LOGIC

CROSS BORDER SUPPLY CHAIN SECURITY

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Abstract: Cross-border supply chains are extremely dynamic, increasingly complex because of a growing number of the participants and vulnerable to a large number of threats and hazards. Securing the supply chain and ensuring its smooth functioning at the same time is essential to the national security and economic prosperity. As people all over the world rely on the goods transported by the global supply chain system, all participants must cooperate in dealing with this problem. The cross-border supply chain security problem and procedures for improving the security are the main topics of this paper.

Keywords: supply chain, security, customs, visibility, standards

1. INTRODUCTION

The terrorist attack on the World Trade Centre 11th September 2001 has changed the world and consequently, the providing of logistic services. It is important to note that these logistics disruptions were not caused by the attack itself, but by the government's response to the attack: closing the borders, closing the air traffic zones and evacuating buildings all over the country. In the decade following the terrorist attacks in New York City, security has taken on a significant role in the global supply chain system. Before the attacks, the main thought was- the right goods at the right time. Today, we may add, safely delivered. The focus of the supply chains is often on the speed of completing the operations, which can hinder monitoring the safety. In order to ensure the supply chain security, it is necessary to use a multiobjective approach to safety which includes well-defined protocols, understanding of world regulations, employee training, physical security measures, performing detailed checks on the participants, video surveillance for warehouses and cargo loading/unloading operations and using safe facilities.

The problem of cross-border supply chain security is the main topic of this paper, which consists of four parts. The first part describes different threats and risks which companies encounter while operating in global supply chains. The second part deals with the role of Customs in international flow of goods. It describes different challenges which cross-border workers encounter, programmes for improving safety on border crossings, different participants interested in cross-border security and importance of non-invasive inspections. The third part refers to different standards for improving supply chain security. The last, fourth part, refers to the visibility problem, ways of improving the visibility and development of different technologies and equipment which can improve cross-border supply chain security.

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2. CROSS-BORDER SUPPLY CHAIN SECURITY PROBLEM

As organizations keep on developing their supply chains, they rely to a great extent on transport providers, with the aim of delivering and protecting their shipments. Transporters need to ensure constant tracking of shipments, in order to avoid freight thefts, hijackings and smuggling. This sector also experience natural disasters threats, which could have negative impact on business and cause delivery delays and damages to goods. With the aim of mitigating these risks, providers need to be able to identify global threats and react quickly to them. Only some of the threats which cross-border supply chains experience will be described in this paper.

Losses and thefts

The term ''inventory shrinkage'' is used for all the losses made between the point of manufacturing or purchase from the supplier and the point of sale. The average shrinking rate is 1.8% of total annual sale. That means that a $ 33.21 billion loss is made annually in the USA. Authors mention four main causes of losses: thefts by employees, thefts in stores, administration errors and frauds by sellers. In European countries, consumer goods have the following losses: 26 % production losses, 8% distribution losses and 66% retail losses. Transport and distribution losses amount to 14% of total sales for all kinds of products. It has been estimated that thefts cause a $10 billion loss in the USA and $30 billion loss worldwide. The value of the cargo stolen in the EU is estimated at EUR 8.2 billion a year. It is extremely difficult, and in some cases even impossible to collect precise data on cargo theft loss.

Terrorism

The word 'terror' comes from Latin, meaning 'to scare'. The lack of universal definition of terrorism can be described with the comment: ''one country's terrorist is another country's fighter for freedom.'' According to the data from the EU, the main threat comes from separatist movements, with Islamic terrorism as the biggest threat. The official statistics concerning the transport lead us to the following conclusions:

- Transportation activities make 4% of goals in 2006 and 5% of goals in 2007.

- The main methods of attack are an armed attack and bombing.

- Target areas of terrorist activity are the Middle East and Asia.

Smuggling of goods

The main target of illegal products is the black market. It consists of places and situations in which suspicious and illegal products are sold. Black market has the same laws of supply and demand as regular markets. Statistic reports show that the trade in counterfeit and pirated products in 2007 amounted to 176 billion dollars. In 2006 three million pharmacy products were proven fake. Supplying of the black market can be illustrated with the example of smuggling of cocaine in the USA. Illegal supply chains come mainly from South America. Smugglers use roads, sea routes and airways to avoid American authorities. The whole distribution of cocaine is controlled by Colombia's organized crime. In recent years, however, they have included Mexican cartels in the process in order to simplify the logistics and share the risk. Colombians have made a business network by making cells for special purposes like storing and transport. In order to be able to supply their customers, these markets are very flexible and resistant to outside influence. The supplying of a typical gray market can be illustrated as an illegal smuggling of counterfeit products. Gray market includes diverting of goods from illegal supply chains. There is a risk that this market could be discovered by the authorities or companies whose products are copied. This diversity results in different supply chain designs. Supply chains of counterfeit products use the same freight routes and port operations as the legal chains. These products best sell in Europe and the USA, whereas transitions are mainly done across Africa [1][2].

