

# The Development of Professional Manpower in Mainland China in the 1990s

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*Human resources gained importance in mainland China in the late 1980s and early 1990s with the development of the market and the influx of foreign investment. Alarmed by the increasing loss of professional staff, preeminent scholars called for a respect for intellectuals and for the cultivation of highly qualified manpower. In response, the government has adopted various measures to improve the living standard of intellectuals, accelerate the development of higher education, encourage scientific research and development, and develop the job training industry. In recent years, the PRC has made a bid to enhance international competitiveness, with the further development of high-tech manpower being designated as one of the new major tasks. Nonetheless, this analysis finds that the efficiency of human capital investment has been much hampered by imperfections in the allocation system for manpower and the perennial brain drain problem.*

**KEYWORDS:** human resources; high-tech manpower; brain drain; job training

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"*Rencai*,"<sup>1</sup> or skilled manpower, has been at the forefront of the public agenda since the People's Republic of China (PRC) launched economic re-

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<sup>1</sup>According to the definition used by mainland Chinese scholars, "*rencai*" consists of per-

forms. In the 1980s, to meet the demands of economic reconstruction and the opening-up policy, Beijing undertook efforts to promote the mobility of skilled labor in order to overcome the rigid employment system practiced over three decades under the planned economic system. Reform measures—such as hiring workers on a contract basis, allowing skilled workers to transfer jobs and undertake part-time work, and conducting job fairs for talented people and college graduates—were implemented one after another. In previous work, this author pointed out that although the reforms encountered strong resistance and their side effects aroused loud criticisms, the competition for able workers on the job market had awakened many work units to the importance of human resources.<sup>2</sup>

In the early 1990s, the development of high technology brought great changes to the whole world. Human capital has become one of the buzzwords of "knowledge" society.<sup>3</sup> In the quest for "excellence" and the emphasis on "international competitiveness," many countries have placed the development of human resources firmly on the agenda.<sup>4</sup> For mainland China, Deng Xiaoping's endorsement of further economic reforms in early 1992 marked a new page of the PRC's human resources policy. The mushrooming of foreign-funded enterprises and the dire shortage of qualified manpower had forced the government to speed up the pace for reforming the employment system, and to simultaneously attend to the development of human resources. Thus we have seen the emergence of a quest for highly qualified manpower or "*gao cengci rencai*" (high-level manpower). In recent years, the PRC has spared no efforts in advocating the knowledge economy, the rapid development of science and technology, as well as the enhancement of international competitiveness. A further development of

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sonnel who have received a two-year college education or above and those technical staff without college education diplomas. See Niu Yuesheng et al., eds., *Jiushi niandai de Zhongguo rencai ziyuan: Xianzhuang, qushi, guihua, duice* (China's human resources in the 1990s: Present condition, trends, programs, and strategies) (Beijing: Zhongguo renshi chubanshe, August 1993), 13.

<sup>2</sup>Jueichi Wang, "The PRC's Policy Regarding the Skilled Labor Market over the Past Two Decades," *Zhongguo dalu yanjiu* (Mainland China Studies) 41, no. 6 (June 1998): 81-100.

<sup>3</sup>Joop Hartog, "Behind the Veil of Human Capital," *Observer*, no. 215 (January 1999): 37-39.

<sup>4</sup>Ka Ho Mok, "Education and the Marketplace in Hong Kong and Mainland China," *Higher Education* 37, no. 2 (March 1999): 133-35.

high-tech and professional manpower has been designated as a major task in the coming decade.

The paper aims to focus on the development of professional manpower in mainland China in the 1990s. The analysis first deals with the evolution of policy and the scope of high-level manpower; then analyzes the development of higher education, an academic research contingent, and on-the-job training; and finally assesses the efficiency of the investment and its future prospects.

### **The Evolution of the PRC's Policy Regarding High-Level Manpower**

The PRC's policy regarding professional manpower first appeared in 1985 in the document entitled "Decision on Reform of the Educational System" (the "1985 Decision"). The document declared that by the end of the twentieth century, institutions of higher learning would shoulder the major responsibility of cultivating high-level manpower in mainland China.<sup>5</sup> Such a pledge, however, was no more than a slogan in an environment where "surgeons make less money than barbers" and investment in education was by no means rewarding.

In early 1990, in an international conference on human resources convened in Beijing, mainland Chinese scholars pointed out that the development of human resources for the coming decade would be centered on cultivating skilled and professional manpower. In this time frame, however, the academic sector already began to face two unprecedented threats. One was the outflow of skilled technicians and middle-aged teachers into high-paid foreign-funded enterprises. The other was the "study-abroad" fever gripping young promising researchers. Many graduate schools were forced to abandon their selective entry processes due to lack of applicants. In addition to the brain drain and diminishing supplies of new recruits, most universities also faced an unprecedented wave of retirements. The univer-

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<sup>5</sup>Gao Yan, "Cultivate High-Level Professional Manpower for Applied Science through Various Channels," *People's Daily*, August 31, 1986, 5.

sities under the State Education Commission, for instance, saw over 36.4 percent and 38.1 percent of their associate professors and full professors retire between 1993 and 1995. Zhejiang Institute of Technology in 1992 had seventy-seven professors, seventy-four of whom were over fifty-six years old.<sup>6</sup> The situation aroused a widespread sense of crisis, resulting in calls for cultivating a respect for professionals and for the cultivation of skilled manpower.

The sense of crisis became all the more acute after the policy for further economic reform and opening-up was launched. In late 1993, the rapid expansion of foreign-funded enterprises resulted in a wave of job-hopping among professionals. Instead of prejudices and rejection, job seekers with postgraduate degrees became favorites at job fairs. There soon appeared two syndromes in several big cities: a craze for advanced academic diplomas and a fervor for certificates. To be competitive, high-wage job seekers must gain high academic diplomas or at least two bachelor's degrees, and at the same time must carry certificates verifying the qualification tests they have passed, including exams in English, accounting, or computer proficiency. Recruiting "highly qualified professionals" has thus become a fashion among large state-owned enterprises and foreign-funded enterprises.<sup>7</sup>

The rapid changes in the job market brought about two effects. One was that the government obtained a golden opportunity to promote and perfect the mechanisms for the flow of human resources. Aside from job fairs, both government- and nongovernment-run job-finding services mushroomed. Additionally, the widening income distribution gap between different regions, between urban and rural areas, and among different trades and enterprises under different ownership systems began to produce a segmented job market. While fierce competition was reported in the primary market (which was composed of large units and large profit-making enterprises in big cities and the eastern region), the secondary job market formed

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<sup>6</sup>Shi Zhongyin, "On the Construction of the Teacher Contingents in Institutions of Higher Learning," *Gaodeng jiaoyu yanjiu* (Journal of Higher Education) (Wuchang), 1993, no. 4: 80; "The Deterioration of Brain Drain is Worrisome," *Ta Kung Pao* (Hong Kong), February 26, 1990, 2.

<sup>7</sup>For changes in the market for talented people in the 1990s, see note 2 above.

by local governments and rural enterprises in central and western regions suffered a serious brain drain.<sup>8</sup> To adapt to the changes, the Ministry of Personnel in late 1994 established three national-level regional human resources markets in Tianjin, Shanghai, and Shenyang. The markets were geared to the needs of their respective regions, and simultaneously conducted transregional activities for the exchange of human resources and established relations with international human resources markets.<sup>9</sup>

In May 1995, the Chinese Communist Party (CCP) Central Committee and the State Council jointly issued a decision to accelerate scientific and technological progress. Two important policies were pronounced for the coming five years. One was to increase the ratio of research and development (R&D) to gross domestic product (GDP) from 0.7 to 1.5 percent by the year 2000; the other was to raise the scientific and educational levels by speeding up the training of first-rate scientists and technicians.<sup>10</sup> Two years later, the Ministry of Personnel mapped out a new program for the development of human resources between 1996 and 2010. According to the program, the task for prosperous eastern provinces and cities was to cultivate high-level manpower in order to develop the high-tech industries. For the relatively backward central and western regions, the focus was placed on building up mechanisms to stimulate the flow of talented manpower and raising the overall quality of local manpower.<sup>11</sup> Nonetheless, over the past two years, thanks to the strong advocates for the intellectual economy, innovative technology, and enhancement of international competitiveness, the cultivation of high-level manpower has become the mainstream of the PRC's human resources policy. This focus has been placed at the top of the agenda by governments at various levels in mapping out a blueprint for the future.

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<sup>8</sup>For an analysis of the segmented job market for talented people, see Jueichi Wang, "The Evolution of the PRC's Policies Governing College Graduates' Employment," *Issues & Studies* 34, no. 3 (March 1998): 37-39.

<sup>9</sup>"Three Regional Human Resources Markets Formed," *FBIS-CHI-94-197* (September 18, 1994).

<sup>10</sup>Wu Ming, "Science and Education Vital to a Prosperous China," *Beijing Review* 38, no. 26 (June 26-July 2, 1995): 4.

