ABSTRACT

The regional development programs promoted by the national governments and international multilateral agencies, like the World Bank and the Inter American Development Bank, are oriented to public policies under which public goods, like public services and infrastructures, are supplied to underdeveloped regions, many in Latin America. More a more evidences are pointing to the fact that success of these programs depends in a good part of externalities, which are related to the changes in the form of networking and values among the stakeholders in the territory. These externalities are defined as the Social Capital.

As externalities, they are not directly evaluated in the projects economic and social impact, but accepted to exist and the planners of the projects do acknowledge the importance of social networking, although never assessed.

Several approaches have been proposed for the assessment of the Social Capital. For managing development projects, the Woolcock approach is considered one of the more interesting.

The objective of the research project described in this paper is to measure up front the social capital of a given regional development project, from the project plans before implementation, and to compare the social capital results with those of the benefits according to the drafted project framework agreed upon the multilateral agencies and the region authorities.

The regional program selected is the “Programa de Desenvolvimento da Zona da Mata” (PROMATA) in the State of Pernanbuco Brazil, under the sponsor of the Inter American Development Bank. The project was designed to induce development in which community resources were to be mobilized, with the intention of getting the stakeholders involved as proponents and protagonists of social change in their territories. That social based bottom-up framework was a

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very interesting opportunity to observe the social capital component given the profile of the project.

The research was carried out with the project just finished, which provided the background to compare the up-front analysis with the changes in the social network and values observed.

The drafted project plans, including all programs and actions to be implemented, and the preliminar budget, are evaluated using a modified Regnier Abacus by a panel of experts in International Development Projects adapted to reflect the Social Capital model based on Woolcock attributes.

The results were processed using Correspondence Analysis and Bayes Model to produce the indexes associated with Woolcock attributes reflected in the decision matrices used to represent the Social Capital status.

KEYWORDS: Social Capital, Woolcock Model, Regnier Abacus, Correspondence Analysis, Bayes Model, IDB Regional development projects,

1. INTRODUCTION

Local Development, according to the World Bank (2001) allows the implementation of collaborative solutions that will foster the productive potential of the regions as a way to produce growth in both social development and economic terms. Therefore, local development with respect to regional resources endowment can be considered the strategic way to bring them to fulfillment. There are three dimensions to it:

- Economic. As the measure of the capacity of local industry to organize the production factors to the level of productivity allowing them to compete in the market.
- Social. As the values and the local institutions can be the base for development, and in turn can be strengthened during the process.
- Political. In the measure that local authorities are able to induce a stimulant environment which favors the development of the local social and economical potential, facing and solving the problems arising from administrative bureaucracy, existent policies, dysfunctional economic models, all linked to traditional practices from the past.

For the groups in the society to assume the central role in this process, it is necessary to have people capable of assuming responsibilities, taking initiatives, start business and to bet for a new direction, which can only happen under a participative and democratic process [Franco 2000].

From the 90´s It was started in Brazil a collaborative planning processes where the community gained importance in the drafting of needed solutions, and the local development was framed by the integration of social capital, local
authorities and local actors. The process has been recently extended to include sustainability, once that natural resources are not endless and cannot be used without disposition.

The concept of social capital [Putman 1995] [Coleman 1990] [Woolcock, Naraya 2000] [Melo Nieto, Froes 2002] became an important theoretical instrument for the analysis of development processes, previously based in cost-benefit models, when the interrelation between social capital and development was taken into account. Social capital in Melo Nieto (2002) work was inclusive of concepts such as; confidence, solidarity, cooperation, participation, initiative, organization, networking.

According to Nahapiet and Ghoshal (1998) the social capital appears as a resource that in conjunction with others, under favorable conditions, allows the local communities the possibility to build sustainable development projects, which enhance their live hood, based on their own capacities and potentialities.

The impact evaluation of local development projects is oriented to highlight the results produced by the development program intervention, in the people, the institutions and the environment. Such evaluation provides insight of the intended effects, planned or unplanned, positive or negative [Aedo 2005] [Baker 2000] [Silva 2001].

Project PROMATA was launched in 2002 with the Inter-American Development Bank support (IDB) with a budget over 100 Mill USD, and finished in 2012 with 2 years delay. The project aim was to bring development into an economically depressed region in Pernambuco called “La Mata”, presented in the figure 1. The cause of the economic decline was the long crisis of sugarcane industry, which was the main cultivation in the region. The project scope had two objectives, one at municipality level and other at regional level. The methodology was based on the collective participation of population using an induction process for the development. However, this approach was not without faults, as it was open to manipulation of the participation process because of relations in the community were under asymmetric empowerment.

