Searching for an Exhaustive Breakdown of Innovation Activities

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Abstract

An eight-fold classification of Scientific and Technological activities is put forth here based on a three pairs' taxonomy of twin Research and Innovation's contrasting characteristics. As a result, a consistent, more complete description and measurement of R&I might ensue than current ones.

The taxonomy

Analyzing a crucial feature of Science & Technology, let us start from an irrefutably essential characteristic of all Innovation activities:

both SCIENCE and TECHNOLOGY aim at | REPRODUCIBLE · RESULTS |

therefore searching for | GENERAL · SOLUTIONS |

Three couples of twin, contrasting characteristics can be derived from the

|GENERAL · SOLUTIONS| binary relationship,

provided that we simultaneously allow for the

|conceptual-SCIENCE _ versus _ practical-TECHNOLOGY| divide; they are:

1) Conceptual versus Practical;

2) General versus Particular;

3) Questions versus Answers.

Two points ought to be made at this analytical stage:

A. The resulting taxonomy is symmetrical, namely made up of an even number of categories since such amount is proportional to a sum of pairs;

B. more specifically, the whole number of categories shall be eight (i.e. two to the third power). This may appear at first sight a counterintuitive, puzzling result. In fact the S&T activities' categories which can be sensibly detected throughout the OECD statistics are currently an uneven, lesser number, at most five: 1) Basic Research; 2) Applied Research; 3) Experimental Development; 4) Engineering; 5) Technological Innovation. Of these, only the first one detects "conceptual" activities, the remaining concerning "practical" ones. This circumstance is a bit paradoxical, since the international effort - mainly driven by OECD - to measure S&T pursuits was at first addressed at measuring Scientific Research activities.

The classification

TThis theoretical situation offers an ample scope for a seminal taxonomycal investigation, which according to us results into an eight-category classification:

Technological activities

1. ***Finalised research on general questions.*** The first category is made up by indicators measuring the S&T activity specified by triplet: |**practical · general · questions**|. This category overlaps with "Applied research".

2. ***Finalised research on particular questions***. A symmetrical category shall consist in the activity identified by triplet |**practical · particular · questions**| - i.e., "Experimental development", according to the Frascati Manual's definition of this search activity.

3. ***Engineering.*** The third category of our taxonomy, covers S&T activities producing |**practical · particular · answers**|. It consists in practical answers derived from rational - mainly scientific - knowledge.

4. ***Technological innovation.*** The fourth category, symmetrical to the third one, is made up by S&T activities which have produced: |**practical · general · answers**|, namely technological innovations.

Scientific activities

1. ***Contemplative science.*** Then comes the category of S&T activities consisting in the investigation of |**conceptual · general · questions**|.

2. ***Publishing***. The following, symmetrical category is made up by |**conceptual · general · answers**| which of course scientists publish and cite in scholarly journals.

3. ***Experimental research.*** The seventh category of indicators includes those measuring S&T activities which provide |**conceptual · particular · answers**| by looking for new empirical observations.

4. ***Inductive research.*** The last category is obviously symmetrical to the seventh one and includes |**conceptual · general · answers**|. Indeed, in principle Experimental science starts with the conception of theories (originated from whatever hint), which actively rule the subsequent search for empirical evidence, that may refute or tentatively confirm such hypotheses. Conversely, Inductive research begins with the collection of a (given) empirical evidence; then, attempts at generalising the properties shown by data are made, by using the methods of Probabilistic Statistics.

References

1. Popper KR. The Logic of Scientific Discovery, London. 1959.