Bases for feasibility analysis of Logistics Platforms at borders

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Abstract

In the context of public policy for innovation and competitiveness of foreign trade, the Ministry of Communications and Transportation and the Ministry of Economics, Federal Government of Mexico, have been incorporated into the planning of the National System of Logistics Platforms (PL) a set of Logistics Platforms at Borders (PLAF). The article begins with the conceptual presentation of this type PL that are designed for land borders of Mexico, to the north by the United States and south by Guatemala and Belize. Here are presented the bases for market analysis, to identify microlocalization, to formulate the business model and to establish economic and financial feasibility of projects PLAF. Articulation between market scenarios and the economic and financial feasibility, and the proposal of a business model involving different actors stands out: landowners, the development of the community by the local authority and equipment logistics buildings in modules, real estate companies in the logistics sector. The methodology was developed at the Institute of Engineering of the National Autonomous University of Mexico, and transferred to the Federal Government of Mexico.

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1. Introduction

In a broad meaning a logistics platform (PL) is a territory equipped to develop logistics activities. The basic equipment of a PL are: logistics buildings, lay-out suitable for the efficient movement of vehicles, docks, parking for vehicles, in some cases infrastructure for intermodal transfer, offices for logistics operators, and complementary services for the vehicles and their operators (Antún, JP, Lozano, A, Alarcon, R, et al; 2008). This equipment provides the PL geographically concentrated operations logistics processes and allows proper management of the flow of merchandises, as well as improved productivity of transport operations. By being concentrated in one geographical location infrastructure, the PL facilitate: i) the change of the tractive unit in modal transport, and ii)
the breaking of the load units in view of deconsolidation of loads, and can be used to perform different operations for logistics processes such as order processing with and without inventories and other activities, generally referred to as logistics value-added activities. On the positive externalities associated with the management of flows of goods vehicles and reducing the number of these vehicles, reduced vehicle tours in physical distribution, mitigating congestion in urban road networks, mitigation of emissions and gas greenhouse effect, resulting from the operation of a PL in a region, a metropolitan area and/or an urban area, becoming PL draft plans and land management programs are more incorporated. The advantages provided by an PL to supply chains that make it attractive in some cases, are production plants where companies are located in competitive segments in priority industries in public policies (Lozano, A; Antun, JP; Alarcón R; et al; 2008).

Eight types of Logistics Platforms (PL) are considered: Distribution Logistics Platforms (PLADIS), Logistics Platforms at Border (PLAF), Logistics Platform for Cluster Support (PLC), Port Logistics Activities Zone (ZAL), Air Cargo Centers (CCA), Intermodal Terminals Railway (TIF) and Dry Ports (PS), Agrolog Centers (AGROLOG) and Food Logistics Centers (CLA).

Currently, the implementation of logistics platforms is recognized as a key factor to boost competitiveness (Alarcón, R, 2012) of the countries in Latin America at both national and regional and local level, which is reflected in the public and private efforts to promote the development of logistics infrastructure framed in national strategies and programs that are being made in Mexico, Panama, Colombia, Ecuador, Uruguay, to name a few cases. These experiences, like others in Europe and Asia, reveal the importance for the successful implementation of a project in its different typologies PL: the sustain its economic and financial feasibility from detailed market analyzes that allow dimensioning and establish technical basis of the project (including its location at both macro and micro) and define the business model as the most suitable development scheme.

Logistics Platforms at Borders (PLAF) are support infrastructure for the production of transportation and logistics services in proximity to land border crossings. Provide facilities to carriers for cross-border traffic management (change of tractor, exchange of railway locomotives and staff driving charge transfer from one vehicle to another, etc.), inventory management, order processing and consolidation of cargo units on export destinations, facilities for freight-forwarders, brokers, carrier services (hotels and restaurants) and the vehicle. Often in projects of PLAF, Customs facilities exist.

The methodological basis for the realization of Market Research, Microlocalization Analysis, Technical Basis, Business Model Schema, and Economic Feasibility are presented in this article. The experience in real Case Studies allows authors to present the methodology as a checking detailed list of what must be done at each stage of a feasibility study of a project PLAF.

