

Assessing Stakeholders' Interests in Postal Security

T. Männistö and M. Finger

Abstract—The events of October 2010, where terrorists managed to get explosive devices onboard of three passenger aircrafts and two air freighters, demonstrated weaknesses of the international air cargo and airmail security. Ever since, postal security has gained interest among policymakers and authorities. This study augments the limited body of academic literature on the topic by demarcating areas of postal security, identifying relevant stakeholders in each area, and investigating why these stakeholders engage in postal security. Research is based on a case study on Swiss Post's mail service.

Keywords—Dangerous goods, mail bombs, postal security, supply chain security, theft of mail, trafficking.

I. INTRODUCTION

POSTAL security is evolving faster than ever. Recent mail bomb attacks demonstrate vulnerability of the mail system to terrorism. At the same time, the expanding e-commerce increases cross-border flows of both legal and illegal merchandise. On top of that, competition is intensifying as governments abolish the remnants of the former postal monopolies. Consequently, the Posts are starting to see security as a source of competitiveness and extra revenues. Altogether, interest in postal security is mounting among policy makers, authorities, managers, and academics. Following sections elaborate why postal security is becoming increasingly important.

A. The Yemen Bomb Plot

In October 2010, al-Qaeda terrorists dispatched two parcel bombs from Yemen to the US via the express couriers UPS and FedEx. Each explosive parcel contained 300 to 400 grams military grade plastic explosive and a detonator hidden inside a printer's toner cartridge. Before the authorities managed to intercept the parcel bombs at trans-shipment points in the UK and Dubai, the bombs had travelled on board two air freighters and three passenger planes.

In the wake of the events, US authorities introduced new unilateral security regulations on US-bound air cargo and mail. According to the new rules, the Posts were allowed to load mail items, weighting over 500 g, onto passenger planes only under very strict conditions. As a result, European postal operators accumulated large backlogs of delayed items destined for the US.

To mitigate the risk of future disruptions due to security breaches and resultant regulations, the Universal Postal Union (UPU), the UN organization coordinating postal policies among 192 countries, established an ad-hoc inter-committee security group to draft minimum security requirements for the

postal sector. The committee comprised representatives of the UPU member countries, ICAO (International Civil Aviation Organization), IATA (International Air Transport Association), WCO (World Customs Organization) and TSA (Transport Security Administration), among other key stakeholders. The work resulted in two standards. S58 lays out general security requirements for physical and process security of the postal service. S59 focuses on airmail security. The 25th Universal Postal Congress, held in Dohain Qatar in September/October 2012, opted for making the both security standards mandatory for all UPU members [1].

B. Airmail and Lithium Batteries

Electronic equipment and devices are apparently one of the most frequently shipped product categories in cross-border e-commerce [2]. Given that many portable electronic appliances, such as cameras, laptops and mp3 players, contain lithium-based power sources, the UPU requested the ICAO to relax its rules regarding the carriage of lithium batteries and cells by airmail.

As a result of the negotiations, the ICAO decided to allow the transport of electronic equipment, containing up to four lithium cells or two lithium batteries, by airmail as of 1st January 2013. Yet, the derogation is conditional. Each postal operator must get an approval from its respective national civil aviation authority (CAA). The approval depends on a Post's capability to train personnel and control the acceptance of mail items for the air transport. Due to the huge volume of postal items, the large number and diversity of mail acceptance points, the unfamiliarity of an average mailer with dangerous goods regulations, and the dynamic routings of international mail dispatches, postal security managers struggle with implementing reasonable controls to secure airmail from lithium batteries.

C. Illicit Trade by Post

The cross-border e-commerce is growing, so as the fulfillment of the online orders by Posts and express couriers [1], [2]. Alas, the dark side of the phenomenon, rogue online pharmacies, replica stores, and black markets, drive contraband trafficking through the postal network.

The Silk Road is one of the many illegal online black markets that facilitate trade in contraband ranging from illegal drugs and doping products to fake identities. The online storefront of the Silk Road is hidden in the deep web and accessible only through the anonymising TOR-gateway (= The Onion Router). Buyers purchase products (and services) with practically untraceable virtual money called Bitcoins. Law enforcement authorities are having a hard time busting moderators, sellers and buyers of online market places due to the strong anonymising technologies [3].

T. Männistö and M. Finger are with the École Polytechnique Fédérale de Lausanne, Chair Management of Network Industries MIR, (e-mail: toni.mannisto@epfl.ch, matthias.finger@epfl.ch.).

Targeting the order fulfillment part of the illegal value chains, that is the physical transport of contraband from buyers to sellers, is one of the most promising strategies for disrupting the illegal trade. Therefore, in the future, the Posts may need to deal with an increasing number of requests coming from the police, customs and regulatory agencies on trafficking matters.

D. Mail Bombs and “White Powder” Letters

Terrorists and criminals can also use the non-airmail postal service to intimidate, maim, and kill people. The US has a long history of extensive criminal investigations on malicious mail campaigns. Ted Kaczynski, aka the “Unabomber”, terrorized the US society from the late 70’s to mid 90’s with a series of parcel bombs that killed 3 people and injured 23 others. In 2001, two waves of letters containing Anthrax spores killed five and infected 17 victims in the weeks following the September 11th attacks. Between October 2003 and February 2004, three ricin letters were sent to US political institutions.

Anthrax, ricin or other dangerous biological agents have never been found in the European mail system. Yet, European countries have encountered numerous mail bomb attacks over the last decade (see Table I).

