

Katarzyna Marzęda-Młynarska

Maria Curie-Skłodowska University, Poland

katarzyna.marzeda-mlynarska@mail.umcs.pl

ORCID ID: <https://orcid.org/0000-0002-4608-7290>

Integrating Routine Activity Theory and Transparency in Governance for Food Security through the Example of Operation Opson

Abstract: This article explores the integration of criminology into food security policies through the lens of Routine Activity Theory (RAT) and transparency in governance, with a specific focus on Operation Opson. Food-related crimes, including fraud, theft, and contamination, pose significant threats to global food security and the achievement of Sustainable Development Goal 2: Zero Hunger. The study develops an integrated framework combining RAT and transparency to identify, prevent, and respond to food-related crimes, ultimately strengthening food security. RAT helps map out the food supply chain's vulnerabilities, identifying motivated offenders, suitable targets, and the absence of capable guardians. Transparency in governance enhances accountability and public trust by making regulatory processes and results openly accessible. The case study of Operation Opson, a joint initiative by Interpol and Europol, illustrates the practical application of this framework. The findings underscore the importance of incorporating criminological insights into food security strategies to achieve zero hunger by 2030, promoting a more secure and resilient global food system.

Keywords: criminology, food security, Operation Opson, routine activity theory, transparency in governance

Introduction

Food security remains a pressing global issue, with millions of people around the world still lacking reliable access to adequate nutrition. According to the Food and Agriculture Organisation of the United Nations (FAO), food security exists when 'all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and

healthy life' (FAO, 1996). Despite significant global efforts, this challenge persists, closely linked to socio-political and economic factors that impact international development agendas. As such, food security is central to Sustainable Development Goal 2 (SDG 2), which aims to achieve zero hunger by 2030 (United Nations, 2015). While food security policy traditionally focuses on agricultural productivity, distribution systems, and economic access, new threats have emerged that are less often addressed within these frameworks. Food-related crimes, such as food fraud, theft, corruption, and other illegal activities in food systems, pose increasingly severe risks by disrupting supply chains, compromising food quality, inflating prices, and contributing to malnutrition, health risks, and social instability.

This article addresses the research problem of how criminological insights (Pływaczewski et al., 2019), specifically Routine Activity Theory (RAT) (Cohen & Felson, 1979) and governance transparency (Donaldson & Kingsbury, 2013; Hale, 2008; Kosack & Fung, 2014), can be integrated to prevent food-related crimes and enhance food security efforts aligned with SDG 2. It aims to develop an integrated framework that incorporates criminological insights into food security policy, by applying RAT and governance transparency to counter food-related crimes.

In exploring this framework, it is essential to consider existing governance practices that exemplify these principles. The European Union's regulatory framework for food security, which emphasizes transparency, traceability, and risk management, serves as a strong example. Its key regulations, such as the General Food Law Regulation (EC) No. 178/2002 (European Parliament & Council, 2002), establish principles for food safety, traceability, and swift response mechanisms for food-related risks, contributing to a robust legal foundation. In alignment with environmental, social, and governance (ESG) practices, the EU's regulatory framework also supports sustainability, ethical governance, and corporate responsibility, which are critical in managing food supply vulnerabilities. These regulations provide a form of 'guardianship' in the Routine Activity Theory framework, ensuring that food products meet stringent standards of safety and integrity, fostering public trust, and promoting ethical practices within food systems.

Although food-related crimes are gaining attention in the literature both in English (Rizzuti, 2020; Robinson, 2023; Wilson, 2008) and in Polish (Pływaczewski & Płocki, 2013; Pływaczewski & Lewkowicz, 2015), there remains a need for deeper research on the practical applications of criminological theory to combat these threats. To contribute to this field, this study poses the following research question: How can integrating RAT and governance transparency in food security policy reduce vulnerabilities in food supply chains and deter food-related crime? The study hypothesizes that integrating RAT with transparency in governance will help identify and mitigate vulnerabilities in food supply chains, thereby enhancing food security.