2. Bases for doing the study of market of a project of logistics platform at border (PLAF)

To perform a Market Research of a Project of Logistics Platform at Border (PLAF) eight activities conclude with the identification of potential clients should be made.

2.1. Defining the corresponding influence area of the Project

Experience shows that define the area of influence of the project is not easy. It is recommended that an "immediate hinterland" linked to the location of the border crossing, and therefore the actors in cross-border transactions (not only administrative and customs and sanitary certifications, etc., and transportation, but also considering practical and necessary infrastructure in marketing channels such as distribution centers and facilities for "cross-dock") and then extend it according to results obtained in the Case Studies of Supply Chains (see below section 2.4).

2.2. Analysis and evaluation of the infrastructure and operation of the current offer of transport and logistics services related to the area of influence of the Project

Analysis and comprehensive assessment of the infrastructure and operation of the current offer of transportation and logistics services in the area of influence corresponding to the Project Logistics Platform at Border (PLAF) is recommended, considering at least:
a. Analysis the infrastructure and operation of transport in the area of influence of the Project

For this analysis should be performed to characterize the transport infrastructure linked to the project, including:

(1) Characterization of the Road Network
(2) Characterization of the Transport Services (motor freight, railways, maritime, air, and intermodal)
(3) Characterization of the Port Terminals, Intermodal Rail Terminals, Air Cargo Terminals, and Trucking Terminals
(4) Characterization of border infrastructure crossing

b. Analysis the infrastructure for logistics processes and their operation in the area of influence of the Project

This analysis should take an inventory of the technical characteristics and an analysis of the operational status of the infrastructure for logistics processes and their operation:

(1) Inventory and technical characteristics of the logistics infrastructure in operation: Logistics Platforms, Logistics Centers, Logistics Parks, Corporate Distribution Centers, other formal real estate developments for logistics activities, “regional clusters” relevant to logistics activities and industrial areas undergoing new opportunities for the development of logistics infrastructure (in the area of influence of the Project)
(2) Technical and operational characteristics of Trucks Center (in the area of influence of the Project)
(3) Technical characteristics in other planned Logistics Platforms projects: Distribution Logistics Platforms (PLADIS), Logistics Platforms at Border (PLAF), Logistics Platform for Cluster Support (PLC), Port Logistics Activities Zone (ZAL), Air Cargo Centers (CCA), Intermodal Terminals Railway (TIF) and Dry Ports (PS), Agrolog Centers (AGROLOG) and Food Logistics Centers (CLA) (in the area of influence of the Project)

c. Joint assessment of the infrastructure and operation of transport services and logistics related to Project and its area of influence.

Here, based on the results obtained in sections a and b, it is recommended that an analysis of Strengths, Weaknesses, Opportunities and Threats (SWOT) for the Project PLAF, derived from the joint assessment of the infrastructure and operation of transportation and logistics services in the area of influence.

2.3. Analysis of the economic activities in the area of influence of the Project

This is an analysis of the economic activities in the area of influence of the Project, specifically considering the competitive segments in foreign trade, and in particular those whose supply chains are linked to the border crossing

2.4. Characterize supply chains in competitive segments in foreign trade, and in particular companies whose supply chains are linked to the border crossing in the area of influence of the Project

This part of the study requires an important field work, only way to generate new primary information. Also, it should be noted, should be provided sufficient resources to do it.

a. Inventory of supply chains in competitive segments in foreign trade related to border crossing

The inventory of supply chain in competitive segments in foreign trade related to border crossing is the starting point, and is made based on available secondary information and direct research: the Government at central and federal level as appropriate (Ministries / Foreign Trade Commissions / Internal Trade / Industry Chambers, etc) entities established by Regional Governments linked with economic development (Commerce / Industry Regional / Local), Customs at central and local levels at the border crossing, Supply Chain Directors and Traffic Managers in companies whose their supply chains are linked to the border crossing.

b. Identification of companies whose supply chains are linked to the border crossing

It seeks to establish a sampling frame with all companies whose supply chains are linked to the border crossing
c. Selection and implementation of Business Case Studies supply chains of companies whose supply chains are linked to the border crossing

Here are key: i) the development of criteria for the selection of companies, and ii) to define the methodology for conducting the case studies, which measure the performance of current operations, and competitive innovation that would induce the Project.