<sup>11</sup>"The National Program for the Development of Human Resources in 1996-2010," *Zhong-guo renshi bao* (China's Personnel News) (Beijing), July 22, 1997, 2.

Just as economic development varies across regions, the scope of high-level manpower in mainland China is also varied according to area, profession, and time period. In remote and less developed areas, for instance, "high-level manpower" may include personnel with bachelor's degrees from elite mainland universities. In big cities and rich provinces, however, "high-level manpower" generally denotes talent with master's degrees, doctorate-level education, two bachelor's degrees, or senior professional personnel. The professions mentioned most in connection with high-level manpower range from academic staff members and researchers, medical professionals, engineers, computer programmers, bankers, real estate or stock market professionals, accountants, managers, and lawyers. These people, according to Daniel Hecker's expanded concept, are included in the scope of high-tech employment.<sup>12</sup> PRC Vice-Premier Li Lanqing in mid-1999 defined the new catchphrase "high-level manpower" as having the following attributes:

[Aside from being specialized in different fields, these] high-quality, high-standard personnel should love the socialist motherland, have good ethical conduct, a high sense of social responsibility, the spirit of innovation, and capability for practice. They should have the spirit of hard work, unity, and cooperation as well as a broad vision oriented toward the world. They should be physically healthy, intellectually noble, and psychologically sound.<sup>13</sup>

The cultivation of high-level manpower in the 1990s can be analyzed from three angles: the rapid development of higher education, the cultivation of academic research leaders, and the promotion of on-the-job training programs.

### **The Rapid Development of Higher Education**

The move to begin the rapid development of higher education in the

<sup>12</sup>Daniel Hecker, "High-Technology Employment: A Broader View," *Monthly Labor Review*, June 1999, 8-28.

<sup>13</sup>Liu Zhenying and Yin Hongzhu, "Li Lanqing Addresses State Council Academic Degrees Committee, Emphasizing the Need to Enhance Academic Degrees Work and Calling for Training of High-Quality Personnel," *FBIS-CHI-1999-0525* (May 11, 1999).

1990s was launched on November 14, 1992 by Zhu Kaixuan, then vice-minister of the State Education Commission, in his speech entitled "Conscientiously Implement the Guidelines of the CCP's Fourteenth National Congress, Quicken the Reform, and Actively Develop Higher Education" to a national conference on higher education. These guidelines were repeated in the "Program for China's Educational Reform and Development" issued in February 1993 (the "1993 Outline"). Three important messages were delivered. One was "to adapt the development of higher education to the socialist market economy." A second was to realize the goal of relying mainly on domestic resources in training high-level specialized personnel by the turn of the century. The third was the introduction of "Project 211"—to upgrade one hundred universities along with their key curricula to international repute by the start of the twenty-first century.<sup>14</sup> In brief, quantity and quality would go together. Under the three guidelines, undergraduate and postgraduate education in mainland China over the past decade has witnessed rapid development.

### *The Massive Spread of Undergraduate Education*

The most important measure regarding the development of undergraduate education has been the relaxation of control over the number of fee-paying students. In August 1992, the State Education Commission permitted its subordinate institutions to recruit fee-paying students, as long as the total did not exceed 30 percent of the total enrollment. Two years later, forty-odd colleges and universities were allowed to charge tuition to all of their newly enrolled students. The tuition system was extensively practiced in 1997 and is expected to be extended to all colleges and universities in the year 2000.<sup>15</sup> Thanks to the two measures, college enrollment

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<sup>14</sup>See Zhu Kaixuan, "Conscientiously Implement the Guidelines of the CCP's Fourteenth National Congress, Quicken the Reform, and Actively Develop Higher Education," *Zhongguo gaodeng jiaoyu* (China's Higher Education) (Beijing), 1992, no. 12:13; *Zhongguo jiaoyu nianjian 1994* (Educational yearbook of China 1994) (Beijing: Renmin jiaoyu chubanshe, August 1994), 1-12.

<sup>15</sup>Ying Qiping and Gordon White, "The 'Marketisation' of Chinese Higher Education: A Critical Assessment," *Comparative Education* 30, no. 3 (1994): 217-36; Cui Lili, "Tuition: Public to Invest More Capital in Education," *Beijing Review* 38, no. 39 (September 25-October 1, 1995): 15-18.

**Table 1**  
**Number of University and Two-Year College Entrants in Mainland China (1992-98)**

Year	Four-Year College (A)	Two-Year College (B)	A/B Ratio
1992	349,800	404,300	1:1.16
1993	386,458	537,494	1:1.39
1994	409,599	490,247	1:1.20
1995	447,809	478,131	1:1.07
1996	505,323	460,489	1:0.91
1997	579,679	420,714	1:0.73
1998	653,135	430,492	1:0.66

**Sources:** *Zhongguo jiaoyu tongji nianjian 1991-1992* (Educational statistical yearbook of China, 1991-92) (Beijing: Renmin jiaoyu chubanshe, 1991), 26; *ibid.* (1993), 34; "The 1996 Statistical Communiqué for National Educational Development," *Zhongguo jiaoyu bao* (Chinese Education News), April 14, 1997, 2; "The 1997 Statistical Communiqué for National Educational Development," *ibid.*, April 13, 1998, 2; *Zhongguo tongji nianjian 1999* (Statistical yearbook of China 1999) (Beijing: Xinhua shuju, September 1999), 645.

escalated from 754,192 in 1992 to 923,952 in 1993 and then to 1.08 million in 1998.<sup>16</sup>

Given such rapid development, noteworthy is that two-year college enrollments, contrary to the expectations of the 1993 Outline,<sup>17</sup> have continually shrunk. Between 1992 and 1998, the ratio of two-year to four-year college enrollments dropped from 1:1.16 to 1:0.66 (see table 1). The shrinkage has reflected changes in the job market for highly qualified manpower.

### *The Development of Postgraduate Education*

In the 1980s, postgraduate education played a subsidiary role in the development of higher education. Although the "1985 Decision" to cultivate high-level manpower had brought a surge of enrollments in the mid-1980s, the number soon plunged thanks to changes in the job market for

<sup>16</sup>The 1998 Statistical Communiqué for National Educational Development," *Zhongguo jiaoyu bao* (Chinese Education News), May 22, 1999, 2.

<sup>17</sup>See note 14 above.



higher academic degrees. As mentioned earlier, in the late 1980s many graduate schools even faced the predicament of not receiving enough applicants.

The major prominent achievement during this period, however, was the multiplication of the function of postgraduate education. For years, postgraduate education sought to cultivate qualified teachers and researchers for positions at institutions of higher learning. After the reform of the educational system in 1985, educators began to urge the training of higher-level professionals for economic construction; that is, pure research and applied research should be developed together.<sup>18</sup> In 1987, to promote the in-service training programs which had been practiced on a trial basis for two years, the State Council Academic Degrees Committee started a special entry test which was much easier than the national entrance examination and furthermore offered test takers the opportunity to first attend review classes.<sup>19</sup> Encouraged by the policy, the percentage of the enrollments for in-service training to the total recruitment for master's programs surged from 28.8 percent in 1985 to 59.5 percent in 1987.<sup>20</sup>

To meet student educational expenses and ensure the return of graduates to their original work units, two different admission programs were conducted. One was the admission of commissioned students (*daipei sheng*) whose tuitions were sponsored by the state-owned enterprises they were employed or to be employed by after graduation. The other was "job-related enrollment" (*dingxiang peiyang*) for personnel working in government units. As few enterprises were willing to make such investment, the former had soon lost its original function.<sup>21</sup> The latter, on the contrary, has

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<sup>18</sup>See note 5 above; Wu Benxia, "Study on Several Issues Concerning Reforms and Development of Postgraduate Education," in *Lun Zhongguo gaodeng jiaoyu* (On China's higher education), ed. Chinese Society of Higher Education (Beijing: Beijing shifan daxue chubanshe, 1987), 78-83.

<sup>19</sup>Chen Wenji and Zhang Zhiying, "Problems Concerning the Admission to In-Service Training Programs," *Zhongguo gaodeng jiaoyu*, 1998, no. 4:32.

<sup>20</sup>*Zhongguo jiaoyu nianjian 1988* (Educational yearbook of China 1988) (Beijing: Renmin jiaoyu chubanshe, April 1989), 228.

<sup>21</sup>The "contract training enrollment" quota in the 1990s has turned into a shortcut for self-supported students to obtain admissions into graduate programs. For further information, see Jueichi Wang, "On the Development of Graduate Education in Mainland China in the

become the major channel for in-service training. In 1989, the government undertook the further step of requesting all universities to appropriate 30 to 40 percent of their respective master's program enrollment quotas for job-related students.<sup>22</sup>

While contributing to the rapid development of undergraduate education, these job market changes have also opened the market for postgraduate education. The growing fever for seeking advanced degrees has speeded up the reform of graduate education. Over the past years, two major tasks have been emphasized: the rapid increase in applied research enrollments and the establishment of professional training programs.