The article consists of three parts: the first examines the nature and impact of food crime on food security, emphasizing the need to integrate criminology into

food security policy; the second details the theoretical foundations of RAT and transparency in governance, establishing the basis for the proposed framework; the third presents the case study of Operation Opson, showing how these strategies work in practice to deter food-related crime. The research employs a theoretical approach, integrating content analysis and case study analysis. Content analysis is applied to examine secondary data sources, including international reports from Interpol, Europol, and the FAO, as well as relevant academic literature. This allows for the identification of recurring themes and patterns regarding the roles of RAT and transparency in governance in mitigating food-related crimes in supply chains. The case study of Operation Opson serves as an illustrative validation of the proposed theoretical framework and demonstrates the practical application of RAT and transparency in combating food-related crimes.

1. Food-related crimes and their impact on food security

Food-related crimes have a long history (Wilson, 2008) and have evolved with changes in food production and distribution. The concept involves illegal activities that compromise the integrity, safety, and availability of food, typically driven by financial gain. These crimes can occur at any stage of the food supply chain, from production and processing to distribution and retail, and have severe consequences for public health, consumer trust, and economic stability.

There are many definitions of food-related crimes. According to the United Kingdom Food Standards Agency, 'food crime is serious fraud and related criminality in food supply chains'. This definition also includes activity impacting on drinks and animal feed (FSA, 2023). The FAO defines food fraud as 'a situation in which the consumer is deceived about the amount, quality and/or identity of the food they consume' (2023). According to Spink and Moyer, food fraud is defined as 'a collective term used to encompass the deliberate and intentional substitution, addition, tampering, or misrepresentation of food, food ingredients, or food packaging; or false or misleading statements made about a product, for economic gain' (2011). Although there is no universally accepted definition of food crime or food fraud, several key elements are highlighted in the various definitions provided by different authors; these emphasize intentionality, fraud, economic gain, and the potential threat to public health.

Food fraud is a major global issue today, costing the food industry up to USD 40 billion a year (Financial Times, 2023) and causing USD 110 billion in lost productivity and medical costs each year due to unsafe food, particularly in low – and middle-income countries (World Health Organization, 2022). It involves various food groups, such as meat, dairy, seafood, spices, and alcohol. For example, almost half of the honey imported into the EU was filled with sugar syrups, a practice known

as ‘honey laundering’ (European Commission, 2024). In addition to the financial costs, food crime carries a high risk to the health and life of consumers. According to the World Health Organization (2022), an estimated 600 million people a year worldwide – almost 1 in 10 – become ill after eating contaminated food, and 420,000 die, resulting in the loss of 33 million years of healthy life.

The number of incidences of food-related crimes has significantly increased due to the industrialization of food production and distribution. As food supply chains have become more complex and globalized, opportunities for fraudulent and illegal activities have expanded, undermining efforts to ensure the safety, availability, and nutritional quality of food. The shift towards industrial-scale food production and distribution has led to longer and more complex supply chains. Food products now often travel long distances and pass through multiple hands before reaching consumers, creating numerous opportunities for food fraud. These illegal practices pose a serious threat to food security, as defined by the FAO in 1996. It should be noted, however, that the concept of food security has evolved considerably over time (Marzęda-Młynarska, 2014; Shaw, 2007) and has relatively recently expanded to include food quality and safety issues, reflecting changing understanding and priorities. Addressing food-related crime is thus critical to achieving SDG Targets 2.1 and 2.4 by 2030, which include access to safe and nutritious food.

Applying criminological perspectives to food security is an area of growing research interest, though direct studies are still limited. Internationally, this field has attracted attention through studies on ‘green criminology’ and its focus on the environmental impacts of food production (e.g. Donnermeyer, 2017; Holley et al., 2018), as well as research on specific food-related crimes, like fraud and exploitation in supply chains (e.g. Hendricks & Masehela, 2024; Khamala, 2022). This increased interest is echoed in Alice Rizzuti’s (2020) literature review, which highlights criminological approaches to food crimes, particularly in relation to food safety, a key part of food security. Rizzuti’s review shows that, while the topic is gaining ground, criminological studies on food-related crimes are still underrepresented. She identifies two main research directions: studies that focus on fraudulent practices in the food industry and policies to prevent them, and ‘green criminology’, which looks at environmental harm, social justice, and fair access to food (Rizzuti, 2020, p. 4). In Polish scholarship, there is also a growing interest in exploring the criminological aspects of food security; the contributions of Wiesław Pływaczewski (Pływaczewski & Lewkowicz, 2015; Pływaczewski & Płocki, 2013) and scholars from the University of Warmia and Mazury in Olsztyn (Lenartowicz, 2021), whose work integrates criminology with various aspects of food system vulnerabilities and advances the intersection of criminology and food security, are especially noteworthy. Despite these contributions, however, there remains a need for further research to develop comprehensive frameworks that address food security policy through a criminological lens, specifically focusing on how criminological tools can be applied

