

# Analysis of International Transport Service Development Experience and Implications for China

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**Abstract:** Chinese Ministry of Transportation is mandated to provide integrated transport services after new round of super-ministry reform. Building an integrated transportation system is the starting point to make a breakthrough and fulfill the responsibility. With the gradual deepening of the reform, remarkable results have been achieved in integrated transportation services in recent years. During the 13th Five-Year Plan period, the integrated transportation system will put equal emphasis on infrastructure construction and service development. To meet higher requirements in the new context, an improvement will be made to the integrated transportation system, which will be a complex and arduous systematic project. This paper analyzes international advanced experience and summarizes lessons worth reference for China in the development of integrated transportation services.

## 1 INTRODUCTION

Transportation is the fundamental service industry that leads and foreruns national economic and social development. During the 12th Five-Year Plan (FYP) period, the sector has accomplished noticeable achievements, manifested in the continued improvements in scale, network, function and service of transportation. As the focus of development shifts from infrastructure to service, the transportation sector has entered into a new stage of network optimization, convergence improvement and and service integration.

The 13th FYP period is a decisive stage of building a comprehensive well-off society and a critical period for deepening the four-pronged comprehensive strategy. It provides a major strategic opportunity to promote green, integrated, smart and safe transportation and let it lead national development. The reform and development of the transportation sector starts from and places foothold on service for which an integrated transportation system is fundamentally built. Improving integrated transportation services has become important content of transportation development in the new stage, in order to meet the increasingly diversified travel demand, improve the transportation

efficiency and reduce the logistics cost. The developed European countries and the United States have achieved coordinated development and organic convergence of a variety of modes of transportation after years of efforts. The significant improvements in both level and efficiency of integrated transportation services provide a strong guarantee for their economic and social development. The rich successful experience, particularly of the United States, European Union and Germany, can be used as reference by China to develop integrated transport services.

## 2 INTERNATIONAL EXPERIENCE

### 2.1 United States

**Legislation on integrated transportation.** The Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA, nicknamed Ice-Tea) declares it is a US policy to "develop a 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 continuation act adopted in

1998 further extends and deepens the policy. The Transportation Equity Act for the 21st Century (TEA-21) in 2000 aims to coordinate the development of various modes of transportation. The US transportation legislation is an open democratic process, particularly in view of public participation and different stakeholders, as shown in Figure 1.

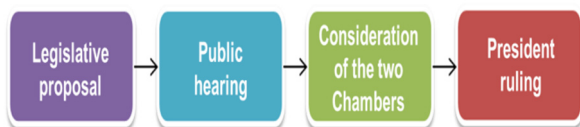


Figure 1. Diagram of the legislative process of the US Congress

**Plans for integrated transportation.** The US Department of Transportation (DOT) develops a comprehensive transportation strategic plan every five years to clarify the mission, goals and objectives of transportation development. According the DOT Strategic Plan 2012-2016: Transportation for a New Generation released in 2013, the country pursues five strategic goals: safety state of good repair, economic competitiveness, livable communities and environmental sustainability. The unchanged core of the US transportation services is safety, convenience and sustainability. For each of the strategic goal, the plan set out strategic measures and focus areas, proposed research and engineering projects and careful and meticulous project support, and clarified the budget, as shown in Figure 2.

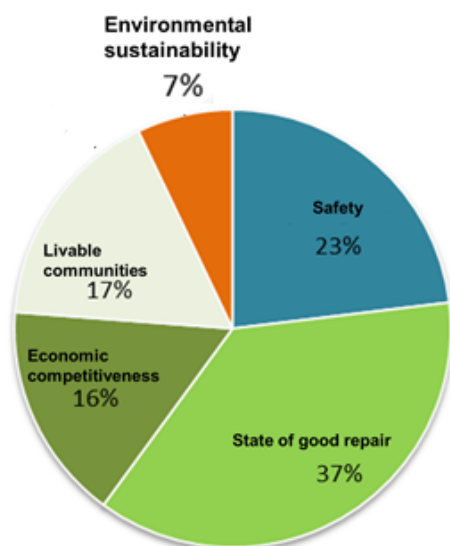


Figure 2 Proportion of budget for each strategic goal

**Special programs.** The special action plans inject an important impetus to the development of integrated transportation in Europe and the United States. Following the Ice-Tea, the US Government arranged \$ 155.3 billion for the development of intermodal transportation during 1992-1997 and implemented the Alameda Corridor Plan to improve the marine and rail transportation in the Ports of Los Angeles and Long Beach. The City of Los Angeles began to invest \$ 1.8 billion in 1996 to transform the 20-mile railroad expressline from the harbor to the downtown Los Angeles. After the transformation, the intersection-related delay of trains was reduced by 90%, noise by 90%, emissions by 28%, running time by 30%, waiting time by 75%, while the revenue is estimated to grow by US \$ 31.9 billion by 2020. The Alameda Corridor is considered one of the most important transportation projects in the recent 20 years and a representative example of marine and rail transportation in the country.