*The rapid development of applied research enrollments:* In early 1993, several months after Zhu's aforementioned speech, the State Council Academic Degrees Committee and the State Education Commission jointly drafted six major tasks for the development of postgraduate education in the 1990s. Three of these tasks were concerned with rapid expansion: accelerating the development of postgraduate education, particularly doctoral degree education; reforming recruitment measures; and speeding up the cultivation of applied manpower.<sup>23</sup> In response to the policy, job-related enrollment was extended from the personnel of government units and enterprises at the national level to those at the grass-roots level.<sup>24</sup> In addition, another two kinds of enrollment were added—fee-paying students and students who were supported by research funds or scholarships. These two kinds of enrollment have been categorized as "enrollment outside the state plan" (*jihuawai zhaosheng*) and "enrollment according to the state plan" (*jihuanei zhaosheng*), respectively consisting of job-related and public-funded students.

By the mid-1990s, practical orientation had become the mainstream

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1990s: On the Fierce Enrollment Competition," *Zhongguo dalu yanjiu* 42, no. 5 (May 1999): 85-104.

<sup>22</sup>Yin Yali and Ren Cui, "The System and Reform of the Job-Related Enrollment," *Xuewei yu yanjiusheng jiaoyu* (Degree and Graduate Education), 1994, no. 6:12-13.

<sup>23</sup>*Zhongguo jiaoyu nianjian* 1994, 161.

<sup>24</sup>Zhang Puqun et al., "Improve Special Entrance Tests to Ensure Quality," *Xuewei yu yanjiusheng jiaoyu*, 1995, no. 1:73; Dong Xi, "Some Rules for the Applications for Admission into Graduate Schools," *Daxuesheng* (University Students) (Beijing), 1995, no. 6:63.

as the craze for high academic diplomas on the job market engendered a craze for master's degrees. In 1996, a document entitled "Several Opinions Concerning Further Improvement and Strengthening of Graduate School Work" was issued, reiterating the importance of cultivating the applied type of high-level manpower and making a distinction between master- and doctorate-level education. One year later, Xie Guihua, an Academic Degrees Committee official, pointed out that master-level education should turn to cultivating applied manpower for economic construction and high-tech development. Such students would account for 60-70 percent of the total students between 1996 and 2000. Cultivation of research manpower would be left for doctoral degree education.<sup>25</sup>

According to statistics, between 1992 and 1998, enrollments for graduate schools were more than doubled, increasing from 33,439 to 72,508.<sup>26</sup> The enrollments for master's and doctoral programs respectively doubled and tripled (see figure 1). Between 1994 and 1999, the percentage of working personnel constituted over 56 percent of the total test takers for graduate schools (see table 2). Presently, most of these personnel have to take the national entrance examination rather than the special entry test.

*The development of professional training programs:* Established in October 1990, professional training programs were aimed at training high-level managers (MBA), engineers, lawyers, and medical practitioners, and upgrading the contingent of middle school teachers (MA). These programs place emphasis on structured courses rather than research training; their applicants are staff members with at least three years of working experiences in government offices, enterprises, or middle schools.<sup>27</sup> In the past two years, these programs have shouldered another new task: to retrain workers laid-off from restructured government units and help them transfer into other fields.<sup>28</sup> Of the professional training programs, most noteworthy is

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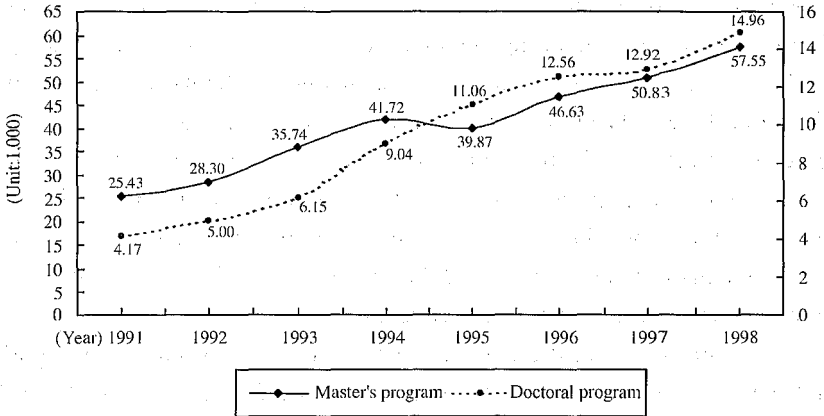
<sup>25</sup>See *Xuewei yu yanjiusheng jiaoyu*, 1996, no. 1:1; "The Focus of Master Program Education Should Turn to Cultivating Applied Type Talents," *Ta Kung Pao*, November 4, 1997, A4.

<sup>26</sup>*Zhongguo tongji nianjian 1999* (Statistical yearbook of China 1999) (Beijing: Xinhua shuju, September 1999), 644.

<sup>27</sup>Xie Guihua, "Professional Degree: The Foundation for Higher-Level Applied Type Talents," *Zhongguo jiaoyu bao*, November 12, 1998, 2.

<sup>28</sup>"Study and Training Programs Provided for the Surplus Staff of Various Departments under

**Figure 1**  
**Postgraduate Enrollments in Mainland China (1991-98)**



**Sources:** *Zhongguo jiaoyu tongji nianjian 1991-1992* (Educational statistical yearbook of China 1991-92)(Beijing: Renmin jiaoyu chubanshe, 1991), 38; *ibid.* (1993), 34; *ibid.* (1994), 34; *ibid.* (1995), 34; "The 1996 Statistical Communiqué for National Educational Development," *Zhongguo jiaoyu bao* (Chinese Education News), April 14, 1997, 2; "The 1997 Statistical Communiqué for National Educational Development," *ibid.*, April 13, 1998, 2; "The 1998 Statistical Communiqué for National Educational Development," *ibid.*, May 22, 1999, 2.

the MBA program, the evolution of which has served as a model for the development of other programs.

The purpose of the Chinese MBA programs is to provide further education for "promising young and middle-aged economic and management staff members in enterprises and governmental institutions."<sup>29</sup> In the 1980s, there were only two formal MBA programs: one was set up in Dalian under the assistance of the State University of New York at Buffalo; the other, the China Business Administration Training Center, was set up in Beijing in cooperation with the European Community. In 1991, nine local elite universities were allowed to begin their trial MBA programs. This number was increased to twenty-six in 1993. To ensure quality, the Nation-

the State Council," *Zhonghua renmin gongheguo guowuyuan gongbao* (The PRC State Council Gazette), June 14, 1998, 595-97.

<sup>29</sup>"National Examination of MBA in 1997," *Beijing Review* 40, no. 9 (March 3-9, 1997): 31.

**Table 2**  
**Structure of Test Takers for Master's Programs in Mainland China (1995-99)**

Year	Total	Working Personnel		University Graduates	
		Number	% of total	Number	% of total
1994	116,000	66,000	56.6	51,000	43.4
1995	155,000	88,000	56.8	66,000	42.6
1996	204,000	119,000	58.3	83,000	40.7
1997	242,000	144,000	59.2	96,000	40.0
1998	274,000	161,000	58.8	108,000	39.4
1999	319,000	185,000	58.0	134,000	42.0

**Sources:** *Guangming ribao*, January 15, 1995, 5; *ibid.*, February 2, 1996; *Zhongguo jiaoyu nianjian 1995* (Educational yearbook of China 1995) (Beijing: Renmin jiaoyu chubanshe, December 1995), 210; *ibid.* (1998), 236; *Zhongguo jiaoyu bao*, February 2, 1996, 1; *ibid.*, January 24, 1997, 1; *ibid.*, January 29, 1999, 1.

al Guiding Committee for MBA Education in October 1994 set up a special team for the establishment of the Chinese Graduate Management Admissions Test (GMAT). Three years later, a unified management entrance examination (*guanli ruxue kaoshi*) was formally introduced.<sup>30</sup>

In the mid-1990s, when an MBA craze swept mainland China, Gallup conducted a market-demand survey of two hundred foreign enterprises and two hundred Chinese domestic enterprises. The result revealed that approximately one in ten randomly selected interviewed enterprises in Beijing was interested in management training leading to an MBA for its executives. The survey underlined the clear preference by Beijing decision-makers for the MBA designation. The market has also attracted leading business schools from the United States and Europe to establish joint venture programs. A total of nine such programs existed in 1997.<sup>31</sup> Of them, the China Europe International Business School, run by Jiaotong University in cooperation with the European Foundation for Management Development, was ranked by *Business Week* in November 1995 as one of the

<sup>30</sup>Shen Li, "MBA: Fast Track to Success," *ibid.* 39, no. 15 (April 8-14, 1996): 17-28.

