Wireline Market Analysis Assessment using ArcGIS Geostatistical Analyst Extension

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Abstract

The solution was customized to understand the structural factors of the Brazilian cities for cross-selling proposes. The ArcGIS Geostatistical Analyst extension was used for exploratory spatial data analysis and to create a statistically valid surface. The analisys was developed using a municipal Geodatabase (more than 800 variables and 5561 cities). The final cluster (market segments) was composed for 12 groups with different patterns for cultural, infrastructural and urban behavior. The results were integrated to marketing users of Brasil Telecom - a brazilian wireline operator - for forecasts and cross-selling proposes. The results presented herre are fictitious, ilustrating the employed method and the potential of ESRI Tools for the generation of models for estimating market potential.

1. Environment

The Brasil Telecom S.A. – Brt - is a telecom company and provides services in Brazil in Region II, covering the states of Acre, Rondônia, Mato Grosso, Mato Grosso do Sul, Tocantins, Goiás, Santa Catarina, Paraná e Rio Grande do Sul, as in Distrito Federal.
Nowadays, the working area correspondes about 23% of the population, 25% of the GDP and 33% of the national territory (aproximately 2,8 million Km^2).
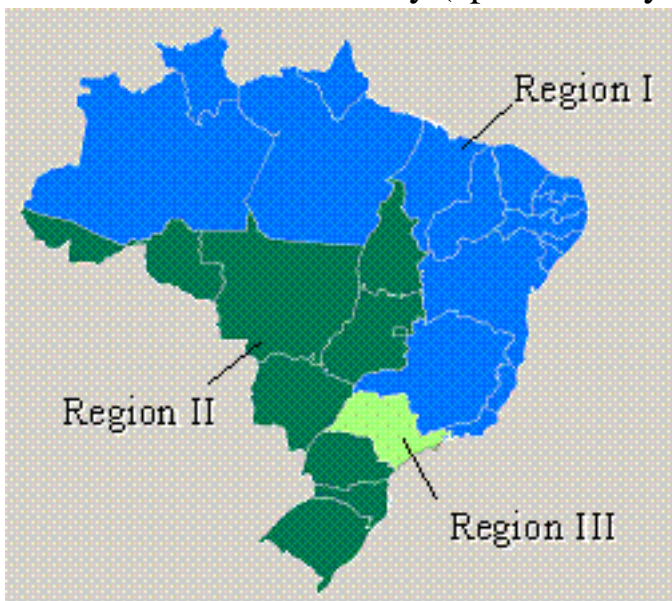
The Brt provides voice services for local and long distance modalities, in national intra-sectorial and intra-regional areas, as for the public telephoning system, data communication, network services (infrastructure for other telecom companies or network capacity rental), value added services and supplementary services, sech as conference, call identification, virtual answering machine, 0800 and others.

In this context, it is very important the comprehension on the different market segments and its relationship with the telecom infrastructure already implemented as a subsidy for the expansion studies as well as treatment characteristics supported on the geography.

2. Objectives

The general objectives of this project is the brazilian market analysis based on telecom and tecnology events supported by a municipal geodatabase that envolves social-demographics and infraestructural characteristics. The specific objectives of the project are as follow:

- Ø   To map the brazilian municipalities for identification of the degree of service on telecom networks;
- Ø   To analise the cities that are similar between themselves and has differences between other groups;
- Ø   To model, with a nation-wide scope, a geographic and market database which assists the business development strategies focused on positioning products at market;

3. Scope of Project

The project consist of 5561 brazilian cities and was detailed in the Brt work space that involves 1865 municipalities located in North, South and Center-West of Brazil.

The analysis were done using ArcView 8.x and Geostatistical Analyst extension.

