



A strategic planning model for the passenger rail implementation process: The case of Mexico

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ABSTRACT

The development and growth of modern regions is based on the construction of infrastructure, where strategic planning plays a key role. Basically, a plan should be aligned with neighborhood regions in order to enhance their inhabitants' quality of life. Transportation is in the core of infrastructure efforts, because it represents a complex system with relationships between different actors, both internally and externally. In this piece of research, a comprehensive model for the implementation of an intercity train in the Mexican context is proposed. Covering a wide variety of phases, from the design activities through to the operation stages, non-prescriptive guidance is provided to lead the construction of passenger railway infrastructure projects. Unlike similar models developed in the European or North American settings, the one presented here considers the conditions and characteristics of the Latin-American countries, making it relevant for nations in the region. After analyzing its potential benefits, the optimization of resources can be expected as a result of its practical implementation.

1. Introduction

As a result of both market liberalization and economic globalization, planned transport projects are required to absorb the traffic resulting from mobility needs either of people or goods. They represent not only an instrument of financial and social cohesion, but also of territory interconnectedness, spatial integration and improved accessibility (Vasallo and Izquierdo, 2010). Accordingly, transportation becomes a critical industry to integrate territory and facilitate movement.

In spite of the existence of different alternatives such as road, port and airport infrastructure, the train offers multiple benefits to its users, e.g. convenience, cost, travel time, reliability and availability. Japan, the US, Germany, France and Spain already have a great advantage in the field of High Speed. If we consider that Japan started the high speed train from Tokyo to Osaka in 1964; and UK imposed a new challenge to those countries willing to update their infrastructure when the line leading from the Channel Tunnel to London was completed (Channel Tunnel Rail Link, nowadays High-Speed 1 or HS1) in 2007; Mexico, and the Latin American region in general, lag behind their

developed counterparts in terms of creation of train transport system (Martínez Sánchez and Givoni, 2012).

As can be seen, there is a need for developing transport plans, models, methods and frameworks, aimed at integrating all aspects of the design, construction and operation of the associated systems. Consequently management, economic and technological advances in the subject should be encouraged (Chen, 2012). While reviewing the literature, it became evident that there was confusion between the three terms 'model', 'methodology' and 'framework'. Wong (2005) argued that the first provided an answer to 'what is', the second offered an answer to 'how to', while the latter answered both.

Therefore, in this paper a model for implementing a train transport system in Mexico, is proposed. While it considers the traditional five stages included in other models, i.e. preparation, feasibility, design, construction and operation, it has been developed to contemplate the features of the Latin American environment, with special attention in risk management, an area normally neglected in traditional approaches.

In the following sections, a brief description of the Mexican context is presented. Then, the steps for developing the model are carefully

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detailed. Next, the various aspects included in the proposed model are discussed. Finally, the conclusions of the study along with its advantages and limitations are exposed, and recommendations for future research are outlined.

1.1. The Mexican context

The process of demographic concentration, politic and economic development in the State of Mexico and Mexico City, produced regional imbalances in the administrations between 1988–1994 and 1994–2000. During those periods, the growth of the country was achieved through the orientation of the political efforts to the international trade, driven by the North American Free Trade Agreement (NAFTA), which contributed to the development of plans for goods movement by truck as dominant mode.

These changes led to the backwardness and the dismantling of the Mexican passengers rail industry. Consequently, local governments have invested in road highway transportation infrastructure, a system that has represented more than 90% of the annual national travel figures (Parodi, 2011). After more than one decade of weak growth (2000–2012), the current National Development Plan (NDP) 2013–2018 establishes the need to build new transportation infrastructure aimed at enhancing the economic activities. Furthermore, the increase of the competitiveness arising from better interconnectivity is established as one of the main lines of domestic development (Gobierno de la República, 2013–2018).

Along this line of thought, the National Infrastructure Program¹ (NIP) 2014–2018 (PwC, 2014) considered the construction of three passenger rail transport projects: the fast train from Queretaro to Mexico (Valley), the interurban train from Mexico to Toluca, and the transpeninsular train of Yucatan. Each of which represented an investment of about 2500, 2200 and 1100 USD million respectively, during a three-year span from 2014 to 2017.

Due to financial difficulties and unforeseen circumstances, the Secretariat of the Treasury and Public Credit (STPC) announced, in January 2015, the definite cancellation of the transpeninsular rail, and the indefinite suspension of Latin America's first high-speed train line, from Queretaro to Mexico (The Japan Times News, 2015). Now, only the intercity rail from Mexico to Toluca survives, which began its construction in August 2014.