<sup>31</sup>"Masters of the Market," *Business China*, April 29, 1996, 6-7; "PRC: Sino-U.S. Cooperation Helps Chinese MBA Students," *FBIS-CHI-96-228* (November 23, 1996).

top five business schools in Asia.<sup>32</sup>

According to various reports, the enrollment for MBA programs increased between 1991 and 1997 from eighty-six to twenty-five hundred, with the ratio to the total master's enrollments rising from 0.3 percent to 5 percent.<sup>33</sup> MBA enrollment has also been reported as the most competitive of all postgraduate enrollments. The Shanghai 1999 *guanli ruxue kaoshi* drew five thousand test takers, accounting for 17 percent of the total of the unified entrance examination for graduate schools.<sup>34</sup> The PRC declared that by the year 2000, there would be five hundred thousand managerial personnel trained.<sup>35</sup>

### The Cultivation of Academic Leaders

Since launching economic reforms, Beijing policymakers have been occupied with a crucial issue—how to fully tap into the potential of the skilled and professional talents collected in academic institutions. In the early 1980s, much emphasis was placed on the utilization of human capital via the reform of the job market for talented people. Once market influences began to seep in during the late 1980s, some elite universities adopted reform measures for academic promotion procedures in an attempt to rejuvenate the academic contingent. Such measures included the promotion of young able scientists to senior positions.

In February 1992, Zhuhai city in Guangdong province shook up the job market for talented people by offering one million *yuan* as an award for outstanding high-tech inventions. The measure had at once given rise to a

<sup>32</sup>"China Europe International Business School," *Business China*, May 27, 1996, 6-7.

<sup>33</sup>See Huang Baoyin, "Our Country's 'MBA'," *Keji ribao* (Science and Technology Daily) (Beijing), March 5, 1998, 8; Huang Baoyin, "Incidentally Enhance the Quality of Our MBA Education," *Jingji guanli* (Economic Management), 1999, no. 3:59-60; Zhu Qing, "1997: The Implementation of a Unified Entrance Test for MBA Programs," *Guangming ribao*, October 15, 1997, 6.

<sup>34</sup>Tang Jingli, "The Unified Entrance Examination for Postgraduate Education Becomes Hot Again," *Zhongguo jiaoyu bao*, February 1, 1999, 1.

<sup>35</sup>Wei Liming, "Scientific Programs Make Headway," *Beijing Review* 41, no. 23 (June 8-14, 1998): 8-10.

trend of "high awards, high bonuses, and high salary" amid large cities and enterprises. In face of the growing respect for talent in society and the increasing drain of personnel to the tertiary sector, many scholars urged the government to improve the substandard living conditions of professors as well as the overall research environment. In response, the PRC announced two important policies: one is the aforementioned "Project 211" and the other is "The Project to Train 100, 1,000, and 10,000 Professionally Trained Personnel" in 1994, now generally called the "Million Qualified Personnel Project" (the MQP Project).<sup>36</sup> The announcement of the two projects, particularly the latter, marked a turning point in the development of high-level manpower in China.

The purpose of the MQP Project was to groom "cross-century academic and technological leading persons" to tackle the urgent demands of professionally trained personnel given the brain drain and the aging of personnel specializing in advanced fields of study. Three levels of talents were projected by the turn of the century. The first level consisted of one hundred prominent experts in key disciplines, most of whom were around forty-five years of age and were well known to international scientific and technological circles. The second was comprised of one thousand academics forty-five years of age or younger and technological leading persons who met advanced domestic standards and would maintain the dominant position in their disciplines. The third level was targeted at ten thousand young individuals—between thirty and forty-five—who would be groomed for leading roles in the future. These people who possess fairly high levels of academic proficiency in their respective disciplines would serve as the mainstay or core of their disciplines.<sup>37</sup> The project has fostered the reform initiated by "Project 211" and has given momentum to the cultivation of young academic and technological leading persons in mainland China. Over the past years, the following three important developments have been of vital importance to the enhancement of a scientific and tech-

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<sup>36</sup>For a detailed analysis, see Jueichi Wang, "The System of Recruiting and Promoting University Teachers in Mainland China," *Zhongguo daxue yanjiu* 41, no. 12 (December 1998): 59-76.

<sup>37</sup>"Experts Discuss Training Cross-Century Professionals," *FBIS-CHI-94-156* (August 10, 1994).

nological contingent: the reform of the personnel system, the establishment of an academic award system, and the development of the postdoctoral fellow system.

### *Reform of the Personnel System*

The heart of the reforms, as analyzed by Ying and White, was to change the "iron rice bowl" system into a mobile personnel system.<sup>38</sup> The important measures included an introduction of the short-term contract system to newly recruited young faculty members, and the promotion of young and middle-aged professors based on talent and service. The latter, pioneered by elite universities such as Beijing, Qinghua, and Nanjing universities in the late 1980s, quickly evolved into general practice after "Project 211" was launched.<sup>39</sup> To promote rejuvenation, some institutions requested that a third of all team members for any key project must be young scientists.

To improve performance, many universities have also set up a system of incentives and penalties. For instance, Nanjing University offered monetary awards and priority in promotion to those teachers with papers published in famed international academic journals.<sup>40</sup> Starting from 1994, several elite universities started the measure of annual assessment for academic performances. Those senior professors who failed to obtain research grants, were not undertaking any research projects, and were not advising or teaching students would lose their qualification to conduct graduate research activities during the following year. Those teachers who were assessed incompetent in teaching and research might face demotion.<sup>41</sup> In 1997, 25.3 percent of key universities claimed the creation of an echelon of young academic leaders while 46.8 percent of such universities had young

<sup>38</sup>Ying and White, "The 'Marketisation' of Chinese Higher Education," 217-36.

<sup>39</sup>See note 36 above.

<sup>40</sup>See Ye Jun, "Ranked First in the Science Citation Index [SCI] for Three Consecutive Years," *Daxuesheng*, 1996, no. 7:4; Wang Xiping, "Problems in Performance Assessment for Promotion in Institutions of Higher Learning," *Qunyan* (Popular Tribune) (Beijing), 1998, no. 3:25.

<sup>41</sup>Yu Fengsheng, "A Study on the Strengthening of the Young Teachers' Contingent," *Gao-deng jiaoyu yanjiu*, 1994, no. 5:35.



scholars as the mainstay of their teaching body.<sup>42</sup>

### *The Establishment of an Academic Award System*

Academic awards in the 1980s in mainland China were few, meager in sum, and difficult to obtain.<sup>43</sup> In comparison, awards in the 1990s were copious in terms of both number and size. Funds have been established by the state and provincial governments, as well as have been offered by foreign entrepreneurs, particularly those from Hong Kong. Most of these funds are targeted at outstanding scientists under the age of forty-five. After the mid-1990s, funds targeted at scientists under the age of thirty-five have also multiplied. Three major funds established under the State Natural Sciences Foundation Management Committee were specifically oriented to the MQP Project. The Young Scientists Fund, established in 1987, was to shoulder the task of cultivating ten thousand young scientists. The Outstanding Young and Middle-Aged Natural Sciences Fund, established in 1992, was aimed at the cultivation of one thousand young leading persons. The cultivation of the top one hundred scientists was conducted through the State Outstanding Young Scientists Fund.<sup>44</sup>

Aside from the funds at the state level, key universities and institutions each have set up their own project for cultivating young academic leaders under the name the "Hundred-Person Plan" or the "Project for Cultivating Academic Leading Persons." Qinghua University, for instance, declared the goal of supporting five hundred or so young academic scientists by the year 2000.<sup>45</sup> The professors or researchers listed in these programs

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<sup>42</sup>Zhang Jiuqing, "A Summary of the Survey Report on Invigorating the Nation through Science and Education," *Zhongguo keji xinxi* (China Science and Technology Information), 1997, no. 5:14.

<sup>43</sup>See Tang Jinxiu, "Principal Defects in Our Country's Technological Awards," *Kexuexue yu kexue jishu guanli* (Science of Science and Management of S&T) 14, no. 12 (1993): 35-37; Yang Jituan, "A Discussion on the Reform of the Scientific Award System from a 'High Award' Perspective," *ibid.*, no. 9:24-26.

<sup>44</sup>"Attach Importance to Building up and Cultivating the Cross-Century Academic and Technological Leading Persons," *Zhongguo keji luntan* (China Forum of Science and Technology) (Beijing), 1994, no. 6:5; Guan Peijun, "The Present Condition in the Construction of University Teachers' Contingent," *Zhongguo gaodeng jiaoyu*, 1998, no. 3:46.

