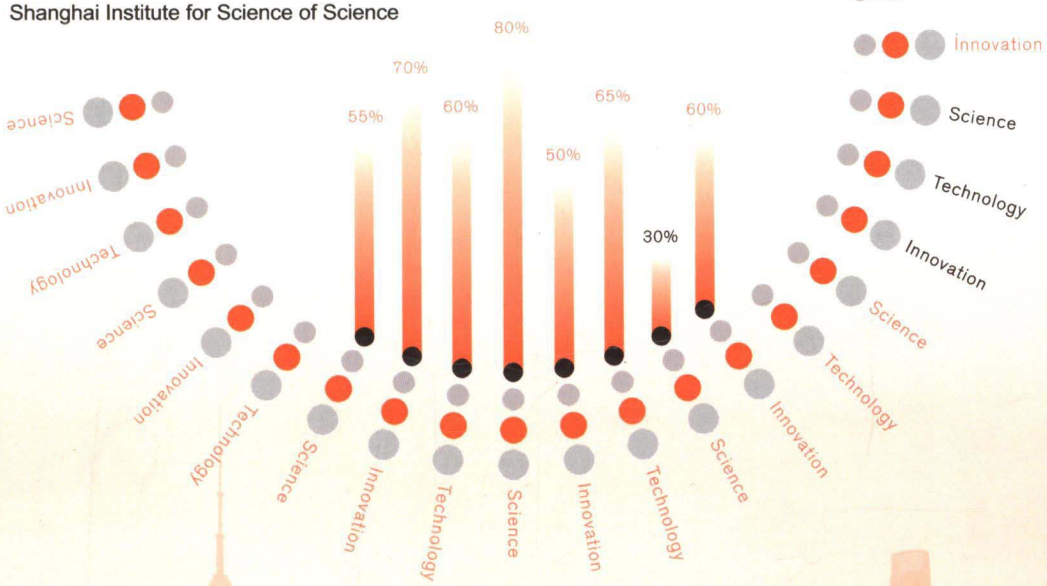
Shanghai Science and Technology Innovation Center Index Report

2016

"Shanghai Science and Technology Innovation Center Index" Project Group
Shanghai Institute for Science of Science



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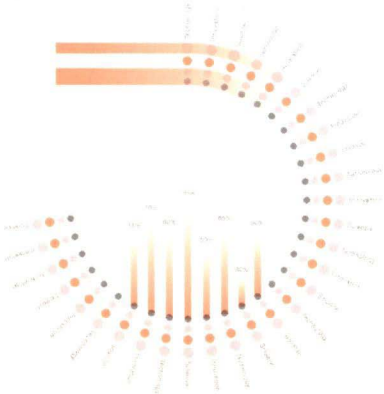

Science-Pie

www.siss.sh.cn

ISBN 978-7-5486-1299-5

9 787548 612995 >

定　价：　88.00元

易文网：www.ewen.co

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常州大学图书馆
藏书章

学林出版社
www.xuelinpress.com
上海人民出版社

图书在版编目（CIP）数据

2016 上海科技创新中心指数报告 = Shanghai Science and Technology Innovation Center Index Report 2016：英文 /《上海科技创新中心指数》研究编制组，上海市科学学研究所著．—上海：学林出版社，2017. 9

ISBN 978-7-5486-1299-5

Ⅰ．①2…Ⅱ．①上…②上…Ⅲ．①科技中心—指数—研究报告—上海—2016—英文 Ⅳ．① G322.751

中国版本图书馆 CIP 数据核字（2017）第 220569 号

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责任编辑　胡雅君

封面设计　陆　弦

出　　版　上海世纪出版股份有限公司学林出版社

地址：上海市钦州南路 81 号

电话 / 传真：021-64515005

发　　行　上海世纪出版股份有限公司发行中心

地址：上海市福建中路 193 号

印　　刷　当纳利（上海）信息技术有限公司

开　　本　720 × 1000　1/16

印　　张　8

字　　数　10 万

版　　次　2017 年 9 月第 1 版

印　　次　2017 年 9 月第 1 次印刷

书　　号　ISBN 978-7-5486-1299-5/G·504

定　　价　88.00 元

（如发生印刷、装订质量问题，读者可向工厂调换）

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Shanghai is in the process of implementing "Innovation-driven Development" Strategy and speeding up the construction of a science and technology innovation center with global influence. In order to grasp the rules of developing an innovation center and to evaluate the progress results, a systematic and multidimensional index system, reflecting the features and trends of Shanghai science and technology innovation is urgently required. With the instruction and support of Science and Technology Commission of Shanghai Municipality, Shanghai Institute for Science of Science formed a research team to conduct the study and compilation of the index report. The team teased out the advantages, features and inadequacies of Shanghai's innovation industry, and supervised the building of the science and technology innovation center based on the detailed data analysis.

