

# THE IMPORTANCE OF INNOVATION MEASUREMENT: ANALYSIS OF AVAILABLE TOOLS

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## ABSTRACT

*Nowadays, the ability to adapt to change and to develop innovations represents one of the principal ways of gaining competitive advantage and of surviving in an increasingly global market. Accordingly, innovation has achieved significant consideration as an economic variable and therefore, the possibility to assess the degree of innovation has attracted the attention of the scientific community.*

*In this work a search and analysis of existing innovation evaluation tools has been done, with a double objective. First, to establish the state of the art of innovation measurement, in order to present a set of tools to organizations to enable them to conduct the assessment. And second, to put at the disposal of the scientific community detailed information about the characteristics of the existing innovation measurement tools, so that it can be used in projects that target the development of new and better innovation evaluation systems.*

*Keywords: Innovation; assessment; tool; review; analysis.*

## 1. INTRODUCTION

### 1.1 INNOVATION: A WIDELY USED TERM TODAY

Innovation is a common term in the literature, but what does this concept really mean? Historically there have been different definitions and classifications of the innovation concept, since its meaning has evolved over the years.

One of the first definitions of innovation was developed by Joseph Alois Schumpeter in the book "Theory of Economic Development". In this book, innovation is defined as "the commercial or industrial application of something new -a new product, process or method of production, a new market or source of supply, a new form of commercial, business or financial organization".

Another definition is given by Drucker (1985), stating that innovation is "the specific tool of entrepreneurs, the means by which they exploit change as an opportunity for a different business or service".

Slaughter (1998) defines innovation as "the actual use of a nontrivial change and improvement in a process, product, or system that is novel to the institution developing the change".

The Innovation Unit of the Department of Trade and Industry in the UK defined innovation in 2004 as “the successful exploitation of new ideas”.

According to the Oslo Manual (OECD and Eurostat, 2005), innovation is “the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organizational method in business practices, workplace organization or external relations. Innovation activities are all scientific, technological, organizational, financial and commercial steps which actually, or are intended to, lead to the implementation of innovations”.

## ***1.2 CLASSIFICATION OF INNOVATION***

In the literature, we can find different classifications of the concept of innovation. For example, according to the DTI of the United Kingdom (Department of Trade and Industry) innovation can be product, process, position and paradigm. According to the Oslo Manual (OECD and Eurostat, 2005), innovation can be product, marketing, process or organizational. And according to Slaughter (2000) innovation can also be incremental, architectural, modular, system or radical.

The different models that exist to describe the innovation process have also evolved over time, just as the concept of innovation itself has, becoming more complex and complete. For this reason, there are differences depending on the author who defined them and the year in which they were developed (Errasti et al., 2011; Saren, 1984; Trott, 2008; Forrest, 1991; Berkhout and van der Duin, 2007; Rothwell, 1994; Liyanage and Greenfield, 1999; Hidalgo et al., 2002; Niosi, 1999; European Commission, 2004; Eveleens, 2010; Cantisani, 2006; Cummings and O’Connell, 1978; Galanakis, 2005; Josty, 1990; Padmore et al., 1998; Papinniemi, 1999). The following classification of innovation models has been adopted for the purposes of this study:

- The Linear Model: an interpretation of the act of innovation; a rigid model that includes no external factors such as a socio-cultural and a global economic environment. This model is divided into two sub-models, the Technology Push and Market Pull Model.
- The Mixed Model. It is also divided into two sub-models:
  - The Marquis Model: recognizes the environment as a key source of knowledge that feeds the innovation process. The idea is the key driver of innovation and may come from any part of the organization.
  - The Kline Model: considers innovation as a means to the identification of science and technology-related problems and their solution. The path starts with an idea that materializes in a response to a market need and is developed through feedback.
- The Integrated Model: an overlapping model, where there is global integration between functions and there are close (integrated) relations with suppliers and customers, strategic alliances with companies, as well as the creation of consortia for competitive research.

- Format 2: Assignment of an innovation index or degree and the resulting company ranking based on that index
- Format 3: Analysis of the strengths and weaknesses of the company and list of recommendations or good practices

Among all the tools under analysis, 65% use more than one format to output their innovation results. An analysis of the most commonly used formats yields the following:

- 75% of the tools use Format 1
- 88% of the tools use Format 2
- 56% of the tools use Format 3

## 5. CONCLUSIONS

The economic crisis facing many companies means that today, the ability to adapt to change and to develop innovations represents one of the principal ways of gaining competitive advantage and of surviving in an increasingly global market. The concept of innovation has achieved significant consideration as an economic variable. Therefore, the possibility of measuring the level or degree of innovation within companies, so as to use it as a yardstick to assess company performance, has become an important research issue.

There are a wide range of innovation assessment tools, adapted to the different types of organization and their various types of activity. The indicators for evaluating the degree of innovation that these tools incorporate have evolved over time, in parallel with the concept of innovation, becoming more complete and complex.

There is no "ideal" innovation assessment tool that fits all organizations, as each one has a specific focus and each of them have some limitations in terms of scope, scientific properties or ease of use. Another question to highlight is that in order to get a good assessment of innovation in organizations, it is important to adopt a multi-method approach as it is unlikely that a single instrument, by itself, provide a valid and reliable assessment. Therefore, further work is required to analyze the characteristics of the instruments described in this paper. Thus, knowing the strengths and weaknesses of each of the tools in more detail, future research should be directed to develop new, more advanced and more efficient innovation evaluation systems.

After the analysis of the 16 tools carried out in this study, the following conclusions were obtained related to their specific characteristics: most of them (65%) use between 10 and 50 indicators and most of them use multicriteria decision techniques for assessing innovation. It also noted that almost all of them classify these indicators by dimensions, which means that we may study the behavior better and define areas of improvement in a more concise way.

The most widely used input format consists of questions with responses on a Likert-type scale (82%) and the most widely used output format consists of the assignment of an innovation index or degree and the resulting company ranking based on that index (88%).

With this work, two objectives have been achieved. On the one hand, a series of innovation assessment tools from different sectors, applicable in different types of organization, have been compiled and analyzed, so that organizations wishing to evaluate and to improve their innovation-related performance can choose the ones that best suits their reality.

On the other hand, the characteristics of each of the tools have been analyzed to obtain information on methodology, the number of indicators, and so on, in order to share this information with the scientific community, so that it may be used in future development projects involving new and better innovation assessment tools.

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