A pre-investment model for a sustainable development

S. Flores Morales
Programa de Maestría y Doctorado en Urbanismo,
Edificio de Posgrado de la Facultad de Arquitectura, UNAM,
Ciudad Universitaria, México

Abstract

Through the course of this age, much has been talked about ecological and demographic sustainable indicators, but not enough about the economic sustainable fact that must exist when we have a locality that needs to emerge from an ecological deterioration exposure, caused by the arrival of man to the lands who started cultivating, gradually transforming them into urban land use, so the concentration of population and changes in the economic relations turned into sustainable developments. The analysis of the land's geomorphology and its scale economy are of equal importance, so to identify in an Evolution Affinity Matrix (EAM) the factors that construct the evolution of a population center (urban area) which are the social and cultural sides, the technological, economic aspects and the politic relations in the territorial context is fundamental.

The pillar of the EAM is the design of an information system for pre-investment; essential for the identification of the scale economies in the geographical space that have a degree of constant uncertainty, as happens in under-developed countries, which are economically poor, but rich in human and natural resources. The development of this methodology is to create an information system that fits the model and helps to propose alternative economies for an initial investment policy.

Keywords: sustainability economical, regional, GIS, strategic urban planning.

1 Introduction

Planning a territorial area is an important dimension of the regional urban development. Considering the rapprochement of many crises, such as: food

WIT Transactions on Ecology and the Environment, Vol 127, © 2009 WIT Press
www.witpress.com, ISSN 1743-3541 (on-line)
doi:10.2495/RAV090071

supply, hydrologic, energy, economic and many others, the conclusions on the topic of the current urban challenges, [1], special attention is given to the compensation mechanisms between regional economies and the emphasis to convert the share-competitive activity; we can find this situation in Mexico due to the lack of the necessary information to elaborate a pre-plan investment, making the position of country more vulnerable.

It is necessary to emphasize the lack of legal and financial mechanisms that provide certainty to the investment capital, particularly the issues regarding to land ownership.

In Mexico, since the oil expropriation on March 18, 1938, to the present day, PEMEX (Mexican Petroleum) has been the only generator of regional investments in the country, be it domestic or foreign. And without the intention of being catastrophist, the future predictions in Mexico: 2030 to 2050 [2], because of the low quality of oil extraction, which involves the end of the era of cheap oil, is the start of the regional economic crisis with the collapse of the national economy.

So we can say that the sustainability obliges us to make a call to the economic and financial worlds.

2 Conceptual theoretical frame

We will undertake efficient research on the factors of production growth that will lead us to consider socio-economic theories such as those of Alexis De Tocqueville, in 1840 in France, who came to the United States of America [3]. He made some very specific comments about "pauperism" on the people and the "father syndrome" (the people expect solutions from government as a father), and affirms that proactive regional growth is achieved only with efficient economic policies and anti-poverty proposal programs, a need to be consistent with a land management plan, and taking into account the number of people who would set up, and the external demand of the human capital. This forces us to recall the texts of Rousseau that since 1700, he mentioned in his chapter X [4], the territory must be large enough to feed its inhabitant population and must have enough space to give life to the earth; from that time it is of great concern that the land has to feed mankind, and mankind has to make it produce, and this is called sustainability. After the industrial boom, philosophers and scientists from all over the world decided to set their eyes again on the lives of human beings and, at the summit in Stockholm in the 1970s, they could define guidelines that permeated the global thinking and have survived to our present day, but the problematic situation is not solved because of inadequate economic, social, cultural and environmental strategies.

Now, if we put these ideas into the modern economic policy, we can say that the creation of cooperatives and other enterprises inside productive chains, must lead us to a sustainability that has to be asserted, initially, by two factors: human capital accumulation and technological progress, to operate efficiently. However, these factors are not enough, because in order to gain regional competitiveness [5], we must have competitive elements; into a strongly located process that

promotes expertise and local effectiveness. It is necessary to add that we must always think about optimizing the territory. That is why those competitive entities, with spaces that have different attraction factors, are successful in the urban economic and regional development; history reminds us that the territory has always been transformable, and today, is technologically easier to do than before.

