

## Chapter 7

# Building an Expert–System for Maritime Container Security Risk Management

**Jaouad Boukachour**  
*University of Le Havre, France*

**Charles-Henri Fredouet**  
*University of Le Havre, France*

**Mame Bigué Gningue**  
*University of Le Havre, France*

### ABSTRACT

*Until lately, transportation risk management has mostly dealt with natural or man-made accidental disasters. The September 11th tragedy has made transportation operators, as well as shippers and public authorities, aware of a new type of risk, man-made and intentional. Securing global transportation networks has become an important concern for governments, practitioners and academics. In the current time-based competition context, securing transportation operations should not be sought at the expense of time effectiveness in physical and informational flow processing. In this paper, the authors describe a project for the design of an expert-system dedicated to maritime container security risk management, present a literature review on decision-support systems dedicated to transportation risk management, and discuss the various steps of expertise modeling in a transportation risk management context.*

### INTRODUCTION

Until lately, transportation risk management has mostly dealt with either natural or accidental man-made disasters (Merrick, Dorp, Mazzuchi, Harrauld, Spahn, & Grabowski, 2002) focusing

therefore predominantly on incident prevention and consequence mitigation.

9/11 tragedy has made transportation operators, as well as shippers and public authorities, aware of a new type of risk, still man-made but this time intentional (Abkowitz, 2003).

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Securing the global transportation networks has thus become an important concern for governments, practitioners and academics, and all the more so as:

1. Beyond terrorism-related risks, lie numerous other intentional man-made transportation risks such as drug smuggling or tax avoidance: e.g., “South African ports face a relatively low risk of international terrorist attack, but high incidences of illegal human movements through stowaways and trafficking as well as smuggling of illegal substances” (Maspero, Van Dyk, & Ittmann, 2008).
2. In a widely spread time-based competition context, securing transportation operations should not be sought for at the expense of delay effectiveness in physical and informational flow processing: e.g., “the WCO passed a unanimous resolution in December 2007, expressing concern that implementation of 100 percent scanning would be detrimental to world trade and could result in unreasonable delays, port congestion, and international trading difficulties” (Caldwell, 2008).

In the past 5-6 years, various initiatives have been launched reflecting this concern (Bichou, Bell, & Evans, 2007) for a detailed presentation of these initiatives), as “Governments and industry have all responded with proposals to create more confidence in supply chain security, while maintaining smooth flows of goods and services in a global supply chain” (Lee & Whang, 2005):

- As from 07/01/2004, the International Ship and Port facility Security (ISPS) Code launched by the International Maritime Organization (IMO), aims at detecting security threats, assessing security and ensuring that adequate measures are in place, based on collection and exchange of secu-

rity information and the establishment of roles and responsibilities in the risk management process.

- The Container Security Initiative (CSI) has been designed in 2002 by the US Customs and Border Protection (CBP) Administration to identify potentially high-risk containers and evaluate the risk actually brought by these containers before they are shipped to the US, using such screening devices as X-ray scanners.
- Adopted in 2003, the SAFE Framework of Standards to Secure and Facilitate Global Trade is World Customs Organization’s initiative to promote security and facilitation standards for international trade, security-centric networking between national customs administrations, and, through the Authorized Economic Operator (AEO) concept, a cooperation between customs and business operators likable to the US C-TPAT (Customs-Trade Partnership Against Terrorism) program.

Academics and practitioners have also begun addressing this topic:

Following an informal and rather natural thread,

- Some authors have contributed to the definition of the concept of supply chain risk management (Juttner, Peck, & Christopher, 2003) and have defined this concept as “the identification and management of risks for the supply chain, through a coordinated approach amongst supply chain members, to reduce supply chain vulnerability as a whole”.
- Other academic writers have looked into the sources of risk for the supply chain: e.g. based on the robust classification of risks into three types (environmental, organizational and network-relates), Das and Teng (1998) have identified the first two

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