TABLE I
 MAIL BOMB EVENTS IN EUROPE

<i>Event</i>	<i>Month and year</i>
Campaign of seven parcel bombs against prominent EU figures and institutions.	Dec 2003
A wave of seven parcel bombs in the UK.	Jan – Feb 2007
Parcel bombs explosions in two embassies in Athens (three other bombs defused).	Nov 2010
Parcel bomb explosions in two embassies in Rome (third bomb addressed to Greek embassy defused).	Dec 2010
Parcel bomb explosion against Swiss nuclear lobby in Olten, Switzerland.	Mar 2011
Campaign of five mail bombs against prominent people associated with the Celtic F.C. in Scotland.	Mar – Apr 2011
Parcel bomb attacks against Deutsche Bank, Equitalia (Italian tax office) and the Greek Parisian Embassy	Dec 2011

E. Theft of Mail

Customers expect that the Posts deliver the right item to the right addressee undamaged within product-specific time limits. Each lost, incomplete, damaged and late delivery undermines customer satisfaction and the credibility of postal service. Bad process control, lax management, and pilferage are some of the root causes for the bad delivery performance. Thus, anti-theft efforts help reduce number of lost items and contribute towards enhanced delivery reliability, higher customer satisfaction and stronger postal brands.

F. Motivation, Objective and Structure

The mounting interest in postal security has given rise to new regulations, intensified the interaction between the Posts and the law enforcement, and increased the reputational risk associated with security management. The evolving security environment is both an opportunity and a threat for the Posts.

Our research supports managerial and political decision-making by identifying relevant stakeholders and elaborating

their interests and motives in five key areas of postal security. We address following two research questions:

- What stakeholders are active in various areas of postal security?
- Why these stakeholders engage in postal security?

This paper advances the theory development in the field of supply chain security (SCS). Our research answers to the call of [4] on empirical research on external sources of pressure that drive organizations’ SCS strategies. Our research also strengthens the ontological basis of the SCS as a standalone research discipline by linking areas of postal security to the generic taxonomy on supply chain crime [5]. Our case study approach answers to the call of [6] on more qualitative studies on logistics and the call of [4] on more case studies on supply chain security. Finally, this paper augments the very limited body scientific publications on postal security.

We structure the rest of the paper as follows. The second chapter discusses and refines key concepts relating to postal security and safety. The third chapter elaborates the methodology of the study. In the fourth chapter, we review the relevant literature on supply chain security with intent to identify and define sources of pressure that drive SCS efforts. The literature review concludes by presenting theoretical propositions. The chapter five portrays contemporary postal security and safety context in Switzerland from the perspective of Swiss Post’s managers and Swiss authorities. The analysis of the chapter six reveals who are the key stakeholders in each of the five areas of postal security and why these stakeholders engage in SCS. We conclude the paper by discussing the findings in the light of our initial research propositions and extant literature.

II. KEY CONCEPTS

A. Postal Service

According to the UPU Convention (Art. 12), the basic postal services cover acceptance, handling, conveyance and delivery of priority and non-priority letter-size items (letters, cards, and small parcels up to 2kg) and parcels (up to 20kg). Each of the 192 member countries must have a designated operator who is responsible for the basic providing postal services in its territory and fulfilling the provisions arising from the UPU Convention and its regulations. The combined network of the designated operators, called the ‘single postal territory’, covers practically the whole world.

The designated operators (called Posts throughout this paper) are very often former state-owned postal monopolies. Today, many governments are reducing their control and ownership in national postal operators. Many countries are also opening their postal markets for competition. For instance, the EU directive 2008/6/EC ordered the full opening of the postal markets in 16 member states from the beginning of 2011. As a result, around 95 % of the EU’s internal postal markets are currently liberalized. Altogether, irrespective of the degree of state ownership and market liberalization, the Posts must provide all citizens “quality basic postal services at all points in their territory, at affordable prices.” (UPU

Convention Art. 3)

Many countries oblige their Posts to provide services beyond the UPU's basic service. For example, the Swiss postal law (RS 783.0) obliges Swiss Post to transport letters (items less than 2cm thick, up to 2kg), parcels (items more than 2cm thick, up to 30kg), newspapers, and periodicals at least five days a week to all permanent settlements in Switzerland. Moreover, the law requires uniform pricing for domestic mailings of the same type and class. That is, posting a domestic A-Mail standard letter costs always 1.00 CHF regardless of the distance between the sender and the addressee. According to the law, people living in Switzerland should also have a 'reasonably' convenient access to the postal services. Obligatory service provisions are called Universal Service Obligation (USO).

B. Types of Non-Mailable Items

The UPU Convention defines what kind of items the Posts can accept for international delivery and under which conditions. Among other articles, the Convention (Art. 15) prohibits international exchange of illegal drugs, obscene and immoral material, counterfeits, most live animals and dangerous goods. The Convention also stipulates that Posts should transport valuables only in insured, or at minimum, registered letters. The UPU regulations set country-specific exemptions from the common rules.

Aside from the UPU Convention and its regulations, the range of mailable items depends on multiple factors. The infrastructure, underpinning the postal delivery, sets technical constraints for postal items in terms of contents, packaging, weight and dimensions. The maximum weight for a postal item is usually between 20 – 30kg. A Post may also refuse to accept dangerous, bulky, perishable or particularly fragile items. The Posts require sufficiently robust packaging and the full payment of the postage. Freight logistics companies take care of shipments which transport is beyond the capabilities of the postal system.

The Posts have a degree of freedom to decide what kind of items they accept for delivery. A postal operator could ban firearms, for instance, for safety or moral reasons. The Posts' business partners, air carriers in particular, may have their own internal policies that affect the range of mailable items. In extreme cases, airlines could decline to carry mail altogether.

A broad variety of commonly traded goods have explosive, flammable, oxidizing, infectious, radioactive, corrosive or ecologically hazardous properties. Dangerous goods regulations classify such hazardous commodities and set provisions for their handling, packaging, labeling, marking, and segregation. The provisions are transport mode specific. Table II presents some important international conventions governing the transport of dangerous goods by road, rail and air.

