

REJUVENATING COUNTRY THROUGH INNOVATION

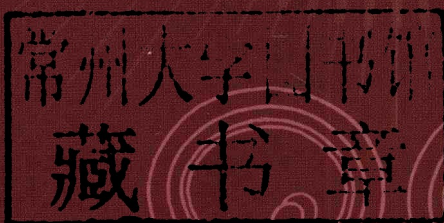
INNOVATION MANAGEMENT AND THE RISE AND FALL OF A NATION

Zhou Jizhong

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Beijing

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Responsible Editors: Lin Jian Liu Chao

Brief Introduction

This book defines innovation management in broad sense from three dimensions, i. e. , institutional design, innovation management and innovation culture, providing a perspective to observe the national strength of a country. Innovation management, in narrow sense, only refers to the management of scientific and technological innovation.

Focusing on China as well as some other influential countries in the world, including developed countries, such as the United States, the UK, Germany, France, Japan and Italy, and emerging economies including Russia, India and Brazil, the book discusses extensively the relationship between innovation and national strength from the perspective of innovation management in broad and narrow senses, highlighting the dominant role of innovation in development in the 21st century.

This book is intended for employees of businesses, teachers and students in institutions of higher education as well as civil servants and cadres at all levels.

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Preface

It has been eight years since the publication of *Management of Scientific and Technological Innovation* (Economic Science Press, 2002), during the period I have thought about republishing the book, so as to update some information. Nevertheless, in exploring the diversity of research approaches, I came up with the idea of publishing this book *Rejuvenating Country through Innovation—Innovation Management and the Rise and Fall of a Nation* in cooperation with Science Press.

Since I majored in physical chemistry of metallurgy first and then turned to management of technology (MOT) in university, the first research project I took charge of was about the "Scale and Composition of China's Science and Technology Investment", funded by National Natural Science Foundation of China (Department of Management Sciences) in 1987. I went to the United States in the September of the same year, as a visiting scholar in the field of "science and technology policy and management" in the Science, Technology and Society (STS) center, Massachusetts Institute of Technology (MIT). After returning to China, I published *Science and Technology Trends in the United States: Policy Trends of a Scientific and Technological Power* (Science Press, 1991), and later *On Scientific and Technological Education* (Science Press, 1993), *International Scientific, Technological and Economic Cooperation* (Science Press, 1993), and *The Ultimate Choice: Science and Technology and Education* (Shaanxi People's Education Press, 1997). *Management of Scientific and Technological Innovation*, published by Economic Science Press in 2002, is organized and written in a quite systematically manner and has been used as the textbook for my graduate course "Management of Scientific and Technological Innovation" in the Graduate School of the Chinese Academy of Sciences for years. As my research interest gradually turned from the macro to micro management of technology, I published *R&D and Services for Innovation Systems Engineering* (Economic Science Press) and *Linkage of Technological*

Innovation and Intellectual Property Rights (Science Press) in 2009. Like my previous works, the two books were also fruits of the research projects funded by National Natural Science Foundation of China (Department of Management Sciences) and National Social Science Foundation, but what's different is that they were the co-works by me and my students. The two books are about our studies on the management of technological innovation and intellectual property rights in telecommunications, pharmaceutical and financial industries as well as businesses in these industries, highlighting that "enterprises are the main practitioners of independent innovation".

As *Management of Scientific and Technological Innovation* has also been used as a textbook by some other universities, in 2009, some teachers from other universities asked me to update some information when republishing the book, because great changes have taken place in this field in recent years. Unexpectedly, I suffered from a serious illness shortly after I decided to republish the book at the end of 2009. Recovered from this illness and inspired by the works regarding "the rise of China" (especially Martin Jacques' *When China Rules the World: The Rise of the Middle Kingdom and the End of the Western World*), I came up with an idea of "grafting" "innovation management" into "prosperity of a nation", and thus wrote the book *Rejuvenating Country through Innovation—Innovation Management and the Rise and Fall of a Nation*.

Among management disciplines, policy design in public administration and management of scientific and technological innovation in innovation management are both related to national strength, design of innovation policy, innovation culture and innovation management. Therefore, this book can be considered as the continuity and development of my thoughts, a confluence of my works including *Management of Scientific and Technological Innovation* (Economic Science Press, 2002), *R&D and Services for Innovation Systems Engineering* (Economic Science Press, 2009), *Linkage of Technological Innovation and Intellectual Property Rights* (Science Press, 2009), *Science and Technology Trends in the United States: Policy Trends of a Scientific and Technological Power* (Science Press, 1991), and *International Scientific,*

Technological and Economic Cooperation (Science Press,1993). It is, hereby, noted that there are many quotes from those books in the first three chapters of this book, i. e. , "China in a Century" , "The United States in Crisis" , and "The Conservative UK" .