The design and evaluation of the results from the programs in this type of projects, rooted in community participation, is largely difficult. The traditional post implementation evaluation only evidence the budget overrun and the quantifiable objectives achievement, but not the real change in the future of people lives within the region, principal and overall objective of the project.

In the other side, social capital offers a framework to evaluate the real impact in the community of the development project. If social capital objectives were placed in the development project planning, they will open a new scheme where government-citizen relations or community-person relations will be the changing force for development. One the possibilities are to do a priori-evaluation of the
development project plan to assess the potential impact in the social capital. For this purpose PROMATA project has been taken as the basis for the a priori evaluation research using the Woolcock model for social capital, and the associated strategy matrices.

Woolcock (1998) social capital model as described by Moyano (2001) deploy two strategy matrices one for government-citizen relations (Macro) and other for community-person relations (Micro) which provide a classification and grading of the social capital analysis, well suited for high level evaluation of local development projects.

In this analysis, a “group of experts” in regional development projects provides the information. A special designed questionnaire relating project plan activities with social capital attributes is used. Following statistical analysis provides the values to be used in the Woolcock matrices.

![Figure 1: PROMATA regional context](image)

2. WOOLCOCK SOCIAL CAPITAL MODEL

As already mentioned Woolcock (1998) social capital model has been selected as most appropriate for the analysis of local development projects, particularly those with large investments behind.

This model considers two types of relations, government to citizens or Marco level, and community to person or Micro level. Those levels or directional “axes” are analyzed by two strategy matrices, which also have two scaled attributes
each. The four attributes result in eight scenarios, which do describe the patterns of relations associated to the perceived social capital [Moyano 2001].

The attributes associated to the Macro level are:

- **Integrity.** Government commitment with collective well being. Efficient operation of public and private administration.
- **Synergy.** Collaborative relations government-citizens. Private-public cooperation in the economic development.

The attributes associated to the Micro level are:

- **Linkage.** Commitment of people in the communities with change. Collaborative relations with other communities (intra-community).
- **Integration.** Collaborative relations within the community (inter-community).

The eight social capital scenarios resulting from the Macro and Micro level are presented in the following, table 1 following Moyano (2001).

<table>
<thead>
<tr>
<th></th>
<th>Integrity (Low)</th>
<th>Integrity (High)</th>
<th>Integration (Low)</th>
<th>Integration (High)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Synergy</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Low)</td>
<td>Collapse States (Anarchy)</td>
<td>Inefficient States</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(High)</td>
<td>Predator States (Statism)</td>
<td>Efficient Cooperation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Linkage</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Low)</td>
<td>Amoral Individualism</td>
<td>Amoral Familism</td>
<td>Anomie</td>
<td>Opportunities of Autonomy</td>
</tr>
<tr>
<td>(High)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 1: Woolcock Social Capital Scenarios.

From these scenarios, only those resulting from the evaluation of the social capital of PROMATA will be described in a further point if this work.

**3. SOCIAL CAPITAL QUESTIONNAIRE**
As already mentioned before the weights for the relations between the activities in the development programs to be analysed and the Woolcock attributes are projected by an expert panel in local development projects.

The methodology selected is a questionnaire based in Regnier Abaco model [Mojica 1991], which allows to use an small expert panel, no more than ten, working in one single review cycle, to classify the association of classes, because in this case it was not possible to work with Delphi several refinement cycles [Linstone, Turrof 1975]. The Regnier questionnaire used in this study is presented in table 2.

This questionnaire allows only one single answer by row, associating the project activity/program to the social effect, attribute that contributes to reinforce. Resulting for each pair activity-attribute the punctuation tally form the experts answers, for both MACRO attributes and MICRO attributes.

### 4. ANALYSING A PRIORI SOCIAL CAPITAL

For this statistical analysis, several steps are implemented. First, the validity of the relation model generated by the Regnier questionnaire, looking into the statistical significance of the pairs activity-attribute. Second, the MACRO and
MICRO attributes value estimation for the representation and analysis using Woolcok matrices.

For the analysis of the statistical significance of the questionnaire data there are used contingency tables and the Pearson Chi-Square test [Agresti 2002] [Delucchi 1983]. The resulting contingency table is presented in table 3. In this table, the attributes are the dependent variable.

