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Multimodal Transport Security

Frameworks and Policy Applications in Freight and Passenger Transport

COMPARATIVE PERSPECTIVES ON TRANSPORTATION SECURITY

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Contents

1. Introduction

Genserik L. L. Reniers, Dawna L. Rhoades, Joseph S. Szyliowicz and Luca Zamparini

Recent decades have witnessed the emergence and implementation of a new vision of transportation across the globe. That vision, known as intermodalism or multimodal transport grew out of technological innovations and a realization that the traditional modal approach to moving people and goods by road, rail, water or air no longer sufficed. This modal approach, whereby each mode is administered and operated in isolation from the other modes, had created a situation characterized by numerous problems including urban congestion, environmental pollution and bottlenecks that prevented the smooth flow of goods and people thus imposing ever-heavier costs upon communities and governments everywhere. Accordingly, it became increasingly obvious that it was essential to view transportation in a new way, one that recognized transportation as a system, that the modes, though possessing individual characteristics, were interrelated. Technological changes in transportation and communication have been a powerful driver that unleashed these forces. Indeed it has been argued that intermodalism emerged from a box in 1956 when a ship called the *Ideal X* sailed from New Jersey to Texas carrying freight packed in containers. Until then, ships were loaded and offloaded much as they had been for centuries; now goods could be shipped across the globe at greatly reduced costs since the freight needed to be packed only once. Thus ships could be loaded and unloaded more quickly. Malcom McLean had created a new technology that transformed international trade and investment patterns.

Since the container could easily be transported not only by sea but by road or rail, those modes also began to change to accommodate the new technology, and imaginative entrepreneurs who recognized the economic advantages of shipping freight in an integrated way through different modes were able to seize market opportunities. Concomitantly, important technological innovations, such as double stack trains, further spurred the revolution whereby air, ship, rail and truck became intertwined so that intermodal systems began to be created.

Passenger traffic was also transformed since populations were growing everywhere and increasing numbers of people were traveling domestically and internationally. To meet this ever-growing demand for faster, reliable, convenient travel services, linkages among passenger road, air and rail services began to be created, a process that continues to the present. This is particularly important in the case of international and/or intercontinental trips that rely on air transport in order to reach virtually every possible destination in a reasonable amount of time. It is then evident that the air transport network has to be connected with the networks/infrastructures of the other transport modes. Moreover, as people everywhere became increasingly concerned with issues such as congestion, air, water and noise pollution and climate change, the social costs of existing transportation systems became increasingly apparent and the need to view transportation not merely in traditional economic terms but in terms of its sustainability became ever more apparent.

Thus, as the 20th century came to a close, it became increasingly obvious that the traditional modal approaches no longer sufficed and that new policies and practices were required to deal with the new demands and challenges. In the US, for example, Congress enacted, in 1991, the landmark Intermodal Surface Transportation Efficiency Act (ISTEA) that moved policy away from the age old emphasis on specific modes, notably the highways, towards intermodalism. For the first time, federal legislation recognized the constraints and negative consequences imposed by traditional modal policies and the need for a new approach that emphasized flexibility, innovation and greater public involvement. One of the most notable effects of this new approach and of concurrent technological innovations (i.e. containers, intermodal hubs and so on) has been a drastic contraction of overall transportation costs. This rationalization of costs has been one of the main determinants of the large increases in international trade.

Though the concept of an integrated transportation network quickly gained widespread acceptance among transportation professionals, it has proven difficult to define. Indeed many – including contributors to this volume – continue to prefer the term 'multimodal'. In our view, however the term 'multimodal' which is widely used throughout the world is not adequate because it can be used to refer simply to the obvious fact that goods and people may use more than one mode of transportation from origin to destination. This term ignores the obvious fact that people have traveled and shipped goods in this way since the earliest days of human existence and, more importantly, fails to capture the critical integrative element that distinguishes the new approach. Adding to the confusion, however, is the fact that though the term 'intermodalism' captures the essence of the process, it does not take into account all elements involved

(i.e. security, sustainability). This is evident if we consider some of the ways in which the term has been defined.

For example, consider the following popular definition: 'the coordinated passage of goods and people by way of two or more of the primary modes of transport (sea, air, rail, road) from origin to destination as defined by the passenger or the shipper and consignee, with a single travel directive bill of lading or ticket and a single price covering the entire trip' (Alt et al., 1997, p. 36ff). This definition captures the integration dimension well but it fails to include other critical elements – choice and inclusiveness – that many consider to be integral dimensions. Thus, intermodalism has also been defined more broadly as: 'a system that is both safe and efficient and productive and flexible in responding to the needs for good movements and . . . offer(s) people choices and flexibility in their personal movements. This system must also be "international, intelligent and inclusive"' (Jeff, 1998, p. 13). Yet many would argue that even this definition is inadequate because it does not recognize explicitly the externalities of a transportation system. It is obviously possible to develop an integrated system that is safe, efficient, flexible, intelligent, international and inclusive but which continues to pollute the environment and waste energy. Nor does it consider the critical elements of safety and security, elements that are essential in today's world.

