal economies that exploit the vulnerable. The problem of inequality is compounded by **bank secrecy, tax havens, and cryptocurrencies** that enable money to be moved and saved in an opaque way. **Conflict zones** are fertile areas for illicit markets, like smuggling weapons, oil, drugs, and natural resources. Even **democratic processes** in more stable parts of the world are under threat from organized crime. Election campaigns are expensive, and money buys power.

At this moment, there is a global need to fight illicit activities. Because illicit activities affect all other major crises we face, there will be no sustainable development, good governance, managing migration, or lasting peace if we cannot control illicit markets and organized crime. Therefore, this special issue aims to motivate research and practice on illicit markets that encompass operations research (OR) and analytics methodologies to disrupt these markets, such as **behavior analysis in social networks, criminal profiling, crime detection and investigation, interagency information sharing, sentiment analysis, misinformation and misbehavior analysis, media planning, trend detection, analysis and tracking, network interdiction, visualization and modeling, weak signal detection, predicting locations and shelters of activities, information/opinion/knowledge spread and modeling, social media analysis, community detection, expertise and authority discovery, and supply chain inspection**. This integrative perspective offers opportunities to adapt existing solutions or advance new solutions that consider reciprocal interactions within and between the analytical and social approaches of different illicit markets to develop a holistic solution for preventing the problem.

Objective

In this special issue, we call for rigorous research that borrows from various disciplines and presents relevant and original work related to the disruption of illicit markets using OR and analytics approaches. This can be rendered in various forms, such as a new way of framing the issue via problematization, design approaches and constraint inducements, and behavioral and technological solutions.

We are interested in research exploring factors that contribute to or facilitate initiatives solutions to disrupt illicit markets using OR and analytics methodology and understanding the dynamic systems from descriptive characterization and predictive estimation control solutions against illicit networks. Further, we recommend focusing efforts toward developing potential solutions to the problem of illicit operations by using a sustainable supply chain design and management lens

wherein we desire to disrupt certain exploitive and harmful activities and dynamics while enhancing other constructive and beneficial economic activities and behaviors. However, while it stands to reason that OR and analytics can play a unique and effective role in in-counter illicit efforts, several practical challenges exist for OR and analytics practitioners in applying their techniques: the extent of the problem is unknown, traffickers and smugglers dynamically adapt their deceptive techniques, with fragmented data, and limited resources. At the same time, these challenges present opportunities to advance OR and analytics methodologies. There are many possibilities for members of this community to apply their skills to counter illicit operations. In what follows, we suggest some open opportunities to do so; however, authors are not limited to these topics:

1. Integrative study of ecosystems that includes illicit and licit components.
2. Identification of victims, perpetrators, and relevant operational environments by criminal network analysis.
3. Development of acute interventions, including but not limited to the initial target. Victim-centered interventions include exit costs and appropriate duration for restorative care.
4. Design of sustainable systems management strategies to combat illicit markets.
5. Formulation of operational models with objective functions that capture multiple and conflicting goals.
6. Frameworks for data collection, management, and sharing.
7. Embrace intersectionality and nuance.
8. Generating synthetic networks for illicit interdiction operations.
9. Disrupting illicit markets using community-based resource allocation models.
10. Predicting the supply and number of potential victims by reducing recruitment effectiveness and addressing the root causes of risk factors.
11. Estimating demand for goods and services supplied by illicit networks.
12. Disrupting trust among illicit actors.

Examples of topics of illicit operations include (but are not restricted to):

- The exploitation of people, such as human trafficking, human smuggling, slavery, irregular migration, online sexual exploitation
- The illicit wildlife trade, illicit environmental markets for natural mineral resources and endangered terrestrial and marine species, such as illegal logging timber, conflict diamonds, elephant poaching, oil illegal taps, e-waste dumped illegally, smuggling gold, pangolin poaching
- Drug production, like cocaine, meth, opioids (opium), cannabis, heroin
- Cybercrime through online commerce, such as identity theft, cyber extortion, darknet markets, ransomware attacks (WannaCry), cryptocurrency hackers

- Illegal production and sale of illegal goods, such as counterfeiting, EU customs, Operation Pangea, toxic substances, online purchase counterfeiting, pharmaceutical counterfeiting, illegal pesticides

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Papers will be subject to a strict review process under the supervision of the Guest Editor, and accepted papers will be published online individually, before print publication.