4. Project Purposes

The project used several sources of information for market database modeling involving variables such as: geographic, social, income, educational, consumption, industrial activity and urban infrastructure, detailed by municipalities. Some of the information that had been concentrated in this database are shown bellow:

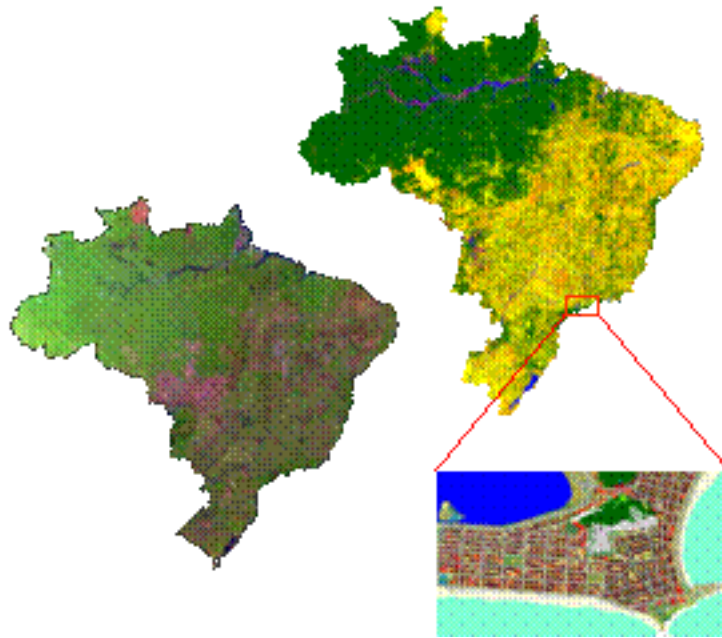a)   Urban area of the cities extracted from Landsat-7 satellite images;

Fugure a) Representation of Brazil made for satellite image and morphology.

b) Interaction of highways for cities from the information of the road maps of Street Base©;

Figure b) Road System.

c) Hidric resource system of each city;

Figure c) Representation of brazilian hidric resource system

d) Social-demographic data collected by IBGE (Brazilian Institute of Geography and Statistics) per city.

Figure d) municipal consuption data, education level and income per household collected by IBGE.

A database has been assembled by the structuring of this information with more than 800 variables. About 130 variables had been selected because they were considered most significant to the study of development of telecommunications and technology. An explore data process was carried through, including the transformation of the variables to prevent discrepancies in processes therefore in the data existed monetary units, percentile and data dame.
The analyses of each variable were made using an Explore Data => Histogram searching some transformation to the reduction of the asymmetry and curtose coefficients.
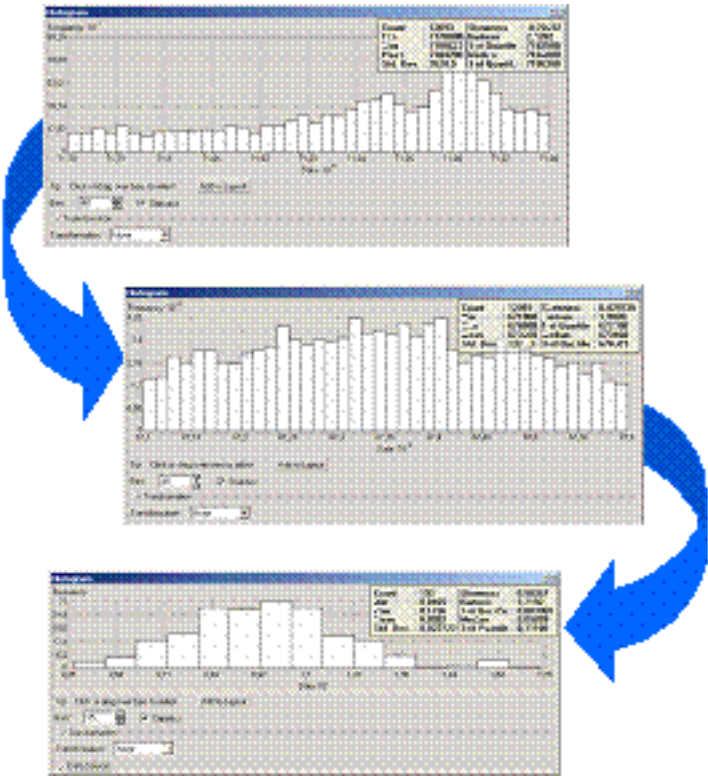
Still inside the selection process to the best set of variables it involved the study of association or disassociation between them.
After the removal of redundant variables, the explanation of the municipal technological development was analyzed serching the directions of maximum and minimum variances and

