

# INTERMODALISM: THE CHALLENGE AND THE PROMISE

By

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## I. Introduction

This paper discusses the state of intermodalism in the U.S. today – its achievements, the expectations that it arouses, and the issues that must be dealt with if the U.S. is to achieve the intermodal system that is required to meet the challenges generated by domestic needs and by the changes that are sweeping the world. The U.S. has succeeded in building an extensive transportation system based on the development of individual modes – rail, road, air, and water. Now the challenge of blending the separate modes into a national intermodal system is being confronted. Precisely because it possesses this rich heritage, the U.S. must confront all the issues and difficulties associated with bringing about change to well established and entrenched modal systems. Furthermore, any transportation system is shaped by a country's political system so that the U.S. must deal with specific issues that are the result of its system of government. Nevertheless, despite such differences and regardless of the level of development of the existing system and the different modes, the U.S. case is of more than academic interest for the creation of an intermodal system for freight and passenger involves dealing with general issues that are universal.

Accordingly, I shall first discuss the factors that make intermodalism an ever more important element in transportation. Then I shall turn my attention to the state of the U.S. intermodal system and the challenges that it confronts. In the process I shall try to draw some general conclusions about the issues that the U.S. or any country seeking to develop intermodal transportation must deal with.

## II. The Pressures for Intermodalism

Intermodalism has emerged as a major new approach to the planning of transportation systems and its further development is inevitable for all countries, regardless of the quality and efficiency of the various modes, because domestic and international pressures are creating a need for such a system.<sup>1</sup>

To begin with, it is obvious that the existing infrastructure in the U.S. and in many other countries is being strained to the limit and that it will be no easy matter to expand the existing system. The demand for both passenger and freight transportation continues to grow steadily, placing increasing pressures on

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<sup>1</sup> These are discussed by R. Alt, P. Forster, and J. King, "The Great Reversal: Information and Transportation Infrastructure in the Intermodal Vision" in National Conference on Intermodal Transportation Research Framework (Washington, DC: Transportation Research Board, 1997), pp 36ff. Hereafter SITRF.

ports, airports and highways. For example, while the population increased by about 20% between 1977 and 1995, the number of domestic trips increased by 92%, of international trips by 131%, in the same period.<sup>2</sup> Future projections suggest that this demand will continue and even accelerate. For example, it is estimated that freight traffic will increase by an estimated 21% by 2006.<sup>3</sup> Accordingly, policy makers in governmental and corporate organizations are paying renewed attention to rail travel for passengers and to moving freight through truck/rail combinations. Their goal is not to minimize the existing modes but to leverage the enormous investments that have already been made. Integrating the modes and using each to its best advantage is a strategy to optimize the existing resources and to create new capabilities.

A second major driving force is the nature of modern economic systems, which are characterized by increasing pressures to reduce costs by increasing productivity and reducing inefficiencies. In the search for ways to do so, attention naturally becomes focused on the ways in which transportation is integrated with the production process. Hence, such developments as “just in time” production have become commonplace as businesses seek to reduce inventory and other costs. Now suppliers have to meet the needs of their customers in new ways, ways that place new demands on transportation systems. Passenger transportation is also subject to similar pressures, as people demand ever faster and more reliable travel service.

These developments are taking place on a global scale as resources and markets are becoming increasingly connected through global supply chains. Levels of international trade and economic interactions continue to climb while existing patterns are being transformed as competition becomes increasingly international in scope. National economies are becoming ever more integrated into a global system and corporations possess an international perspective so that production, assembly, outsourcing all takes place in countries that offer competitive advantages. Such global markets require new kind of transportation systems and it is increasingly obvious that national development no longer depends solely on the ways in which productive sectors operate but also on their ability to distribute their products rapidly and efficiently to international markets. This requires national transportation systems with sophisticated port and other infrastructures to handle international trade.

