Educating More T-Type Talent to Boost Service-Oriented Manufacturing in China

She Zailing
School of Management, Wuhan University of Technology, Wuhan, P.R.China, 430070
(E-mail: ld005@ld.cn)

Abstract This paper is trying to analyse the development trend of service-oriented manufacturing in China. To meet the needs of this transformation of manufacturing companies, it is inevitable for educational sectors to train more service-oriented talents, that is T-type talent. The paper first discusses the relationship between this new trend and T-type talent, which is very strong and tight. Then the paper moves to formulate the mechanism or role for education to play in training personnel wanted by the trend. Finally, after exposing some weakness in Chinese education system, the paper reaches conclusions on how to reform it.
Key words Service-oriented manufacturing; Vocational education; Endogenous growth theory

1 Introduction

It has been a trend since the late several decades of last century that success of a manufacturing business can not be achieved without taking competitive service as its intermediate input. And service and manufacturing combines more tightly and intensively, so a new conception “service manufacturing” is created. However, this service-oriented trend must get the support by education which produce human resources it need. Specifically T type talents are welcomed in contemporary job market and wanted by service manufacturing enterprises. In China, we have witnessed a huge expansion of higher education sector, but sorrowfully there are still a great needs for more talented personnel which can not be meet, especially in higher position.

The more developed the society is, the greater the need for broad and special talents will be. Science is moving in a trend of highly both differentiation and integration. Basic sciences are crossed with each other, with one area penetrating into others. There have emerged a large number of multidisciplinary, interdisciplinary, intermediate-disciplinary and cross-disciplinary. And some of the major concerns facing modern human, such as environment, population and resources, can not be fundamentally solved without help of a variety of disciplines, which require workers in different fields to sincerely cooperate, therefore, in addition to a deeper knowledge of one’s own subject, it is also necessary to understand the knowledge and developments of other professional disciplines immediately or distantly associated with it. To adapt to such trends, a comprehensive range of knowledge is strongly recommended, thus T-type talents are greatly valued with decades going by. The T-type personnel (or T type talents), namely broad and special talents, is such with the letter T to indicate the structural characteristics of these people's knowledge, in which - means the width of knowledge, while“ | ”represents the depth of expertise, when combined together, it means these talents should not only acquire deeper skills, but has a broad range of knowledge, consequently such people are called T-type talents. In other words, it is those who can absorb or make most of many sciences, and successfully coordinate "miscellaneous" and "specialization" have a bright future. There have been many researches and papers regarding this area, for instance, Lin Chongde, based on the distinct characteristics of Eastern and Western educational models, summed up some contents which a T-type talent should have, he then considered that in terms of width, a T-type talent should grasp those knowledge which are learned by students in Western countries, such as creativity, adaptability, independent thinking and practical ability, what’s more, Western education attaches great importance to motivation of students to develop operative ability and adaptability, and focuses on cultivating students’ personality. In terms of depth, a T type talent should learn by heart what is taught by Oriental education, such as logical thinking, understanding and overall thinking. He also pointed out that the knowledge taught by educational modes in East and West have a lot in common, they are consistent with each other in many aspects, so there is a solid foundation to train a T type talent by "[m]elting the East-West educational model. However, we must make it cleat that these two kinds of educational models also have significant differences, for example, only very few Nobel winners are from Oriental education background, probably due to the fact that people brought up under Oriental mode of education are less innovative than their counterpart in Western education system.