to identify and mitigate vulnerabilities in food supply chains, thereby enhancing food security efforts in alignment with SDG 2.

2. Theoretical background and integrated framework: Routine Activity Theory and transparency in governance

Routine Activity Theory (RAT), developed by Lawrence E. Cohen and Marcus Felson in 1979, is a significant framework in criminology that examines the environmental aspects contributing to crime (Cohen & Felson, 1979; also Clarke & Felson, 1993; Felson, 2002). This theory emphasizes the importance of situational factors in the incidence of crime, positing that for a crime to occur, three elements must converge in time and space: a motivated offender, a suitable target, and the absence of a capable guardian. The absence of any one of these elements is sufficient to prevent such violations from occurring (Cohen & Felson, 1979, p. 589).

A 'motivated offender' refers to an individual or group inclined to commit a crime. RAT assumes that there is always a pool of motivated offenders ready to exploit criminal opportunities. A 'suitable target' can be a person, object, or place attractive to an offender, with factors like value, visibility, and accessibility determining suitability. The 'absence of capable guardians' refers to a lack of individuals or mechanisms that can deter criminal activity. Capable guardians include police officers, security personnel, vigilant bystanders, or even technological measures like surveillance systems and locks. When these guardians are absent, the likelihood of crime increases (Cohen & Felson, 1979, p. 590).

RAT provides a framework for understanding how specific situations can lead to criminal acts, shifting the focus from offender characteristics to broader environmental and situational factors that facilitate crime. By identifying and addressing these factors, it becomes possible to develop effective crime prevention strategies. This theory has been extensively applied in criminology to understand and prevent various types of crime, from property crimes and urban crime to cybercrime, retail theft, food-related offences like food fraud, tourism-related crimes, and farm crime (Anderson & McCall 2005; Astor et al., 2010; Brantingham & Brantingham, 1995; Brunt et al., 2000; Ceccato & Newton, 2015; Clarke, 1999; Eck & Weisburd, 1995; Felson, 2002; Holt & Bossler, 2008; Newman & Clarke, 2003; Spink & Moyer, 2011; Weitzer, 2014).

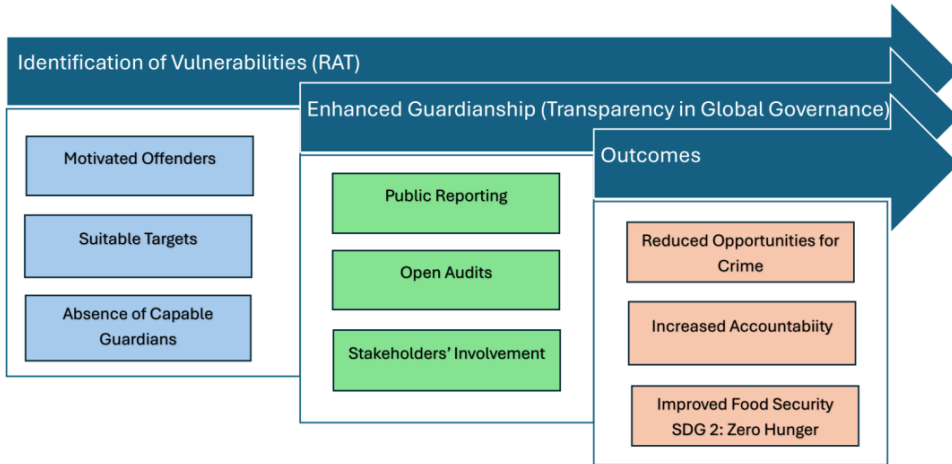
In parallel, transparency in governance refers to the openness and accessibility of information regarding the decision-making processes, activities, and policies of international or domestic regulatory bodies. Transparency ensures accountability, inclusiveness, and integrity by making actions and outcomes public and accessible for scrutiny by stakeholders, including states, civil society, and the general public (Florini, 2007; Grant & Keohane, 2005). This openness fosters trust and enhances