These developments have been spurred by deregulation, which greatly accelerated the trend towards intermodalism. It is a new industry created, largely, by imaginative pioneers who perceived market opportunities and founded such major corporations as UPS, FedEx, and JB Hunt to exploit them. Essentially freight intermodalism in the US has been a private sector activity, which emerged because of the realization that intermodalism was economically advantageous. Its roots can be traced back to the 1950s when trains began to carry trailers. But the real revolution started in 1956 when a ship called the Ideal X sailed from New Jersey to Texas with a load of containers. This marked the beginning of the container revolution. Soon ships were sailing across the Atlantic and Pacific with containers rather than break bulk cargo. Those containers were moved by rail – a new business for the railroads, which possessed underutilized capacity. Deregulation accelerated this process by eliminating numerous rules and regulations, which had prevented carriers from innovating and competitors from entering the market. A host of new companies became active and new patterns of cooperation and competition have

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<sup>2</sup> Pocket Guide to Transportation (Washington, DC: USDOT, Bureau of Transportation Statistics, 1998), p. 10

<sup>3</sup> Policy Options for Intermodal Freight Transportation (Washington, DC: Transportation Research Board, 1998) p. 16. Hereafter, POIFT.

emerged. Concomitantly, important technological innovations, such as double stack trains, further spurred the revolution whereby air, ship, rail and truck became intertwined.

On the passenger side, deregulation resulted in an explosive growth in air travel and tourism creating, in the process, well known problems of air traffic congestion and access to airports but modal integration lags well behind developments in the freight sector and stands in sharp contrast to the European scene. The last major new airport built in the U.S., the \$5 billion Denver International Airport, does not have a transit link. The contrast with Europe is striking. Passengers using Charles de Gaulle airport in Paris have access to both a metro station and a high-speed rail station. Similarly, Frankfurt airport is directly connected to the local underground and intercity rail. Many individuals and groups are seeking to create a passenger intermodal system in the U.S. that will be as effective and efficient as the European one. They anticipate that such a system will be based on a high-speed rail network that is linked to other transportation modes through intermodal terminals that provide travelers with easy access to several modes. However formidable barriers will have to be overcome before this goal is achieved.

Social concerns are also influencing the drive towards intermodalism for worries about the environment and with the social costs of existing transportation systems are evident everywhere. Transportation is now widely viewed not merely in traditional economic terms but in terms of its sustainability, in terms of how it impacts environmental and ecological systems as well as the society as a whole. Because of such concerns, it is today practically impossible to envisage, in the U.S., a program to greatly expand the highway system. Nor is it likely that the severely constrained airport capacity will soon be eased to any significant degree. Accordingly, there is a renewed interest in railroads because of their many advantages in terms of fuel efficiency, pollution, and other environmental impacts.<sup>4</sup>

All these considerations have had a profound impact upon U.S. policy makers. By the end of the 20<sup>th</sup> century, the U.S. was definitely committed to intermodalism for Congress responded to the changes, which were taking place by making intermodalism an explicit element of its transportation policy. The key event was the passage of the landmark Intermodal Surface Transportation Efficiency Act (1991) that moved policy away from the traditional emphasis on specific modes, notably the highways, towards intermodalism. It stated:<sup>5</sup>

“It is the policy of the United States to develop National Intermodal Transportation System that is economically efficient and environmentally sound, provides the foundation for the Nation to compete in the global economy, and will move people and goods in an energy efficient manner....The National Intermodal Transportation System shall consist of all forms of transportation in a unified, interconnected manner....

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.

Such a vision could obviously not be achieved easily or quickly. One important gap that was immediately apparent was the limited understanding of the actual state of intermodalism and the role of

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<sup>4</sup> Sustainable Transport (Washington, DC: The World Bank, 1996).

<sup>5</sup> Cited in POIFT, p. 156

various actors as well as the barriers and obstacles, which hindered its development. Accordingly, several important conferences and commissions were convened to study and discuss such issues. Some of the most important were:

- The National Commission on Intermodal Transportation (1994)
- National Conference on Intermodalism: Making the Case, Making it Happen (1994)
- National Conference on Setting an Intermodal Transportation Research Framework (1996)
- Intermodal Transportation Education and Training (1997)
- Committee for the Study of Policy Options to Address Intermodal Freight Transportation (1998)

Their very titles suggest the problem areas that concerned government officials and other experts concerned with the growth of intermodalism – the status of the existing system, regulatory and institutional issues, educational and research questions, and the special problems of freight. Their findings and conclusions reinforced each other and will be discussed below. Suffice it to say that there was strong agreement that considerable progress has been made but also great concern with the barriers and obstacles that had to be overcome if the vision of a true intermodal system were to be realized. The passage of new legislation, TEA-21 in 1998 reinforced the principles of ISTEA but implementation has remained troublesome in many areas and the achievement of the intermodal vision is still dependent on the resolution of many difficult issues.