"Innovation management" or "rise and fall of a nation" , particularly the latter, is an extremely large topic and broad field of research. It is impossible for a single person to expound these two issues in details in a single book. Therefore, the book is written in a style of "extremely rough sketch" to set up a three-pillared framework of "institutional design" , "innovation management" and "innovation culture" and briefly illustrates the changes of a country's national strength. Compared with "complicated descriptions" , " sketchy simplicity" is not detailed enough and far from being completed; however, it impresses readers with being simple and clear. Finally I had to choose "a simple style" , due to my limited energy and knowledge. With the "simple" exposition, however, I often felt the book's limit in its depth and scope. Thus, it is never modest remarks that "there must be many errors and mistakes in the book and I earnestly expect your understanding" .

In the end, I want to extend sincere thanks to my three students for their contribution to this book. Xu Zhi, a post- doctoral student back then, co-authored two parts in Section Two, Chapter One, i. e. , "Bottlenecks in the allocation of resources for basic research" and "Service innovation in China's commercial banks" ; Hou Liang, a doctoral student back then, co-authored one part in Section Two, Chapter One, i. e. , "Innovation management of China's telecom enterprises" ; and Zhao Yuanliang, a doctoral student back then, co-authored four parts in Section Two, Chapter One, i. e. , "Innovation management of China's pharmaceutical industry" and three cases of pharmaceutical enterprises.

I also want to express my heartfelt gratitude toward the Department of Management Sciences, National Natural Science Foundation of China for their 20- years support for me. Since my first research project funded by the Foundation in 1987, it has been giving financial support to my research work. The writing and publication of this book has also been directly supported by the

project of “ comparative study of ‘ services- R&D linkage model’ in China’s enterprises” (project No. : 70773110) of the Department of Management Sciences.

I would like to extend especial thanks to the Science Press for its support all along. Since the publication of *Science and Technology Trends in the United States: Policy Trends of a Scientific and Technological Power* in 1991, seven books of mine have been published by the Press. My thanks also go to Lin Jian, managing editor and also the first reader of the book, who has offered me many valuable suggestions on the contents and style of this book.

Zhou Jizhong
December 2010
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“Innovation is the soul of progress of a nation, and it is the inexhaustible impetus for the prosperity of a country. The essence of science is innovation, which entails ceaseless discovery and innovation.” “The decisive factor of today’s worldwide economic, scientific and technological competition lies in the capacity of innovation.” “Scientific and technological innovation has increasingly become an important foundation and mark of the emancipation and development of social productive forces, and decides more than ever the development process of a country or nation. Unable to innovate, a nation could hardly be prosperous, and could hardly stand towering in the international community. To this problem, not only leaders and cadres at various levels, but also the society, as a whole, should have very strong political awareness.” “Innovation comprises theoretical innovation, institutional innovation, scientific and technological innovation, and other innovation. Emancipation of the mind, and theoretical innovation, are mighty forces driving the advancement of a society.” (Jiang Zemin, 2006)

Then, how did innovation become the soul of a nation’s progress, and how did it become the inexhaustible impetus for the prosperity of a country? Why do we say that “The decisive factor of today’s worldwide economic, scientific and technological competition lies in the capacity of innovation?” How did emancipation of the mind and theoretical innovation become the mighty forces driving the advancement of a society? Why do we say that innovation mainly comprises theoretical innovation, institutional innovation, and scientific and technological innovation? All these questions have continually been discussed in theoretical studies and social practices both at home and abroad. This book attempts to deal with these questions from the perspective of “Innovation Management and Rise and Fall of a Nation”.

Management is an activity, and it is also a science. Innovation management is a branch of the management science. Management can be divided into four functions, i. e. , planning (including making systems, strategies and decisions), organizing, assuming leadership, and controlling (Jones et al. , 2005). Innovation management, therefore, may briefly be defined as an extension of the aforesaid management functions: planning innovation (including institutional innovation, strategic innovation or decision-making innovation), organizing innovation, leading innovation (including mind innovation and theoretical innovation), and controlling innovation. Here, innovation is in its broad sense.

In the academia, innovation management largely refers to the management of

technological innovation or the management of scientific and technological innovation. This is because in the management science community, the management of technological innovation or the management of scientific and technological innovation, as an area of knowledge, became an established subject early, and was later conventionally called innovation management for short. Innovation management is a secondary discipline in management schools of some universities. Therefore, innovation management books currently published are largely about the management of technological innovation or the management of scientific and technological innovation. Examples include, among many others, *Innovation Management and New Product Development* by Paul Trott (2005), *Managing Innovation: Integrating Technological, Market, and Organizational Change* by Joe Tidd et al. (2008), *Managing Innovation: New Technology, New Products, and New Services in a Global Economy* by John E. Ettlie (2008), *Overall Innovation Management: Theory and Practice* by Xu Qingrui (2007), and *Innovation Management* by Chen Jin et al. (2009). The so-called “innovation” here is in its narrow sense. Of course, even though in its narrow sense, innovation management touches on the issue of national development to a certain degree.

“Innovation management” in the title of this book, which integrated the above-described two connotations, is innovation management in its broad sense, including not only institutional innovation and innovation culture, but also the management of scientific and technological innovation (namely innovation management in its narrow sense). The organic fusion of institutional design, innovation management and innovation culture, i. e. integration, ought to lead to advanced productive forces, improved competitiveness and ultimately national prosperity. Therefore, there is an essential relationship between “innovation management” in its broad sense and “rise and fall of a nation”, and that is the core view of this book.