Accordingly, it is necessary to expand the definition to include such factors as safety, security, efficiency, cost-effectiveness and long-term sustainability. Thus, we suggest the following definition: An intermodal system is one in which the individual modes are linked, governed and managed in a manner that creates a seamless and sustainable transportation system. Such a system should be economically efficient, environmentally sound, safe and secure, and ethically based.

Implicit in such a perspective is the idea that each mode should be utilized for the purpose for which it is best suited in terms of these considerations. Thus, as many containers as possible should move by rail and not by road and the aviation mode should be used only for high-value long-distance and trans-oceanic trips. Furthermore, every effort should be made to minimize the negative impacts that are inherent in each mode. Such a system maximizes efficiency, offers more choices for personal and freight mobility and minimizes environmental impacts and the use of energy – a critical point given transportation's heavy reliance on petroleum and its contribution to global warming.

Powerful forces created the need for this new approach to transportation. Most obviously, the process of globalization has impacted transportation in many ways. New economic units such as the EU and NAFTA were established and competition between countries and regions intensified,

creating increased demand for transport – the role of which became more and more critical at the same time that the existing patterns were demonstrating major weaknesses. These structural changes in the global economy were accompanied and intensified by the emergence of new consumption patterns which created new pressures to distribute goods to global markets. As a result, new patterns of international trade emerged, creating opportunities for innovation and change. Production patterns were also affected as firms everywhere sought to minimize costs and eliminate inefficiencies in various ways. Such concerns led to the introduction of 'just in time' production, an approach that reduced costs by eliminating much of the need for warehousing and storage. As a result of these changes, national development now requires not only sound domestic economic policies but the ability to export and import products rapidly and efficiently to numerous foreign markets. This can only be achieved through integrated global supply chains.

1. INTERMODAL SECURITY

However defined, the new complex transportation infrastructure which has emerged creates difficult new security challenges that are a major concern for governments everywhere. No mode – land, sea, water and air – has been immune as subway systems, airports, buses, ships, railroad stations and airplanes in many countries have been targeted, often with devastating consequences in terms of human lives and in economic terms. Attempting to ensure that people can continue to avail themselves of various mobility options and that trade can continue to flow smoothly and economically has become an international priority because intermodal transportation networks are a major sector in any economy and a significant contributor to national growth.

Thus, new security measures have been implemented everywhere and these have enhanced the security of various modes to varying degrees. However, transportation security requires going beyond safeguarding the individual modes to ensuring the security of the intermodal terminals, the nodes that link and integrate passenger and freight flows. Their importance has continued to grow as globalization and technological developments have accelerated in recent years, particularly in the fields of transportation and communications. These trends have made the world a smaller place. As technological progress has continued to shrink distance and time, an ever-expanding flow of people and goods across national frontiers further accelerates the process of economic and financial integration. Today companies produce in many countries, ship components from one subsidiary to

another, distribute finished goods to markets in many countries and use the transportation system as a warehousing system. To accommodate the growing demands these developments place on the transportation system, new intermodal facilities have been built everywhere. Airports have proliferated throughout Asia, new road and rail links have been established through the Channel and the Trans-European Network, and many countries are modernizing and expanding their port facilities. Such projects facilitate and enhance interdependence and interconnectedness, but at the same time present new and attractive targets for terrorists who have become increasingly sophisticated in recent decades, understand the inner workings of transportation systems and are developing new weapons and capabilities.

Intermodal terminals are very attractive targets because of their economic and social significance and the difficulties that are involved in safeguarding them. Traditional security challenges are multiplied by numerous new problems of coordination and integration, such as clearly defining the roles of the many different types of personnel working in these terminals, and ensuring that they understand their proper roles in the security program and can manage them effectively. For example, the new emphasis on direct rail connections to airports means that security practices for the railways and those for aviation modes need to be harmonized. Of course, ensuring that all rail passengers are subject to rigorous aviation screening standards is no simple matter. Thus, intermodalism greatly complicates security procedures, particularly when there is a continuing tendency to think of security purely in intramodal terms within one mode at a time.

Modal thinking is reinforced by the tendency of virtually all governmental agencies (even those which have overarching responsibilities across modes of transportation) to function in a reactive manner by responding to particular threats, rather than taking a more holistic view of the situation. For example, the airline hijackings and the problem of bombs aboard airplanes that emerged in the late 1950s and 1960s resulted in government-mandated, stepped-up security measures by the airlines and at airports. By contrast, little focus was given at the time to security measures in road, rail or sea-going modes.