### III. Obstacles and Barriers

#### A. The Concept

Perhaps the most elementary source of difficulty is the high degree of confusion about the very concept of intermodalism. Many definitions abound ranging from very narrow to more expansive ones. The most restricted focuses on the role of the container and defines intermodalism as the "...transport of goods in containers"<sup>6</sup> A somewhat broader but inadequate definition because goods have been shipped in this manner for centuries and because it also ignores people is: "any shipment of goods that involves two or more modes of transportation during a single journey".<sup>7</sup> A broader and better definition which recognizes passengers is: "the coordinated passage of goods and people by way or 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."<sup>8</sup> A broader and improved definition which reflects a concern with such factors as the efficient use of resources, safety, quality, and cost is the one developed by the National Center for Intermodal Transportation: "an approach to planning, building, and operating the transportation system that emphasizes optimal utilization of transportation resources and connections between modes.... what matters is the quality, cost, timeliness, and safety of the trip. Still broader is a definition that includes such critical elements as choice and inclusiveness: "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."<sup>9</sup> Yet, in my view, even this definition lacks a critical element for it fails to recognize

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<sup>6</sup> POIFT, p. 14

<sup>7</sup> POIFT, p. 118

<sup>8</sup> Alt et al., p. 34

<sup>9</sup> Gloria Jeff, "Welcoming Remarks" in Intermodal Education and Training (Washington, DC: National Academy Press,

explicitly the externalities of transportation. It is possible to develop a system that is safe, efficient, flexible, intelligent, international, and inclusive but which does not promote sustainable development for it continues to pollute and waste energy. Accordingly, I propose 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.

The issue of definition is more than a semantic quibble. It has profound practical consequences. Without clarity and agreement on just what is meant by a concept, it is difficult to discuss it intelligently, let alone move to implement it. Many experts believe that the lack of consensus creates confusion in the planning process. Also, it becomes extremely difficult to educate and train people or, to build the level of public support that will be required to create an intermodal system. A precise vision needs to be clearly defined and widely disseminated.

## B. Education and Training

Such an effort clearly involves the educational system. This represents a second important gap that limits the development of intermodalism. There are several dimensions to this issue. At the most general level, there is general awareness. Since it is a relatively new concept and since there is no consensus on its content, it should not be surprising that most people have not been exposed to the concept or the vision embodied therein. The common reaction when I use the term is to ask me what I mean. Indeed my word processor believes that intermodalism is a misspelled word and underlines it in red. Yet it is not feasible to expect that an intermodal transportation system can be realized unless the public is educated to the promise of intermodalism and accepts the importance of engaging in the kinds of behaviors that are required. It is the public that an intermodal system is designed to serve, it is the public that influences decisions concerning transportation projects and policies, and it is the public that will make a new transportation system an effective one.

But more than public awareness and support is required. An intermodal system needs persons who are educated in intermodalism, who possess the skills required to help plan, manage, and operate intermodal systems, who understand the ethical issues involved. At present it is widely acknowledged that there is a shortage of such people; most education in American universities is still modal in orientation. Few programs focus on intermodalism or provide the kind of total systems perspective that is required. Hence, "...we perpetuate the old paradigms instead of training transportation professionals for the 21<sup>st</sup> century."<sup>10</sup>

There is also a need for in-service training for people presently working in transportation organizations. Few people knowledgeable about intermodalism are to be found in state departments of education, metropolitan planning agencies, or private sector transportation companies. And, because of continuing

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1998) P. 13. Hereafter IEAT.