**Financial support.** After the implementation of the Ice-Tea, the US Government arranged US \$ 155.3 billion in fiscal years 1992-1997 for the development of intermodal freight and passenger transportation systems. TEA-21 guarantees an investment of at least \$ 198 billion in surface transportation during 1998-2003, increasing the total appropriations for highways and safe and public transportation to \$ 218 billion(Rong, 2005).

**Enhanced management of integrated transportation.** The United States has established a robust management system that matches with the integrated transportation system. At the national level, the management involves multiple government departments and even non-governmental organizations (NGOs). These coordinated agencies play different roles in system management and policy formulation, as shown in Figure 3.



Figure 3 Functional departments for integrated transportation system management

In addition to the permanent specialized agencies, DOT is also flexible to set up cross-sectoral agencies. These non-permanent agencies are often aimed at the objectives of the US transportation strategies or authorization acts, such as transportation safety, intermodal convergence, improved competitiveness of freight economy, internal and external work coordination, and provision of advice on policy development to the department.

## 2.2 European Union

**Implementation ensured legislation.** Transportation plans and the accompanying budgets come into legal force in the European Union only after a variety of legislative procedures. They need to be proposed by the Department of Mobility and Transport of the European Commission and submitted to the European Parliament for approval. The amendments also require the same legislative process. The products of such legislative procedures include the Seven-year Development Plan, Long-term (50-year) Strategic Plan for Transportation, Trans-European Transport Network, European Transport Policy for 2010: Time to Decide (White Paper), Roadmap to a Single European Transport Area – Towards a Competitive and Resource Efficient Transport System. The legislative procedures and levels ensure the implementation of plans, standards and budgets and effectively avoid the flip-flop phenomenon.

**Integrated transportation standards.** EU countries have developed three standardized loading units for intermodal transportation, namely

containers, semi-trailers and swap bodies. While containers follow the ISO-Container standards, semi-trailers and swap bodies are subject to the unified standards of dimensions, weights and axle load set by European Committee for Standardization. The European Modular System (EMS) has been designed to standardize the development of truck models and effectively promote transnational intermodal transportation within Europe.

**Special programs.** In 2003, the European Union began to implement the Marco Polo program that adjusts the freight transportation structure to intermodal transportation. In 2007, the Freight Transportation Logistics Action Plan and the Intermodal Transportation Pilot Project were carried out to promote intelligent transportation system and standardized transportation units and support intermodal transportation networks. By the end of 2010, the Marco Polo Program has produced remarkable effects on a switch of the modes of transportation by funding more than 150 projects, of which 83% involve the change in modes of transportation. Recognizing the environmental benefits of rail and water transportation, it is the most direct and effective initiative to promote the EU development of intermodal transportation.

**Subsidies or tax exemptions.** Enterprises are compensated for the economic losses with the switch to intermodal freight transportation. For example, the EU will provide economic compensation to a newly open rail line if the liability operation is confirmed. In order to reduce long-distance transportation and increase short-distance feeder service, the EU member states are required to provide tax exemptions or financial subsidies to trucks for access to multimodal transportation. For example, the German law exempt certain vehicles from highway use tax.

## 2.3 United Kingdom

Regularly renewed transportation acts. The United Kingdom develops and amends the transportation acts every 5-10 years in order to ensure applicability. To date, there are Transport Act 1962, Transport Act 1968, Transport Act 1980, Transport Act 1985, Transport Act 2000 and Local Transport Act 2008.

**Local independence and autonomy in transportation planning.** The UK Department of Transport authorizes the local agencies to independently screen and sort the transportation plans for the administrative region. The

independence and authority shall not undermine the consistency with the strategic deployment of national integrated transportation plan. The UK Central Government guides local transportation planning agencies through regulations and manuals on transportation environmental assessment and multi-objective transportation project evaluation. Local transportation planning agencies are responsible for assessing urban transportation projects.

