



On transformation of public sector research: A preliminary post-STBL assessment in Taiwan[☆]

Yuan-Chieh Chang^{*}, Min-Nan Chen¹

Institute of Technology Management, National Tsing Hua University, Taiwan, ROC

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ABSTRACT

The paper examines the impact of the Science and Technology Basic Law (STBL) enactment of 1999 on the transformation of public sector research (PSR) in Taiwan. The paper proposes a research framework to assess the changes on PSR mainly through four dimensions: (1) new infrastructure build-up, (2) industrial research links, (3) patenting and licensing, and (4) industrial education/training. Nine research hypotheses are developed. Based on the survey data of 107 PSR establishments, the paper reveals that Taiwan PSR has experienced a burgeoning infrastructure build-up and a more active partnership with industry in the post-STBL period. However, the paper argues that the scientific–economic transformation of PSR in Taiwan tends to develop better “industrial collaborative research and training capabilities” than “patenting and licensing capabilities” in the preliminary post-STBL period. The divergence on patenting, licensing and partnership capabilities still persists between experienced PSREs and non-experienced ones, suggesting a learning effect. These findings provide crucial policy implications to delineate appropriate roles of PSR in the new scientific–economic regime.

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1. Introduction

In many countries, universities, non-profit research institutes (NPRIs) and government laboratories are regarded as the public sector research (PSR) undertaking government-funded research. The PSR forms one of the most important science and knowledge base in the national innovation system. In the rise of knowledge-based economy, a main concern of government today is how to make best use of the PSR knowledge base to foster innovation and economic competitiveness [1]. For governments, changing the structure and function of the PSR has become a crucial task to facilitate knowledge flows into new sources of industrial innovation [2].

In order to reap the economic contribution of PSR, various institutional and organizational innovations of PSR establishments (PSREs) have burgeoned such as devolution of intellectual property right (e.g., the US Bayh–Dole Act of 1980, Science and Technology Basic Law of the late 1990s in Japan, Korea and Taiwan), technology transfer offices, incubator facilities, increasing availability of venture capital and PSR spin-offs. It has been increasingly aware that PSR produces discoveries and inventions that immediately show the potential to be commercialised, especially the science-based technologies such as biotechnology and information and communication technologies [3–5].

In the rising importance of PSR as sources of industrial innovation, many researchers have tried to assess the impacts of the Bayh–Dole Act on the changes of market-oriented research [6], university patenting and licensing [7,8], university spin-offs [9,10]

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^{*} Corresponding author. 101, Sec. 2, Kuang-Fu Road, Hsinchu, 300 Taiwan, ROC. Tel.: +886 3 5742251; fax: +886 3 5745310.

E-mail address: yuchang@mx.nthu.edu.tw (Y.-C. Chang).

¹ Min-Nan Chen is a doctoral Student at the Institute of Technology Management, National Tsing Hua University, Taiwan, ROC.

and regional economy [11,12]. Research has been supported that Bayh–Dole Act has effectively stimulated the increase of technology transfer and commercialisation activities in PSR. Almost two decades later, Japan, Korea and Taiwan enacted the Science and Technology Basic Law (STBL) in the late 1990s to echo the Bayh–Dole Act of the US. However, little research attempts to systematically assess the impacts of STBL enactment on transformation of PSR in these countries. The paper sets out to bridge this gap, by paying special attention on the case of Taiwan.

The paper starts with examining the STBL enactment and PSR in the Taiwanese innovation system in Section 2. Section 3 reviews the new “scientific–economic” regime of PSR occurring worldwide and Taiwan. The paper further develops a research framework to assess the transformation of PSR in Taiwan, The postal questionnaire exercise, statistic methods, and structural interviews are described in Section 4. The results of PSR engaged in the “scientific–economic” activities between pre- and post-STBL are shown in Section 5. The underlying factors for the results are discussed in Section 6. Finally, some conclusions and policy implications are made.