<sup>10</sup> "Toward a National Intermodal Transportation System", National Commission on Intermodal Transportation, September 1994, p. 39. Hereafter TNITS. See also M. Downey "Opening Remarks" and M. Meyer "Charge to the Conference" IEAT, pp. .9, 15). For a detailed analysis of the educational situation in regards to intermodalism in the APEC countries see the chapter in this volume.

modal orientations, which I will discuss below, most staff time is inevitably devoted to short-term problems and operations of particular modes.

### C. Technology

One area requiring particular educational attention is technology for it is clear that new and emerging technologies have to play a key role in dealing with the numerous physical impediments that constrain the seamless flow of passengers and freight. Congestion, especially in urban areas is commonplace and, though efforts continue to ease the problem by building new roads, such efforts are severely constrained by the limited amounts of land available for such improvements and the growing realization that it is simply not possible to build one's way out of congestion. Accordingly increased attention is being paid to rapid transit for passengers and such innovative schemes as full road pricing.

To be effective such schemes will require not only different policy mechanisms but also the implementation of new technologies to ensure that the innovations work effectively and well. There is an obvious need for further technological developments. Technologies have already had a profound impact on the development of intermodalism – double stack trains, super container ships, large aircraft, the operations of such innovative companies as UPS and FedEx - and there is little doubt that new technologies such as satellite communications specifically and information and communication technologies generally will have a similar impact in the future.

Recognizing that information and communication technologies will be essential components in the realization of the intermodal vision, the US government is making large investments in ITS. These activities are already having an impact. New computer models, simulations and other technologies are becoming available daily that help planners and managers.<sup>11</sup>

However, much remains to be done. For passenger intermodalism to succeed, for example, it is not sufficient to build transit systems; an appropriate information infrastructure that facilitates a seamless journey is required. This kind of infrastructure exists for automobiles in the form of road signs, maps, driver education program, news of traffic conditions and the like. Someone using public transit, on the other hand, has no such aids readily available. The traveler is forced to develop the necessary information by identifying transfer points and checking one or more schedules. There is often a lack of clear and precise information on how one can shift from one mode to another, especially where airports are concerned. To cite a personal example, I recently flew into Baltimore and wanted to take the train to Washington, D.C. Putting aside the fact that the train station was not located in the airport, it proved very difficult to find information on how to get to the train station or to obtain train schedules. New developments in communication and information hold great promise for facilitating such journeys by integrating information systems and ticketing systems but many issues of standardization and coordination still have to be overcome.<sup>12</sup>

Similar promise and failure to achieve it characterize the freight side. Despite significant technological advances by the private sector, the EDI capability remains inadequate, primarily because of the limited coordination between modes and the problems posed by a lack of common standards.<sup>13</sup> Nor can one

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<sup>11</sup> See B. Nault, "Information Technology for Freight Transportation Coordination", POIFT, pp. 234-257.

<sup>12</sup> Alt et al., op. Cit., pp. 47-48.

<sup>13</sup> See B. Nault, "Information Technology for Freight Transportation Coordination", POIFT, pp. 234-257.

overlook the need for persons with the requisite skills to deal with the new technologies which has been revealed in a series of studies sponsored by the USDOT to determine the existing level of professional capacity in ITS. These essentially demonstrate that agencies need greater awareness and understanding of ITS and that many professionals do not yet possess the necessary skills.<sup>14</sup>

In many respects these are similar to those required by professionals working in intermodalism. Above all the ability to deal with technological innovations is required, for a high rate of technological change continues to sweep intermodalism but most individuals and organizations are not oriented towards technological innovation. In addition to training people to deal with new technology, there is also a need to develop a new culture within transportation organizations, one that is hospitable to innovation.

#### D. Coordination and Integration

In addition, on both the passenger and freight side, the effective use of the new technologies requires a high degree of coordination and integration of resources. This is perhaps the most challenging task not only in terms of technological implementation but, indeed, for the future of intermodalism itself. Achieving coordination is never easy but it is essential for the achievement of intermodalism because of the variety of actors who are involved in developing and implementing intermodal policies and projects.