<sup>45</sup>Song Xiaomeng, "Young Academic Leaders Are Multiplying," *Guangming ribao*, September 25, 1994, 1.

and plans mostly obtained promotion to senior titles and at the same time have enjoyed preferential treatment in the allocation of research funds and manpower.<sup>46</sup> According to reports, in early 1998, a total of 130 professors were awarded the Young Scientists Fund; 342 young and middle-aged teachers obtained the entry into the MQP Project.<sup>47</sup>

In response to Beijing's bid for "cultivating a Chinese Nobel Prize winner," further breakthrough measures have been launched over the past two years. One such advance was the establishment of the prestigious "Changjiang Awards" in April 1998, under which the winners would obtain a subsidy of over 100,000 *yuan* and at the same time enjoy preferential treatment in housing and benefits, research funds, and manpower.<sup>48</sup> In August 1999, the State Supreme Science and Technology Award, coined the "Chinese Nobel Prize," was introduced by granting five million *yuan* each to two scientists of Chinese nationality. Of the award, 500,000 *yuan* would go to the individual, with the rest of the money required to be used as research funds for any scientific projects the award winner chooses. In the meantime, readjustment was also made to the aforementioned national-level awards, with an increase in the monetary award and a reduction in the number of projects.<sup>49</sup> Such readjustment, declared Xu Guanhua, vice-minister of the State Science and Technology Commission, is aimed to "let scientists with outstanding contribution become rich first."<sup>50</sup>

### *Development of the Postdoctoral Fellow System*

Initiated in 1985, the postdoctoral fellow system in mainland China

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<sup>46</sup>For instance, the Chinese Academy of Sciences recruited, via the program, overseas Chinese scholars under the age of forty and with two years of postdoctoral research experience. Those who were recruited were not only granted the senior academic title of research fellow, but could also use state laboratories and have access to two million *yuan* for research purposes. See Wei Liming, "Young Scientists Playing Greater Role," *Beijing Review* 41, no. 4 (January 26-February 1, 1998): 13.

<sup>47</sup>Guan, "The Present Condition," 46.

<sup>48</sup>"The Establishment of the Honor Professor System in Our Higher Education," *Zhongguo jiaoyu bao*, August 5, 1998, 1.

<sup>49</sup>"State Supreme Science-Technology Award Established," *FBIS-CHI-1999-0809* (August 9, 1999).

<sup>50</sup>"Scientific Talents Are Scarce," *Ta Kung Pao*, August 21, 1999, A3.

has carried multiple functions. The system first seeks to ensure the availability of manpower needed by the academic sector for scientific research. The second goal is to cultivate new blood within the academic leadership. Third, the system aims to facilitate the mobility of high-level manpower, providing a transitional period particularly for those doctorate holders who have returned from abroad. Thus, various preferential policies have been implemented. These include special housing arrangements, salary and benefits equal to those of assistant professors, and the transfer of household registration for spouses and children. The recruits of all research centers must be from other universities or academic institutions. The prescribed length for each term is two years; extension for another term is permitted but with a shift to other research centers. After their projects are concluded, the postdoctoral fellows need not return to their original units and thus enjoy freedom in seeking jobs.<sup>51</sup>

In October 1994, the Shanghai Baoshan Iron and Steel Group and Shanghai Jiaotong University jointly set up a postdoctoral fellow center, with the former covering personnel expenses. Soon another nine joint centers were set up in Shenzhen, Harbin, and Jiangsu province. In June 1996, the National Postdoctoral Management Committee formulated provisional regulations to promote cooperation between universities and enterprises. Three major reasons were given. First, cooperation may ease the state burden as enterprises shoulder personnel expenses. Second, the provisions accord with the policy of "integration of production, study, and scientific research," and may supplement the manpower the high-tech enterprises need. Third, such cooperation may serve as a channel to send high-level manpower to central and western regions.<sup>52</sup>

In the period from 1985 to 1995, 4,848 postdoctoral fellows were recruited, of whom 702 returned from overseas. These researchers, thirty-

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<sup>51</sup>Tang Hua, "The Postdoctoral Fellow System: Let Young Scientific and Technological Talents Come up," *Liaowang zhoukan* (Liaowang Weekly), 1995, no. 44:50-51.

<sup>52</sup>"Forum: Postdocs in Enterprises Enter the Battlefield for Economic Construction," *Zhongguo keji luntan*, 1998, no. 5:1-6; Gu Meijuan, "Thoughts over Several Problems Concerning the Development of Postdoctoral Research in Enterprises," *Xuewei yu yanjiusheng jiaoyu*, 1998, no. 5:71-74; "A Serial Report on Postdoctoral Research in Enterprises," *Keji ribao*, September 24, 1998; *ibid.*, October 3, 1998, 1.

one years old on average, had each undertaken around two to three projects during their two years of study and 20 percent of them had won national academic awards. Around 50 percent of these researchers left after completing the term and became senior staff in other units. A few stayed in the same institutions, were promoted to senior positions, and are now engaged in their own research work.<sup>53</sup> By May 1999, 450 centers had been set up by 227 universities, institutions, and enterprises, and over nine thousand postdoctoral fellows were recruited. Of these centers, sixty-two were stationed in enterprises, with more than sixty postdoctoral researchers.<sup>54</sup>

### The Development of On-the-Job Training Programs

Job training in mainland China has involved a two-pronged attack. One is the opening of non-degree programs or various seminars; the other is overseas training. Reliance on foreign expertise is their common feature.

During the Eighth Five-Year Plan period (1990-95), around 300,000 foreign experts visited mainland China and participated in various kinds of training programs; over 690,000 Chinese received training, one-third of whom were senior staff and postgraduate students.<sup>55</sup> The demand for foreign expertise has generally come from four sectors: (1) foreign-funded enterprises, (2) large state-owned enterprises and various township and village enterprises, (3) key construction projects, and (4) academic institu-

<sup>53</sup>During the period from 1985 to 1995, for instance, Beijing University recruited 321 post-docs. Of these, 109 stayed and became permanent faculty members, 15 were enlisted as core teachers, 20 became full professors, and 4 began to receive Ph.D. students. The Beijing University of Aeronautics and Astronautics enrolled 124 postdocs; of them 14 had obtained senior titles and 7 became advisors supervising research programs at the doctoral level. See Li Guirong and Yin Baolin, "Implement the Postdoctoral Fellow System to Cultivate Talent and Produce High Quality Performance," *Xuewei yu yanjiusheng jiaoyu*, 1997, no. 5:71; Wu Yong, "Today's Postdocs in Mainland China," *Zhongguo jiaoyu bao*, February 22, 1996, 3. See also note 50 above.

<sup>54</sup>"Postdocs Have Constituted a New Force for Our Country's Economic Construction," *Wen Hui Bao* (Shanghai), February 18, 1997, 2; "Enterprises Establish Post-Doctoral Education Centers," *FBIS-CHI-98-104* (April 14, 1998); "Our Country Has Set up 450 Postdoctoral Centers," *Renmin zhengxie bao* (People's Political Consultative Conference Weekly), May 4, 1999, 1.

<sup>55</sup>Xu Xiuyun, "The Invitation of Foreign Experts: The Present Work and Development," *Zhongguo qingbao xinxi* (China Information Review) (Beijing), 1997, no. 6:9.

tions.<sup>56</sup> Of these four sectors, foreign-funded enterprises have constituted the main driving force behind the establishment of the job training industry in mainland China.

In the 1980s, the dearth of qualified manpower in mainland China forced foreign-funded enterprises to rely on expatriates for management and at the same time invest millions of dollars in the training of local middle-level managers. After nearly a decade of effort, three major forms of management training gradually emerged: (1) joint-venture MBA programs or non-degree management training programs; (2) management training centers operating under the Training Bureau of the State Production Office; and (3) small-scale centers sponsored by provincial and municipal economic commissions.<sup>57</sup> But these programs, the foreign-funded enterprises complained, benefited more the managers of state-owned enterprises and government ministries.<sup>58</sup>

Two major factors contributed to the rise of job training in the 1990s. For one, the quality of manpower by this time had been considerably enhanced thanks to the rapid development of higher education in the past decade. More and more foreign companies began to recruit local talent in place of expatriates to reduce the huge costs associated with hiring foreign professionals and in order to avoid the oft-reported alienation arising from the latter's high-handed management styles and harsh discipline.<sup>59</sup> Attracted by the vast number of well-educated researchers and engineers as well as cheap labor and land,<sup>60</sup> foreign investors then flocked into big cities after Beijing affirmed the further opening-up and reform of the market system. The localization of management, coupled with the surging number

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<sup>56</sup>Shi Zhongcheng, "Scholars on the International Personnel Market," *Guoji rencai jiaoliu* (International Talent Exchange) (Beijing), 1995, no. 4-5:80.

<sup>57</sup>"PRC Human Resources: Multilateral Programs Benefit JVs More," *Business China*, April 13, 1992, 51-53.

<sup>58</sup>In 1986, for instance, there were nine special training centers for managers at the state level and seventy-six provincial-level enterprise management institutes. See "How China is Coping with the Demand for Managers" (Part 1), *Business China*, February 24, 1986, 27-28; "Making Future Managers in the PRC" (Part 2), *ibid.*, March 17, 1986, 36-37; "PRC Human Resources: Foreign-Assisted Programs for Management Training," *ibid.*, March 9, 1992, 36-37.

<sup>59</sup>"All in Earnest," *Business China*, September 1, 1997, 5.