According to SENERMEX,² these metropolitan areas have grown considerably since 1980 as a consequence of the urban development policies, focused on the expansion of the road infrastructure. Additionally, the impractical use of the land and the lack of attention to the public transport service have prevented a balanced and sensible investment in the two cities. With these ideas in mind, in the next section the interactions between Mexico and Toluca are described to better understand the need for a train in the central region of the country.

1.2. The need for a train between Mexico and Toluca

The evolution of these two zones allowed for increasingly rapid rates of people and goods interchange. Therefore, there was a social demand for a public transport initiative capable of satisfying the requirements of the area (SENERMEX, 2013). In the last official census, the National Institute of Statistics, Geography and Informatics (INEGI, 2010) revealed that the Toluca Valley was Mexico's fifth metropolitan area, just behind Mexico (20.1 million),

Guadalajara (4.4 million), Monterrey (4.1 million) and Puebla (2.7 million). Its population went from 1.92 million in 2005 to 2.15 million inhabitants in 2010, which represents an increase above 10%. Even more, it is estimated that in 2017, it will be over 2.44 million (COESPO, 2012).

This growth in the Toluca Valley has had several effects such as disorderly urban development, environmental impacts, and again, the rapid explosion of road infrastructure. In the highways connecting both areas, more than 45,000 vehicles move an average of 700,000 passengers (SENERMEX, 2013), more than half of the population (1.3 million) going from the State of Mexico to Mexico City on a daily basis (INEGI, 2010).

This is the reason why a new 13.5 km second floor highway is being built, which not only will be finished by June 2016, but will also include three elevated viaducts, costing 210 million USD (Dávila I, 2015) (EXCELSIOR, 2015). As is evident from the analysis of data, there is a need to enhance the transport system between the two cities, and the train offers a feasible way to satisfy it. In the following part, some of the features that the project includes will be described.

1.3. The intercity rail between Mexico and Toluca

Interest about the intercity train started as early as 1984, when the Transport Commission of the State of Mexico in conjunction with the Secretariat of Communications and Transportation, the Federal Highway Commission, and the Urban Transport Office of the Federal District first analyzed the prevailing situation. Then, a study conducted by the French company SOGELERG determined the urgency to build an electric train between the cities (SENERMEX, 2013). The project was never implemented but this was the initial impulse that gave life to the current initiative.

More than three decades later, the so-called intercity rail Mexico-Toluca has been designed to be a safe, fast, effective, comfortable, sustainable and economic passenger transportation alternative. With a total length of 57.7 km, the project will have four stations, two terminals and a workshop. Whereas its maximum speed will be 160 km/h, the commercial one will be 90 km/h, leading to a travel time of 39 min. The maximum volume of the train during peak demand will be 15,660 passengers at a frequency of four-six minutes, and a capacity of 1044 people per train (560 seated and 484 standing) (SENERMEX, 2013).

Since this is the first intercity rail project in the country, the experience of the Mexican participants is still scarce. Authorities might believe that it will serve as a support tool for future efforts along the same line, a tool that can be developed from the practical experience gained in this project (Díaz, 2013). Nevertheless, international practices reveal that the construction of such infrastructure requires the efficient management of a comprehensive public transport system, fed by a network of routes at regional level, with a long rather than a short term vision.

It is then necessary to have a guidance model at hand, which considers all the elements involved in the initiative, prior to launching this type of project. In the next section, some models that have been developed in different contexts will be reviewed to lay a foundation for the herein proposed.

2. Train implementation models

In Mexico, the publication of models about the implementation of transport infrastructure is limited to the description of operation procedures, sometimes in an informal way. For instance, there is a guide for supporting the planning process of public works, edited by the Secretariat of Communications and Transport (SCT). But the document is mainly related to the construction and modernization of roads (SCT, 2013).

Then, the need for building a tailored model for the rail industry is

¹ National Infrastructure Program, 2014–2018. Published in the Mexican Official Journal of the Federation on Tuesday April 29, 2014.

² SENERMEX Engineering and Systems SA de CV. Is part of the Group SENER, leader company in the engineering sector, with international presence. In Mexico, they develop engineering projects in the infrastructure sector such as: roads, subways, airports, trains, buildings, railroads and similar.

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