

NIS理论视阈下的日本国家

创新体系研究

■ 郑成功 李彬 著

 Study on Japan's National Innovation System
from Perspective of NIS Theory

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摘 要

当前,我国经济正处于稳定增长时期,经济发展虽已取得了显著成就,但是进一步发展还面临着一些亟待解决的问题,如资源环境约束日趋严峻、经济增长主要依靠要素投入、技术进步贡献率比较低、对外科技依存度过高,等等。基于现实压力和长远思考,我国开始逐步构建国家创新体系(National Innovation System,简称“NIS”)。回眸近半个世纪,可以看到自1978年起,我国就已经开始着手建设国家创新体系。1999年,我国将国家创新体系建设确定为国家战略。2006年,进一步提出了增强自主创新能力、建设创新型国家的战略目标。2010年,我国再次强调了科技和自主创新的重要性,胡锦涛同志指出建设创新型国家,依靠科技力量是根本,大幅度提高自主创新能力是其关键所在。

在全球化时代,我国要想更快、更好地建设创新型国家,就必须放眼世界,掌握国际动态,学习国际经验。如今,美国在开放式创新模式方面取得了显著成效,欧洲各国也正在积极加强合作,并且在设计国际标准和营造创新制度环境等方面为我国提供了宝贵经验。但是,欧美均为早期的发达资本主义国家,与中国经济发展历程迥异,相比较而言,日本作为赶超国家与我国现代化的历史进程更为相似,特别是日本由“技术革新”大国到“创新滞后”,再到“创新力量积蓄”,已积累了丰富而宝贵的经验与教训,因此系统研究日本国家创新体系的架构、机制、经验与绩效,对于还未走出基础研究困境、模仿跟踪多、创新突破少、关

键领域原始性创新不足、且正在试图努力实现经济跨越式发展的中国来说,有着极为重要的借鉴意义,它可以为我国建设创新型国家提供一个独具特色的蓝本。

本书在创新经济学与演化经济学理论框架下,运用了规范分析与实证分析相结合、逻辑推理与演绎相结合、比较制度分析与历史分析相结合,以及案例分析等研究方法,研究了包括日本建设 NIS 的历史演变进程、国际国内背景、作为制度创新构筑者的政府、作为知识创新源头的大学、作为技术创新主体的企业、作为 NIS 核心的产学研联盟,以及产学研联盟在内等日本国家创新体系特点、成效及运行机制等问题。

本书得出如下五个主要结论:

(1) 二战后日本经历了技术改造、技术引进、反求工程和模仿式创新过程。此后日本将技术立国作为国家战略给予高度重视,近年来日本又将技术立国战略升级为科技创造立国战略。

(2) 日本 NIS 中各创新主体均发挥了各自的作用。政府作用主要表现在不断强化科技创新推进体制和科技基本计划审议机制,完善知识产权和研发体制,建立科技法律体系,为 NIS 提供制度基础等方面。大学作用主要表现在不断强化创新人才培养和提高研发能力等方面。企业作用主要表现在集研发、生产与技术引进为三位一体,此外企业具有隐性知识、构筑竞争的组织能力、内外联动时时创新、JIT 和 TQC 生产管理创新等经验。日本企业创新正在由独立主义向开放式创新模式转型。

(3) 日本产学研联盟模式丰富多样,独具特色,既有共同研究、受托研究、捐助讲座、大学衍生企业、就业体验和技术转移等六种基本模式,又不断创新了企业联合体、技术指导、科学训练营、全面协议、会员制和学生参与等新模式。日本多元化的产学研联盟在“官”之主导下更为活跃。利用三重螺旋理论分析日本产学研联盟的演进过程,可以看到目前日本企业与大学开展的共同研究进展很快,大学也在积极创办衍生风险企业,承担了市场化的知识生产职能,政府在此过程中正在由“支援”型政府向

“促进”型政府转型。

(4) 实证测度了日本建设创新型国家绩效。收集世界 25 个主要国家 2008 年的相关数据,构建了创新基础设施、创新投入水平、创新潜能、创新产出水平等 4 项二级指标,28 项三级指标,运用主成分和聚类分析方法,结果显示日本处于国家创新水平最高的组别中,日本的综合得分排名位于美国、荷兰、澳大利亚、加拿大等国家之后,位居世界第五位。