2 Service-Oriented Manufacturing and T-type Personnel

As the world's one of the biggest manufacturing country, China clearly calls for expansion of producer services in its "Eleventh Five-Year" Plan, and also gives more coverage to the specific development arrangements for a number of key sectors. This shows that modern producer services, which is essentially contributable both to the radical transformation of the economic growth mode and upgrading the industrial structure, has been recognized as one of the national strategies. In contrast to strong demand, the producer service sectors in China lag far behind. According to a research concerning small and medium enterprises in Huai'an Jiangsu province found that，facing a serious brain drain and poor-coordinated working environment at the same time, they are plagued with a severe problem of low-skilled personnel who are less well-educated and ineffectively trained, plus their irrational age structure, all these problems are greatly impeding development of their own competitive advantages, and service-oriented manufacturing is even more impossible task. In contrast, new technologies have a significant impact on the enterprise scale in United States, Japan and other developed countries, therefore enterprises tend to become small gradually, as a result cumbersome and large enterprises give way to flexible small and medium enterprises, that is why producers of services providers are mostly small businesses. The said service-oriented manufacturing constitute a great need for creative talents, whether in the producer service sector, which is essential in any industrial production activities, or in the service areas of production, also in the field of manufacturing requirements of knowledge and skills are becoming more and more higher. Developed countries in West has a good reason for their stronger producer service sector, because their development of discipline and knowledge is so advanced that cross or edged disciplines are overwhelmingly developed, along with their mode of education, providing innumerable comprehensive talents for the producer services industries. In retrospection, our education put too much emphasis on "standard answer" as well as obedience, largely ignore the training of students' innovative abilities, for student, social and educational environment are not conducive to create and invent, which already formed a tradition of "duck" teaching methods, as a result students are short of speculative exercise, with little help to improve their intellectual development; besides, society and schools reinforce excessively on unity, disliking and lacking the tolerance to embrace individual differences. Regional or national competitions come down to education and human capital. Scientific and technological progress can not be achieved without hundreds of millions of high-quality labor force, which is inseparable from of innovative educational model; therefore we have to absorb the fortes of the Western educational model, by combining features of their own development, and train more T-type talent to meet the demand.

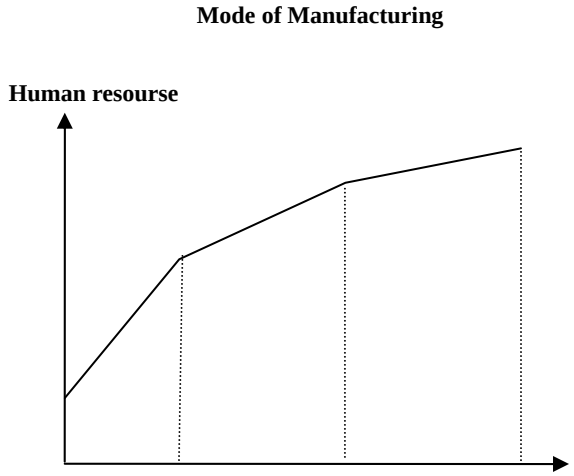

Figure 1 The Relationship Between Manufacturing and Talent Needed

As shown by above table, with transformation of manufacturing model, demand for more talented personnel continually grow, and new manufacturing model relies heavily on professionals. Faced with such fact, more and more Chinese equipment manufacturing companies already raise human resource management to the strategic level, and begin to realize that management of human resource is a powerful impetus to the development of enterprises, and gradually consider how to retain qualified personnel and so forth. However, at present among China's large and medium state-owned enterprises

whose main areas are construction machinery, a large proportion are still lacking enough attention on human resources management, leading to a serious drain on manpower, such things also exist in a number of large state-owned equipment manufacturing enterprises. In this regard, these enterprises should combine internal business objectives and external environments and devise a comprehensive and effective human resource development plan. In addition, domestic firms tend to have no much incentive to improve managers at all levels, in fact, the management layer, particularly in middle and above, have a direct influence, sometimes even determine, the survival and development of an enterprise, for that sake, great emphasis should be put on development or improvement of the whole managers, thus to cultivate outstanding managerial talents is to an efficient way to improve and upgrade service providing ability throughout the manufacturing industry.

3 Education Support to Produce T-type Talents

There have been numerous papers home and abroad written in recent years to testify the relationship between education and economic growth. Most of the ideas support that education investment plays a positive role in boosting economy, by creating great human resource reserve. One case in point is technology industry, which contributes enormously to the overall growth of world development; however without education there will be no such advanced technology. We human beings can achieve present living standard beyond the imagination of kings and aristocrats' imagination a century ago, only through accumulation of knowledge and experiment.

Endogenous growth theory suggests that, through human capital accumulation economy can achieve long-term growth. Needless to say, the accumulation of human capital must get the support of the education system. Generally speaking, education and economic development are positively and closely related with each other in a high degree, because most often it is education which directly affects the quality of labor resources, while cultivating and application of high quality workers make the cornerstone of economic development. So no wonder every country in the world today puts in priority development of education, mainly expecting the boosting effects of education to happen, which last in a long term and move in a upward cycle. Since the role of education is so significant and can not be replaced with other sectors, that education should not become a victim to be squeezed especially when economic development is the absolute goal. It is true that, in the context of limited financial resources the country needs economic growth and only by this way some critical social problems can be well solved, but the development of education is fundamental and we should not underestimate the development of education, simply because we want beautiful and superficial digits in a short term.