<sup>60</sup>"Techno-China," *ibid.*, December 13, 1993, 4-5.

of joint ventures and foreign-funded enterprises, had at once given rise to both the prominent issue of acute shortage of managerial staff and a wave of job-hopping.<sup>61</sup> In face of the high staff turnover rate, many companies adopted various incentives to retain their talented staff. Four kinds of offerings have become indispensable: large pay raises, compensation-related benefits, promotion prospects, and a good training program. The last had enticed foreign training companies to set up branches in mainland China. The competition among companies and the rise of multinational holding companies in the mid-1990s have contributed to the establishment of the job training industry in mainland China.

Training programs after the mid-1990s have been quite diversified. In addition to programs for sales and basic management training, strategic management training—such as MBAs and mini-MBAs—has been offered for the cultivation of local executives. For top foreign and Chinese managers, there are programs combining networking and training. Some niche-oriented training firms concentrate on such areas as computer software, ISO 9000 standards, cross-cultural communication, and executive secretarial skills. Other firms provide services such as train-the-trainer programs and human resource-related consulting.<sup>62</sup>

In the meantime, multinationals such as Shell and Motorola have opted to take full control of the training agenda by setting up extensive in-house training infrastructures according to their own needs. The former, for instance, has placed emphasis on teaching such interpersonal skills as teamwork and employee participation.<sup>63</sup> In 1994, General Motors started to localize training via cooperation with Qinghua and Jiaotong universities. By 1998, seventy non-credit courses at the two universities have been offered, covering both "soft" skills (management and budgeting) and technical ones. Most of the students were sent by GM and its joint venture partners to receive training specific to their jobs.<sup>64</sup>

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<sup>61</sup>"Employee Training Programs School's In," *ibid.*, April 17, 1995, 3.

<sup>62</sup>*Ibid.*; "Can't Buy Love," *ibid.*, August 3, 1998, 12.

<sup>63</sup>See "Coming of Age," *ibid.*, August 5, 1996, 1-2; "All in Earnest," *ibid.*, September 28, 1998, 4; "Staff Development and Retention," *ibid.*, September 1, 1997, 6.

<sup>64</sup>"Back to School," *ibid.*, December 7, 1998, 8-9.

Overseas training has, however, been reported as the most important incentive to attract and retain talent. This has been especially true over the past two years as the staff turnover at foreign companies has fallen and salary growth too is stabilizing. Recently, overseas training has become "the number one factor" on which Chinese college graduates choose a job, ahead of "compensation and location." Accordingly, a report by *Business China* pointed out that "a firm that does not send staff overseas for an MBA or offer computers and English classes is at a distinct disadvantage."<sup>65</sup>

For government units, around 150,000 people were sent overseas between 1990 and 1995. These people can be categorized into three groups: (1) senior professionals in the fields of industry, agriculture, business, communications, city planning, finance, banking, and law; (2) factory directors, managers, and leaders of government units; and (3) staff in charge of the party and government bureaus. These training programs offer no academic degrees and some last around two weeks. Most of these programs have been cosponsored by the state, local governments, or work units.<sup>66</sup>

### **Challenges and Prospects for the Coming Decade**

The PRC's efforts to upgrade human skills over the past decade have not been made in vain. First, China's ranking in overall international competitiveness has risen from 34th in 1994 to 24th in 1999; its ranking in science and technology has risen from 23d to 13th. The average number of technical personnel for every 10,000 personnel in state units has increased from 1,044.7 in 1990 to 2,374.2 in 1998.<sup>67</sup> The Ministry of Personnel declared that over the past four years, under the "Hundred-Person Plan,"

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<sup>65</sup> According to a survey of 1,436 young workers between twenty and thirty-five years of age, 65 percent of those surveyed chose "opportunities for job training and bringing their talent into play" as the first factor for changing their jobs. See "How Enterprises Attract Talent?" *Zhongguo qingnian bao*, December 15, 1999, 11; "Playing for Keep," *Business China*, July 5, 1999, 12.

<sup>66</sup> "New Ways for On-the-Job Training," *Guangming ribao*, February 14, 1995, 6; Na Mu, "Interviews about Overseas Training," *Guoji rencai jiaoliu*, 1996, no. 1:45.

<sup>67</sup> Wu Zhaohong and Shui Jiayue, "Strive to Improve International Competitiveness," *Qiushi* (Seeking Truth) (Beijing), 1998, no. 6:32.

1,077 middle-aged and young scholars have obtained senior titles.<sup>68</sup> By the year 2015, the number of Chinese professional and technological personnel will have increased to about 88 million.<sup>69</sup>

Another aspect is the elevation of knowledge in society. In contrast to the phenomenon of "surgeons making less money than barbers" in the late 1980s, those with professional skills and high academic diplomas have become the most sought-after. The percentage of the "white-collar" population has been continually growing in big cities and rich provinces. The living conditions and social status of intellectuals have been much improved. In late 1999, the Ministry of Education declared that in the early twenty-first century, university faculty wages should be raised to above the average of the sixteen trades. The Ministry of Education also appropriated special funds for the nation's elite universities. This has resulted in a policy where raise hikes range from 300 to 5,000 *yuan*, depending on performance—as is the case at Qinghua University.<sup>70</sup>

The high rate of return for the investment in higher education has made more and more Chinese families willing to invest in higher education for their children, and turned higher education into one of the hottest industries in mainland China. In September 1998, the Institute for Chinese Juveniles conducted a survey of 6,534 young men between the ages of fourteen and twenty-eight in twenty-seven big cities across nine provinces. When asked about their own educational expectations, 32.8 percent expected to receive bachelor's degrees, 20.9 percent intended to pursue master's degrees, and 8.8 percent aimed at doctorates. For their own children's educational levels, 44.5 percent wished for doctorates.<sup>71</sup> Such a strong market demand encouraged the government to further relax the enrollment

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<sup>68</sup>"The Goal of the 'Hundred-Person Plan' Has Been Basically Achieved," *Zhongguo qingnian bao*, November 28, 1999, 1.

<sup>69</sup>"Song Defu Views Personnel System Reform," *FBIS-CHI-1999-1014* (August 30, 1999).

<sup>70</sup>Beijing and Qinghua universities each received 1.8 billion *yuan*; Fudan University obtained 1.2 billion *yuan*, and Shanghai Jiaotong University and other several universities each obtained 0.6 billion *yuan*. See "The Status of University Professors is Up," *Zhongguo qingnian bao*, November 16, 1999, 6.

<sup>71</sup>Study Group of the Institute for Chinese Juveniles, "Forty Percent of Young Men Want to Obtain Doctorates," *ibid.*, February 3, 1998, 8.



quota system and in September 1999, 2.7 million freshmen began classes. Furthermore, the allocation of funds for education in the national budget is to be increased by one percentage point annually over the next three to five years, a change which would provide higher education opportunities for 15 percent of the population by the year 2010.<sup>72</sup>

In the quest for high diplomas, postgraduate education has proven to be the winner. This is different from the 1980s when higher education played second fiddle to undergraduate education. Now postgraduate study is generally regarded as the core of the development of higher education. In recent years, Chinese educators and scholars are advocating the further development of higher professional education in order to meet the human skill requirements of the coming century.<sup>73</sup> In June 1999, the CCP Central Committee issued a document entitled "Decision on Deepening Educational Reform and Promoting Quality Education in an All-Around Way," in order to delegate the rights of such development to local governments at the provincial level.<sup>74</sup>

Encouraging signs are also observable in the economic sector. There are advocates for the knowledge economy; for the integration of industry, academic research, and education; and for the enhancement of international competitiveness. Accompanying these are various international conferences held in Beijing or Shanghai for the development of high-tech industries, and measures formulated for revitalizing trade through science and technology.<sup>75</sup> Furthermore, the State Council on June 25, 1999 allocated special funds—up to one billion *yuan*—to encourage technology-based small and medium-sized enterprises (SMEs) with employees under five hundred to conduct R&D. Two conditions were given. One is that the

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<sup>72</sup>Hu Angang: "PRC's Higher Education Becoming Hot Industry," *FBIS-CHI-1999-1010* (October 11, 1999); Xi Mi, "Market Confronts Education Reform," *Beijing Review* 42, no. 44 (November 1, 1999): 21-22.

<sup>73</sup>"Development of Higher Professional Education Urged," *FBIS-CHI-1999-0423* (April 23, 1999).

<sup>74</sup>"[CCP] Decision on Education Reform," *FBIS-CHI-1999-0619* (June 16, 1999).

