RESEARCH ON CHINA'S SCIENCE AND TECHNOLOGY INDICATORS

Du Xiangying, Fei Shunjun, Gan Xin, Sun Dejiang, Wang Hongbo
National Research Center for Science and Technology for Development
PO Box 3814, Beijing, 100038
The People's Republic of China

ABSTRACT

This is a brief presentation of China's effort in creating statistics and indicators on science and technology.

RESUME

Cette communication présente de façon synthétique les récents efforts réalisés en Chine pour créer des statistiques et des indicateurs sur la science et la technologie.

1.BACKGROUND

China's economy has been developing steadily and continuously since the Chinese government started to reform and concentrate its main efforts on economic construction since 1979. Soon it has been felt than in order to understand the current situation in China. it would be necessary to create standard statistics. But, at that time, it was difficult to get timely and comprehensive understanding of the current and rapidly changing situation on social, economic, science and technology areas: there existed not enough statistics and no effective methods. Also, it appeared impossible to make any international comparison. We started to solve this problem in 1980. Several basic statistics have been collected throughout the whole country in the last decade, which include:

- the third population census in 1982;
- China's Science and Technology Survey in 1985;
- China's industrial survey in 1986 which also contains an "input-output" table.

On the basis of these surveys and statistics, a periodic survey system or yearly sampling survey system was set up for each of the above statistical series. These laid the foundations for research on China's S&T indicators and the establishment of our information management system.

2. ESTABLISHMENT OF THE INFORMATION SYSTEM ON SCIENCE & TECHNOLOGY (S&T) IN CHINA

Being short of unified national leadership, China's scientific statistics were incomplete before the S&T Survey was performed (1985). Because various departments (Academia Sinica, Educational institutions and various industrial departments) have their own S&T information system set up for their own need, there were no unified statistics and indicators which could be used by all the departments. Most systems were only confined to S&T input. Also there was no standard sets of definitions to be used for the construction of indicators. It proved difficult, if not impossible to make a national comparison, obviously it was impossible to perform international comparisons. Therefore, the single most important step was to set up a unified and complete indicators system for the S&T Survey in 1985, with standard definitions. At the beginning, in order to speed up the process of establishing our own indicator system, the general framework we used was a Input-Activities-Output model, as recommended by UNESCO indicators, and a similar S&T activities classification scheme was applied. But considering China's specific situation, we made some changes and supplements, for example:

A. Planned projects were added into the set of Activities and a project survey table was designed;

B. Based on general industry classifications, specific indicators were designed for new technological industries with strategic importance;

C. Some changes of the R&D classifications were made. The following pattern was used: a. Basic Research, b. Applied Research; c. Experimental Development; d. Engineering Design and Test Production; e. Technological Diffusion and Services; f. Productive Activities.

This survey was finished in 1986 and the results have been published in Chinese, Russian and English. Various analytical reports have been published by many departments and regions. Since this survey, a conventional S&T statistics report system has been set up. Each province had to have its own statistics group which had to supply statistics on its Province. Also a national computer statistics center was established. With the help of the State, S&T Commission, the State Educational Commission and the State Statistics Bureau, we have been performing periodic surveys in R&D institutions attached to government departments, universities, and large or medium sized enterprises. Reports are regularly published.

The State S&T Commission of China started to publish "S&T Statistics Collection" in 1985, which has published recently the 1989 report, and "Statistics on Science and Technology" began to be published in 1986, the 1988 issue being published recently.

3. "CHINA's S & T INDICATORS", 1989.

Entrusted by the State S & T Commission of China, the National Research Center for S & T for Development and Beijing Institute of Information for Management, a research group was created which has the task of editing a report entitled "China's S & T Indicators". This research report gives an objective description of S & T activities, their scale and level in China through carefully selected indicators and reliable data. It reflects the development of China's science and technology and the role science and technology have to play in the progress of our national economy. This report also exmines China's position in science and technology in the world.

The "Indicators" report include six parts:

PART 1. RESOURCE FOR SCIENCE AND TECHNOLOGY

S&T input factors including personnel, expenditures, equipments, information, documentation, etc.

PART 2. ADMINISTRATIVE DEPARTMENTS FOR SCIENTIFIC RESEARCH AND TECHNOLOGICAL DEVELOPMENT

According to the Chinese situation, administrative R&D departments are divided into four parts: government departments, enterprises, universities, and other R&D institutions. This part mainly discusses their respective roles in our national S&T system. For the first time, the S&T information and documentation institutions examined separately, as is required by UNESCO, and statistics on them were independently collected in 1988.

PART 3. BASIC RESEARCH.

PART 4. OUTPUTS OF S & T ACTIVITIES AND THEIR IMPACT ON ECONOMY AND SOCIETY

This part includes the following main topics: important scientific and technological awarded achievements, academic literature output including reports and working papers,patents,technology transfer, technology import and export, trade in technology intensive products, labour productivity, value added of manufacturing industries, etc.

Indicators on the relations between Science, Technology and Society include: education level, average life span, medical conditions, quality of life, environmental protection, etc.

PART 5. POLICIES OF THE CHINESE GOVERNMENT FOR SCIENCE AND TECHNOLOGY

Most scientific research and technological development institutions in China belong to the government departments. Thus, governmental policies will definitely play a significant role. Since 1985, the Chinese government has taken a series of reforms in the Science and Technology areas such as funds allocation, personnel management and the opening and development of the technical market etc.This chapter deals with the content, performance and resultst of these measures.

PART 6. INTERNATIONAL COOPERATION AND EXCHANCE

4. RESEARCH IN RELATION TO THE S & T INDICATORS

During the editing of the "Indicators" report, we felt it necessary to strengthen our research on *output indicators,* such as the number of academic papers and their quoted percentage. We have so far examined the SCI, ISR, ISTP and EI systems and made broad estimations. But the four index systems are not complete, so we are considering enlarging our sources of data. Moreover, difficulties in language and communication in the past years definitely affected the spread of Chinese articles throughout the world. International comparisons were not included in this "Indicators" report, because of data limitations. These issues are examined now and will soon be solved. In addition, research on R&D expenditures is quite complicated in China and more research on this topic is needed.

In1984, research about "total productivity factors " was started in China. The evaluation is made through the residual value method of production functions. Nowadays many people have diverging opinions on the method, and the practical applications of this indicator are not fully supported.

With the development of China's export oriented economy and the increase of technical exchange between China and foreign countries, more people are interested in an international competitiveness indicator. We are doing some research in this field, and willing to cooperate and exchange our views with our colleagues all over the world.