Mario M. Carrillo Huerta in his study on public policies for global regional development, mentions Porter about the importance of competitiveness of the territory of which, he thinks, it depends on the combination of three factors that enable the region to participate successfully in regional, national and international markets. We mentioned them below, added to each one there is a synonym, which will be a label in order to establish an initial equation for the pre-invention model [6].

a) Promote the social cohesion, fighting the exclusion.
(Human Capital, Factor = HC)
b) Promote the sustainable and equitable development.
(Planning Factor; = P)
c) Increase the real entrance and the social welfare of the inhabitants.
(Capital Factor; = C (financial and material resources) and Social Development Factor; = SD)

To obtain adequate results, it is of capital importance for our model, to identify factors for the sustainable development, proposing numerical or quantitative values for them.

HC+P+C+ SD =SPM = Successful Participation in Markets.

This is a simple equation that does not take into consideration the deterioration of the local regions that exist within a tourist economy, and we need to know the factors to rescue a community that is the subject of deterioration in order to summarize some studies that were made in Agenda 21, [7]. During this decade of change, the works about those geographic areas emerged for tourist investment. These clarify in detail the ecological, social and cultural deterioration of those areas, considered as tourist wealth; we can name their cultural heritage, historical heritage, natural beauty, and social hospitality. Try to identify, successfully, each one of these characteristics, that would be subjective; because the tourist flow mainly occurs through mouth to mouth recommendations, starting with the first visitors, who make a chain of tourist entailments, forming a mass of tourist-human visitors in search of novelty or exoticism At the same time, these visitors are like devastating predators, leaving the areas with no future alternative for the economy.

2.1 Rescue of the cycle of deterioration of the geographic space with tourist investment

An evident phenomenon of deterioration in any natural environment is caused by the action of the human kind, which is cyclically repeated in those areas with

potential tourism, like many others. The human force and also the foreign investment, strengthen what is called the "Deterioration Tourist Cycle", converting it into a common denominator in each of these spaces, due to the lack of planning and pre-inversion programs that provide: rescue of the natural, ecological, social and cultural areas with potential tourism investment.

To make this rescue happen it is necessary to obtain information, which is grouped into three major elements, to help us achieve a pre-investment plan. These elements are: the ecological or natural, the social and the cultural, located within the affected region. Identify which are the economic ties in the geographic space needed to be strengthened and enhance their competitiveness, and then evolve into a sustainable regional economy planned, in several stages, before making the investment.

2.2 Planning guidelines for the management of a sustainable project

1. Integrated with objectivity: tourism projects must have a diagnosis, perspectives and strategies for sustainability within specified approved activities and restriction norms.
2. Open and Relative: open to the economic context and surrounding regions as long as we have a constant monitoring of changing environmental factors assuming their relationship through a long-term action.
3. Dimensioned within specific characteristics: the term in assigned time and space to avoid the stop of periods in pre-marked areas for tourist use with unique and specific characteristics which are a determining factor in creating the methodology on the geographical environment load capacity.
4. Lasting with critical constraints: the benefit, as a sustainable plan, turns into a long term lasting effect when we considerer the critical constraints of the environment, these are the factors that affect the density, intensity and the use modality, e.g. the water, the discharges, the inhabitability etc., factors that need to be planned for long-term lasting effects.
5. Viable in the economic and institutional management: the economic, social and environmental viability are essential as far as they are within an institutional management, which guarantees human capital training and an appropriate management of political and economical resources.

It is important to mention that for the lineament 5 to be effective, it must be studied thoroughly. Our only interchange recourse is the soil, and for this purpose it is necessary to obtain a financial mechanism that guarantees any investment, and this obliges us to enter the agriculture field.

2.3 Financial mechanism: the land possession as a financial guarantee

The importance of land possession is vital, as the land is a sole object of exchange that ensures immediate investment and scaling to the regional one; this is called "geopolitics."

It is important to link territorial relationships with other important factor in our country: illegality; speculation about the use and ownership of the land. This problem has not been controlled so far due to the lack of an official rural land registry that would give order and legal certainty to the rural property market, which would promote investments.

This kind of registry in Mexico would provide certitude, security, clarity and responsibility to the investments destined for the tourism on Mexican soil. It would also be a regulatory phenomenon of immigration which is directly proportional to demographic changes of the place, as well as the capacity to preserve ancestral traditions. Population growth is going to define socioeconomic status that burst the original social scale transforming it. However, this is a collateral effect of the enormous pressure on the official labour and bureaucrat markets, causing a spatial effect; this means housing and local participation to the affected population.

