

# Foreword

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Today, China is undertaking what is probably history's most spectacular investment in basic science, especially in biotechnology. Under its 2006 Science and Technology Plan, it has set out an ambitious goal of investing 2.5 per cent of GDP in research and development by 2020. This will require nearly a quadrupling of expenditure. Among the targeted areas are protein science, development and reproductive biology, transgenic plant breeding, and drug development.<sup>1</sup> China already has more researchers than any other nation except the United States.<sup>2</sup> And China is just developing new plans for bringing more equality to national health care.

It is not clear to me, however, whether this investment will be successful in benefiting the Chinese economy or the Chinese citizen in the street. As noted in a recent OECD report, China's 'capabilities for making productive use of accumulated investment in R&D, human resources for science and technology..., and the related infrastructure have developed much [more] slowly, especially in the business sector,' than has the nation's overall socioeconomic progress.<sup>3</sup> There are many steps in R&D from basic research to the development of products that matter for health care or for food production. At each stage, entrepreneurs and innovators, whether in the government or in the private sector, are needed to take basic ideas, visualize their application, and invest in the research and production facilities needed to turn those ideas into products. China will require an enormous infrastructure of institutions and legislation for this to happen.

Intellectual property may significantly help this process. In the United States, for example, research sponsored by the National Institutes of Health at major research universities is often patented and licensed to venture-capital funded biotechnology companies. These firms bring basic research ideas to the academic to some degree of commercial applicability and then either invest in the needed clinical trials and production processes or sell the ideas through joint ventures with existing larger pharmaceutical firms. Patents are important to the universities, to the venture capital process and to the strategic alliance process.

It is also possible that intellectual property could harm the process. Patents on research tools have complicated biotechnology research in the United

States. And in agricultural biotechnology, patents have led to industry conglomeration in ways that have slowed entry by new firms and may have slowed application to important crops such as wheat.

This is the background against which Professor Yahong Li is publishing this important and much needed book. It would be relatively easy to write a book that examines China's patent legislation and compares it with China's commitments under the 1995 Agreement for Trade Related Intellectual Property. It would also be relatively easy to describe criticisms of China's enforcement procedures, typically relying on critiques by foreign firms seeking stronger intellectual property rights. What is special about this book is that it goes well beyond such analysis.

First, Professor Li brings solid knowledge of the biotechnology sector. Therefore she is able to investigate the law to a much deeper degree – not just to note enforcement difficulties but also to examine whether the Chinese implementation of the law in different areas really serves the social policies of encouraging research and the application of that research. The United States is discovering, for example, that details of patent law – what kinds of inventions should receive protection, how broad that protection should be, what rights it provides – make an enormous difference in whether the law in fact helps innovation or hurts it. Professor Li applies this kind of thinking to China.

Second, Professor Li knows the Chinese language and has looked carefully at a variety of Chinese judicial material. Her reviews of specific controversies and decisions provide deep insight into how the Chinese patent granting and enforcement system really works, and allow consideration of the details of patent coverage – details that are crucial for evaluating the effectiveness of the law. I know of no other academic writing in English which has combined knowledge of the industry with knowledge of original Chinese sources.

Third, Professor Li brings understanding of the business matrix of biotechnology, including the working of the US venture capital and research communities. Hence, she is able to provide insight into the really difficult questions that will face China as it attempts to convert this massive research investment into products that benefit the Chinese people. These are not just questions of the scope of patent coverage in biotechnology; they are also questions of the applicability of antitrust law, of the appropriate government rights in government-funded inventions, and of the matrix of contract law and intellectual property law that affects licensing.

In short, Professor Li is publishing a highly valuable book at an optimal time. It will, of course, be valuable to practitioners. But its value is deeper.

China will face new tasks in the next decades in ensuring that its expanded scientific research investment genuinely benefits its society, especially in a time of likely economic slowdown. I very much doubt that China's system for harnessing innovation will look much like that of the United States university licensing and venture capital system; it will almost certainly involve different kinds of mechanisms designed for China's society. I am absolutely confident, however, that China's decision-making in this area will benefit from the analysis in this book.

I am privileged to have been Professor Li's dissertation supervisor at Stanford and to provide this Foreword. Her book goes way beyond that dissertation and is a valuable contribution to our understanding of China's patent law and its innovation system.

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## NOTES

1. H. Xin and G. Yidong, China Bets Big on Big Science; *Science* 311: 1548-9 (17 March 2006)
2. OECD Reviews of Innovation Policy, OECD 2008.
3. *Id.*