The global freight system which is vulnerable at many points is of particular concern because of the devastating economic consequences, nationally and internationally, that would follow from a successful attack. As Robert Bonner, the Commissioner of the US Customs Service has noted: 'If terrorists used a sea container to conceal a weapon of mass destruction and detonated it on arrival at a port, the impact on global trade and the global economy could be immediate and devastating – all nations would be affected. No container ships would be allowed to unload at U.S. ports after such an event.'[1] Consequently, the economies of all countries would

receive a major shock as international trade would not return to its normal state for months. In the meantime, economic growth throughout the globe would slow, imposing a heavy burden on all states, especially upon those least able to bear it.

Another factor of concern lies in the awareness that terrorists have adopted new tactics and now seek to inflict as many casualties as possible. Intermodal nodes such as train stations, airports and metros which are often crowded with people are therefore attractive targets. The March 2004 attacks on the Madrid train stations in which over 170 people were killed and many more injured, and the July 2005 attacks on London's underground system which killed 56 people, including the four suicide bombers, and injured about 700 other people, provide vivid and tragic proof of the appeal of these targets. These attacks only involved a tragic human toll but a series of such attacks could produce significant changes in mobility patterns and hence on the quality of life as well as on economic activity.

Transportation facilities are often national and international icons and the demolition of a famous bridge or tunnel would possess great symbolic significance. Transportation security is thus an essential counter-terrorism tool. Terrorists have to travel to their targets with their weapons or to a place where they can obtain them. A secure intermodal system can obviously limit the mobility of terrorists, an issue of growing concern to law enforcement agencies everywhere. It can also increase the security of vehicles which can be, and often have been, used as weapons. The tragedy of 9/11 was the result of airplanes that were transformed into missiles. Most common are truck bombs which have been launched against intermodal terminals, bridges and tunnels, vessels in ports, trains and buses. Terrorists are also exploring the potential of other weapons including nuclear materials. The acquisition of 50 kg of Highly Enriched Uranium (HEU), would permit terrorists to assemble a nuclear weapon, albeit an inefficient one. However, building a bomb is a difficult task, even with the necessary materials and the technical know-how. More likely is a radiological attack using a 'dirty bomb' or other radiological dispersal device (RDD) that explodes and disseminates radioactive materials in transportation facilities or disperses such materials in powdered form, perhaps from a plane.

Even more likely are chemical and biological attacks. Terrorists may be able to acquire numerous agents that cause such diseases as plague, botulism and smallpox. The deployment of a few grams of these microbes in a passenger intermodal hub would suffice to cause death and create panic. Many other virulent toxins can be identified, some of which such as sarin gas and anthrax have actually been used. Each of these substances poses unique challenges that require particular countermeasures and responses that also depend on the nature of contexts and resources.

Cyber-attacks, which are commonplace, also pose an ever-growing threat. These can take many forms. A specific database of a transportation owner/operator can be attacked in order to gain information, or an attacker can seek out a weakly defended pathway for access to a network in order to shut down service or to introduce harmful instructions. Attacks can be launched against train control centers and air traffic control systems, ports, power and telecommunications systems, and railroad signals. A successful attack would have devastating consequences.

Since attacks against transportation systems can take many forms and involve a variety of weapons, safeguarding transportation systems is a challenging but essential task. Safeguarding this system is no easy matter for several reasons. First, its sheer size creates difficulties. Shipping freight in containers has proven to be a reliable and inexpensive way of sending goods from one corner of the world to another and container freight has grown exponentially in the few decades since its introduction. Today, about 90 percent of the world's cargo movements involve containers. Almost 50 million full containers are shipped between the world's major ports each year, six million of these arrive in the US each year (Szyliowicz, 2009). Another ten million arrive by road or rail.

Second, the economic and technological integration that has been achieved has not been matched by an equal degree of political coordination and cooperation. There is a growing discrepancy between traditional political borders and economic boundaries that continue to expand outward as a result of various international trade agreements. As a result, new questions have emerged to complicate the already complex and difficult issue of border security. There is an obvious trade-off between efficient trade flows and enhanced security risks.

Thus, the problem of safeguarding intermodal transportation systems is further complicated because it is an international as well as a national issue. But world politics continues to be largely characterized by the interactions of independent international states with varying degrees of power and influence. Thus, national and international security concerns require a strong measure of cooperation, reaching agreements, often a difficult and challenging task when attempting to create a new regime.

Since the system is characterized by a lack of agreement on responsibility and overlapping claims to jurisdictional authority, policy makers in national governments confront substantial challenges in such areas as port and aviation security since numerous national agencies and actors are involved as well as private sector firms and other non-governmental organizations and international organizations such as the International Civil Aviation Organization (ICAO) and the International Maritime Organization (IMO). Coordinating all these international, transnational