This causes more lucrative pressure, the land value increases and the agricultural land is exposed to auctions without a strategy for planning and land use. At this very moment, land destination strategies should be applied to be consolidated as an urban population, surrounded by the appropriate economic environment for investment.

The generation of new jobs go hand by hand with outside influences, with the loss of cultural identity and local participation in a land without financial guarantees.

2.4 Necessary investment capitals

It is very important to identify the necessary investment capital, referring to the competitive advantages which will be the economy factors over time, and these will be the principal actors in the planning within the model of political management, alert to the processes that are developed in areas with unique characteristics. Such factors are: the economic, social, cultural, technological and the natural-ecological, as a geographical space, where all the attractions are immersed for investment, as well as the container of all the resources and inputs of habitat, making it a priority to protect and improve, producing a long-term sustainability. So the geographical environment becomes a capital space, and not for being the last to be identified. This would mean that it is the last in the process, on the contrary, it is the first factor to appear and the trigger of the investment of any tourism project as a geographical area with natural beauty, which is measured through landscape diagnostic, and the diversity of the species in the flora and fauna, with quantitative and qualitative indicators.

And so we conclude with the major issues that are inputs to the system:

1. Geopolitics.
   Spatial Capital: territorial, natural, ecological and geographical politics.
2. Economy.
   Investment capital: geographical environment and environmental indicators. Tourism load capacity as indicator.

3. Urban Factors
   Human capital: urban and rural demography, social, cultural, territorial.
4. New technologies.
   Technological capital: financial and investment economies.
   New technologies for daily urban infrastructure supplies.

These four fundamental capitals are the ones we will entwine in a matrix with four factors that will summarise the eight elements of the system. Its aim is to clarify the favourable variables to define the pre-investment model that will simulate the development of a sustainable project.

3 Methodological frame: evolutionary affinity matrix

It has to be remembered that the objective of this model is to aid in securing a future looking view and mention it as a synonym for this pre-inversion model, the result is the logical view of a planned program investment which can check some terms that are not complete or certain. This model will help us to define future problems to be solved, or amortize to clarify the dimensions in which we can enter in the space-time in a geographical informatic simulation, with an Urban Information System (UIS), for the proposed sustainable urban investments projections in diverse geographies.

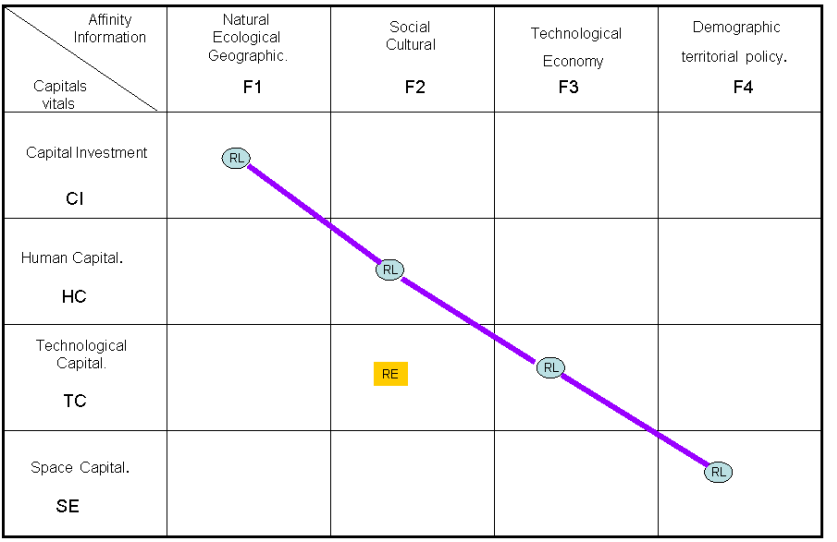

Figure 1: Relations of affinity information.