The team follows the developing rule for "Innovation 3.0" which is to couple science technology innovation with city function. It looks at "Five Strengths" from the perspective of innovation ecology: cohesive force of innovative resources, influence of scientific and technological achievements, environment friendliness to attract innovative startups, the driving force of the emerging industry and

innovation capacity of facilitating regional development. The index system includes 5 primary indicators and 30 secondary indicators. This report calculated all annual index of Shanghai science and technology innovation center since 2010 based on the data of 2010 (reference value 100).

The Shanghai Science and Technology Innovation Center Index reveals a general trend of steady rise of all indexes in recent years and a big acceleration especially after 2014. Analysis of the index shows both the annual development highlights, such as the attraction of top talents from home and abroad, the development of science and technology services, the accelerated gathering of innovation capital from the society and the outstanding performance of outbound investment on high technology; and some noteworthy issues, including a slowing of corporation R&D investment growth.

The team hereby would like to express heartfelt thanks to a great number of related departments and organizations, namely the Organization Department of the CPC Shanghai Municipal Committee, Shanghai Municipal Bureau of Statistics, Shanghai Municipal Commission of Commerce, Shanghai Intellectual Property Administration, Institute of Scientific & Technical Information of Shanghai, Shanghai Technology Market Management Office, Shanghai Scientific and Technological Information Center, Center for Knowledge Competitiveness and Regional Development of Shanghai Jiao Tong University, Shanghai Academy of Social Sciences and Shanghai S&T Statistics and Analysis Research Center, for their long-term support. The appreciation also goes to all the experts and professionals for the attention and generous help during the compilation.

Special thanks to Dr. WANG Yuan, former Executive Vice President of Chinese Academy of Science and Technology for Development and Dr. XUAN

Zhaohui, Deputy Director of Shanghai S&T Statistics and Analysis Research Center for the advices and guidance on this report.

Constant exploration and extensive research is required to evaluate regional innovation-driven development level, and to supervise the development of the Science and Technology Innovation Center. We look forward to all valuable opinions to improve the index system and an annual report truthfully reflecting new trends, new situations and new characteristics of Shanghai innovation. Together let us witness the great march to Shanghai's international Science and Technology Innovation Center.

"Shanghai Science and Technology Innovation Center Index" Project Group

November 2016

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Chapter One

Introduction

Building a Scientific and Technological Innovation Centre is not only one of the national strategies but also an inevitable choice for Shanghai to break through the development bottlenecks and to reconstruct the developing engine. Since 2015, Shanghai has improved its innovation ecology and boosted the innovation-driven development with full energy and vigor. Shanghai has been in the process of implementing "*The National Plan for Speeding Up Innovative Reform and Building Shanghai as Science and Technology Innovation Center with Global Influence*" and the "*Opinions*" on this agenda are being addressed by the CPC Shanghai Municipal Committee and Government. The related 9 supporting policies and the "2+X" working mechanism were carried out. Shanghai is stepping into the key stage of building the center.

I. Fundamental Ideas

With the instruction and support of Science and Technology Commission of Shanghai Municipality, the research team, formed by Shanghai Institute for Science of Science in 2015 conducted the study and compilation of the index report, which not only coordinated with the national strategy but also highlighted with Shanghai's characteristics. The purpose of the report is to further master

the rules of building and developing an innovation center, and to supervise and evaluate the progress and results. A dynamic and open index system, which is of global standard with vertical comparability, has been brought out after a year's research and study. The compilation is taken into consideration of the following four aspects.

Firstly, the index system will be incorporating these "five strengths" to test and measure Shanghai's innovative function, industrial function and city function. International Scientific and Technological innovation cities normally contain following features: 1) The city must be a center of global innovative resources and possess an outstanding career platform attracting high-level talents from the world. 2) The city must be capable of outputting high-level technology achievements and influential organizations and individuals. 3) The city must have a creative and friendly business environment, inclusive and open culture, and a balanced ecosystem. 4) The city must be able to accumulate and give full play to its first mover advantages, to lead the industrial development and to support the emerging industries. 5) The city would be the driving force to surrounding areas and play a key role in global innovative network as a linking hub. The city could also represent the country in global innovative challenges and cooperation. The report focuses on the "five strengths" — concentration of innovative resources, influence of scientific and technological achievements, environment friendliness to attract innovative startups, the driving force of the emerging industry and innovation capacity of facilitating regional development, creating an index system with 5 primary indicators and 30 secondary indicators.