To verify the statistical signification of the relations, now reflected in the contingency table, the Chi-Square test is used, which is assintotically \( \chi^2 \) with (8-1)x(8-1)=49 freedom degrees. The formula is:

\[
\chi^2 = \sum_{i=1,8} \sum_{j=1,8} \frac{(x_{ij} - x_{ij}^e)^2}{x_{ij}^e}
\]

Where \( x_{ij} \) is the frequency for each cell, and \( x_{ij}^e = p_i p_j n \) is the expected frequency if the variables were independent. In addition \( p_i = \sum_j x_{ij} / n \) and \( p_j = \sum_i x_{ij} / n \) are the marginal probabilities. In the table 4 the results are presented.

Can it be noticed that the p-value (bilateral assintotic significance) is less that 0.001 which confirms the significance of the relations. As there were many cell with cero value in the MICRO attributes, the test based on Montecarlo simulation and the Exact Test of Fisher [Agresti 1992] [Fisher 1954] are calculated in addition. This confirms the results of the Chi-Squared.
The relations between frequencies and probabilities in a contingency table are
the following equations, where the frequencies and marginal probabilities of
rows and columns are represented by $x_{i}, x_{j}, p_{i}, p_{j}$, and the frequencies and
probabilities of the cells are represented by $x_{ij}, p_{ij}$, and the cell conditional
probabilities are $p_{ij}/p_{i}$, with $n$ the total number of cells.

$$
\sum_{j} x_{ij} = x_{i}, \sum_{i} x_{ij} = x_{j}, \sum_{i} x_{i} = n, \sum_{j} p_{ij} = p_{i}, \sum_{i} p_{ij} = p_{j}, \sum_{i} p_{i} = \sum_{j} p_{j} = 1
$$

$$
\sum_{i} p_{ij} = \sum_{i} p_{ij} = 1, p_{ij} = p_{ij}/p_{i} = p_{ij}/p_{j}
$$

Considering that rows or columns follow a multinomial distribution, the ML
estimator for the probabilities yield the equations:

$$
\pi_{i} = x_{i} / n, \pi_{j} = x_{j} / n, \pi_{ij} = x_{ij} / n
$$

$$
\pi_{ij} = x_{ij} / x_{j}, \pi_{ij} = x_{ij} / x_{i}
$$

Where the cells and marginal distributions are binomial.

The expected value for the marginal frequencies of each of the attributes is
calculated as follows:

$$
\bar{x}_{j} = E(x_{j}) = \sum_{i} E(x_{ij})
$$

$$
E(x_{ij}) = n\pi_{ij}
$$

$$
\bar{x}_{j} = n \sum_{i} \pi_{ij}
$$

The probability estimation for the cells is calculated from the conditional
probability estimated and the column marginal.

$$
\pi_{ij} = \pi_{ij}/\pi_{i} = (x_{ij} / x_{j})\pi_{i}
$$

Table 4: Chi-Squared Pearson Test (Source: SPSS)

<table>
<thead>
<tr>
<th>Value</th>
<th>df</th>
<th>Sig. asintótica (bilateral)</th>
<th>Sig. de Monte Carlo (bilateral)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chi-cuadrado Pearson</td>
<td>179,867</td>
<td>49</td>
<td>.000</td>
</tr>
<tr>
<td>Razón de verosimilitudes</td>
<td>185,098</td>
<td>49</td>
<td>.000</td>
</tr>
<tr>
<td>Estadístico exacto de Fisher</td>
<td>153,740</td>
<td>49</td>
<td>.000</td>
</tr>
<tr>
<td>N de casos válidos</td>
<td>248</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. 46 casillas (71.9%) tienen una frecuencia esperada inferior a 5. La frecuencia mínima esperada es 10.
b. Basada en 10000 tablas muestreadas con la semilla de inicio 677935123.
Depending in how is selected the row marginal probability estimation, tow different values can be obtained. In the option (A) the estimation resulting from the contingence table is used $\pi_{ij} = x_{ij} / n$, then $\bar{x}_{j.} = x_j$.

Option (B) uses other marginal probability, resulting of the assignation of the budget to the programs of PROMATA. In this case, the equations are as follows:

$$\pi_{ij} = (x_{ij} / x_i)\eta_i$$
$$\bar{x}_{j.} = n \sum_i (x_{ij} / x_i)\eta_i = n \sum_i x_{ij}\phi_i$$
$$\phi_i = \eta_i / x_i.$$

Considering options A and B, the normalized estimated a priori values for the attributes of Woolcock are shown in the table 5.