These can be divided into three general groups – governmental officials, the private sector, and the public and various interest groups. The first category includes not only the USDOT but also all the state DOTs, the MPOs, city councils, and numerous other local government structures such as regional transportation districts. The second includes the shippers and the modal carriers. The third involves a group that has increasingly come to play an important role in transportation planning for there is growing recognition that the public should be involved in transportation decisions in a meaningful way. Bringing all these groups together so as to achieve a consensus on projects and policies is obviously no easy matter. At the most elementary level, coordination between the private and public sectors is required as well as between modes. However, this is difficult to achieve because of the competitive nature of the relationships as the case of combined ticketing -- an obvious and desirable goal -- illustrates.

Basically there are two ways in which coordination can be achieved.<sup>15</sup> The first is called vertical integration and involves total control of an entire system. This is how UPS, for example, operates. It owns its own vehicles (planes and trucks) as well as the information and communication infrastructure. This approach has many advantages including the ability to invest large sums and to develop proprietary systems (UPS hand held scanners are a good example). It also facilitates dependability and efficiency for there is no need to deal with other organizations, each with its own goals and resources. However, this approach works only when dealing with certain standardized items; more common are cooperative arrangements, which bring different transportation groups together.

Many experts believe that such arrangements are the way of the future because the trends discussed above which are making intermodalism inevitable – new trade patterns, decentralized production and distribution – make vertical integration difficult to achieve and implement. It becomes a high-risk

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<sup>14</sup> “*ITS Training and Education Needs Assessment Baseline: A Review and Synthesis of Thirteen Prior Studies, Field Interviews and AS Summary Assessment in ITS Needs*,” USDOT, ITS Joint Program Office, 1999.

<sup>15</sup> Alt et al., op. cit., pp. 48ff.

strategy despite its many benefits. On the other hand, cooperation makes control difficult (as seen in the relationship between airlines and airport shuttles) since each actor has its own interests, which it seeks to promote. By and large most cooperative arrangements have emerged within modes, and even here often only after difficult and complex negotiations. This situation has important implications for intermodalism, which requires cooperation across modes as well as project planning which I will discuss below since a large number of actors, public and private, are inevitably involved. The difficulties in bringing the Alameda corridor project to fruition provide a fine example. Despite widespread agreement on the vital need for the future of the region to provide a better rail link between the ports of Los Angeles and its rail yards to eliminate the need to move containers by road it proved no easy matter to bring the project to fruition. Each actor – the ports, the railroads, the state government, the federal government, and various counties, to name a few – wanted to minimize its own costs and risks. Similar problems arise when dealing with information technologies for there is an obvious need for shared databases and uniform standards but many organizations are unwilling to share proprietary information for fear of giving competitors an advantage.

#### E. Institutional Structures

Further complicating the achievement of horizontal cooperation are the institutional arrangements which presently prevail and which represent powerful barriers. These take many forms. The most fundamental is the continuing dominance of the individual modes. Until passage of the ISTEA act, national and state policy was modally oriented and all agencies were organized around modes so that policies and resource allocations were all limited to single modes; they never cut across modes. Even today, the existing policy and planning systems are inadequate. The USDOT still operates by modes – there is an Office of Intermodalism within the Secretary’s office but each mode also has its own intermodal office. Under these conditions, getting intermodal projects and plans approved and funded at the national level is not as easy as it should be.<sup>16</sup> As the National Commission on Intermodal Transportation noted, “planning and policies, particularly at the Federal level, do not encourage and accommodate intermodalism.... federal government institutions are organized along modal lines, which inhibits planning and developing an intermodal transportation system.”<sup>17</sup>

The barriers, however, extend well beyond federal policy making structures. Because of this history, each mode possesses its own organizations, cultures, constituencies and powerful interests who benefit from a modal focus. Congress and its committees also reflect modal interests and are responsive to these groups. State/local units also are linked to modal interests. Hence, while there are powerful forces supporting each mode, there are few politically effective intermodal groups and the balance of power remains heavily biased in favor of the specific modes, especially highways. Furthermore, particular modal cultures are deeply embedded in most organizations, including state Departments of Transportation. Under these conditions it should not be surprising that it has proven a difficult task to get these actors and agencies to work together so as to create an effective and efficient intermodal system, locally, regionally, or nationally. Given this history, the nature of the industry and the structure of government in the U.S., overcoming these barriers remains a challenge that will not be rapidly overcome.<sup>18</sup>

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<sup>16</sup> TNITS, pp. 40 ff., 70ff.

