

**KNOWLEDGE PRODUCTION AND TRANSFER IN
PHYSICAL AND LIFE SCIENCES**

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DECLARATION

I declare that this thesis is my own account of my own research and contains, as its main content, work which has not previously been submitted for a degree at any tertiary educational institution

Daniela Nicolau

A handwritten signature in black ink, appearing to read 'Daniela Nicolau', written in a cursive style.

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ABSTRACT

Questions about knowledge flows between different fields of science are important from a policy perspective.

This thesis focuses on knowledge transfer between physical sciences and life sciences. Science and technology are increasingly intertwined in a complex continuum. This complexity of the science and technology today asks for a concerted, articulated and comprehensive understanding of the process of science and technology.

The approach that this research has taken is to *analyse the process of science and technology*. The thesis asks: *What is the trade of science and technology?* In order to answer this question we developed an anatomy of knowledge and we analysed the internal developments in science via the analysis of the role of the researchers as carriers and producers of knowledge.

Secondly the thesis asks: *What are the mechanisms and directions on which scientific knowledge migrates?* This research postulates that the analysis of the process of science and technology translates to the analysis of the production and transfer of scientific and technological knowledge.

What is obvious and essential for science and technology is the difference between the specific mechanisms of knowledge production. This thesis suggests that the modern mode of knowledge production is characterized by an increasing density of communication on three levels: between science and technology – on one hand – and society on the other-; between scientific practitioners; and with the entities of the physical

and social world. Central to our research is the concept of '*mode of knowledge production*' with mode 1 and mode 2 being defined by Gibbons.

The four case studies employed emphasise on how collaboration across disciplines is highly important for the production of new knowledge. The main characteristic of newly emerging fields is an increasing synergy between disciplines, which leads to several types of communication between them.

With the increasing of the interdisciplinary intensity the border between the production of knowledge and the transfer of knowledge begins to be blurred. The transfer of knowledge occurs today at a more conceptual level. It follows that the production of knowledge has a large component of knowledge transfer. To study it, this thesis proposes a quasi-quantitative model. In this unified framework for the knowledge transfer mechanisms, transfer is seen as a process with a number of stages and forms. We tested our framework on four case studies.

The third part of the thesis proposes a taxonomy of interdisciplinarity, and deals with the social engineering of knowledge transfer that is the design of adequate guidelines for policies aiming at maximization of knowledge transfer. In this way the thesis aims to contribute to the understanding of processes of development of new emerging scientific fields.

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