TABLE II
 CONVENTIONS ON TRANSPORT OF DANGEROUS GOODS

Instrument (abbreviation)	Legal basis	Scope (contract parties)
The European Agreement concerning the International Carriage of Dangerous Goods <i>by Road</i> (ADR)	Standalone legally binding agreement	Mainly Europe (47)
Regulations concerning the International Carriage of Dangerous Goods <i>by Rail</i> (RID)	Appendix C of the COTIF convention	Mainly Europe (47)
ICAO Technical Instructions for the Safe Transport of Dangerous Goods <i>by Air</i> (ICAO-TI) ¹	Annex 18 of the Chicago Convention	Global (191)

The transport mode specific dangerous goods regulations derive from the model regulation known as the 'United Nations Recommendations on Transport of Dangerous Goods'. The model regulation lists a few thousand dangerous goods and groups them into nine main classes. The UPU's letter and parcel post regulations (Art. RL 144 and Art. RC 133) prohibit the mailing of these dangerous goods by post. Yet, a few exceptions exist.

The UN model regulation allows transportation of certain dangerous goods in 'limited quantities' under relaxed conditions. Normally 'limited quantity' articles are standard consumer products like sprays and aerosols that contain very small amounts of dangerous substances. Many Posts accept certain dangerous goods in limited quantities but only for the surface carriage and on a contractual basis.

The ICAO-TI (Art. 2.3.1) and the UPU Convention (Art. 15) allow postal items, containing three types of dangerous goods, for the air carriage: patient specimens, certain infectious substances and low-activity radioactive materials. The acceptance is naturally conditional to a number of safety provisions.

National legislations set the legal basis for possession, transport, handling, import, transit, and exports of goods. Correspondingly, the national laws define the *de jure* range of mailable items. Obviously, legal and statutory restrictions vary across countries. Thus, the range of mailable items in international postal service depends on the laws and statuses in the country of origin, the country of destination and possible transit countries. Fig. 1 summaries the five sources of restrictions that confine the group of mailable items.

¹The IATA's Dangerous Goods Regulation is not a legally binding document but the *de facto* practical guidance for the aviation industry.

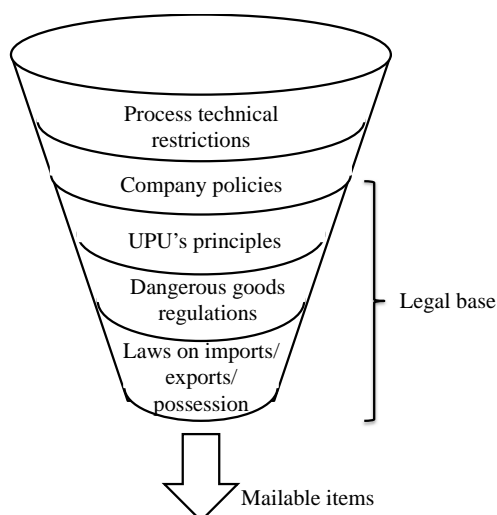


Fig. 1 Determinants of mailability

Open Science Index, Humanities and Social Sciences Vol:7, No:8, 2013 publications.waset.org/16075.pdf

The UPU's principles apply universally in the global sphere of the 'single postal territory'. The process technical restrictions and company policies are specific for each Post and business partner. However, transport mode specific regulations and laws & statuses depend on the characteristics of a posted item.

Let us elaborate the latter statement. The type and class of a mail product delimit maximum delivery times. For example, Swiss Post delivers domestic the A Mail letters in the following working day and the B Mail letters at latest at the third working day following the date of mailing. The Posts often arrange the logistics in a way that they can meet the promised delivery times at the lowest cost possible. Accordingly, the Posts often dispatch the priority items by air and the economy items by the slower but cheaper surface transport.

The induction point refers to the location where the sender hands her item over to the Post. Public mailboxes and post office counters are examples of classic mail induction points. The term 'origin-destination parameter' refers to the item specific pair of the induction point and the delivery address. The origin-destination parameter defines the routing and the use of the airlift in conjunction with the type and the class of a posted item. The routing fixes countries of transit. The airlift option defines whether the ICAO's dangerous goods regulations apply.

C. Types of Contraband

Non-mailable items encompass various types contraband. In this study, we define contraband as goods that are imported, exported, or transported illegally or which possession is illegal. Table III describes various types of contraband.

TABLE III
 TYPES OF CONTRABAND

Type	Description	Typical commodities
Absolute	Commodities not allowed for export/transit/import or which possession is illegal	Narcotics, stolen goods, counterfeits, hate mail
Relative	Commodities exported/imported without appropriate licenses permits or certificates.	Firearms, pharmaceuticals, dual-use goods
Fiscal	Commodities exported/imported without paying appropriate duties or taxes	Cigarettes, alcohol, luxury goods
Malicious	Commodities introduced to supply chains with intention to cause damage, maim or kill	Chemical, biological, radiological, and nuclear weapons, improvised explosive devices
Hazardous	Prohibited or inadequately packed / marked / handled dangerous goods	Explosives, batteries, aerosols

Certain commodities, like stolen goods and counterfeits, are inherently illegal. However, most contraband are otherwise legitimate goods that have become illegal due to illegal shipping methods. For example, cigarettes are legal *per se* but become illegal fiscal contraband when imported to a country without paying appropriate duties and taxes. Interestingly, contraband does not necessarily refer to a physical commodity. Message contents of correspondence, such as fraudulent claims on lottery wins, chain letters and hate mail, are illegal as well.