<sup>17</sup> TNITS, p. 12.

<sup>18</sup> Alt et al., p. 33



This problem is also evident at the state level, particularly in the relationships between the state Departments of Transportation and metropolitan planning organizations. ISTEA increased the power of MPOs but these organizations often possess inadequate staff, tools, and experience to promote intermodalism, even though they usually understand the necessity for such a system in their regions. Hence, they possess a different perspective from that of state DOTs that often remain oriented towards highways so that conflicts often occur over the priorities that should be allocated to various projects. The state DOTs, however, tend to emerge victorious for they control most of the funding for transportation. Creating genuine partnerships between these agencies has proven very difficult because each has its own interests, culture, resources, goals, and political alliances. Nor can one overlook the degree to which cooperative planning efforts are an innovation so that those seeking to work together have limited experiences to draw upon. Moreover, land use and transportation are closely related but different agencies have jurisdiction over the former so that even more actors have to be involved in any meaningful attempt to achieve an integrated system at any level. And, freight issues are commonly slighted because most agencies oriented towards passengers. The need to resolve this complex of issues is widely recognized but recognition has not yet led to resolution.

Aggravating the problem of modal relations are the differing private/public sector perspectives and the public attitudes towards new transportation projects. Not only is the private sector fragmented and competitive, it possesses a different planning perspective from that of the public sector, being oriented towards the short term rather than the long term. Nor can one ignore the position of labor unions, which often view intermodalism negatively because the new arrangements often mean a loss of jobs. Furthermore, many intermodal policies and projects are regional in scope and cover several states or urban areas, which usually involves extensive negotiations between many governmental actors for seldom does a single institution administer the entire area.

The need is obvious -- to move towards cooperative arrangements and partnerships. But this is easier said than done for the different actors must trust each other. Unfortunately trust is in short supply because of the historic conflictual relationship between the private and public sectors and between labor and management and, indeed, between governmental institutions as well. Incentives for cooperation and coordination between various actors and for people to interact intermodally would be very helpful but, at present, there are, at best, only limited rewards for such behavior.

#### F. Laws and Regulations

Rather than positive incentives, there are numerous regulatory and legal barriers. Despite the great degree of deregulation which has taken place in the U.S. and is underway in many other countries, and which facilitated the emergence of intermodalism, many regulations and laws still hinder the development and implementation of intermodal policies and projects. It is generally acknowledged that there are numerous unnecessary, inconsistent, and complex regulations not only at the Federal level but also at the State and local levels as well.

#### G. Infrastructure

If a better intermodal system is to be created, serious infrastructure problems will have to be resolved. The most important of these involves eliminating existing bottlenecks and building linkages between modes in the form of the nodes where the modes come together, namely freight and passenger terminals.

The capacity of the existing freight terminals is, in many cases strained and new ones are urgently required. Building such facilities, however, is no easy matter. There are many reasons for this state of affairs (most of which have been discussed above); particularly noteworthy are the many actors (public and private) involved, the tendency by MPOs to favor passenger projects, the public concern with externalities and difficulties in securing the necessary financing.

## H. Financing

Obtaining the funds to resolve infrastructure problems has proven to be extremely difficult so that financing is a major impediment to the creation of an intermodal system. Several reasons have been identified for this state of affairs. Many localities confront a shortage of funds and in some cases even highway projects are being neglected, although funding is historically allocated by modal agencies and highways have always been favored. Even when funds are available, these are often limited to specific projects, usually modal ones, so that intermodal projects, which tend to be large and expensive cannot be financed. In addition, state DOTs, which have control over the bulk of the financial resources, are often DOTs in name only, usually functioning essentially as highway departments. Even if favorably disposed towards intermodalism, they may be restricted by regulations, which prevent spending on non-highway projects. In the absence of such restrictions, intermodalism often means, even with the passage of ISTEA and TEA 21 legislation, shifting funds from the highway mode to another such as transit. Under these conditions it is not surprising that there is so much opposition to spending on intermodal freight and passenger projects.<sup>19</sup>

