**Innovation as a competitive differential based on investments in R&D by GII countries:
A contributing to the global efficiency as to the Data Envelopment Analysis (DEA)**

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1. Introduction

Innovation is considered the main factor that allows the societal masses and economies to solidly become more developed. The designated "new growth theory", and the criticism given by it, were brought, in fact, to put innovation as the center of a new economical and developmental growth model, in which the ability to produce, disseminate, absorb and recombine knowledge has an essential role (FERRAO, 2002).

According to Rolim (2003), the emphasis in innovation as a responsible for the economical differences among countries takes an ever-growing spot in economical literature. The many different ways innovation is focused turns it into a fundamental piece in its analytical elaborations. It is present in discussions on the national systems of innovation, the so called evolutionist economy (LUNDVALL, 1992), in the industrial *clusters* discussion (PORTER, 1990), in the theory of regulation from the economists point of view (AMABLE *et al*., 1997), of the authors that work along with industrial districts (BECATTINI, 1991) and even from the perspective of the neoclassical economy authors (ROMER, 1990).

In this context, innovation stands out associated to the idea of scientific discovery because of the referred investigation and development activities, executed inside businesses, investigation institutions or universities. Innovation processes occur when, based on this discovery and the making of experimental nature prototypes, it is possible to widen determined methodological procedures, which allows transforming the discovery in some kind of generic technological knowledge. In other words, potentially appropriable by any entity that can benefit from it for the activities they develop. This way of perceiving the innovation process is clearly sequential, hierarchical and descendant.

This article sought to evaluate the efficiency of the countries presented in the GII regarding their performance in competitivity and technological innovation. To analyze the results, Data Envelopment Analysis (DEA) is utilized through input oriented BCC (Variable Returns to Scale) and CCR (Constant Returns to Scale).The variable dispersion analysis shows that the data is not equally distributed for presenting a variation coefficient superior to 25% and through Pearson's coefficient correlations have been found and it's being verified that there is a strong positive correlation between variables in the study.

About the definition of orientation (input/output oriented) – The orientation is up to the data analyst – can be oriented to the output. In addition to the model variation (CCR and BBC are the main models) DEA also changes depending on the orientation, which can be input or output. All the applications of this article were done with an input orientation. This type of orientation is common in literature.

It is necessary to more deeply understand the efficient units by determining the efficiency, it is also important to verify which ones were benchmarked to set a pattern for the other inefficient countries.

Key words: Data Envelopment Analysis, Innovation, Efficiency