Sending contraband by post is a criminal offense and may lead to prosecution and state-administered sanctions. Naturally, other contraband items lead to more serious consequences than others. Mailing hundreds of grams uncut heroin leads most likely to hefty fines and imprisonment for both the sender and the receiver. In contrast, shipping of perfume bottles without paying regard to dangerous goods regulations, leads, at worst, to a reprimand from a competent authority or Post. In contrast, posting items that violate only process technical restrictions or company policies may raise disputes between the Post and mailers but does not activate authorities.

Fig. 2 illustrates how the types of contraband overlap. Untaxed cigarettes and heroin are pure examples of fiscal (1) and absolute (2) contraband respectively. Undeclared doping substances match the description of both fiscal and relative contraband (3). Stolen hand grenades count as absolute and hazardous contraband (4). Undeclared fireworks break fiscal laws, licensing requirements and dangerous goods regulations and are thus fiscal, absolute and hazardous contraband at the same time (5). Improvised explosive devices (IED) are absolute, malicious and hazardous contraband (6). A shipment of undeclared and poorly packaged cigarette lighters counts as purely hazardous contraband (7). Clearly, all contraband types are non-mailable.

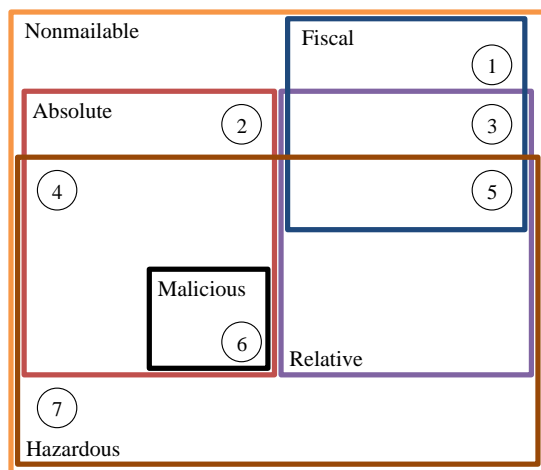


Fig. 2 Overlapping types of contraband

Dangerousness is a convoluted concept in SCS. This far, we have attributed dangerousness to the commodities that have a potential to cause damage to people, assets or the environment *during transport*. However, counterfeit drugs are not dangerous during transport but may put consumer health in danger. On the contrary, many dangerous goods for transport do not pose any risk to consumers in small quantities. In fact, many everyday consumer-friendly appliances like laptops and cell phones include lithium batteries and are thus classified as dangerous goods (for transport). Moreover, missile guidance systems may comprise high-tech electronic components that do not pose risk during transport nor are dangerous for consumers. However, when these components fall into the hands of terrorists, they endanger lives of thousands.

III. METHODOLOGY

Our method is following. First, we use the generic supply chain crime taxonomy [5] to demarcate areas of postal security. We restrict our subsequent analysis to five areas that we consider most consequential to the contemporary postal security. Second, we review relevant literature in order to understand motives of organizations that engage in supply chain security. Finally, we conduct a case study on Swiss Post's two logistics-related business units Post Logistics and Post Mail. Following sections elaborate our method for literature review and case study.

A. Literature Review

Literature review serves three purposes in this study. First, being familiar with the extant literature helps us identify the most important managerial problems and gaps in academic research. This enables us to formulate original research questions that are justified by the practice and theory. Second, as suggested by [7], we construct theoretical propositions on the basis of the literature. The propositions guide our case study research. Finally, we contrast research findings with the literature.

The literature review has three parts. We start by introducing prominent academic contributions on supply chain security management (SCSM). Next, we present the very few

publications on the postal security management. Finally, we focus on publications that elucidate why organizations engage in SCS.

We used the Thomson Reuter's Web of Knowledge and the Elsevier's Scopus in search of candidate papers for the literature review. Our search strings included, but were not limited to 'supply chain security', 'postal security', 'terrorism', 'cargo crime', and 'mail bomb'. The searches yielded a large number of papers. We assessed the relevancy of the candidate papers for our research by screening first the titles of the papers and then the abstracts. After discarding most of the papers, we ended up with 12 highly relevant academic contributions. However, we realized that some of the influential and relevant contributions had escaped our search. Thus, we decided to include these papers to our review sample.

B. Case Study

In this study, we want to find out why stakeholders engage in postal security. We decided to carry out a case study to explore this question because the case study method is preferable when investigating real life phenomenon in depth [7] and because the case study method gives a freedom to select most appropriate instruments for data collection and allows investigators tap into multiple data sources.

Our case describes and analyses the Swiss postal service from the security perspective. We decided to focus on Switzerland because of its advanced postal service. Also practical and confidentiality issues influenced our decision to select Switzerland.

We exploited multiple sources of evidence and data collection methods in order to build a rich and compelling case study description. In addition to interviews, we reviewed Swiss Post's internal documents, analyzed case-related publicly available reports and statistics and conducted on-site visits. Our use of multiple sources of evidence in the case study research is consistent with [7] who argues that the triangulation of data sources increase validity of research.

We interviewed nine experts over the course of the data collection. We sent questions to the interviewees beforehand. We audiotaped interview sessions, transcribed the tapes down to a reasonable detail, and sent the transcriptions to the interviewees for commenting. Table IV presents titles and affiliations of the interviewees and indicates if the interview sessions involved more than two people (= group interview).

TABLE IV
 INTERVIEWEES

Organization	Interviewees
Swiss Post	Security manager Import manager Tax specialist
Swiss Customs	Risk assessment specialist Security specialist
Cantonal Police	Vice-chief
INTERPOL	Senior crime analyst Counter-terrorism specialist
World Customs Organization	Technical officer 1 Technical officer 2

As recommended by [8] and [9], we engaged in overlapping collection, coding and analysis of research data. In the analysis stage of our research, we scanned through our case study database and searched for evidence that would support or conflict with our theoretical propositions.