Secondly, the index is chosen with reference to the existing domestic and overseas index studies. 2/3 of the indicators in the report are of international

comparability. The team studied internationally recognized evaluation methods, tested and measured various indicators with international comparability. In the area of concentration of innovative resources, for example, the test and measurement of the total amount and structure of R&D input were stressed. In the area of creating friendly environment, the proportion of newly established companies and tax policies for scientific and technological innovative corporations were highlighted. Other indicators including the percentage of the number of employees in the knowledge-intensive industry to reflect high-quality employment; the increased percentage of knowledge-intensive service industry to compare features of industrial structure among different cities; the number of Fortune Top 500 nominees, the comparison of PCT patent features, and the amount of outward investment, all these would further broaden the horizon of international comparative study.

Thirdly, to demonstrate the potential and advantages of innovative ecology, emphasizing the scientific nature and availability of the data. 50% of the indicators came from the "*13th Five-Year Plan for National Scientific and Technological Innovation*", "*13th Five-Year Planning Outline for National Economy and Social Development of Shanghai*" and "*13th Five-Year Plan for Scientific and Technological Innovation in Shanghai*", using both functional and procedural indicators to analyze key tasks in "Four Girders Eight Pillars" program. The team not only focused on the test and measurement of the programs which served national strategies, for instance, the increasing investment in fundamental researches, and the construction of Zhangjiang Comprehensive National Scientific and Technological Center, but also on subjects which represented Shanghai's openness and comprehensiveness,

such as various foreign investment R&D centers and the multiple categories of innovation subjects.

Fourthly, new situations and new trends are to be reflected in the report, however data related to statistical serials are unlisted. In the area of innovation environment attractiveness, apart from studying a second-grade indicator which is residential foreign population in Shanghai, the team also appraised the implementation effects of the "*Suggestions on the Implementation of Deepening the Institutional Mechanism Reform of Talents Work and Supporting Innovative and Entrepreneurial Talents*" introduced by local authority (hereinafter referred to as "Talents 20") in 2015. The team used statistics on IT upgrade speed and development level to demonstrate the city's information infrastructure level. For example, the data of fixed-line broadband internet download speed, released by Broadband Development Alliance, was taking as one of the references. The data helps to master and analyze new situation, new trends and new feature during the construction of the center, and are vital for data-based decision making process.

II. Methodology

To build Shanghai as a Scientific and Technological Innovation Center of global influence requires international benchmarking, attracting global innovation resources and showing its favorable city functions. The purpose is to turn Shanghai into a comprehensive and open Scientific and Technological center, a major hub for global innovative network and a main source for international science, technology and industries. Shanghai aims to establish a basic framework for the innovation center and to lay a solid foundation for future

development by 2020. Core functions of a Scientific and Technological center city would come into being by 2030, to facilitate the international Scientific and Technological cooperation (Figure 1–1).

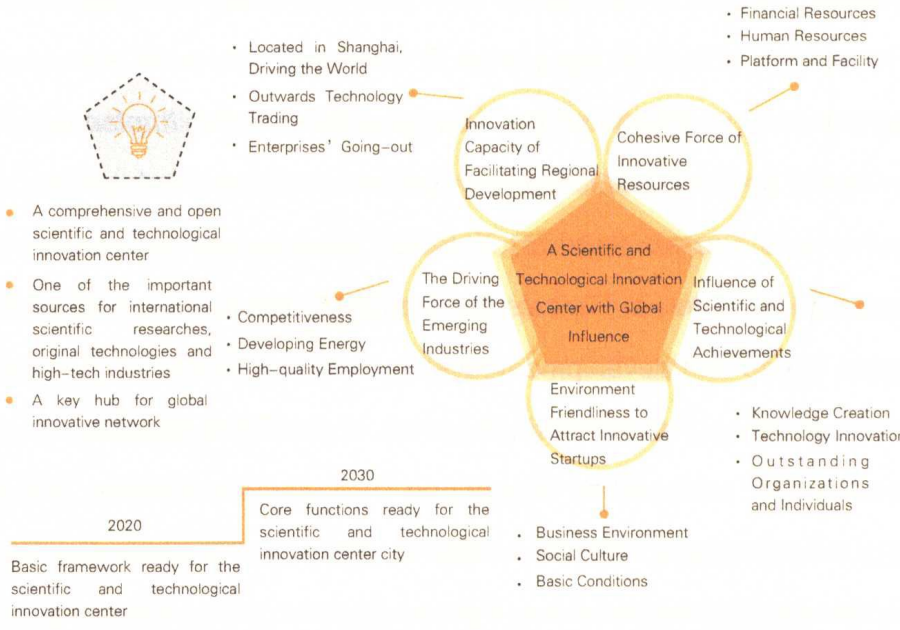

Figure 1–1 The National Strategy: Marching towards a global Scientific and Technological innovation center

The Scientific and Technological Innovation Center Index has 5 primary indicators and 30 secondary indicators (Table 1–1), which represent Shanghai's ability, position and influence of innovative development. With the connotation and function of "five strengths", the index system is able to reflect the developing condition of the center, based on the thorough analysis of all indicators and consideration of all suggestions from various aspects.

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