**Enterprise management of the government and implementing agencies.** Through a series of governance innovation from 1980 onwards, entrepreneurship has been introduced into the public sector and some public affairs can be contracted to private companies. In terms of highway, the business related to technology and production is generally carried out by the private sector, covering highway planning, design, supervision and construction, as well as information collection and distribution, technical management and maintenance production. Many transportation policy studies are also undertaken by private companies (such as transportation diversity research by Mott MacDonald). SERCO operates on behalf of Highways England the National Traffic Control Centre which provides real-time highway information and vehicle guideline, scheduling and control.

## 2.4 Germany

**Joint intermodal transportation services.** Frankfurt Airport integrates highways, regional railways and high-speed railways for surface transportation, making it very convenient for passengers to transfer between railway and airplane. The air and rail transportation infrastructure that were basically completed in 1995 enable direct access to the airport from all the southern cities and northern lines through Hanover and Hamburg and lay the foundation for easy transfer at the airport. The German Federal Railway Authority has set up the airport codes of the international air transportation system for major railway stations. Airlines can select a number of trains and railway stations to share codes. The practice significantly increases the total traffic and consolidates the hinterland of airports (Rong, 2005). Through the provision of air and rail intermodal transportation services, Frankfurt Airport has strengthened the pivotal function and enhanced the competitiveness with secured hinterland and market resources, and

further contributed to the regional transportation integration.

### **Favorable integrated transportation policy.**

To accommodate and encourage the development of intermodal transportation, the German Government adopts a special treatment policy for trucks involved in intermodal transportation services, including increased weight limit from 40 tons to 44 tons and lifted weekend transportation ban for trucks engaged in intermodal transportation services and exemption from € 1,500 highway use tax for trucks dedicated to intermodal transportation services.

## 2.5 Australia

**Philosophy of integrated management.** In 1987, Australia built the Department of Transport and Communications on the department of transport and the department of aviation and communications, making a transition from dispersed management to centralized management. Government departments thereafter provide unified management of transportation services and integrated management and coordination for all modes of transportation, which ensures effective national macro-control. Later, the department was re-organized to the Department of Transport and Regional Services. In November 2007, the Department of Infrastructure, Transport, Regional Development and Local Government was established to put more emphasis on transportation infrastructure construction, regional economic development and local government coordination and management while bearing the existing functions. On September 18, 2013, the Department of Infrastructure and Regional Development formed by way of an Administrative Arrangements Order issued on 18 September 2013 and performs functions in infrastructure, transportation and regional development, including the majority of the functions previously performed by the former Department of Infrastructure and Transport. The institutional integration and functional division in the transportation sector shows that the Government always bears in mind the philosophy of integrated management in the overall planning and systemic management of different modes of transportation.

**Integrated transportation laws and regulations.** The Australian integrated transportation system covers a wide range of laws, such as finance, operation, management and supervision. The highly refined legal provisions, which stipulate such general issues as the state and federal government coordination and such specific

issues as data collection and transportation investigation, provide a legal basis for effective integrated transportation services.

**Participation of NGOs and private enterprises.** The private sector and NGOs actively participate in integrated transportation services. NGOs are also involved in the development of policies and industry standards by the Department of Infrastructure and Regional Development.

### 3 IMPLICATIONS FOR CHINA

After years of efforts, the European Union and the United States have moved towards intermodal transportation with coordinated development and organic convergence. The significant improvements in the level and efficiency of transportation services provide a strong guarantee for economic and social development. Their practices are worth reference, summarized as follows:

#### 3.1 Establish legislation

Taking into account economic development requirements and resource and environmental constraints, developed countries work out the core policy of integrated transportation development and upgrade it to national strategy through legislation. The legislative height not only protects policy independence from alternate political parties and policy consistency from "flip-flop", but also ensures appropriate policy implementation (Wu, 2011). In short, the important legislative status, clear development direction and system continuity are prerequisites for integrated transportation development in developed countries. In view of the long-term independent development, system and policy for highway, railway and civil aviation and the lack of coordination between different modes of transportation, China also needs to clearly define and explicitly interpret the core objectives, rights and responsibilities, and priorities of integrated transportation development within the legal framework, in order to minimize the exclusion and friction between entities and maximize the efficiency of administration. In addition, the coordination between different transportation laws and the balance of rights and responsibilities of enterprises in the transportation business chain are also important.