(5) 日本 NIS 的主要经验有日本政府高度重视 NIS,企业积极推行信息化,整个国家的信息化发展迅速,研发投入和技术贸易居世界领先水平。但是,日本在技术转移、信息化水平、基础研究水平、人才培养与合作研究国际化、应用 IT 技术等方面与美国和欧洲相比仍有较大差距,特别是日本还存在着对开放式创新认识不足和进程缓慢等问题。

本书的创新性贡献体现在以下五个方面:

一是研究 NIS 具有理论性。本书注意运用发展成熟和处于学术前沿的理论分析现实问题,丰富了相关理论,主要运用了贝塔朗菲的系统论与哈肯的协同论,分析了日本 NIS 的架构与运行机理,运用切萨布鲁夫的开放式创新理论考察了日本由传统封闭式创新模式向开放式创新模式转型的特点,运用埃兹科维茨的三重螺旋理论解析了日本产学研联盟的最新进展,在研究日本 NIS 理论方面具有创新性贡献。

二是研究 NIS 对象具有新意。以某个国家的 NIS 为研究对象具有很大难度,主要是难以把握该选题的系统性和各要素的相关性。迄今为止,新时期专门针对日本 NIS 的研究,日本国内尚没有专门的学术著述。虽然有英国学者克里斯托弗·弗里曼的研究,但是弗里曼的研究是针对 20 世纪 80 年代以前日本 NIS 的研究。而本书以 21 世纪日本 NIS 作为研究对象,在国内外的相关研究中具有新意。

三是研究日本 NIS 具有系统性。本书系统地研究了日本 NIS,采用“总——分——总”的研究思路,首先对 NIS 进行文

献综述；其次，对 NIS 的各个主要构成要素——政府、大学、企业、技能人才进行研究，并使用了翔实的、最新的一手数据和文献进行分析；最后，对 NIS 进行总括性研究，研究了 NIS 的核心产学联盟和产学官联盟，并提炼了迄今为止日本 NIS 的经验与不足之处。

四是实证研究日本 NIS 方法创新。本书采用统计学中因子分析、主成分分析和聚类分析方法测度了日本 NIS 的发展水平，弄清了日本 NIS 各种发展经验与不足之处。

五是本书通过研究日本 NIS 建设经验得出了对中国创新型国家建设的借鉴与启示：我国应加强政府对产学联盟的主导作用，突破传统模式，创新产学联盟新模式，提倡产学联盟的开放式创新理念，加强产学联盟的知识产权保护，重视战略性新兴产业的产学联盟，实现科技成果的快速转移，鼓励产学共同研究，支持大学创办衍生风险企业。

关键词：日本；国家创新体系；产学官联盟；三重螺旋理论；开放式创新

ABSTRACT

At present, China's economy is in the critical period of change towards steady growth. Although the economic development has made remarkable achievements, its further development is still facing some problems to be solved, such as resources and environmental constraints are increasingly grim, economic growth depends mainly on factor inputs, technological progress contribution ratio is relatively low, and high dependence on foreign science and technology. Based on the pressure of reality and long-term thinking, China began to build the national innovation system (NIS) gradually. Looking back the nearly half-a-century building of NIS, 1978 is the starting year of China's building of the NIS. In 1999, China made the building of the NIS a national strategy. In 2006, China put forward the strategic goal of enhancing the capability of independent innovation and the building of an innovative country. In 2010, President Hu Jintao stressed the importance of science and technology and the capability of independent innovation, he pointed out that relying on scientific and technological strength is the essence and greatly improving the capability of independent innovation is the key during the process of building an innovative country.

In the era of globalization, in order to make the building of

an innovative country faster and better, China must keep the whole world in view, master the new international developments, study the international experience. America has achieved remarkable success in the development of open innovation model, and European countries actively strengthen the cooperation, China should learn the experience of designing the international standards and creating innovative institutional environment from the European countries. However, looking at the economic development process, Japan, as a catch-up country, has a more similar background with China's development. Plus, Japan has accumulated rich experiences and lessons during its development process from "big country of technological innovator" to "innovation lag" and then to "innovative power accumulating". So it has great referential significance to study the Japanese experience in its process of building the NIS system. At present, for China now is still in its plight of lacking basic study, more imitating and tracking, less original innovative breakthroughs in key areas, and trying to achieve economic leaps in its development. It can provide a blueprint and reference for China's construction of an innovative country.