The criteria to identify a list of companies in the sample framework which should be validated with government agencies.

The methodology for the case studies should be based on personal interviews because experience shows that telephone interviews, and even more in the web path, the results were unreliable. Should also be noted that you should not look a quantification of the expected performance improvement of operations in logistics processes, but concentrate on a qualitative assessment based on interviews with Directors of Supply Chain and Traffic Managers at companies whose supply chains are related to border crossing.

The expected results are a characterization of supply chains for each case study and a cross-analysis of all the case studies conducted.

d. Validation of the characterization of the supply chains

To validate the characterization of the supply chains research, focus groups with Professional Associations Executives Logistics and Distribution, Logistics Operators, Carriers Business Associations, Chambers of Exporting Companies etc. is recommended.

This validation activity, also identify those factors of infrastructure and operation, which improve the performance of logistics in the supply chains studied.

2.5. Develop scenarios of improving the performance of the supply chains studied by developing the Project

Based on d. can be formulated scenarios improving the performance of the supply chains studied by developing the Project. Based on the results of 2.2, 2.3, and 2.4 can be formulated at least three (optimistic, intermediate and conservative) market scenarios as steps and time horizons (volume, type of cargo, origins and destinations, requirements associated type of cargo, cargo services, etc..) for transportation and logistics services for the Project.

2.6. Identify potential customers for Project

Based on the case studies and direct research conducted with stakeholders in companies, we can identify potential customers for the PLAF Project, including:

(1) Export companies that seek to locate new Distribution Centers
(2) Operators of logistic services
(3) Global Integrators
(4) Motor Truck Freight Companies
(5) Freight Forwarders

In each case, the key is to describe the infrastructure (logistics buildings, parking areas, etc..) required by potential customers in the Project.

2.7. Characterize the market potential for the Project PLAF

Here the market potential scenarios will be defined for the PLAF Project based on the results of the above analysis, seeking to formulate demands on time horizons; that the key question for the economic and financial feasibility evaluation (see section 6 below)

3. Bases for carrying out the technical characteristics of the project

3.1 Land surface as required by development stages, based on estimated volume of cargo area as market scenarios, and potential customers

Consider: i) Total land surface required for the Project; ii) Land surface required by development stages
3.2 Requirements identified from the prospective customers

Based on each of the identified potential clients, and special requirements that revealed the Case Study, we must specify: i) Lay-out; ii) Characteristics of the logistics buildings; iii) Infrastructure for special logistics services; iv) Parking for trucks

3.3 Microlocation Analysis

The study of land occupation and land use regulations should lead to:

a. Microlocation Analysis
Will be considered at least: i) Availability of land; ii) Connectivity to the border crossing; iii) Connectivity to the road network of high specification; iv) Connectivity to Port Terminals, Intermodal Rail Terminals, Air Cargo Terminals, Truck Center, as applicable; v) Feasibility Areas for Special Tax Regimes under local law Customs as Free Trades and Economics Zones; vi) Potential links with other Logistics Platforms in the area of influence of the Project

b. Proposals for alternatives microlocation of the Project
Should analyze at least three alternatives to the Project microlocation, presenting an analysis of advantages and disadvantages of each of the three proposals.

3.4 Análisis de los flujos de vehículos de carga

For analysis of the flows of freight vehicles must resort to simulation models, both macro level (flows in large modal transport infrastructure) and the micro level (in particular the need to analyze performance connectivity PLAF project with transport networks).

For this we need:

(1) Conduct an analysis of freight vehicle flows in the region, considering the Project infrastructure connectivity with the road network
(2) Establish a proposal for infrastructure improvements in the road network connectivity with high specification to ensure competitiveness for the Project.
(3) Establish a proposed infrastructure improvements in connectivity to the Border Crossing.
(4) Establish a proposed infrastructure improvements connectivity with Port Terminals, Intermodal Rail Terminals, and Air Cargo Terminals, as applicable.