Intermodal freight projects must overcome another barrier – these are expensive projects and it is generally accepted that the private sector cannot finance these projects by itself. Its resources are restricted because many transportation companies enjoy limited profitability. Accordingly, the question of the role of government in financing infrastructure development is an important and complex one that forces us to re-think the relationship between the government and the private sector and raises many complex questions. These include: 1) How to identify the private sector activities that deserve governmental support for many possibilities exist ranging from rail facilities to roads leading to terminals; 2) How should the funding be arranged? Here too many possibilities can be identified ranging from tolls to user charges to limited partnerships to the issuance of tax-exempt bonds to the establishment of trust Funds.<sup>20</sup>

## I. Research

If an effective and efficient intermodal system is to become a reality, we must overcome significant gaps in our knowledge by enhancing the amount of research on numerous intermodal issues. Experts have identified several important gaps. First, we possess inadequate data regarding many intermodal activities. One reason for this phenomenon is that most research is conducted modally by modal agencies. As I have noted, there is a lack of awareness of intermodalism, especially the freight side, by decision makers and even transportation professionals so relatively little detailed data is being gathered. Furthermore, the issue of trust is an important one in this regard for private sector firms which control much of the needed data are often reluctant to share information with competitors or to provide

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<sup>19</sup> POIFT, pp. 77-90; 172ff.

<sup>20</sup> Idem.

proprietary information to governmental agencies. Thus there is a lack of reliable information and there is a great need to develop and disseminate reliable and timely data and data bases for passenger movements and for freight planning in such areas as shippers, receivers, and transportation companies, commodity flows, and their economic value. Such information, especially that dealing with freight movements is urgently required for planning purposes and to legitimize needed investments. The freight data situation is especially serious for the kind of information, methodologies and, simulations that are utilized for planning passenger transportation are not available for freight. Specific priority areas include such topics as methodologies to assess proposals requiring government involvement, measuring the performance of the existing freight system, evaluation of economic benefits, and regulatory and operational issues, including airport and port privatization, and the desirability of various funding mechanisms.<sup>21</sup>

Second, we know little about the “best practices” and research to identify such information concerning passenger and freight movements in such areas as operations, financing, technological innovations, and institutional relationships. The area of technology certainly deserves attention for we possess only a limited understanding of role of new technologies, including the impact of new vehicles and vessels, of the fit between new technologies and existing institutions, or of the changes that will be necessary to accommodate the innovations. Finally, we need models to measure intermodal mobility and to assess how intermodal projects compare to modal projects.<sup>22</sup>

If they are to be useful, the findings of such research cannot be confined to library shelves; they need widespread dissemination so that they are actually utilized as benchmarks. Such mechanisms as workshops, conferences, courses, and educational programs are all useful and could be used to prepare the transportation community to move more effectively and efficiently towards intermodalism.<sup>23</sup>

#### J. The International Dimension

Intermodalism is today a global enterprise and, as such, the solution to many problems discussed above is complicated further. Reaching a consensus and implementing a solution is far more difficult than when dealing with a domestic problem for actions by many actors in many different countries are required. To cite but one obvious example standardization across national boundaries would greatly facilitate the flow of passengers and goods but different national structures, policies, and interests make this very difficult to achieve. Even problems involving only two countries such as congestion at the U.S. Mexican border prove difficult to resolve. And, since many of these issues require multi-national solutions, international organizations are involved but it is not at all clear that the existing international structures are adequate for the task of helping to create a global intermodal system that is effective, efficient, and ethical.<sup>24</sup>

#### IV. Towards Intermodalism

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<sup>21</sup> Ibid, pp. 108-110.

<sup>22</sup> SITRF, pp. 6ff. and passim.

<sup>23</sup> Ibid., p. 7.

<sup>24</sup> Ault et al., op. cit., p 45.