<sup>75</sup>See Li Ning, "Beijing Aims at High-Tech Industries," *Beijing Review* 42, no. 34 (August 23, 1999): 16; Li Ning, "Global Top 500 to Meet in Shanghai," *ibid.*, no. 38 (September 20, 1999): 12-15; "National Conference Stresses Technological Renovation," *ibid.*, no. 37 (September 13, 1999): 5.

scientists and technicians with a college or university education should make up at least 30 percent of the total work force while more than 10 percent should directly participate in R&D. The other is that at least 3 percent of their sales volume should be spent on the development of new, high-tech products.<sup>76</sup>

As for local governments, protectionism in the early 1990s waned. Instead, various preferential measures were formulated to attract high-level manpower. In June 1999, Shanghai took the lead by proclaiming four new measures to build the city into a high-tech center based on quality manpower. One such measure has been to exempt from the requirement of household registration all nonresident high-tech talent who are under thirty-five years of age and have obtained bachelor's degrees or above. About the same time, Beijing, with similar preferential measures, opened the city-based high-tech enterprises, multinational headquarters, and research institutions to all those professionals with nonresident status.<sup>77</sup> These dual breakthroughs led two neighboring cities—Nanjing and Hangzhou—to adopt similar measures. In the war for high-level manpower, Nanjing took the additional step of raising the wage baseline for those with master's degrees or above working in the city.<sup>78</sup> In the academic sector, recruiting expatriate scholars from North America, Europe, and Japan has become a trend among elite universities and newly established research institutions.<sup>79</sup>

Be that as it may, amid the advocates for further development of professional manpower, various phenomena have also been noted that are detrimental to the efficiency of human capital investment. Three have proven most difficult to overcome: irrationality in the allocation of manpower, imperfections in the personnel system, and an increased brain

<sup>76</sup>Lin Ning, "Innovation Fund for Technology-Based SMEs," *ibid.*, no. 34 (August 23, 1999): 13.

<sup>77</sup>See "No Restriction on Household Registration is Required for Talents Staying in Shanghai," *Zhongguo qingnian bao*, July 6, 1999, 7; Yuan Mengde, "A Rush onto the Area of the Huangpu River," *ibid.*, July 16, 1999, B3; *ibid.*, June 10, 1999, 1; "Special Policy for High-Tech Talents Staying in Beijing," *ibid.*, June 10, 1999, 1.

<sup>78</sup>"Shanghai, Nanjing, and Hangzhou Are Vying with Each Other for Attracting Top-Rate Talents," *ibid.*, December 24, 1999, 5.

<sup>79</sup>"Scientists with Business Flair in Demand," *Nature*, no. 394 (August 6, 1998): 601-2.

drain. As the first two have been analyzed elsewhere,<sup>80</sup> this paper will place a greater emphasis on the brain drain problem.

For decades, the maintenance of a rational allocation of professional manpower has been a major goal of the PRC's economic construction. As analyzed before, this goal has become increasingly difficult to attain thanks to the widening income distribution gap between different regions and the segmentation of the job market. Presently, this disparity continues among different specialties, economic sectors, and regions. According to an earlier estimate by Song Defu, minister of personnel, at the end of 1999, 70 percent of specialized personnel would be concentrated in education, health care, economy, and accounting while the fields of material science, energy, biotechnology, information technology, banking, and insurance reported a dearth of qualified manpower. Over 85 percent of skilled manpower was concentrated in government units and state-owned enterprises, and 85 percent of the highly qualified personnel gathered in the eastern and central regions.<sup>81</sup> The three cities of Beijing, Shanghai, and Shenzhen have formed into a triangle absorbing almost all the top young talent in mainland China. This overconcentration has served as a catalysis for the "high academic degree" syndrome in the job market and the phenomenon of overeducation despite strong criticism of the squandering of manpower. In a survey conducted by the Shenzhen city government, 40 percent of the quota for 1999 recruitment required applicants with master's degrees or above.<sup>82</sup> In sharp contrast, most of the work units in the less developed areas are now suffering from undereducation. Many universities and research institutions are understaffed.<sup>83</sup>

Although the diploma syndrome has brought both a golden opportunity for the massive spread of undergraduate education and the rapid development of postgraduate education, there have been prominent side

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<sup>80</sup>See note 2 above.

<sup>81</sup>"Optimization of the Structure of Talent is Urgent," *Zhongguo qingnian bao*, December 25, 1999, 1.

<sup>82</sup>Li Xiang, "Scrutiny of the Phenomenon of Overeducation," *Zhongguo rencai* (China Human Resources), 1999, no. 9:41.

<sup>83</sup>For detailed analysis, see note 2 above.

effects. First, this craze has brought about a rapid reduction in two-year college and vocational education, hindering the normal development of technical manpower badly needed by medium-sized enterprises and units at the grass-roots level. Additionally, the fierce competition in the entrance examination for graduate schools has pushed many students into various kinds of cram classes at the expense of normal courses. On the other hand, the special entry test has been criticized for cheating and offering prerogatives while fake diplomas and certificates are so common that verification of credentials becomes an indispensable procedure for any recruitment process.<sup>84</sup> All these side effects are detrimental to the efficiency of investment, to say nothing of the enhancement of the quality of "creativity" and "innovation."

As for reforms of the personnel system, notwithstanding the implementation of the contract system and an emphasis on competition, the mind-set of "iron rice bowl" is still pervasive. The reform measures analyzed in this paper are one example. Many scientists were afraid to accept monetary awards for fear of raising jealousy in other colleagues. The lack of transparency or sound mechanisms for elimination in the selection process has made many rewards and measures for promotion lose their original incentive function. Moreover, the negative impact of part-time jobs on teaching and research, though widely discussed, has aroused little concern.<sup>85</sup> Likewise, regarding job training, the transfer of trained skills has encountered great obstacles because of the general resistance among state-owned enterprises to new and innovative skills. The high turnover rate of trained personnel has made many work units or enterprises reluctant to invest in training. Finally, many overseas training programs have turned into tourist trips due to the lack of adequate evaluation mechanisms.<sup>86</sup>

The third issue, brain drain, has continually worsened over recent

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<sup>84</sup>See note 21 above.

<sup>85</sup>Wu Degui and Li Weiping, "Only by Liberating Thought and Refreshing Notions Can We Liberate Talent," *Zhongguo rencai*, 1999, no. 7:21.

<sup>86</sup>Chen Qian, "MBA in China: Retrospect and Prospect," *Zhongguo gongshang* (China Industry and Commerce) (Beijing), 1997, no. 9:4-6; Zhuang Weimin, "Some Thoughts on China's Strategy for Human Resources," *Renkou yu jingji* (Population and Economy) (Beijing), 1999, no. 3:21.

years notwithstanding the rapid expansion of higher education. The loss of professional manpower has occurred in two directions. One is the overseas outflow and the other is job-seeking in foreign-funded enterprises in mainland China. The increasing fever for overseas study is still the major cause of the first type. Statistics show that by August 1999, more than 560,000 Chinese professionals lingered in the United States after finishing their studies. Over two-thirds of public-funded students, amounting to 200,000 with 80 percent in the field of natural sciences, have not returned to mainland China.<sup>87</sup> In recent years, self-supported students have become the mainstay; 90 percent fall between twenty-one and thirty-five and have mostly graduated from elite mainland universities.<sup>88</sup> According to a survey conducted in late 1998 of students in five top universities in Beijing, over 70 percent intended to go abroad for advanced degrees.<sup>89</sup> Presently, information technology and biochemistry are the two most prominent fields. Each year mainland China produces 30,000 graduates majoring in computer science. While most of these students go abroad for advanced degrees, the rest postpone going abroad until they finish their master's degrees in local graduate schools. Another report in 1998 revealed that in a senior computer science class at Qinghua University, thirty-five students obtained scholarship offers from eighty-nine foreign universities.<sup>90</sup> Aside from overseas studies, another two popular channels have also emerged for going abroad: one is via immigration, mostly to Canada; the other is through job contracts to work for foreign companies.<sup>91</sup>

For many Chinese scholars, however, much concern has been given to the aggressiveness of foreign-funded enterprises in absorbing high-level manpower. In late 1998 a survey was conducted of five hundred large and

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<sup>87</sup>*Ta Kung Pao*, August 8, 1999, 21.

<sup>88</sup>"An Annual Salary of 100,000 *Yuan* and Housing with Two Bedrooms to Stabilize the Talented Contingent," *Wen Hui Bao*, June 11, 1999, 11.

<sup>89</sup>"Where Are the Professional and Technical Talent," *Shijie zhishi* (World Affairs) (Beijing), 1999, no. 2:38.

<sup>90</sup>Zhao Qinpin, "Thoughts over the Cultivation of Talent for Information Technology," *Keji ribao*, January 13, 1999, 6; Li Ningji, "An Analysis of the Loss of Talent in Computer Science in Mainland China," *Guangming ribao*, May 26, 1999, 9.

<sup>91</sup>*Ibid.*

**Table 3**  
**The Educational Level of Foreign-Funded Enterprise Personnel in Beijing**

	(%)			
Year	1996	1997	1998	1999*
Two-year college or under	46	40	38	27
Two-year college	28	30	30	23
Bachelor's degree	24	27.5	28	42
Master's degree or above	2	2.5	4	8

\*Estimated.

