SUSTAINABLE INNOVATION MULTICRITERIA INDEX (SIMI) FOR ASSESSMENT OF BIOTECHNOLOGY RESEARCH

ABSTRACT

The general goal of this research is to draw up an index for the evaluation of the sustainable innovation potential of scientific research in the biotechnology field. The experiment consisted of the index's conceptual construction, for which the Sustainability Innovation Cube was the chosen methodology. The framework characteristics suggest the use of a multi-criteria approach to draw up the index, thus justifying the option for the Analytic Network Process (ANP). The results show that the ANP is efficient for the synthesis of the innovative sustainable performance in tests with simulated judgements; so, the methodology's validity should be tested in real case studies.

Keywords: eco-innovation, research, sustainability, ANP.

1. Introduction

The demand for sustainability in the production process makes the innovations which are economically, environmentally, socially and institutionally viable, a strategic priority. Accordingly, the methodologies to evaluate the innovation potential of research in biotechnology need to have a multi-criteria character to include sustainability-linked factors. The point of this research is: how can the sustainable innovation potential of scientific research be evaluated?

2. Literature Review

Yoon and Tello (2009) state that sustainable innovation is the development of new products, processes, services and technologies that contribute to the development and well-being of human needs and institutions while respecting natural resources and their regeneration capability. Hansen et al. (2009) developed the Sustainability Innovation Cube (SIC) for the characterisation of sustainability-oriented innovations. However, this paper does not address how the SIC can be used in practical terms for the evaluation of the sustainability potential of an innovation.

3. Hypotheses/Objectives

This research aims at developing a methodological proposal through the construction of a multi-criteria index that shows the innovation potential that the outcome of a given scientific research can generate, considering the factors related to sustainability.

4. Methodology

This research is divided into two stages. The first one is focused on the construction of the multi-criteria index of sustainable innovation for the evaluation of research in biotechnology through a literature review. The second one was undertaken through the use of simulated judgements, applying the ANP's traditional version, using the Super Decisions® software.

5. Data/Model Analysis

The SIC framework that was used is a 3D approach in which the clusters and their respective criteria are as follows: 1. Target Dimension – Economic Effects (FE), Ecological Effects (EE), Social Effects (SE); 2. Life Cycle Dimension – Production & Logistics (PL), Usage (US), End-of-Life (EL); 3. Need Dimension – Technology (TL), Usage System (US), Culture (CT) (Hansen et al., 2009).

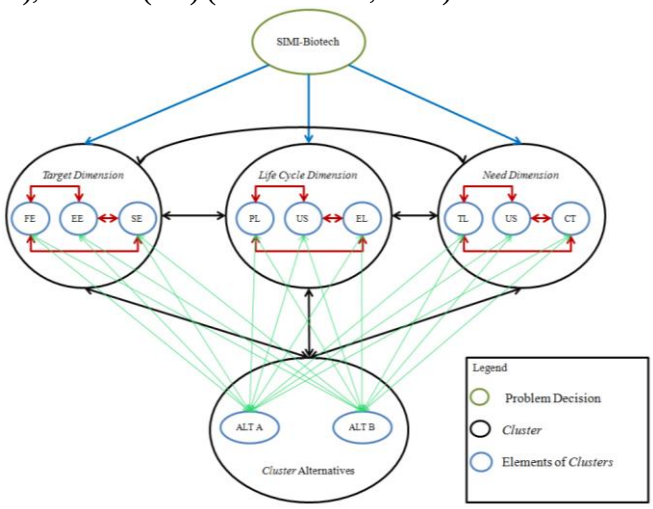

Figure 1: ANP Structure for the Sustainable Innovation Cube (SIC)

6. Limitations

The proposed methodology for this research needs to be tested in a real corporate environment to assess its viability when contrasted with traditional methodologies for the selection of innovative resource allocation projects. Concerning the model, the methodology is only useful to evaluate product type innovations, not being adequate for process innovations.

7. Conclusions

During the index construction, the ANP showed itself to be stable and adequate to adjust the structure of the chosen framework. The simulations showed that the SIMI is able to objectively point out the alternatives with the biggest sustainable innovative potential, as well as the performance of the alternatives in their respective criteria.

8. Key References

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