IV. LITERATURE REVIEW

A. Supply Chain Security

The “9/11” terrorist attacks in the US in 2001 were the wakeup call for policy makers and business executives worldwide. The heightened awareness of the transnational terrorism resulted into an unprecedented wave of security initiatives across industries. In the logistics and transport sector, new security initiatives shifted the focus of SCS efforts from theft prevention towards counter-terrorism [10].

Reference [11] defines supply chain security management as “the application of policies, procedures, technology to protect supply chain assets (product, facilities, equipment, information, and personnel) from theft, damage, or terrorism, and to prevent the introduction of unauthorized contraband, people, or weapons of mass destruction into the supply chain.” Reference [4] argues that supply chain security management is a sub-discipline of supply chain risk management. Supply chain risk management focuses on a full spectrum of sources of uncertainty having potential to affect objectives of logistics operations. SCS deals exclusively with the risk of deliberate man-made activities that exploit commercial supply chains for criminal purposes [5].

Reference [12] identifies three areas for SCS improvement: governmental initiatives, management strategies, and operative routines & technical systems. Reference [13] provides an extensive listing of investment options for SCS. They argue that investments in SCS may bring a variety ‘collateral benefits’ that range from increased customer loyalty to reduced safety stock levels. Their notion is consistent with [14] who argue, in the light of case study evidence that measures to enhance supply chain visibility result also in increased SCS.

Many authors have explored the ‘post-2001’ SCS regime. Reference [15] gauged the operational impact of the Container Security Initiative (CSI) by simulating sea container movements through two major logistics terminals. References [16] and [17] studied implications of the Customs-Trade Against Terrorism (C-TPAT) program to the maritime logistics. Reference [18] assessed compliance costs of the ISPS (International Ship and Port Facility Security) for port operators. Reference [19] created a general supply chain management framework by linking security requirements of nine voluntary SCS programs with distinct management domains.

B. Postal Security

Academic research on postal security seems to be at an early stage. We managed to locate only a handful of journal papers, conference proceedings, and dissertations on the topic.

The *Journal of Contingencies and Crisis Management* has

published an issue with multiple contributions discussing consequences and responses of the Anthrax threat to the postal system (see for example [20]). Reference [21] introduces a methodology for *ex ante* assessment of preconditions and costs (monetary and non-monetary) of SCS investments. They demonstrate their method by assessing optimal security measures for controlling unauthorized access to express mail pick-up and delivery vans.

The doctoral dissertation of McCarthy [22] is probably the most comprehensive academic contribution on postal security management to date. The thesis outlines security governance and management practices at the Royal Mail. The dissertation focuses on theft and terrorism while leaving trafficking with less attention. Reference [23] attempts to link postal security to the general frame of SCS. Unfortunately, the paper builds on very limited and anecdotal data and fails to recognize theoretical roots of the SCS discipline.

Reference [5] introduces a generic taxonomy that categories supply chain crime into six distinct classes. They use case study data, collected from Swiss Post, to validate the taxonomy. Their paper provides an outlook on attitudes of Swiss Post’s managers with respect to various areas of postal security.

C. Drivers of Supply Chain Security

Reference [24] investigates external drivers that motivate companies to pursue towards better SCS. They root their analysis to the institutional theory. Reference [25] posits that organizations adapt their behavior in search of congruence with the surrounding institutional environment. The adoption of dominant rules, values and models leads to isomorphism among the organizations. That is, the organizations start to resemble each other. Reference [25] advances that three types of external pressure contributed towards the isomorphism: coercive, social and mimetic pressures.

According to [24], governments, customers, the society and competitors are the four main sources of external pressure that motivate companies to pursue towards better security in their supply chains. They argue that governments and customers exert coercive pressure in forms regulations, laws, policies and initiatives. The society is a source of normative pressure – the organizations perceive that they have a moral and ethical duty to conform to values and expectations of the society. Also [26] remarks that the society often expects that especially large companies have secure supply chains. Williams et al. [4] suggest that competitors are the source of mimetic pressure, that is, the desire to appear and act like successful and ‘legitimate’ peer organizations.

While [24] attribute the firms’ engagement in SCS to the external pressure arising from governments, customers, the society, and competitors, [27] find evidence that also suppliers drive security of their customers. They conclude that companies tend to partner with organizations that operate at the commensurate security level. Therefore, companies with high supply chain security often expect high security standards of their business partners. Table V summarizes the sources of external pressure found in the SCS literature.

TABLE V
 EXTERNAL SOURCES OF PRESSURE

Source of external pressure	Reference
Governments	[24]
Customers	[24], [27], [26]
Suppliers	[27]
Competitors	[24]
Society	[24], [26]

References [7] and [9] recommend researchers to use theoretical propositions to guide their qualitative research. In the following paragraphs, we formulate theoretical propositions for our case study.

The theoretical and empirical research on SCS suggests that external sources of pressure influence managerial decision-making in SCS. Therefore, we posit following theoretical proposition:

- Proposition 1: All five sources of external pressure drive Swiss Post's security management.

In addition to the economic operators, authorities are closely involved with SCS. The extant literature on SCS does not provide evidence why authorities engage in supply chain security. Our research investigates the authorities' reasons to engage in supply chain security by searching case study corroborating and conflicting evidence for and against the following proposition:

- Proposition 2: Authorities engage in postal security *only* because of their legal mandate.

