USING AHP AND DEA IN COMPARATIVE STRATEGIC ANALYSIS OF POLISH REGIONS

ABSTRACT

The aim of this article is to verify the possibility of implementing methods of AHP (*Analytic Hierarchy Process*) and DEA (*Data Envelopment Analysis*) for strategic analysis of regions using Poland as an example. The subject taken, fits in both the economic theory of regional development, as well as the concepts of *New Public Management*, *public governance* and theory of strategic management. All of these theoretical approaches are in the circle of economics and management science. The study is also characterized by the high potential for its implementation. The results can be used, among others, to evaluate the effectiveness of the potential usage in creating the production capacity and building attractiveness in relation to stakeholders.

In describing the potential and attractiveness of the region, two models of AHP were constructed. They are: *Regional Attractiveness Model* (SEEGI Model) and *Regional Potential Model* (TCB Model). The first one takes into account criteria such as: *Society*, *Economy*, *Environment*, *Government* and *Infrastructure*. Attractiveness is evaluated in relation to the three groups of customers: *Tourists*, *Citizens* and *Businesses*. Appropriately selected statistical variables were introduced at the level of sub-criteria for both models. Evaluation of the validity of the criteria and sub-criteria were based on assessments of the experts involved in local development. The level of attractiveness and the level of potential of regions were calculated using weights of the significance of the model's components and normalized values of statistical variables. The production level in the region was measured by the GDP (*Gross Domestic Product*). To evaluate the effectiveness of potential the DEA method was applied. The study evaluated the effectiveness of expenditures described by criteria of the SEEGI Model in relation to the effects described by: GDP value and criteria the TCB Model.

Keywords: AHP, DEA, multi-criteria analysis, regional analysis, regional competitiveness, strategic management, regional policy.

1. Introduction

The subject taken in the paper is not excessively exploited in literature, and has great practical importance. The implementation of the DEA and AHP can significantly increase the quality (effectiveness and efficiency) of management of regional development.

2. Literature Review

In preparing the *Regional Attractiveness Model* and *Regional Potential Model,* a number of publications were studied. They focus on the following issues: the potential of the region (e.g. Camagni et all 2009), and the attractiveness of the region with regards to different groups of clients (e.g. Cracolici, Nijkamp 2009, Formica, Uysal 2006). The literature was also reviewed in terms of methodology, especially the use of DEA methods (e.g. Martić, Savić 2001) and AHP (e.g. Saaty 2008).

3. Hypotheses/Objectives

Main research question: *Do Polish regions effectively utilize their potential to increase productivity and improve attractiveness on the market?* Detailed questions: (Q1) *How should the potential of the region and its attractiveness be described?* (Q2) *How should the intensity of the characteristics of the potential and attractiveness of the region be measured?* (Q3) *How do the potential and attractiveness of the regions change in time?*

4. Research Design/Methodology

Both models − SEEGI Model and TCB model are constructed on the basis of a review of literature and the opinions of experts (scientists and representatives of local and regional authorities). The significance of elements of the model assessed using Saaty's scale. The arithmetic mean used to aggregate rates, rejecting inconsistent responses (CR>0.10).

5. Data/Model Analysis

The study used two models: SEEGI Model (CR≤01) which takes into account five criteria including: *Society*, *Economy*, *Environment*, *Government* and *Infrastructure*. While the TCB Model (CR≤01) takes into account three criteria, including group of customers: *Tourists*, *Citizens* and *Businesses*.

6. Limitations

The main limitation of the study is access to relevant statistical data which were used to measure the potential and attractiveness of the region. A substantial portion of them is discontinuous in time, which limits the applicability of the trends models. They are also published with a considerable lag (even one year or more), which makes them appropriate only for ex-post analysis. The ability to use these data in the decision-making process is therefore to some extent limited.

7. Conclusions

In the layer of cognitive, the article helps one create a ranking of regions due to the criterion of efficiency of the potential utilization. In terms of methodology, it is worth emphasizing the principles of strategic analysis using methods of AHP and DEA were created and fitted to the specifics of regional development.

8. Key References

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