Although these are serious obstacles to the development of a true intermodal system in the U.S. – and in many other countries -- important steps have been taken to create such a system. However, it is necessary to build upon what has been accomplished if these efforts are to be successful. In order to do so certain conditions will have to be met. The first and most basic is the issue of trust between the key actors. The time has obviously come to replace the conflictual relationship that has existed between government, industry, and labor for so many decades with a new culture that recognizes the common interests that they share and promotes win-win situations so that all can benefit from intermodalism. Although the situation differs in various countries owing to particular histories and cultures, the issue exists in many places and has obvious international implications. Similarly, the development of appropriate intermodal policies, projects, and structures deserves to be a universal priority.

Achieving these goals will require leadership. The call for leadership is often a substitute for specific recommendations. However, in this case, it should be clear that an elite consensus must be forged on the need for a common intermodal vision and that this consensus must be supplemented by widespread support for the vision among all relevant publics including elected officials, community leaders, the private sector, public interest groups, the media and the public at large. There is an obvious need to educate these and many other actors at all levels to the intermodal vision.

Nor can one overlook the urgent need is to develop organizations that are committed to intermodalism and possess the characteristics and human and financial resources for effective intermodal management and planning. In other words, the present policy making structures with their modal emphases deserve careful scrutiny and, possibly, reorganization. This is certainly true of the U.S. case; many have expressed concern with the modal structure of the USDOT and with weaknesses at the state and local level -- the lack of integration of relevant agencies, the absence of an appropriate intermodal orientation and culture, and a lack of staff and resources required for successful intermodal planning and implementation. Specific procedural steps that can be taken include: 1) examining and revising federal, state, and local regulations, laws, guidelines to facilitate intermodalism, 2) providing federal funding as incentives to intermodal efforts, 3) developing system performance measures that allow comparisons to be made across modes and 4) developing appropriate educational programs at all levels and initiation of research in priority areas.<sup>25</sup>

In addition to considering plans and policies, one must also focus upon the ways in which infrastructure projects are planned and implemented, for, as emphasized above, new intermodal facilities, especially terminals are required. Thus renewed attention must be paid to the ways in which decisions are made about the mega projects that form the backbone of the transportation sector for it is important to utilize an approach that permits mega projects such as airports and intermodal terminals to be implemented in a manner that allows them to meet the original objectives in a timely and cost effective manner Two issues are paramount -- the intermodal emphasis and a process that leads to better outcomes. Unfortunately, numerous cases in many countries illustrate the extent to which large transportation projects encounter unexpected difficulties and do not achieve their goals. Examples range from transit systems (San Francisco's BART, Miami's MetroRail) to highway projects (Embarcadero Freeway in San Francisco, London's motorways) to airports (Kansai, Mirabel) to the Chunnel linking England and France.

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<sup>25</sup> TCRP #14, passim.

These cases highlight the complexities involved in planning for intermodalism. To cite but three obvious obstacles: 1) Intermodal projects are usually mega projects with major impacts upon the environment, social, economic, and ecological, so that they often generate widespread public opposition, 2) intermodal projects often involve many, often conflicting, agencies and actors, 3) forecasts are seldom marked by high degrees of accuracy, a phenomenon which raises many issues, including ethical ones.

Under these conditions the traditional “Rational Actor” approach to transportation planning is inappropriate and it is necessary to consider a new paradigm. This approach recognizes that a focus on optimal efficiency is not efficient, that there are numerous advantages to incorporating redundancy, developing prompt and precise feedback mechanisms, maintaining flexibility and creating organizational cultures that emphasize learning and adaptation. While accepting the rational model as a useful organizational framework, it is also essential to appreciate the role of powerful actors and the importance of consensus, of identifying appropriate local project selection criteria and facilitating widespread and productive local participation. Such an approach is particularly relevant not only because of its relevance to specific project decision making but because the future of intermodalism rests, ultimately, upon the emergence of a popular consensus and the only way to create such a consensus is through the development and implementation of planning and policy approaches that permit people to participate in a genuine and meaningful way. Although such considerations may not apply to all countries since decision making procedures and political cultures vary widely, they are certainly relevant to democratic societies and the global trend towards democratization suggests that peoples everywhere are demanding an increasing voice in shaping public policies in all sectors, including transportation.