V. CASE STUDY

A. Swiss Post

The Swiss Post Group is a state-owned corporation that provides a large variety of postal, logistics, financial, retail and public transportation services. Three Group units, PostMail, PostLogistics, and Post Offices & Sales, are involved with the fulfillment of the postal service obligations arising from the Swiss postal law (RS 783.0) and the provisions of the UPU Convention and its regulations. Swiss Post has a monopoly for the delivery of letters up to 50 grams. In the open market, Swiss Post's logistics and mail units compete mainly with the Swiss branches of the global express couriers FedEx, DHL and UPS.

The Security & Safety Standard Policy defines the aim and the scope of security and safety management at Swiss Post as follows:

“Protecting the life, health and physical safety of employees, customers and partners is accorded the highest priority. We will comply with all statutory requirements, safety regulations and contractual obligations. By continually reviewing security risks, we ensure active security planning and preventive measures within our area of responsibility.”

The security manager of Swiss Post emphasized that Switzerland is a tranquil country. Thus, security has not been historically high on the Swiss Post's managerial agenda. Currently, post office robberies and the recently escalated threat of mail bombs are the main security concerns for Swiss Post. The Swiss Post's security manager considered that the

implementation of anti-robbery and anti-bomb measures is a moral duty. Similarly, the security manager considered that even though stolen mail is a very small problem, when contrasted with the huge volumes of processed mail, Swiss Post should make all possible to reduce the theft for the sake of better customer service and credibility.

The security manager of Swiss Post perceives that security has become an increasingly important element in the postal service due to the pressure of supranational organizations and security-centricity of certain governments.

“We need to comply with regulations. Not because they are convincing but more because they are mandatory.” (Security Manager, Swiss Post).

The quote is an illustrative example about the perception of the Swiss Post's management towards air safety and security. They consider that many requirements in the airmail regime are too strict, burdensome and unnecessary. The security manager of Swiss Post pointed out that their competitors should be also obliged to implement the same security measures than Swiss Post. According to him, that's the only way to guarantee fair competition.

B. International Postal Lobbies

The UPU represents the Posts at the global level. PostEurop and the International Post Corporation (IPC) are the main postal lobbies in Europe. The PostEurop, a recognized restricted union of the UPU, is a works for the benefit of all UPU member posts in Europe. All members of the UPU, PostEurop, and IPC are “designated operators” and have thus universal service obligations. These three primary organizations are interested in contributing towards reliable and profitable postal service worldwide. They try to influence the ICAO, WCO, the European Commission and other policy-making bodies to formulate security policies that are aligned with the interests of the Posts.

C. Swiss Customs

The Swiss Customs law (RS 631.0) defines the legal mandate for the Swiss Customs administration. The law sets rules for the collection of duties, taxes and fees from the international traffic as well as surveillance and controls of the movement of people and goods across the Swiss borders. In addition to these customs-specific tasks, the customs law (Art. 95) mandates the customs to assist other federal and regional offices to fulfill their responsibilities. Altogether, around 150 pieces of legislation lay the basis for the operation of the Swiss customs.

The abundance of responsibilities calls for prioritization. Every fourth year, The Federal Department of Finance issues a mandate where it defines priorities, goals and performance measures for the customs for following four-year period. The drafting of the mandate includes constant dialogue between governmental agencies, the customs and the Ministry of Finance. The priorities of the mandate influence operational activities of the customs.

International trade is vital for the export-driven Swiss economy. Thus, the Swiss government and industries expect

that the customs to carry out its tasks with minimum disruptions to the legitimate commerce and travel. Regarding to the postal traffic, Switzerland has signed the Annex J of the WCO's Revised Kyoto Convention that obliges the customs to carry out the clearance for postal items as rapidly as possible (Chap. 2, standard 3).

The number of people working for the customs has been declining over the years. At the same time, the cross-border traffic has been expanding and the government has given more responsibilities for the customs. As a result, the Swiss customs has been forced to improve productivity. The electronic declaration (e-dec), the use of risk analysis, and the shifting some tasks from the customs to the private operators are examples of the initiatives aiming at enhanced productivity. The agreement between the European Union and the Swiss Confederation on customs security measures and simplification of customs formalities (RS 0.631.242.05) facilitates trade between EU member states.

The primary tasks of the Swiss Customs include the collection of duties, fees, excise taxes and VAT from the international traffic; safeguarding and supporting the Swiss economy; protection of the population and the environment; contribution to the national and international security; and cooperation with national foreign authorities. In short, the Swiss customs are interested in illegal, dangerous, or non-compliant cross-border movements.

The Swiss Customs does not collect duties or taxes less than 5 Swiss Francs (CHF) (duties, VAT, and excise are considered separately). Duties are in Switzerland primarily *weight-based and not ad valorem* like in most countries. For example, duty for chocolate is 10 CHF per 100kg. Majority of commodities are subject to the standard 8% VAT rate. Books, medicines and some other articles benefit from the lower 2.5% duty rate. This means that an importer needs to pay VAT only if the value of his shipment (= value of contents + postage + other transport fees) exceeds 62 CHF for standard goods and 200 CHF for goods subject to the preferential VAT rate. Moreover, gifts are exempt from duty and VAT payment if their value is less than 100 CHF. The Swiss government has levied excise tax on tobacco products and alcohols. The customs specialists assured that the postal traffic with relatively low value items is only a marginal source of tax, duty and excise revenues. Therefore, tax and duty evasion in the postal traffic is more a moral than financial problem from the customs perspective, as the quote below illustrates.

"It is true that the money raised in the postal and global courier traffic is just a few millions [each year]. We raise a few billions [in total] in taxes. So the postal traffic is quite peanuts. The higher risk is smuggling in illegal stuff than the fiscal risk." (Tax specialist, Swiss Customs)

The task of safeguarding the Swiss economy includes controls on imported agriculture products, the combat against counterfeits, and efforts towards trade facilitation. The protection of the population and the environment includes the enforcement of illicit trade in firearms, narcotics, sub-standard

consumer and industrial goods and CITES² protected species. Internal and international security aspect covers controls for military and dual-use goods as well as ensuring secure transport of merchandise at the Swiss territory. The latter statement infers the role of Swiss Custom in supply chain security.