Prof. Michael E. Porter (2007), of Harvard Business School, says in his book *The Competitive Advantage of Nations* that “The new theory on the competitive advantages of nations must include ‘technological advancement’ and ‘innovation’ as major aspects to be considered. We must explain what role nations play in the course of technological innovation. Technological innovation entails the continual investment in tangible assets, human resources and research and development, so we must also explain why some nations are enthusiastic about research and development while some are not. The problem is how a nation provides an industrial environment that allows its enterprises to make innovation and progress faster than their rivals. From the broad

point of view, the advancement of technology drives economic growth, and that is also one of the major reasons for economic progress of nations. ”

Thus, there have been adequate studies by linking innovation to the prosperity of a nation. In his book (Chinese edition, about 940,000 characters), Porter mainly used his “ diamond model ”, which consists of factor conditions, demand conditions, firm strategy, structure and rivalry, and related and supporting industries, to measure the competitive advantage of a nation from specific industries, while this book (about 900,000characters) discusses the rise and fall of a nation in a much broader way from three aspects, namely “ institutional design ”, “ innovation management ” and “ innovation culture ”. As to the relationship among these three aspects, “ innovation culture ” has a subtle influence on “ institutional design ” and “ innovation management ”; “ institutional design ” acts directly on “ innovation management ” and reacts on “ innovation culture ”, making them both “ keeping abreast of the times ”; and “ innovation management ” enriches and changes “ innovation culture ” and “ institutional design ” both in content and form. The full linkage between them (not merely interaction between two of them) will result in spiral growth on the whole.

The “ rise and fall of a nation ” in this book is not only a relative but also dynamic concept. From the quantity and quality point of view, the “ rise and fall of a nation ” happens within relative space-time; from the historical point of view, the development of a nation might “ rise and then fall ”, or “ fall and then rise ”, or “ rise, fall and again rise ”, or “ fall, rise and again fall ”. In China, for example, in a history of over 3,000 years from the Zhou Dynasty to the present, if we say that it was rise during the Spring and Autumn Period as well as the Tang and Song Dynasties, and fall during the late Qing Dynasty and the Republic of China, then, from the end of the 1970s when China began reform and opening up to the present day of the 21st century, it is a new period of “ rise again ”. Other countries in the world may also be looked at this way.

As per above accounts of “ Innovation Management ” and “ Rise and Fall of a Nation ”, this book is structured as follows. Ten countries are chosen, and each is discussed in terms of the relationship between “ Innovation Management ” and “ Rise and Fall of a Nation ”. One four-section chapter is arranged for each of the countries, dealing with its “ Institutional Design ”, “ Innovation Management ” and “ Innovation Culture ”, followed by “ Innovation Management and National Strength ”, a summary of the entire chapter. “ Innovation Management ” in the book title is in its broad sense, comprising three aspects, namely “ Institutional Design ”, “ Innovation Management ” in its narrow

sense and “Innovation Culture”; the second section of each chapter, “Innovation Management”, because of being in its narrow sense, deals only with the country’s scientific and technological innovation or innovation in management approach.

In order to avoid repetition in the accounts of the countries (namely, the second section of each chapter, “Innovation Management”), the book gives a systematical description of the main aspects of “Innovation Management” in its narrow sense in Section 2 of Chapter 1, “Innovation Management” in China, mainly the main process of the management of scientific and technological innovation, including innovation strategy and research and development (R&D) (organization of innovation, pilot production and marketing of newly- developed products, risk of technological innovation, and marketing of technological goods), resource allocation and enterprise innovation. “Innovation Management” regarding other countries is treated by only choosing typical aspects.

In the book *The Competitive Advantage of Nations* Porter wrote in 1990, the ten countries chosen are the United States, the UK, Germany, Italy, Japan, Republic of Korea, Singapore, Sweden, Switzerland and Denmark, because the first five countries were the most competitive developed powers then, the middle two were Asian countries with outstanding competitive performance and the last three were small European countries with excellent competitive performance. This book, however, was written 20 years later, in 2010, when great changes had happened to the international competition situation: China, India, Brazil and Russia were hailed as the “BRICs”, while the United States, the UK, Germany, Italy, Japan and France were 6 of “G-7”, a group of seven industrialized countries. A comparison of the two groups of big countries gives a great sense of the times, and is more realistic when looking into the international competition situation in decades to come. The ten countries chosen are all big powers, which compared to small countries, have a bigger influence on the world and have a greater value of reference to China as a big country. Why did the book choose these ten countries? The United States, the UK, Germany, France and Italy are, so far, still the examples of developed countries (also including Canada, Australia, etc.). What’s more, Italy, the UK, Germany and France served as the science center of the world at some point in history and the United States is still the world’s center of science and technology up to now. As to Japan, it is not only an economic power and a science and technology power in the world, but also geographically close to China. China, India, Brazil and Russia, the so-called “BRICs”, can be used as the examples of emerging