3.1 Criterion for the creation of an Evolutionary Affinity Matrix (EMA)

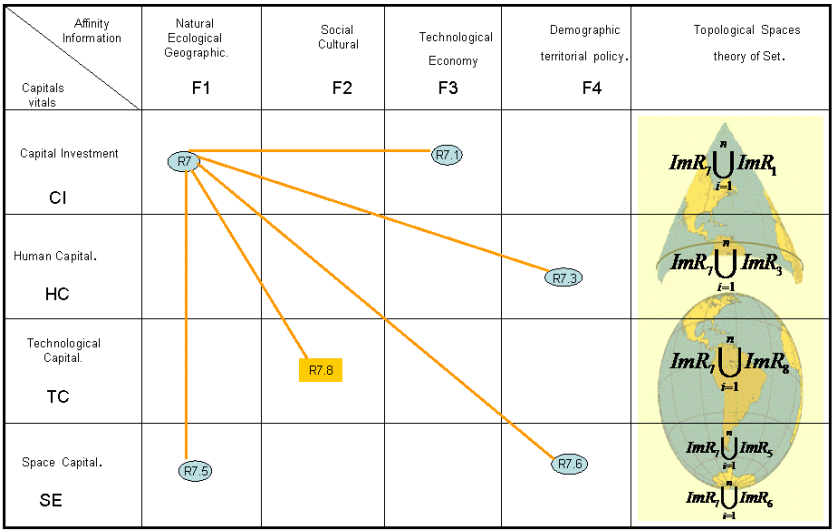

Figure 2: Relations with multiple entailments (natural resources).

Table 1: Multiple relations.

Name of Relation	Equation	Information involved
R7R7.1, R7.3, R7.5, R7.6, R7.8,	$ImR_7 \bigcup_{i=1}^{n} ImR_{1a8}$	Recurso Natural & CI+CH+CT+CE
Table summarizes to order the resulting dates from the analysis.		

3.2 Order of the MAE

In our case, the greatest competitive advantage is the landscape and the cultural environment of the locality. It is the reason why the Space Capital led the lines of needed capital for this exercise, directed to search the generation of sustainable production chains.

1. Go from left to right to search a chronological association of competitive advantages, based on statistical association criterions in order to obtain numerical valuable information.
2. In each column are sought, on basis of the set theory, universes with qualitatively similar information to quantify the resources.

An investment chronology is done, i.e., the factors or competitive advantages, that in order of situational appearance, are essential to plan productive chains in sustainable economies.

4 Results

Expected results of the pre-investment model are the relationships that will exist within the UIS, with all inputs, alphanumeric and cartographic, that would show topological spaces, created with the interfaces of each of the relationships built in the affinity matrix, using the theoretical concepts constructing the pre-tourism model.

Table 2: Model products.

Name of Relation	Information of the interphase	Results like product
R1	Capital of investment and technology	Plane of road and accesses according to deployment of the population in the regional territory.
R2	Human capital and social cultural	Plane of demographic diagnosis and house for the investment in education.
R3	Human capital and territorial politician	Plane of alternatives of Development after the investment.
R4	Technological capital and economic technician	Maps of location of new technologies for sources of supply for the infrastructure.
R5	Space capital and natural, ecological and geographic.	Map of Natural Physical Analysis. Map of Homogenous Zones according to the environmental indicators
R6	Space capital and territorial politician.	Uncultivated or ejidos plane of vocation of uses of the ground, communitarian lots.
R7	Capital of investment and natural, ecological and geographic.	Plane of economic vocation; agriculturist, zootechnics, fish-farming etc.
R8	Technological capital and social cultural	Map of zones with alphabetization statistics. Location of education equipment or qualification.
Table of minimum results of the analysis within a SIU model.		

The analysis and manipulation of data and the various combinations of alphanumeric and cartographic inputs related to a theoretical conceptual scheme, defined by analysis process, is a layer of business that contains and codifies the formulas and indicators that the system will use, the system does not have the necessary tools to diagnose any subject [8].