**Source:** Xu Bin, "The Foreign-Funded Enterprises' Wages and Benefit Policy and the Labor Market," *Renkou yu jingji* (Population and Economy), 1999, no. 3:22.

medium-sized state-owned enterprises in five large cities—Beijing, Shanghai, Guangzhou, Chongqing, and Wuhan. The results show that over the past five years, job-hopping to foreign-funded enterprises and joint ventures accounted for 54.7 percent of the total loss of manpower; the rate rose to 67.6 percent for those enterprises in Beijing, Shanghai, and Guangzhou.<sup>92</sup> According to one report, over one million local high-level professionals worked in foreign-funded enterprises in mainland China in early 1999.<sup>93</sup> The fact that most personnel are highly paid has made foreign-funded enterprises in mainland China earn the name "the white-collar cradle." According to a 1998 survey of multinationals situated in Beijing, mainland scholar Xu Bin found that as foreign-funded enterprises increase their investments, their criteria in recruiting local talent also rise. This trend has resulted in obvious changes in the personnel structure of these enterprises (see table 3).<sup>94</sup> The brain drain to foreign-funded enterprises has become somewhat controversial over recent years, especially given the

<sup>92</sup>"State-Owned Enterprise Talent Flows to Foreign-Funded Enterprises," *Wen Wei Po* (Hong Kong), December 28, 1998, A4.

<sup>93</sup>Gong Shenli, "The Shortage of Talent in the Twenty-first Century Worries China," *Jingji daobao* (Economic Reporter) (Hong Kong), no. 2615 (April 12, 1999): 27.

<sup>94</sup>In Beijing, over 70 percent of personnel are paid over 5,000 *yuan* per month, a standard considered as high income in the city. See Xu Bin, "The Foreign-Funded Enterprises' Wages and Benefit Policy and the Labor Market," *Renkou yu jingji*, 1999, no. 3:23; "Foreign-Funded Enterprises: The 'Cradle' for China's White-Collar," *Keji ribao*, February 14, 1999, 7.

influx of multinationals. In late 1998, Intel and Microsoft announced investments of US\$50 million and US\$80 million respectively to set up research institutes in mainland China. The latter asserted that it would hire as many as one hundred computer science doctorates. This announcement has aroused great panic at local institutions of higher learning.<sup>95</sup>

Another strategy for foreign-funded enterprises to absorb talent is to offer scholarships for use at local universities. The amount to each student is normally two to four times as much as other local scholarships. In fact, their contribution has reportedly constituted half of the total scholarships offered in the thirty local national-level universities. At Beijing University, for instance, of a total of over four million *yuan* in scholarships, three million *yuan* came from foreign enterprises. Aside from discovering and cultivating top talent, foreign-funded enterprises believe that the scholarships are conducive to boosting the prestige of their companies.<sup>96</sup>

The brain gain for foreign-funded enterprises is a brain drain for government units and state-owned enterprises. When commenting on the development of qualified manpower, some mainland scholars complained that the efforts over past years have done little to relieve the shortage of qualified manpower. Such complaints are not groundless. According to a survey conducted by the Ministry of Personnel in early 1999, only 87.63 percent of senior-level professionals have completed degrees of higher education, compared with 93.88 percent in the 1980s. The percentage is to be further reduced in the coming two years due to another wave of retirements.<sup>97</sup> The brain drain problem can also be demonstrated by a comparison of the statistics for 1991 and 1998; during the interval, scientific and technical personnel at state-owned enterprises and institutions have increased 21.8 percent. By applying the following formula provided by mainland scholar Li Ruojian in analyzing the turnover of Guangzhou city,<sup>98</sup>

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<sup>95</sup>See "High Wages to Buy Talents," *Keji ribao*, February 14, 1999, 1; "Everyone's Doing it," *Business China*, December 7, 1998: 9; Li, "An Analysis of the Loss of Talent," 9.

<sup>96</sup>Dong Shi, "Foreign-Funded Enterprises Vie with One Another to Award Scholarships," *Zhongguo qingnian bao*, December 22, 1998, 5; "Everyone's Doing it," 9.

<sup>97</sup>"PRC Faces Shortage of Senior Professionals," *FBIS-CHI-1999-0223* (February 23, 1999).

<sup>98</sup>Li Ruojian, "A Study of Contemporary Job Mobility," *Renkou yanjiu* (Population Research) (Beijing), 1995, no. 2:18-23.

**Table 4****The Turnover Rate of Scientific and Technical Personnel in State-Owned Enterprises and Institutions (1991-97)**

	Total Number		Growth Rate (%)	Mobility Rate (%)
	1991	1998		
Engineering	5,024,000	5,656,735	12.6	-8.7
Agriculture	463,050	635,929	37.3	13.1
Health care	2,757,993	3,254,958	18.0	-3.5
Scientific research	341,934	290,537	-15.0	-39.8
Teaching	8,581,436	11,075,184	29.1	6.3
Total	17,168,413	20,913,343	21.8	-32.6

Source: *Zhongguo tongji nianjian 1999*, 684.

$$\frac{\text{job pop. for the end of a given interval} - \text{job pop. for the beginning of the interval} \times (\text{growth rate in the interval} + 1)}{\text{Average of job pop. during the interval}}$$

Average of job pop. during the interval

(Whereas a negative result denotes the outflow of manpower, a positive result denotes an inflow)

one observes negative results for scientific research, engineer personnel, and health care (see table 4). Although there is prominent growth in teaching personnel at present, such growth is formed by a large increase in teachers at the level of secondary and primary schools rather than colleges and universities (see table 5). According to a report, by the end of 1999, high-level manpower accounted for a mere 5.5 percent of the total scientific and technical personnel.<sup>99</sup>

Among the different units, state-owned enterprises have been suffering most. This is because in the fiercely competitive job market, government and administrative departments, particularly those situated in rich provinces and cities, generally can offset their manpower losses by attracting new blood from poorer areas with better benefits and opportunities for job training and overseas trips. Thus, despite the streamlining of state organs, the rate of high-level personnel working for this sector grew 7.55

<sup>99</sup>See note 81 above.



**Table 5**  
**The Number of Teachers by School Level (1995-98)**

Year	Institutions of Higher Education	Secondary School	Primary School
1995	401,000	3,883,000	5,664,000
1996	403,000	4,040,000	5,736,000
1997	405,000	4,186,000	5,794,000
1998	407,000	4,312,000	5,819,000

Source: *Zhongguo tongji nianjian 1999*, 650.

**Table 6**  
**Professional Manpower in Large and Medium-Sized Industrial Enterprises (1996-98)**

Year	Number of Personnel Engaged in Technical Development	Number of Scientists and Engineers	Growth Rate (%)
1996	1,455,000	796,000	54.71
1997	1,474,000	802,000	54.41
1998	1,410,000	637,000	45.18

Source: *Zhongguo tongji nianjian 1999*, 682.

percent between 1989 and 1994. For state-owned enterprises, however, the growth rate of professional personnel fell from 42 percent to 39.7 percent between 1990 and 1994.<sup>100</sup> From table 6, one can find that between 1996 and 1998, the ratio of scientists and engineers to the total number of personnel engaged in technical development in large and medium-sized industrial enterprises decreased from 54.71 percent to 45.18 percent. In the previously mentioned survey of five hundred large and medium-sized state-owned enterprises, the average gain/loss ratio of professionals for these enterprises was 1:0.71; 42.5 percent of these enterprises had a gain/loss ratio of 1:0.5; and 18.7 percent had a ratio of 1:1. The gain came mainly from the recruitment of inexperienced college graduates while most of those staff flowing out were the mainstay of their enterprises.<sup>101</sup> Many fac-

<sup>100</sup>For detailed analysis, see notes 2 and 97 above.

<sup>101</sup>See note 92 above.

tors have been identified as causing the losses in manpower. These include the accumulation of debt, the lack of respect for skills, and poor management. But effective solutions are yet to be found.<sup>102</sup> Despite government efforts to enhance R&D in enterprises, only 35 percent of the total scientists and engineers worked for companies in late 1999. The low percentage, Xu Guanhua acknowledged, has restricted the development of ability in technological innovation in mainland China.<sup>103</sup>

In a nutshell, the development of professional manpower in mainland China has gained prominent progress since the early 1990s. The bid to enhance international competitiveness has made the PRC place further development at the top of the agenda. As our analysis shows, however, the efficiency of human capital investment has been much hampered by such perennial issues as the irrational distribution of human resources, imperfections in the personnel system, and an increased brain drain. When commenting on the prospects for mainland China to increase in strength by 2015, Foy and Maddison listed several conditions, one of which is the "continued improvements in the efficiency of human . . . capital allocation."<sup>104</sup>

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<sup>102</sup>Zhen Jinming, "Human Resources: Rich or Poor," *Guangming ribao*, June 26, 1998, 2.

<sup>103</sup>"Vice-Minister of Science Speaks on Science Policies," *FBIS-CHI-1999-0924* (September 24, 1999).

<sup>104</sup>Colm Foy and Angus Maddison, "China: A World Economic Leader," *Observer*, no. 215 (January 1999): 41-42.