Migration crisis

The recent influx of migrants into Europe has lead to the greatest migration crisis since World War II. Conflicts in the Middle East, North Africa and central Asia, which caused this situation, do not seem to subside. Because of the rapid flow of migrants in the last two years, members of the EU have taken extraordinary measures, including imposition of new border controls in the entire region. These measures hinder the free movement of goods in many regions of the continent, which causes serious delivery delays, increases costs of cross-border shipments, whereas attacks at freight carriers cause great losses of expensive goods [3].

3. BORDER CONTROL PROCEDURES AND MEASURES

The increase in global trade and importance of cross-border transactions are forcing the governments to introduce more efficient border procedures. From the logistic point of view, it is essential to implement border actions for the goods in transition across two or more countries, so they could become part of the untroubled process in a supply chain. That requires unique and internationally accepted documents which can be transferred by IT systems. Customs organizations must have well trained and well paid personnel, who are aware of their importance in supply chains. Trade and transport have experienced a number of new risks in the past few years.

3.1 Participants interested in border security and partnership with the private sector

Each control relies on business entities which report the data to agencies responsible for border control. Business entities involved in international trade can be classified into one of the categories: traders, transport and related services, facilities and infrastructure.

Table 1: Business entities which take part in international trade [4]

TRADERS	TRANSPORT AND RELATED SERVICES	FACILITIES AND INFRASTRUCTURE
Small and medium-sized enterprises	Sea companies	Seaports
Big and multinational enterprises	Ferry operators	Ferry ports
Foreign companies and investors	Air companies	Airports
Exporters/importers from the same industrial branch	Trucking companies	Railroad terminals
Exporters/importers from different economic branches	International railway companies	Container port operators
Distributors and retail traders	Logistics services providers	Port operators and workers
Buyers and sellers representatives	Freight forwarder	Freight operator and loading-unloading workers
Foreign companies exporting from developed countries	Customs mediators	Storekeepers
Foreign companies exporting from less developed countries	Banks and financial companies	Transit stores operators
	Insurance companies	Port system service providers
		IT service providers and personnel responsible for the development of IT system

Efficient cross-border procedures depend to a great extent on managing the whole supply chain, from materials providers to end users. Logistic have an important role in managing the supply chain. In practice, end users are connected with manufacturers, final products and spare parts thanks to global supply chains. These chains cross from one country's industry into another country's industry. Participation and collaboration of the users from the private sector initiates enhancement of trading performance and competitiveness. The following table displays different participants involved in these operations.

Table 2: Users from the private sector [4]

TYPES OF PRIVATE USERS FROM THE PRIVATE SECTOR	USERS FROM THE PRIVATE SECTOR
Clients	Buyers, payment sender, recipients, importers
Providers/Suppliers	Sender, payment recipient, seller, manufacturer, exporter
Mediators	Bank, customs mediator, exporter and sender, storekeeper, company responsible for checking the credit, trading representative, export representative, company responsible for inspection, railway wagon drivers, logistics centre officials

3.2 Programmmes for improving safety on border crossings

The goal of all programmes conducted by customs organizations is increasing the security in supply chains and facilitating trade.

Authorised Economic Operator (AEO)

The EU introduced this status because of AEO initiative which encouraged customs organs in the Member States to adopt safety measures in supply chains. The goal of this programme is improving the security of the supply chains and ensuring better efficiency which could reduce the costs. It entered into force January 1st 2008 and it is valid throughout the entire EU territory. Authorised Economic Operator is the party which participates in international movements of goods with any functions which meet standards of the World Customs Organization or equivalent supply chain security standards and are thus approved by National Customs Administration. It consists of manufacturers, importers, exporters, mediators, transporters, freight forwarders, port, airport and terminal workers, integrated operators, storekeepers and distributors. [4]

Customs-Trade Partnership Against Terrorism

One of the first reactions of the US Government after the terrorist attacks on September 11th 2011 was creating a new security environment by adjusting and relying on the existing programmes of partnership with the private sector which by then focused primarily on drug trade. These efforts resulted in creating Customs-Trade Partnership Against Terrorism. This programme applies only to import and covers only sea transport [6].