#### 3.2 Develop guiding plans

The United States and the EU countries have released integrated transportation strategic plans to clarify the strategic mission, objectives and steps (Sufian, 2005). In China, the super-ministry management system integration takes time due to long-term block management. The transportation sector basically shows vertical strip development of different modes of transportation, regardless of planning, construction, equipment configuration, operation and management. The development plans, station construction and line layout for highway, waterway, railway and civil aviation are independent of each other. There are also problems of inadequate overall consideration of limited land and line resources, inefficient utilization of resources and redundant construction. It is necessary to develop plans and let them guide integrated transportation development. The plans should set forth the long-term strategic objectives, near-term tasks, and strategic measures and focus areas, and propose research and engineering projects and project support to ensure the realization of strategic objectives.

#### 3.3 Beef up standards as the cornerstone

Standardization lays an important technical foundation for production, operation and coordinated development of various modes of transportation. Unified standards serve as an underlying cornerstone of integrated transportation development, such as in the European Union. China has formed a distinct, comprehensive standard system and set up specialized technical organizations for standardization, covering such fields of transportation as railways, highways, waterways, civil aviation and postal services. However, the technical standards developed independently by ministries (Luo, 2004), such as Chinese Ministry of Commerce and Ministry of Industry and Information Technology, do not coverage well. The standards for intermodal transportation coordination remain very limited. Formulating and amending standards is an effective move to speed up the construction of an integrated transportation system and enhance the energy efficiency of integrated transportation. Therefore, China needs to strengthen the research and formulation of integrated transportation standards and elevate industry-specific technical committees for transportation standardization to the national

level to meet the multi-party needs of standardization.

### 3.4 Push ahead with special programs

In Europe and the United States, special programs serve as an important driving force for integrated transportation development. They have presented remarkable performance in combination efficiency, logistics costs, energy conservation and emission reduction while giving full play to the overall advantages of various modes of transportation. In recent years, the Chinese Ministry of Transport has embarked on the demonstration for integrated transportation services and basically achieved "initial breakthroughs, practicable measures and apparent effects". A total of 16 model cities for integrated transportation services and 16 demonstration projects for intermodal freight transportation have been identified (Chen, 2012). Further, demonstration performance follow-up and evaluation are carried out in a timely manner, in order to optimize the special programs and advance the integrated transportation system.

### 3.5 Provide policy guidance

The integrated transportation development in developed countries such as Europe and the United States is inseparable from high government attention and strong policy guidance. In particular, integrated transportation services involve not only business operators, but also government departments in charge of transportation, development and reform, industry and information technology, finance, land resources, customs, taxation and quality inspection. They are a systematic project that includes infrastructure, equipment and technology, organization and service, and information. Drawing on the experience, China should provide guidance for diversified investment and financing channels, formulate research-based policies on project planning, land use and capital investment, and introduce incentives such as subsidies or tax breaks for enterprises and relaxed business restrictions.

### 3.6 Strengthen guaranteeing management

In addition to an advanced integrated transportation system, a relatively perfect management system is also important to the development of integrated transportation services in developed countries. In

China, the "super transportation" pattern at the national level has been formed and coordinated by the Chinese Ministry of Transportation. At the local level, however, the "super transportation" system remains absent in the majority of provinces and cities and the division of functions and responsibilities are to clarify for integrated transportation. While an integrated transportation management system is yet to establish as a unified organic whole, the existing management systems for different modes of transportation fail to ensure close contact and coordination and effectively integrate departmental functions. China should strengthen the integrated transportation management system by setting up the general office and cross-departmental coordination agencies in accordance with the functional division, but also "super transportation agencies" for specialized industrial management according to modes of transportation.

## 4 CONCLUSIONS

Integrated transportation is instrumentally effective to improve the efficiency of transportation portfolio and technically fundamental to industrial upgrading for better quality and efficiency. It is considered an inevitable option that supports the national strategy and develops transportation at the current stage. The advancement of an integrated transportation system should be start from and put the foothold on service capacity building. The paper summarizes the implications for domestic integrated transportation development based on analysis of the experience of typical countries, such as the United States, European Union, United Kingdom, Germany and Australia. The lessons drawn are of theoretical value and practical significance by supporting management decisions and promoting integrated transportation.

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