the legitimacy of institutions while deterring corruption and unethical behaviour (Hillebrandt et al., 2014; Kaufmann & Bellver, 2005).

Transparency in governance aligns closely with ESG principles, such as accountability and sustainability, by fostering clear, secure, and accessible regulatory practices in complex sectors like international trade (Laszuk & Šramková, 2021). For instance, the European Union's Regulation (EU) 2017/625 on Official Controls (European Parliament & Council, 2017) mandates rigorous oversight at every stage of the food supply chain, ensuring compliance with safety standards and reducing the likelihood of fraudulent activities. Likewise, Directive (EU) 2019/633 on Unfair Trading Practices (European Parliament & Council, 2019) enforces fair and ethical trading practices within the agricultural sector, promoting transparency and strengthening trust across supply chains. These regulatory frameworks can function as 'capable guardians' within the RAT model, establishing preventative controls and offering oversight to reduce criminal opportunities within food systems. In the context of food security, transparency therefore strengthens governance by ensuring that regulatory bodies operate openly, creating a monitored and accountable food supply chain. For example, public reporting of inspections and audits in food production helps discourage criminal activities by making it clear that all actors are subject to oversight. Transparency thus plays a crucial role in ensuring the safety, integrity, and availability of food supplies, which are core elements of the UN's Zero Hunger goal (SDG 2).

The integration of RAT with transparency in governance forms a framework that supports food security policy by preventing crime in food systems. RAT highlights vulnerabilities in food supply chains, such as weak regulatory oversight that could lead to food fraud, and allows for targeted crime prevention efforts. Transparency complements this by enhancing accountability within the supply chain, reducing opportunities for exploitation and criminal activity. Together, these elements create a robust framework for reducing food-related crimes and enhancing food security, directly contributing to SDG 2. By focusing on crime prevention and accountability, the framework helps secure food availability, quality, and access, thus supporting specific SDG 2 targets. For instance, reducing food-related crimes indirectly supports Target 2.1, which aims to end hunger and ensure access by all people, particularly the vulnerable, to safe, nutritious, and sufficient food by ensuring a reliable and affordable food supply, while transparency measures encourage sustainable practices aligned with Target 2.4, which seeks to ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production. This integrated framework contributes to Agenda 2030 by promoting a stable and resilient food system essential for achieving zero hunger. A visual representation of this framework is shown in Figure 1, illustrating how RAT identifies vulnerabilities in the food supply chain and how transparency measures enhance guardianship, thereby leading to fewer food-related crimes and improved food security.

Figure 1. Integrated framework combining Routine Activity Theory and transparency in governance for enhanced food security.



Source: Own elaboration

3. Case study of Operation Opson: Detering food-related crimes

Operation Opson, coordinated by Interpol and Europol, is an international law-enforcement operation aimed at combating the trade in counterfeit and substandard food and beverages. The operation's name, derived from the ancient Greek word for food, reflects its core mission: to safeguard the integrity of the global food supply. Since its inception in 2011, the operation has significantly expanded in scope and impact, addressing the growing complexity of food fraud (Interpol, 2024).