<table>
<thead>
<tr>
<th>Axes</th>
<th>A</th>
<th>B</th>
<th>Ratio A</th>
<th>Ratio B</th>
</tr>
</thead>
<tbody>
<tr>
<td>MACRO</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Integrity</td>
<td>82</td>
<td>76</td>
<td>0,3388</td>
<td>0,3140</td>
</tr>
<tr>
<td>Synergy</td>
<td>120</td>
<td>143</td>
<td>0,4959</td>
<td>0,5909</td>
</tr>
<tr>
<td>MICRO</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Linkage</td>
<td>37</td>
<td>22</td>
<td>0,1529</td>
<td>0,0909</td>
</tr>
<tr>
<td>Integration</td>
<td>3</td>
<td>1</td>
<td>0,0124</td>
<td>0,0041</td>
</tr>
<tr>
<td>Total</td>
<td>242</td>
<td>242</td>
<td>1,0000</td>
<td>1,0000</td>
</tr>
</tbody>
</table>

Table 5: Estimation frequencies Woolcock a priori

5. A PRIORI WOOLCOCK MATRICES

The normalized values of the attributes for the MACRO and MICRO matrices in table 5, are graphically represented, and the resulting strategy matrices can be used to classify the social capital impact of the project.

The MACRO matrix with its attributes Synergy and Integrity is presented in figure 2, for the options A and B.
It can be observed that both estimations place the classification in “Statism”, with more weight in B because the important financing of public governmental programs like infrastructures and public services. The analysis predicts that the programs in PROMATA favor developments with strong statism components in the MACRO social capital.

According to Woolcock classification, statism is present in regions where there is a formally established public authority with all the administrative mechanisms, but there is not integrity in the organization, the public bureaucracy is no competent, and has some tendency to corruption, and in sometimes plundering private property and abuse human rights.

The A MACRO classification is close to the collapse zone. Woolcock considers a region in collapse when the established authority and its bureaucracy do not work, and there is lack of human and material resources to operate. The corruption situation is worse than in statism.

In both A and B there is lack of organizational integrity (efficiency and institutional credibility).

The matrix for the MICRO attributes, Linkage and Integration, is presented in figure 3.

In this matrix can be observed that the points A and B are very close.

![Perfil MICRO](image)

Figure 3: A Priori estimation social capital MICRO

The classification resulting from both options is “Individualism” with a very low value of linkage and nearly null of integration.

In this situation, according to Woolcock, there is not a relation of confidence between the inhabitants of the territory, and do not collaborate openly. It is a common situation in societies with high indexes of social exclusion. The
presence of an small value of linkage shows some collaboration with people form other communities (other villages or territories).

These results are the expected social impact of the POMATA development project, with its activities and associated investments, according to the experts group that formed the panel. This impact does not take in consideration the actual level of social capital, but the impacts that the project program has over the social capital. The direction of evolution. In this study results the programs strengthen the regional government intervention and do not promote the collaborative development with the inhabitants of the territory.

6. CONCLUSIONS

The necessity to evaluate a priori the local development programs from the social capital view is one-step in the right direction, to obtain the desired impacts in the regional community, either in the economical or the human development and sustainable development, having some security are those and not other which will result of the project.

Oftenly the regional development project do not achieve the desired objectives, also the project duration is extended over the planned one resulting in a budget over run. The traditional criteria for managing this public projects rely on the cost-benefit approach, which has many time not real relation with the elements that determined the tangible o intangible benefit value, elements which are part of the social capital.

Because of that a possibility is open to evaluate the impact of a given project design, at high level, within the scope of the social capital. If the sense of the impacts is in the desired direction, it is quite probable that the project is finished with success, even with the presence of time deviations and budget over runs.

In this respect, the work presented in this communication is the starting of exploration methods that would provide an evaluation a priori for the social capital.

Some problems related with the expert panel have to be taken into account. Many of the regional development experts have a top-down approach in their vision of the project events, which favour the management of the project with little involvement with the regional populations. This lack of “social involvement” results in a poor estimation of the MICRO effects. In addition, the perception of the social impact depends on the country where they work. All that introduces noise and distortion in the attributes weights of the social capital expected form the project.

The predictability and consistency of the results, because of the noise introduced in the current approach by the expert panel, is the principal line of research for the a priori evaluation of the social capital in local development projects at regional level. With the focus in the Latin America countries, and Brasil in particular where investment in development projects have been very important.
7. REFERENCES


Franco A. (2000). *Por que precisamos de desenvolvimento local integrado e sustentável*. Instituto de Política Brasilia.