Container Security Initiative

Uses risk estimation criteria to make a prior selection of high risk containers before loading them on ships in international sea ports and sending them to the USA. It was created after the terrorist attack on September 11th 2011 in order to prevent legal trade containers from being used for terrorist activity. In the beginning, it focused on twenty biggest sea ports having a large trade volume with the USA. At the moment, the initiative comprises over fifty sea ports [5].

Secure Freight Initiative

This initiative is financed by U.S. Department of State Security and Department of Energy. It is directed at upgrading the existing security measures in sea ports, in order to prevent terrorists

from using nuclear and radiological materials for attacking the global sea supply chain and from using freight containers for exporting resources for such attacks. This initiative improves the ability of U.S. Government to scan containers in other countries, so that it can discover nuclear and radiological materials and make better risk assessments of incoming containers by using high technology devices, integrated systems and other technologies made for scanning sea container freights [4].

3.3 Non-invasive border inspections

In the past, all inspections used to be invasive. When a border agency was interested in a shipment, they opened the container or truck. Then they inspected everything that was in it. The agency often had to physically move the freight, inspect it and reload it on the vehicle. Thanks to advances in technology, invasive inspections are no longer necessary and are made only in exceptional cases.

Most non-invasive freight inspections are now made by scanning devices, normally by scanners which use x-rays. Then an operator examines the image in order to identify potential irregularities. There is no need to open or remove a container seal or take any parts of the freight. Scanners also enable manifest verification and detection of certain materials[4].

4. STANDARDS FOR IMPROVING SUPLLY CHAIN SECURITY

Along with different technologies and equipment, different types of standards have been established in order to improve supply chain visibility and security. Some of them will be covered in this paper.

ISO 28000-Supply Chain Security

Is a standard developed especially for logistics companies and other organizations that run supply chain operations. Its final goal is increasing supply chain security. It is a high-level management standard that enables organizations to establish an overall supply chain security management system. ISO 28000 requires the organization to assess the security environment in which it operates, to determine if adequate security measures have been applied and to identify relevant regulatory requirements with which it should comply. If security needs are identified by this process, the organization should implement mechanisms and processes to meet these needs.

Tapa standards

TAPA (The Transported Asset Protection Association) is a unique forum that unites global manufacturers, logistics providers, freight carriers, law enforcement agencies and other participants with the common aim of reducing losses from supply chains. Today, TAPA has over 700 members. It applies global security standards, best industry practices, technology, education, benchmarking, regulatory collaboration and the proactive identification of supply chains crime trends. [7]

5. IMPROVEMENT OF SUPPLY CHAIN SECURITY

Companies are facing different problems today: wasting time, because shipments are scheduled manually and products are tracked from channel to channel, missed opportunities from not knowing the exact quantity of goods in transit and stock availability, strained relationships because of delivery delays. The common element of these problems is a lack of visibility. Supply chain visibility is the ability to view products as they are being transferred from the manufacturer to their final destination. The goal is to improve and strengthen a supply chain in order to make data available to all parties interested in the process, including the buyer. As the

visibility started to gain in importance, different companies have developed different solutions, and as a result, there is a whole spectrum of solutions for improving the visibility.

In order to ensure the freight, vehicles and personnel, different technologies and equipment have been developed over the decades, which are to meet different supply chain challenges. Developing security equipment has been a long process. Today, systems are open, image quality is higher, videos are used more often. A lot of logistics providers have developed new security services in order to gain competitive advantage over other companies at the market. It was essential to develop a service which would enable basic asset tracking in real time. Along with the freight and assets, data are exposed to certain risks. Combining physical and internet security is a market imperative. Despite tremendous progress and highly sophisticated solutions, we still do not have a prefect tracking technology. The best option for companies would be a 24/7 visibility, but there are always some limitations. Despite these limitations, every step to better supply chain visibility is a step in the right direction. [8][9].

6. CONCLUSION

The problem of global supply chain security keeps growing, attracts more and more attention and a lot of authors examine it from different perspectives. The event that has changed the world was the terrorist attack in New York in September, 2001. In the last decade, a lot of effort has been put into improving the global supply chain security. However, with the growth of companies grows the criminal rate. The supply chain is growing in complexity, includes an increasing number of participants, who are difficult to control. Therefore, the first step in increasing security may be choosing and cooperating with partners a company can trust. Along with the traditional deployment of RFID, GPS and barcode marking of companies, they have developed sophistic solutions which use cameras and videos. Some authors also mention a variety of different solutions which will have been applied by 2025. All these technologies and standards should increase the security, without hindering different operations. Border crossings and their official hold the greatest responsibility. New security programmes and technologies which should their work easier and improve efficiency and security are constantly being developed.

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