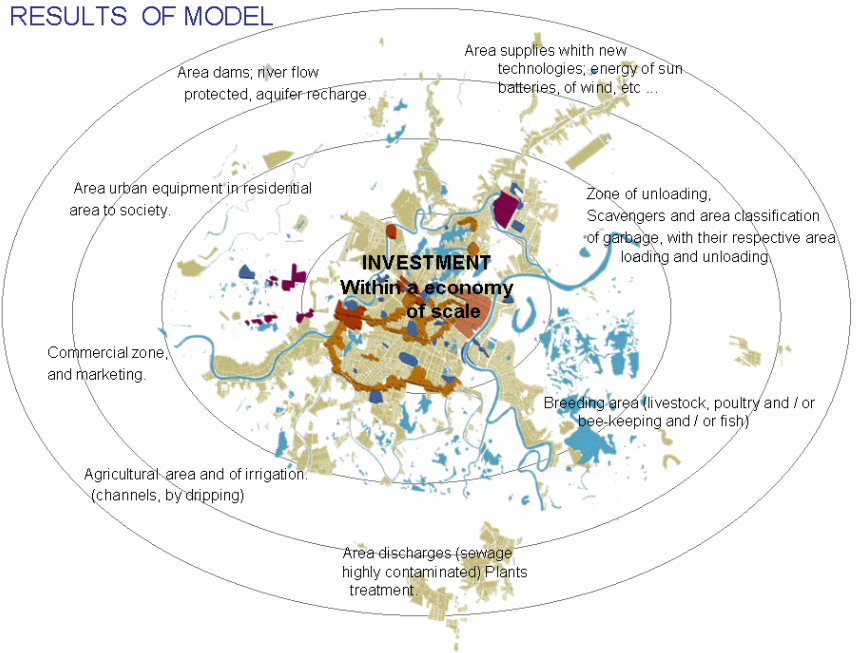

Figure 3: Waited for results of the Pre-inversion Model.

5 Results discussion

We will try to discuss the results answering these three questions:

• Which are the benefits?
1. Promote regional development with a clear vocation.
2. Through a planning process based on the model.

• Which are the immediate advantages of this model?
1. View different scenarios
2. Identify risks
3. Measure possible risks from the initial investment up to the cultural and environmental situations.
4. The model depends on registered information and inputs.

Why is this model important in the pre-planning process and urban development?
1. Reduce the subjective factor in the planning process.
2. Improves the efficiency of management tasks: an UIS provides the government or private industry the opportunity to analyze multidisciplinary data sets faster, to obtain the best solutions with up to date documentation and information that support them.

3. Reduces operation and maintenance costs: multiplier of productivity; an UIS allows less qualified staff executes sophisticated analysis, and at the same time, this improves the technical staff performance.
4. Provides rapid modeling functions to analyze alternative strategies: an UIS provides a planning program model that can observe the efficiency and accuracy of it. Having the ability to take the best and most efficient decision in situations of low or limited budget.
5. Improves the efficiency of communication between users with compatible information materials for the tourism investment: essential for the management or decision-making for investment, whether it is for a city or a municipality.
6. Provides a repository of information for effective decisions for the planning of a scale economic investment: loss and rotation of human resources, may cause that the information could be boycotted, missed or lost with the administration changes. For this reason it is important the existence of a single repository, with passwords and entry permissions to minimize this situation and have a maximum of data incorporated to the UIS standard functions.
7. Validated information for the continuity of urban projects, whether they are partial or regional. The continuity of the projects will provoke the sustainability of a region, thus the study of the behavior of each subject and the strengthening of data analysis, entered into the system.

References

[1] Francisco Covarrubias Gaitan; "Addressed, Mexico towards a Sustainable Urban Development"; 6th International Seminar on Urbanism and Housing -2006. Masters and Ph.D. Programs Graduate UNAM.
[2] MS. Armando Paez; "Addressed, Oil finite resource in Mexico". (CIEPFA - UNAM) Biology Sem. (7-11-2006).
[3] (This can be seen that since the early XIX century to date economies in Latin America has not evolved much)
[4] Jean Jacques Rouseau, 1742. "The Social Contract"; Chapter X, pag.83.
[5] Michael Porter, 1996."Competitive Strategy", Diamond Analysis of competitiveness, pag.76.
[6] Addressed, Mario Miguel Carrillo Huerta, 2007. "Public policies for regional development in a globalized world". Tlaxcala College, A. C.
[7] Agenda 21 from 1998 to 2007. Machu Pichu, Angola, Cuba, Brazil, India. Mediterranean. Sustainable Tourism in the Agenda 21 of the UNWTO, UNEP, IUCN, WHC.
[8] MUP. Sofia Flores Morales. 2006. Geographical information system for decision making SIU of Masters and Urban Planning. Programs Graduate UNAM. http://www.posgrado.unam.mx/urbanismo/labsiut/default.html