Risks involved with postal traffic are often smaller in comparison to the threats in the freight or passenger traffic. Swiss Customs generates only a fraction of its total tax and duty revenues with the postal traffic. Major shipment of illegal narcotics, counterfeits, weapons, dual-use goods travel outside the postal system. There are supply chain security risks involved with the mail delivery. Still, like the following quite suggests, bigger risks loom in the freight transport.

"The worst-case security incident in the mail channel would be a dropped passenger plane. This threat is significant but not as big as the threat of a 'dirty bomb' in a sea container." (Technical officer 2, WCO)

D. Federal Office of Civil Aviation

Switzerland is one of the 191 signatories of the ICAO's Chicago Convention that governs the international civil aviation. Since June 2002, Switzerland is integrated into the legislative framework of the European Union on the civil aviation matters (RS 0.748.127.192.68). Accordingly, the framework regulation EC 300/2008 on the common basic standards on aviation security, its supplementing regulation EC 272/2009 and the implementing regulation No 185/2010 (amended by EC 859/2011) set the baseline for airmail security in the 27 EU countries, Norway, Iceland, Liechtenstein and Switzerland.

The Federal Office of Civil Aviation (FOCA), a special office under the Federal Department of Environment, Transport, Energy and Communications, regulates and monitors the civil aviation in Switzerland (RS 748.0). One could assume that due to the binding international regulations, FOCA monitors the implementation globally standardized aviation security measures in Switzerland. The following quote illustrates that the reality is the contrary – the CAAs have much freedom for interpretation of the international rules.

"Now it's really interesting to observe that each country is applying the measures in a different way." (Security manager, Swiss Post)

E. Airlines

We have anecdotal evidence that airmail accounts for fewer than 3 % of airline revenue and about 4 % of air cargo measured by Revenue Tonne Kilometers [28]. At the same time, the security manager of Swiss Post estimates that around 2 % of Swiss Post's mail travels by air.

Due to the Yemen incidents, many airlines realized the vulnerability of the airmail for security breaches. Moreover, investigations of the UPS airlines Flight 6 crash in September 2010 in Dubai, revealed that the most likely reasons for the

²Convention on International Trade in Endangered Species of Wild Fauna and Flora.

accident was the ignition of undeclared lithium batteries in the cargo hold [29]³.

A plane crash would lead to huge financial and reputational losses for the airlines. Thus, some airlines are reconsidering risks and benefits associated with carriage of mail in passenger planes.

F. The Police

All 26 Swiss cantons have their independent police forces that are competent to act upon all criminal matters in their respective jurisdictions. Switzerland has also the Federal Police which is responsible for the international collaboration and takes part in investigations on money laundering, cyber crime and some other specific fields. The communal police forces support the Cantonal Police forces by keeping order in cities and controlling traffic.

The police are interested in the postal traffic when they need to monitor correspondence of suspects under the criminal investigation or when the police have intelligence that something illegal is going to take place in the postal channel. The police do not carry out routine checks to sorting centers or post offices. When the postal workers or authorities, the customs officers in particular, suspect that they have encountered stolen goods, narcotics or other contraband, they contact the police. The police then take over the cases and starts investigations. Post offices robberies and thefts of mail are also police matters. Nevertheless, Swiss Post, or the postal service in particular, does not have a special standing in the books of the Swiss Police forces.

“The Post is one of the possible partners in an inquiry. We work with all the people who can give answers to us.” (Vice-chief of Cantonal Police)

However, the vice-chief of the Cantonal Police highlights that the police is prepared to deal with a heightened risk originating from the postal system. Police tactics are based on risk assessment – if there is not a reason to control the postal channel, the police priorities more urgent tasks.

“Of course, we could have Anthrax once for real. After that it’s a question of proportionality. Do we employ a hundred of people to enforce something 24/7? Things happen sometimes. If we don’t have information, we adapt the security system according to the risk.” (Vice-head of the Cantonal Police)

The counter-terrorism expert at INTERPOL shares the view of the Vice-chief of the Cantonal Police by stating that terrorist apply a broad array of techniques and *modi operandi* to reach their illicit ends. The postal service is only one way for terrorists to communicate, exchange goods and carry out attacks.

VI. DISCUSSION

All stakeholders assured that their security activities are based on ‘risk assessment’. In principle, this means that the stakeholders prioritize risks with high impact and likelihood over low probability risks with low estimated consequences.

³ Even though the investigators did not find evidence of terrorist involvement, the al-Qaeda claimed the responsibility for the air freighter crash as part of the Yemen incidents.

The ISO risk management standard defines risk as ‘the effect of uncertainty on objectives’. Here, the key observation is that different stakeholders have distinct objectives and thus perceive risks differently. They also perceive probability distributions and risk consequences in a different way.

We found some evidence to support our first proposition that all five sources of pressure, arising from governments, customers, suppliers, competitors and the society, influence Swiss Post’s security management. Governmental pressure means laws and regulations on the global, regional (EU) and national levels. Customers’ interests are important for Swiss Post. This is why the security management of Swiss Post puts a lot of effort to theft prevention and investigation. The airlines are suppliers of transport services for Swiss Post. As the airlines are questioning the security of airmail and encouraging the Posts to increase their airmail security, supplier pressure plays a role in the postal systems. Competitors and peer Posts are sources of best security practices for Swiss Post and thus influential stakeholders in the Swiss Post’s security management. In particular, we see that foreign Posts exert strong pressure through the UPU. The managers of Swiss Post consider the protection of postal workers, authorities and clients from violence a moral but not necessarily a legal obligation. This is an indication of the societal pressure.

