A proposal for the application of multicriteria analysis to rank countries according to innovation using the indicators provided by the WIPO

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Abstract

This article aims to analyze the ranking of Latin American and Caribbean countries in the ranking proposed by the World Intellectual Property Organization (WIPO) in relation to Global Innovation Index (GII) using the multicriteria approach as an instrument. The methodology used is the Technique of Ordination by Similarity with the Ideal Solution (TOPSIS), in order to support the reduction of subjectivity to the decision making process of the global competitiveness models adopted by WIPO. It is based on literature research, through a review on the themes of innovation works, marking the condition of the local productive networks, focusing on the approach of the Porter’s Diamond proposal. The results of the application of the technique bring a new perspective to the methodology of WIPO and allows to suggest new factors indicative that the countries of Latin America and the Caribbean need to develop their networks and creative policies in such a way that the promotion of technological innovation occurs quickly, so that innovation is transferred to society.

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Keywords: Multicriteria analysis; Porter’s diamond; Global innovation indicators; World Intellectual Property Organization; TOPSIS

Introduction

Innovation improves the competitiveness of a country’s production chain at the national and transnational level, since we’re going through the globalization of capital and, as such, the products and services in a country are exposed to the world to overcome barriers to competitiveness.

Technological innovation in developing countries is occurring as a process that has its own characteristics, differentiating it from countries with a high technological level. In this sense, observing innovation and the particularities of how it fits within the framework of a country in accordance with innovation indicators and perspectives will reveal the competitive capacity of a country – according to its global positioning – for the purposes of economic development, which will lead to innovation over the long term (Rocha & Dufloth, 2009).

As such, the objective of this study is to use a multicriteria method to analyze the innovation indicators in 22 countries in Latin America and the Caribbean, observing the alignment of the classification methodology performed in 2015 by the World Intellectual Property Organization (WIPO) with the application of the TOPSIS multicriteria method. Based on this objective, the following research question is formulated: what is the robustness of GII applied to the group of 22 countries when compared to the results of the approach through the multicriteria decision aid method?

Since this study is restricted to the field of global innovation indicators, this research is restricted to the practices observed by WIPO to identify the potential for innovation through indicators of this institution at the national level, which lead to the consideration of a ranking of the most innovative countries on a global level.

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Because of the expansive meaning of the term “innovation”,
it’s use as a scientific tool is restricted. As such, the epistemology
is focused on Porter’s Diamond, since it finds itself within the
stratification of the global innovation principles used by WIPO,
extending to the maximum between the polarity of the terms
“innovation” and “sustainability” because it’s centered around
innovation as the competitive, but also sustainable advantage
of companies in the global production chain (Freire & Freitas,
2009).

To this end, this paper was organized in five sections. The sec-
ond section presents the context of innovation and of WIPO. The
third section deals with the methodology applied. The fourth dis-
cusses the prospects of the tools within the quali-quant context.
And the fifth section provides the concluding remarks regarding
the information analyzed.

Innovation

Innovation has been a goal of different types of organizations.
As such, those aspects should be observed that could either pro-
mote it or remove the barriers for it occurring in each situation.
It is a complex construct, with different concepts, dimensions
and contexts of application. As a consequence, it is under-
stood through different theoretical approaches in various fields
of knowledge, industries and industrial sectors (Bruno-Faria &
Fonseca, 2014). The innovation phenomenon is of extreme rele-
vance to the sustainability of organizations since it enables their
sustainability both in terms of new products, more efficient and
cheaper processes and even businesses that are more compli-
ant with the needs of the environment. The infrastructure that
an organization has for innovation is critical to its success and
it comes in different shapes or complexities (Cruz, Frezatti, &
Bido, 2015).

The epistemological constructs of the innovation concepts
that were widely used until the mid 1970s dealt with the increase
of mass production to keep producing vast amounts of revenue.
However, with the trend toward quality management over pro-
duction, the debate arose to bring the conflicting issue of the
production chain to academia in order to maintain the high
rates of economic output without compromising the environ-
ment (Martins, Lima, & Gomes, 2015).

By transcending geographical barriers and extending to the
transnational level, the issue of competitiveness through tech-
nological improvement and adaptation to the environmental
requirements required the development of strategic innovation
strategies in order to keep up with global quality and perfor-
mance standards (Freire & Freitas, 2009).

In this quest for a global competitive positioning, the geo-
graphic dimensions and the innovation perspective of local
productive arrangements that exceed global competitors and
position the company and the country at a higher innovation and
technology level, reveal the positioning through international,
national, regional and international partnerships, associations
and alignments with innovations of related and supporting indus-
tries.

However, the concept and the identification of a country as
innovating seeks to analyze and document the adaptations and
innovations (even if through benchmarking) so that the best prac-
tices in innovative production processes can elevate the national
intellectual property (Cornell University, INSEAD, & WIPO,
2015).

World Intellectual Property Organization – WIPO

WIPO was established as an institution in Stockholm on July
14, 1967. It was tasked with promoting the global protection of
intellectual property where there is innovation, creativity and
contribution as a stimulus to economic development (Olivan,
2011). Each year the WIPO publishes studies with perspectives
on the global innovation trends, identifying the countries with the
highest levels of innovation, changing the conceptual method-
ology for each study launched per year, maintaining the flow of
micro and macroeconomic analyses that promote innovation.

As such, the global innovation metrics will change so that
the social and economic changes have equivalence regarding the
surveyed indicators (Cornell University et al., 2015). When
the years 2014 and 2015 are compared, for example, WIPO used
a methodology with 81 indicators divided into 3 categories for
2014: 56 in raw data, 20 indicators of international agencies and
5 from questionnaires in economic forums. In 2015, on the other
hand, 79 indicators were addressed divided in 3 categories: 55
in raw data, 19 compound indicators and 5 research indicators
(Cornell University et al., 2015; Fonseca & Lima, 2015).

WIPO, therefore, develops indicators that are the result of
studies and researches that identify countries with active
innovative intellectuals, but it also analyzed the micro and
macroeconomic aspects that characterize the country regarding
its economic-social development (ibid).

In 2015, there were six principles that made up the Global
Innovation Index (GII) of countries. These indicators should
reflect the growing recognition that innovation is something in
which all countries can and must be engaged in order to consider
it for the creation and deployment of innovation policies for
the strategic development of the countries. The six innovation
policy principles defined by the WIPO in the 2015 index are
listed below:

a. Principle 1: innovation policies should focus on maximizing
innovation across all industries in all economic, correlated
and supporting sectors so that the global production chain
can develop technological innovation;
b. Principle 2: innovation policies should support all types and
stages of innovation, because one of the errors of national
innovation policies is to define innovation strategies on
a macroeconomic level, only focusing on the production
of technological products, while innovation should extend
throughout the whole chain of production in order to rethink
the mix of products that make up the high value-added sectors
of production;
c. Principle 3: to empower creativity and creative destruction
to grow in innovation, developing countries need to enable
the rupture of production for something innovative that will
enable new players to enter economic sectors, especially those

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