2. The STBL and PSR in Taiwan

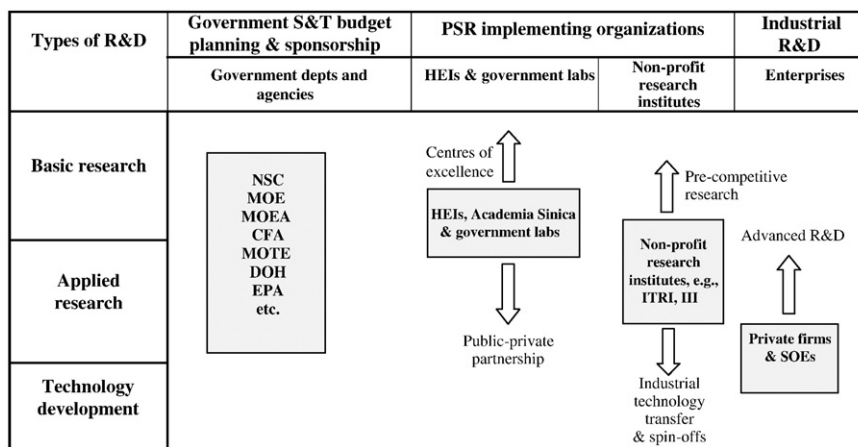
2.1. The STBL and subsequent institutional reforms

Taiwan implemented the Science and Technology Basic Law in January 1999 laid out fundamental principles and directions for the country’s technological development, while providing for sustained and balanced support for national R&D. Most importantly, Article 6 allows PSREs to fully or partially claim and commercialise the titles of IP derived from government-funded research. Before the Basic Law, the assignees of the patents were research funding agencies (e.g., National Science Council) and government ministries (e.g., Ministry of Economic Affairs). Nowadays, normally in the patent certificates, PSREs are the assignees. Therefore, the PSREs have established technology transfer offices in the post-STBL. The revenue from the share of PSREs’ licensing incomes and royalties is pooled to National S&T Development Fund (NSTDF).

Taiwanese government further enacted the Guidelines for the Ownership and Utilization of Government S&T Research and Development Result in 2000. The Guidelines request HEIs (higher education institutes) payback 20% of licensing incomes and royalties to government funding agencies. Other PSREs have to payback 50% of the incomes to National S&T Development Fund. It provides a general guideline about the distributed shares of licensing fees and royalties among contract PSREs, inventors, NSTDF are 40%, 40% and 20% respectively. HEIs can have a favourable share on licensing incomes and royalty than other PSREs can. In summary, contract HEIs can retain 40% of licensing revenue, HEI individual researchers retain 40% and NSTDF keeps the rest, 20%. Other PSREs, HEIs excluded, the income distribution rule is: 25% for contract PSREs, 25% for individual researchers and 50% for NSTDF. The Subsidy Principles allow NSC (National Science Council) to subsidize HEI patent application and maintenance fees up to 80%. PSREs will provide the rest 20% by their own. Despite the NSC patenting subsidy, PSREs still have the ownership of the granted patents.

2.2. PSR in the Taiwanese innovation system

The division of labour by types of R&D activities (in terms of basic research, applied research, and technology development) among PSREs in the Taiwan’s innovation system is illustrated in Fig. 1. The NSC and MOE (Ministry of Education) mainly fund HEI basic research and education. HEIs mainly engaged in basic research and part of applied research. It is worth noting that Academic Sinica is under the Presidential Office. Its function is like the US Academy of Science. However, the president of Academic Sinica



Note: NSC: National Science Council; MOE: Ministry of Education; MOEA: Ministry of Economic Affairs, CFA: Council for Agriculture, MOTE: Ministry of Transportation and Communication, DOH: Department of Health, EPA: Environment Protection Agency, HEI: Higher education institutions, ITRI: Industrial Technology Research Institute, III: Institute for Information Industry, SOEs: state-owned enterprises

Fig. 1. PSR in Taiwan national innovation system.

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