We can distinguish two main managerial domains in the postal management. First, compliance management aims to find most cost-effective ways to meet mandatory governmental security provisions. The second domain, security risk management, deals with security measures going beyond the regulatory compliance. Here, the managers aim to mitigate security risks in a way that contributes towards the goals of *the business*.

The second proposition, suggesting that authorities engage in supply chain security only because of their legal mandate, is partly supported by the evidence. However, it seems that authorities have a substantial freedom to decide their operational priorities and tactics. Thus, for example, pressure from other governmental agencies may influence customs decisions to prioritize certain risk at the expense of others. Companies and the public opinion have an impact on decisions regarding tactical priorities and resource allocations of the law enforcement agencies.

REFERENCES

- [1] UPU, 2012. Postal Statistics – a summary, Economic and regulatory affairs directorate
- [2] IPC, 2010. IPC cross-border e-commerce report
- [3] Christin, N., 2012. Traveling the Silk Road: A measurement analysis of a large anonymous online marketplace (CMU-CyLab-12-018).
- [4] Williams, Z., Lueg, J.E. & LeMay, S.A., 2008. Supply chain security: an overview and research agenda. The International Journal of Logistics Management, 19(2), pp.254–281.
- [5] Männistö, T., Hintsala, J., Urciuoli, L., Supply Chain Crime – Taxonomy Development and Empirical Validation, International Journal of Shipping and Transport Logistics, forthcoming.
- [6] Näslund, D., 2002. Logistics needs qualitative research—especially action research. International Journal of Physical Distribution & Logistics Management, 32(5), pp.321–338.
- [7] Yin, R.K., 2009. Case Study Research, Sage Publications.

- [8] Eisenhardt, K.M., 1989. Building theories from case study research. *Academy of Management Review*, pp.532–550.
- [9] Miles, M.B. &Huberman, A.M., 1994. *Qualitative Data Analysis: An Expanded Sourcebook* 2nd ed., Sage Publications, Inc.
- [10] Sheffi, Y., 2001. Supply chain management under the threat of international terrorism. *The International Journal of Logistics Management*, 12(2), pp.1–11.
- [11] Closs, D.J. &McGarrell, E.F., 2004. Enhancing security throughout the supply chain.
- [12] Urciuoli, L., 2009. Supply chain security—mitigation measures and a logistics multi-layered framework. *Journal of Transportation Security*, 3(1), pp.1-28.
- [13] Rice, J.B. &Spayd, P.W., 2005a. *Investing in Supply Chain Security : Collateral Benefits* Special Report Series.
- [14] Sternberg, H., Nyquist, C. & Nilsson, F., 2012. Enhancing Security Through Efficiency Focus—Insights From a Multiple Stakeholder Pilot Implementation. *Journal of Business Logistics*, 33(1), pp.64–73.
- [15] Bakshi, N., Flynn, S.E. &Gans, N., 2011. Estimating the operational impact of container inspections at international ports. *Management Science*, 57(1), pp.1–20.
- [16] Sheu, C., Lee, L. &Niehoff, B., 2006. A voluntary logistics security program and international supply chain partnership. *Supply chain management: an international journal*, 11(4), pp.363–374.
- [17] Banomyong, R., 2005. The impact of port and trade security initiatives on maritime supply-chain management. *Maritime Policy & Management*, 32(1), pp.3–13.
- [18] Bichou, K., 2004. The ISPS code and the cost of port compliance: An initial logistics and supply chain framework for port security assessment and management. *Maritime Economics & Logistics*, 6(4), pp.322–348.
- [19] Gutierrez, X and Hintsa, J (2006), “Voluntary supply chain security programs: a systematic comparison” ILS 2006. The International Conference on Information Systems, Logistics and Supply Chain, Lyon, France, May 15-17
- [20] Babbs, C. & O'Connor, B., 2003. Dealing with the threat of an attack through the post using biological agents: the UK experience. *Journal of Contingencies and Crisis Management*, 11(3), pp.118–123.
- [21] Haelterman, H., Callens, M. &Beken, T.V., 2012. Controlling Access to Pick-up and Delivery Vans: The Cost of Alternative Measures. *European Journal on Criminal Policy and Research*, pp.1–20.
- [22] McCarthy, K., R., C., 2019. *Crime, Risk and Security the Identification and in Management of Risk-Distribution Pipeline' of Royal Mail*. Doctoral dissertation, the University of Portsmouth.
- [23] Hintsa et al. (2010a), “A holistic framework on voluntary SCS programs and standards – tool for analysis and design”, *Journal of Transportation Security*, Spring 2010 Issue.
- [24] Williams, Z., Lueg, J., E., Taylor R., D., 2009. Why all the changes?: An institutional theory approach to exploring the drivers of supply chain security (SCS). *International Journal of Physical Distribution & Logistics Management*, 39(7), pp.595–618.
- [25] DiMaggio, P.J. and Powell, W.W. (1983), “The iron cage revisited: institutional isomorphism and collective rationality in organizational fields”, *American Sociological Review*, Vol. 48, pp. 147-60.
- [26] Sarathy, R., 2006. Security and the global supply chain. *Transportation journal*, pp.28–51.
- [27] Autry, C.W. & Bobbitt, L.M., 2008. Supply chain security orientation: conceptual development and a proposed framework. *The International Journal of Logistics Management*, 19(1), pp.42–64.
- [28] David, P., Stewart, R., 2010 *International Logistics: Management of International Trade Operations*
- [29] General Civil Aviation Authority of the United Arab Emirates, 2010. *Air Accident Investigation Interim Report*, accident reference 13-2010.