Within the theory framework of innovation economics and evolutionary economics, this book conducts the study methods of the combination of normative analysis and empirical analysis, the combination of logical reasoning and deduction, comparative institutional analysis, historical analysis, and case studies, the objects of study involves the historical evolution process during the building of Japan's NIS, the international and domestic background, the architect of institutional innovation—the government, the source of knowledge innovation—universities,

the technological innovation body—enterprises, and the NIS core: industry-university alliance and industry-university-government alliance and so on. The study covers the characteristics, development status, effectiveness, inadequacies and operating mechanism of Japan's NIS.

Five main study conclusions of this book are as follows:

(1) After World War Two, Japan experienced the process of technological upgrading, technology introduction, reverse engineering and imitating innovation. Then Japan gave "Technical State" high priority as a national strategy. In recent years, Japan upgraded its national strategy from "Technical State" to "Technology and Innovation State".

(2) The main innovation bodies in Japan's NIS have played their respective roles. The role of the government of Japan is mainly manifested in the increasing reinforcement of the Scientific and Technological Promotion Institution and Technology Basic Plan Review Mechanism, improving the intellectual property and R&D institutions, establishing the legal system of science and technology and thus providing the institutional basis for NIS. The role of the universities is mainly manifested in the increasing strengthening of innovation talents training and improving the R&D capabilities. The role of the enterprises is mainly manifested in the TRINITY of R&D, production and technology introduction. In addition, the enterprises have the tacit knowledge, build the organizational capacity of competition, the internal and external linkage of constant innovation, JIT and TQC experience in production management innovation. The innovation of the Japanese enterprises is facing the transition from the independent innovation model to the open innovation model. In the

cultivation of skilled human capital, Japan has developed the national skill appraisal system.

(3) Japanese university-industry alliance models are diverse and unique, including six basic models like joint research, contract research, donor lectures, university spin-off enterprises, employment experience and technology transfer, and innovated new models like enterprises commonwealth, technical guidance, science training camp, comprehensive agreement, membership and student participation. The Japanese diversified industry-university alliance is more active under the auspices of “government”. In addition, the evolutionary process of the industry-university-government alliance in Japan is analysed by using the triple helix theory, the joint research carried out by the Japanese companies and universities is progressing fast, the universities also actively spin-off derivative risk enterprises and undertake the market-oriented knowledge production functions, the government is transferring from “supporting” to “promoting” during the whole process.

(4) Empirical study is conducted to measure the Japanese innovative country performance. The relevant data of 25 major countries of the world in 2008 are collected, four secondary indicators, such as innovation infrastructure, innovation input level, innovative potential, innovation output level and 28 third-level indicators are built, by using principal component analysis and cluster analysis methods, the result that Japan belongs to the highest level of national innovation group is obtained, and the composite score of Japan ranks No. 5 in the world and runs after the United States, the Netherlands, Australia and Canada.

(5) Japan's main experiences are the Japanese government

attaches great importance to the building of NIS, the enterprises actively promote the information technology, the information technology of the entire country develops rapidly, and R&D investment and technology trade are leading the world. However, compared with the United States and Europe, Japan is left behind in technology transfer, informationization, basic research level, talents training and internationalization of collaborative research, application of IT technology, especially, problems like inadequate understanding of open innovation and slow process are still existing in Japan.

The innovative contribution of this book lies in the following five aspects:

First, the study of NIS has its theoretical importance. The real-world problems are analysed by using the mature theories that are in academic frontier in this book and the relevant theories are thus enriched. The structure and operating mechanism of Japan's NIS are analysed by using Bertalanffy's system theory and Haken's synergetics, the transfer from Japan's traditional closed innovation to open innovation is investigated by using Chesbrough's open innovation theory, the latest progress of Japan's industry-university-government is analysed by using Etzkowitz's triple helix theory, and this has its theoretical innovation contribution in analysing Japan's NIS.