3.5 Pre-project of Project lay-out

The development of a pre-project of Project lay-out, provides:

(1) Urban Design
(2) Internal road network considering primary and secondary roads and roundabouts ( "round point" ), to resolve cross
(3) Requirements for operation of motor trucks in the internal road network
(4) Requirements for cross-border operation of motor trucks
(5) Areas for Free Trades and Economic Zones
(6) Areas for Logistics buildings
(7) Area for Business Center
(8) Areas for Offices (Customs Brokers, Logistics Global Integrators, etc)
(9) Areas for Regulators Agency (Customs, Health, National Security, Agriculture, etc)
(10) Area for General Services (restaurants, etc.).
(11) Parking for vehicles & trucks
(12) Access control
(13) Infrastructure connectivity to the road infrastructure
(14) Infrastructure connectivity with border crossing
3.6 Basic infrastructure

An important input to be specified in this part of the study to the investment chapter in the economic and financial evaluation is needed regarding the basic infrastructure—water, electricity, drainage, telephone network, fiber optic network, etc.—.

3.7 Portfolio of transportation and logistics services

Also, it is necessary to design a portfolio of transportation and logistics based on the results, which adapt the offer to the needs of prospective customers identified.

4. Business model for the project

4.1 Establishment of the business model

The business model should be formulated through innovative steps, based on: i) the definition of the specific business objectives for the Project, and ii) the consideration of the elements of conceptualization of business from the market characteristics identified

The Business Model, considering at least will conceptualize:

1. Renting & sale of Logistics Buildings
2. Renting & sale of Areas Offices
3. Revenue from providing infrastructure (platforms, warehouses, cargo handling equipment, etc.) for operations of "cross-docking", customs clearance, etc.
4. Revenue from concessions: operators of parking, areas for vehicle maintenance, service areas for the drivers, security services, health services, certifications, etc.

Then, on this basis, is performed:

a. Strategic sizing the Project

Stages of project development are defined, and each is considered as market demand scenarios, based on Basic Modules. Defining the Basic Modules must include: surface requirements of basic infrastructure (water, electricity, drainage, telephone network, fiber optic network, etc.), lay-out, type of logistics building, access road etc. Project development and basic infrastructure will be performed for each stage, facilitating the sequential development of project-based on Basic Modules.

b. Estimated demand profile according to the elements of the business conceptualization

Will be considered at least:

1. Estimated demand for a five-year horizon for rent and/or sale of logistics buildings
2. Estimated demand for a five-year horizon for rent and/or sale of Areas for Offices
3. Estimated demand for a five-year horizon concessions: operators of parking, areas for vehicle maintenance services, areas for services to drivers, operators of scales, security services, sanitary certifications, etc.

5. Basis for defining a development scheme for the project

This stage of the feasibility study should be very innovative and "grounding" of the Model Business desired and feasible. At least should consider alternative schemes of financial engineering, program and project development marketing plan.

5.1 Financial Schemes
Financial Schemes are defined to develop the project, considering:

1. Real Estate Developers of the Logistics Sector
2. Owners of land (Local Agency, Municipal, private, etc.)
3. Participation of logistics operators
4. Participation of Motor Truck companies

5.2 Program Project Development

Should explore alternatives in the development program Project, considering the urbanization of the first stage and development of Basic Modules:

- The construction of the first stage is recommended raise it in terms of sales and / or rental of land, either to the promoter of the project PLAF own virtually sell and / or lease lots for the construction and marketing of the Basic Modules, or, private developers, or leased purchase land and invest in this activity.

- Therefore, the investment for the development of a Basic Module is first analyzed independently, thereby opening the option of whether another entity that promotes, also under a mode of sale and / or lease

5.3 Marketing Plan

Different schemes for the Marketing Plan, among which will be considered:

1. Urbanized land: rental of short and long term, and sale
2. Logistics Buildings: rental of short and long term, and sale
3. Business Center: rental of short and long term, and sale
4. Offices: rental of short and long term, and sale

6. Basis for economic and financial evaluation

At this stage the required investment costs and operating expenses and expected income, must be introduced in a classical model of economic and financial evaluation, and then determine whether the development of the Project is financially self-sufficient, and whether it represents an attractive investment from the point of view of profitability. It is also important to perform a sensitivity analysis of the results in relation to changes in the costs of acquisition and/or lease of the land, and selling prices and/or income of developed land for the construction of logistics buildings in the Core Module.