In its early years (2011–2013), Operation Opson focused primarily on its core mission. The initial operations aimed to disrupt local and regional food fraud networks while raising awareness about the issue. The operation began with fewer participating countries, mainly concentrating on Europe and parts of Asia. During these foundational years, cooperation between Interpol and Europol was established, setting the groundwork for future expansions (Europol, 2014). The operation expanded its focus between 2014 and 2016 to include a broader range of food products and beverages, emphasizing the complexity of global supply chains. More countries from different continents joined the operation, enhancing its global reach. New and more sophisticated inspection techniques and advanced technology for better detection and traceability were introduced in this period (Europol, 2014; 2015; 2016; Europol, Interpol, 2017). The years 2017–2019 marked a period of consolidation, where Operation Opson strengthened its methodologies and focused on more sophisticated forms of food fraud, including counterfeit health supplements and

organic products. Coordination between participating countries and international agencies improved, leading to more synchronized operations. Greater involvement of private sector partners helped enhance transparency and accountability in supply chains. Extensive public awareness campaigns were launched to educate consumers about the risks of food fraud and how to identify legitimate products (Interpol, 2019). Since 2020, Operation Opson has integrated advanced technologies such as blockchain for traceability, DNA testing for authenticity, and data analytics for identifying patterns of fraud. The use of cutting-edge technologies has significantly improved the detection, traceability, and verification of food products. The operation has seen enhanced global collaboration, with participation from over 80 countries demonstrating its extensive reach (Interpol, 2021).

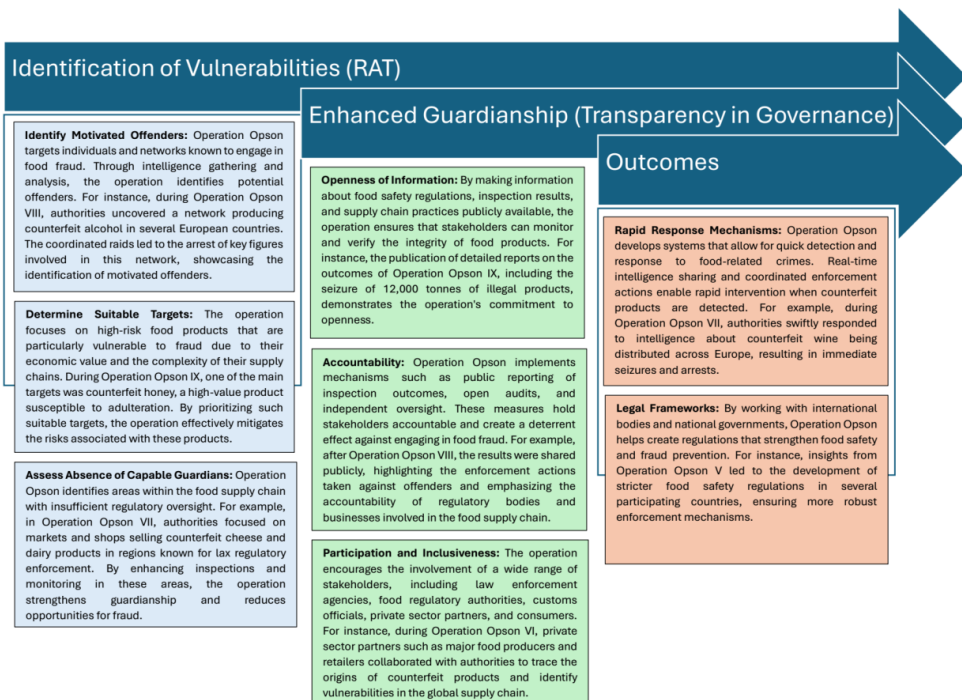
The key element of Operation Opson's strategy is its methodology, which involves several key steps that ensure comprehensive action against food fraud. Initially, participating countries collaborate to identify potential targets and plan coordinated inspection and enforcement activities. This involves scrupulous mapping of the food supply chain to pinpoint vulnerabilities where food-related crimes, such as fraud, theft, and contamination, are likely to occur. By focusing on high-risk products and areas with insufficient regulatory oversight, the operation enhances its effectiveness in identifying and intercepting fraudulent activities. Inspections are carried out at various points in the supply chain, including production facilities, warehouses, markets, and transport vehicles. Suspect products are seized and subjected to rigorous laboratory testing to verify their authenticity and safety. Detailed analysis helps trace the origins of counterfeit goods and uncover the networks involved in their production and distribution. Legal actions, including fines, facility closures, and criminal prosecutions, are then taken against individuals and organizations involved in food fraud. The results of the operation are compiled into detailed reports and shared with the public and relevant stakeholders, promoting transparency and accountability (Europol, 2024).