generating components that synthecize the available information to simplify the interpretation of the data. These components were made through linear combination of the variables.
It was observed that many cities of the country aren't part of the average of any group due to the regulatory particularitities, raised conditions of development or still natural barriers that make it difficult for progress.
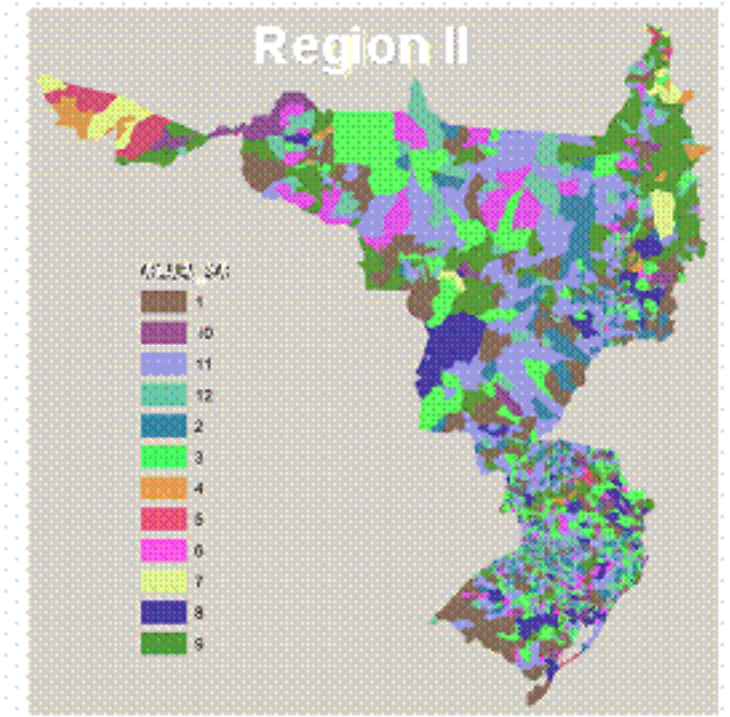
5. Results

Amongst the joined results we can quote that 12 clusters had been generated explained by the components of Infraestructure, Culture and Development.
In the table below we have an example of some characteristics of these components:

Another possible characteristic that was observed in this study was the prosperity degree of the cities. These cities had received scores specificly to assist processes of telecom products forecasting and to subsidize decisions of product mix for cross-selling.
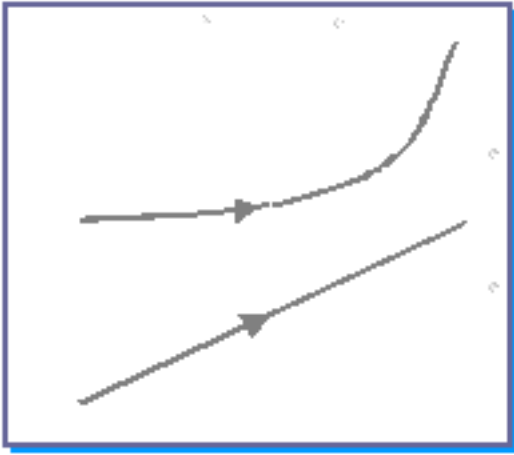
As result of cluster we can analyze the cities below according the map:

Cluster - Region II

6. Geographic Consultation Aplication

The results of this project were implemented in ArcView and developed with specific models, based in generated geodatabase, to allow strategical decisions of services exploration, analyses of attendance degree (quality of service) and new forecasts.

7. Final Considerations

With this new approach to be used internally the Brt can have more accurate results in forecast with an easier visualization.

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