Secondly, the study object of the NIS has its novelty. There is great difficulty in making some specific country's NIS as the study object, and it is very difficult to grasp its systematic nature and respective elements of the subject. So far, the special study on Japan's NIS in the new era is really rare, Japanese scholars haven't written a book to expound it. Although British scholar Christopher Freeman has studied it, his study is on

Japan's NIS before the 1980s. This book has its novelty among the relevant studies both at home and abroad to make Japan's NIS in the 21st century as the study object.

Thirdly, the systemic study of Japan's NIS has its novelty. This book conducts a systematic study of Japan's NIS through the approach of total-sub-total. The first part is the literature review of NIS, followed by the study of respective major bodies of the government, universities, enterprises, skilled personnel in NIS, the analysis is conducted by using informative, the latest first-hand data and literature. Finally, the overall study of NIS is conducted including the study of the core of NIS; the industry-university alliance and the industry-university-government alliance, and finally, the so far experiences and inadequacies of Japan's NIS are refined.

Fourthly, the empirical study of Japan's NIS has its novelty. In this book, standard statistical factor analysis, principal component analysis and cluster analysis methods are adopted to measure the level of NIS development in Japan. The development level of Japan's NIS finally comes at a true knowledge under its various development experiences and inadequacies.

Finally, some lessons and enlightenments toward the construction of China's innovative nation are obtained through the study of Japan's NIS in this book; China should strengthen the government's leading role of university-industry alliance, break through the traditional model, innovate new model of university-industry alliance, promote the open innovation philosophy of industry-university alliance, strengthen the protection of intellectual property rights of university-industry alliance, emphasize on industry-university alliance of strategic

ABSTRACT

emerging industries, realize the rapid transfer of scientific and technological achievements, encourage the industry-university joint research, support universities to start derivative risk enterprises.

Key words: Japan; national innovation system; industry-university-government alliance; the triple helix theory; open innovation

目 录

摘 要.....	1
ABSTRACT	1
第一章 绪论.....	1
一、选题背景.....	1
二、研究意义.....	5
三、文献综述.....	9
四、思路与方法	29
五、创新性贡献	33
第二章 概念释义与 NIS 理论框架	35
一、概念释义与辨析	35
二、NIS 的理论基石与模式	51
三、NIS 理论的硬核与保护带	73
四、NIS 理论的结构体系	75
第三章 日本国家创新体系的演变与背景	80
一、技术改造到创新立国的历史嬗变	80
二、推动日本构建 NIS 的国际背景	95
三、促进日本建设 NIS 的国内背景	106
第四章 日本制度创新的构筑者：政府部门.....	113
一、日本政府科技创新推进体制.....	113
二、日本政府的科技法律体系.....	125

三、日本政府的研发体制改革·····	131
第五章 日本知识创新与技术转移的源头：大学·····	144
一、强化大学的知识创新与研究能力·····	144
二、日本大学技术转移的体制与模式·····	155
三、日本大学衍生风险企业的发展·····	160
第六章 日本技术与管理创新的承担者：企业·····	166
一、日本企业创新的总体特点·····	166
二、日本企业独特的管理创新·····	172
三、日本企业创新的研发活动·····	176
四、独立主义向开放式创新模式转型·····	179
五、日本企业创新模式转型评论·····	188
第七章 日本技术创新的传承者：技能型人力资本·····	189
一、技能型人力资本培育的学校教育·····	190
二、技能型人力资本培育的企业教育·····	192
三、技能型人力资本培育的政府支持·····	198
第八章 日本国家创新体系的核心：创新主体联盟·····	207
一、日本产学联盟的多元化模式·····	207
二、日本产学联盟模式的新进展·····	218
三、日本产学官联盟的三重螺旋模式·····	226
四、日本创新主体联盟的评论·····	238
第九章 日本国家创新水平评估：主成分与聚类分析法·····	242
一、国家创新水平指标体系的构建·····	242
二、国家创新水平指标体系评估方法·····	246
三、日本国家创新水平的实证评估·····	248
四、日本国家创新水平的评估结果·····	260
第十章 日本国家创新体系：经验与启示·····	261
一、日本国家创新体系的成就与经验·····	261

目 录

二、比较中显现日本 NIS 建设的不足	266
三、日本 NIS 建设对中国的借鉴与启示	278
四、日本国家创新体系研究的主要结论	286
五、日本国家创新体系未来研究展望	289
附 录	291
参考文献	295
致 谢	327