The impacts and results of Operation Opson have been significant, reflecting its success in enhancing global food security. Over the years, the operation has resulted in the seizure of thousands of tonnes of counterfeit and substandard food and beverages, worth millions of dollars. For instance, during Operation Opson IX in 2020, authorities seized 12,000 tonnes of illegal products, including contaminated dairy and counterfeit honey, thereby avoiding potential health crises. The operation has also disrupted numerous organized crime networks involved in food fraud, with hundreds of individuals arrested and prosecuted. Insights gained from the operation inform the development of better policies and regulations, leading to stricter food safety laws and improved enforcement mechanisms globally (Europol, Interpol, 2021).

The Operation Opson methodology closely aligns with the principles of RAT and incorporates transparency in governance to achieve its objectives. Motivated offenders are identified through intelligence gathering and analysis, which targets individuals and networks known to engage in food fraud. Suitable targets are prioritized based on

their economic value and vulnerability, such as olive oil, honey, and wine, which are particularly susceptible to fraud due to their high value and complex supply chains. The operation enhances guardianship by focusing on areas with weak regulatory oversight; inspections at these points help identify and intercept fraudulent activities, with suspect products being subjected to rigorous laboratory testing to verify their authenticity and safety. By making processes and decisions open and clear, the operation ensures that actions are subject to scrutiny and accountability. Public reporting of inspection results, open audits, and the involvement of independent oversight bodies create a deterrent effect against engaging in food fraud. Transparency measures also include the involvement of various stakeholders such as law enforcement agencies, food regulatory authorities, customs officials, private sector partners, and consumers. Awareness campaigns and media engagement further promote transparency by informing the public about the dangers of food fraud and the importance of purchasing food from reputable sources. An overview of Operation Opson's methodology and its impact on combating food fraud was used to illustrate the practical application of the proposed framework to integrate criminology into food security policies, represented in Figure 2.

Figure 2. Integrated framework combining Routine Activity Theory and transparency in governance for enhanced food security through the example of Operation Opson.



Source: Own elaboration

Conclusions

This article has explored the integration of the criminological theory of RAT with transparency in governance for food security through the example of Operation Opson. The study set out to answer the research question ‘How can integrating RAT and governance transparency in food security policy reduce vulnerabilities in food supply chains and deter food-related crime?’, which supported the hypothesis that this integration would mitigate vulnerabilities within the food supply chain and enhance food security.

The findings confirm that integrating RAT and transparency in governance establishes a practical framework to address weaknesses in food systems. The developed framework functions by strengthening ‘capable guardianship’ through transparency and accountability measures that systematically reduce criminal opportunities. Regulatory bodies, for instance, could implement stricter traceability protocols, disclose inspection results, and employ real-time monitoring systems that detect disruptions early. These measures not only deter food-related crimes but also stabilize food prices and protect consumer health, verifying the hypothesis that the combined approach improves food system resilience.

Beyond crime prevention, the integration of RAT and governance transparency significantly benefits key stakeholders, including regulators, suppliers, and consumers. Transparent governance encourages ethical behaviour within supply chains, holding suppliers accountable and fostering consumer confidence in food quality and safety. This openness also allows regulatory agencies to respond swiftly to emerging risks, thereby minimizing threats to public health and supporting a sustainable, trustworthy food system. Furthermore, this integrated framework aligns with Sustainable Development Goal 2, which aims to end hunger and ensure food security. By embedding transparent, accountable processes within food systems, the approach protects vulnerable populations from issues like food fraud and contamination, which disproportionately affect low-income communities. In doing so, it supports both food safety and social equity, extending the impact of this criminological model beyond mere crime reduction.

The integration of RAT and governance transparency also establishes preventive mechanisms within the food sector. Enhanced visibility through regular audits and public reporting increases the perceived risk of detection among offenders, thus reducing incidents of food fraud and contamination. This approach bolsters the resilience of food supply chains against future threats, ensuring long-term food security. This study validates the hypothesis, demonstrating that the combined application of RAT and governance transparency not only strengthens food security but also fosters an ethical, transparent food system that aligns with broader sustainable development goals.

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