

A Comparative Study on Formal Cooperative R&D by Government, Industrial, and University Laboratories in the United States

Huei-huang Wang

Associate Professor, Department of Public Administration,
Tam Kang University

ABSTRACT

Cooperative R&D has become a central issue in the public policy debate for enhancing the economic competitiveness of firms and countries since the 1980s all over the world. By developing a framework including the laboratory's mission focus along the process of technical change, external variables, and internal variables, this paper examines how public policies and other structural factors have influenced the cooperative R&D efforts exerted by government, industrial, and university laboratories in the U.S. Considering the increasing interest in the problem of 'whether there are any meaningful differences between public and private organizations' since the early 1980s, this paper searches specifically for patterned effects on cooperative R&D by variables representing the influence of market competition and political authority.

This paper finds that theories of cooperative R&D based on economic spillover or externalities can hardly explain the differences in the pattern of cooperative R&D by laboratories in the U.S., except for government laboratories in 1991. Traditional understanding of the role played by political authority and market competition has not been confirmed by this research either. Furthermore, there are interesting

differences in the pattern of cooperative R&D behavior between government, industrial, and university laboratories in the U.S. This paper finds that R&D laboratories in the U.S. in the 1990s have responded quite aggressively to initiatives in cooperative R&D, and therefore also rejects the cliché that government authority has always resulted in impasse and conservativeness. Contrary to the general impression that private organizations are more competitive and therefore more adaptable and responsive to new challenges, industrial and government laboratories have not shown significant response to the structural factors as expected by the traditional view.

Key Words: Cooperative R&D, R&D Laboratories, Industrial Laboratories, University Laboratories, Science and Technology Policy

Introduction

In the United States, many basic industries fell behind foreign competition during the 1960s and 1970s in product and process technology. To regain the competitive edge, significant restructuring has occurred in the 1980s. One of the allegedly fastest ways of catching up has been the use of joint ventures. This mechanism has been used to improve the efficient utilization of existing technologies and enhance the effectiveness in creating new technologies that can be crucial in helping the economic competitiveness of this nation. Joint ventures involving two or three firms increased from under 200 per year in the 1970s to over 400 per year by the mid-1980s. After the enactment of National Cooperative Research Act of 1984, larger scale cooperative arrangements have increased significantly. Since cooperative R&D has been treated as such an important policy instrument, it is crucial to look empirically into what are the structural factors that have influenced R&D laboratories' motivations and efforts to engage in cooperative R&D. Since informal type of cooperative R&D agreements were not surveyed in the database (National Comparative Research and Development Program, NCRDP) used in this research, the focus of this paper will be restricted to formal type of cooperative R&D agreements.¹

1 Informal cooperative arrangement poses another theoretical challenge, i.e. as a result of informality, the nature of cooperation can not be easily defined.

比較美國國家、產業、大學實驗室 在共同研發差異上的因素

王輝煌

淡江大學公共行政學系副教授

摘 要

共同研發自一九八〇年代以來，在如何提高個別公司或國家整體經濟競爭力的辯論中，已成為世界各國公共政策上的主要議題之一。本研究發展了一個簡單的理論架構來探討什麼因素造成美國國家實驗室、產業實驗室、大學實驗室在共同研發的努力上，有所差別。此架構包括三類因素：各實驗室對科技變遷過程中不同階段的重視程度，影響各實驗室行為的內在與外在因素。鑑於八零年代以來，在公共行政或企業管理學界興起一股對公、私組織到底有任何不同的研究熱潮，本研究在外在因素中，特別注意考察在承受不同程度市場競爭壓力與政府公權力影響下，各實驗室在共同研發的努力上是否也有特定的差別。

本研究發現，建構在經濟外溢效果或經濟外部性的共同研發理論並不能解釋美國各實驗室在共同研發上的差別。公權力與市場競爭壓力的影響也沒有一致而顯著的影響。不但如此，美國的國家實驗室、產業實驗室、大學實驗室在共同研發的行為模式上有很大的不同。特別是美國的國家實驗室在一九九〇年前後有顯著不同的表現。本論文發現美國的國家實驗室在一九九〇年代在共同研發上有相當積極的作為，這發現排除了在公權力影響下組織會較保守、被動、不能動彈的陳腔濫調。反而產業實驗室、大學實驗室的實證結果卻大大異於一般人對非官方組織較具彈性、較能反映環境變遷壓力的印象。

關鍵詞：共同研發、國家實驗室、產業實驗室、大學實驗室、
科技政策