6.1 Estimated Investment required for the Development Program of the Project

Should be considered:

1. Cost of acquisition and / or rent the land
2. Costs of development and basic infrastructure of the first phase (water, electricity, drainage, telephone network, optical fiber network, etc.)
3. Cost of construction of logistics buildings, for the Core Module
4. Cost of new infrastructure to improve the connectivity with the network of roads and highways
5. Cost of new infrastructure to improve the connectivity with the border crossing
6. Cost of new infrastructure to improve the connectivity with Port Terminals, Intermodal Rail Terminals, Air Cargo Terminals, as applicable.

6.2 Estimated costs and operating expenses

Should estimate the costs and operating expenses, considering at least:

1. The costs per square meter used, concepts relating to sale and / or rental of lots, development works and equipment
2. The commission on sales, a variable cost that will be linked to the dynamics of project marketing.
3. The fixed costs of management in the first year and an annual increase.
(4) The expenses for sales and their annual increase.
(5) Amortization of deferred, understanding the recovery of investments made for planning, authorization and supervision, which is done through annual charges proportional to the volume of sales that apply to the marketing period.
(6) Payment of taxes defined as a percentage of the profits

6.3 Expected revenue

The expected revenue for sales and rentals are quantified, also considering at least: i) sales revenues based on a program that includes the period of years defined in the Marketing Plan; ii) the rental income based on a program that includes the period of years defined in the Marketing Plan.

6.4 Economic and Financial Evaluation of the First Stage of the Project

Here the classic method, basic financial planning, to develop the first phase of Project PLAF, which shall consist of: (1) Premises; (2) Summary of Investments; (3) Investment Plan; (4) Income Statement; (5) Cash Flow; (6) Balance Sheet; (7) Calculation of Financial Ratios (essentially the Internal Rate of Return-IRR)

6.5 Results of the Economic and Financial Evaluation of the First Stage of the Project

With the results of the Economic and Financial Evaluation will be defined if the PLAF project is economically and financially viable, ie:
• If development PLAF Project is financially self-sufficient, and
• If the development of the PLAF Project represents an attractive investment from the point of view of profitability (measured based on the Internal Rate of Return-IRR)

6.6 Sensitivity Analysis of the First Stage of the Project

Finally, it should perform a sensitivity analysis of the results of 6.5 under at least two scenarios:
• Changes in the cost of acquisition and/or lease of the land
• Changes in selling prices and/or revenues of developed land for the construction of logistics building in the Basic Module.

7 CONCLUSIONS

As noted at the beginning, experience in studies of logistics platforms either performed or supervised, allowed the paper has been conceived essentially as a "checking list" detailed and practical than it should be in each of the stages of a Feasibility Study of a Logistics Platform at Border (PLAF) projects.

This papers is a useful contribution to the planning agencies in the governments of the countries in Latin America where National Logistics Infrastructure Master Plans are structuring, among which are Mexico, Peru, Colombia, Ecuador, Paraguay, Uruguay and Panama, development banks operating in the region -World Bank, Inter-American Development Bank and the Andean Development Corporation- are funding both the Master Plans as specific projects, including cases that have been generated entirely by the private sector (BID, 2011).

In future articles, the methodological basis for project studies of the other 7 types of Logistics Platforms, will be presented.

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REFERENCES

ALARCÓN, R (2012) Competitividad Logística de Centros de Población, Tesis Doctoral en Urbanismo, Facultad de Arquitectura, Universidad Nacional Autónoma de México
ANTÚN, JP (1994) Toma de Decisiones Multicriterio: El Enfoque ELECTRE, D-38 Series del Instituto de Ingeniería, Universidad Nacional Autónoma de México, México DF
ANTÚN, JP; LOZANO, A; ALARCÓN, R ET AL (2006) Estudio para el Desarrollo del Centro Logístico Puerta Chiapas- Fase 1: Estudio de Mercado y Microlocalización; Fase 2: Modelo de Negocio y Análisis de Factibilidad, elaborado bajo convenio con la Secretaria de Economía, Instituto de Ingeniería, Universidad Nacional Autónoma de México, México DF