The past ten years saw great expansion of Chinese higher education at least in numerical sense, whether it essentially enhanced productivity of the labor force, is a question really hard to answer. Since 1999, China began to enroll new students into universities in a larger number than ever before, which we can discover easily from movement of the curve in the figure below. The line between year 2000 to 2004 is almost vertical. It is a great leap forward in 1999, in which growth rate is larger than ever before, forty-seven percent, which never exceeded ten percent except two years before 1999. With such a quick pace, number of new entrants of regular HEIs[①] increased from 220,610,000 in 2000 to 447,340,000 in 2004. Later the growth rate decreased yearly to 3.6 percent in 2007, nevertheless the number is still very huge, achieving 56,590,000, which is more than the total population of medium-sized nations.

As a consequent, number of new postgraduates climbed up faster four years later in 2003, since the human resource market could not absorb so many graduates, a great part of them chose to study further, hoping to add up more value to themselves, which might be good to find a good job after graduation. But most of time reality is not what we expect to be, and many postgraduates found it harder or equally difficulty to look for a decent job, few not many even regret resigning from their former positions for sake of further study, only to find it impossible to get it back.

Ironically, the question has been newly raised among parents in rural areas that whether it is worthwhile to send their children to universities. There is no enough evidence to show what the percentage of those parents is, but it is a fact many poor family begin to reconsider sending their children to colleges, with the job market becoming extremely tighter. Stereotyped discriminations against girls have been exasperated by relatively higher intuition and hardness to secure a decent job in cities. From the date of her borne, many parents think it better to send the daughter to work as early as possible rather than to higher education, to get their investment in her back as soon as possible, also

① Higher education institution (university or college of higher education).

from the same date they attach less attendance on her study and have no higher expectation from her.

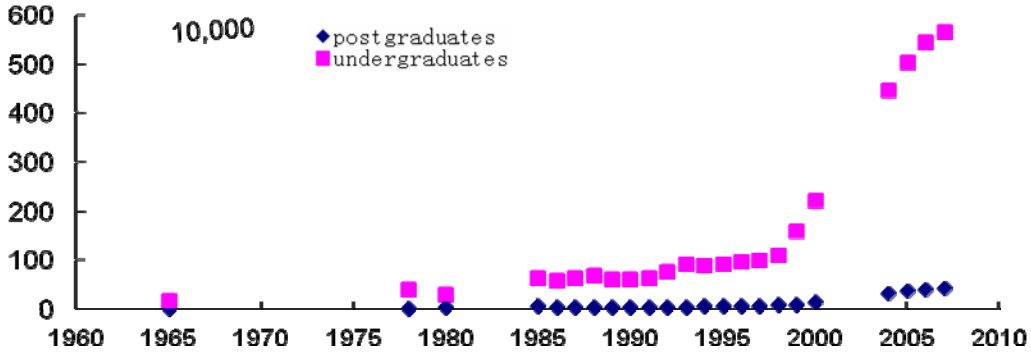

Figure 2 The Expansion of China Higher Education Sector

With devaluation of school by some parents in rural villages, there are still many well-informed parents in poverty-stricken areas insisting on sending their children to higher education, and parents in cities whose points of view are different from counterparts in rural areas pay much more efforts on their children's education, some of them going far from normal, and their kids are burdened with lots of classes, leaving no much free time to children's own.

4 How to Reform Education System to Meet the Need

Support offered by Education is not only beneficial to manufacturing sectors, but good for other social sectors as well. So, How to reconstruct education system in China in order to support manufacturing industry or even the whole Chinese economy?

First of all, deep reform is necessary concerning overall educational and teaching system. While the decentralization among colleges and universities have already been started, but China's contemporary education system is still filled with formalism with a thick color of bureaucracy. From actual practice, we can conclude education should have a certain independence, otherwise its objects can not be fully fulfilled. Sadly there are too much administrative interference into education by the government in China. Administrative bodies within education system have no clear purpose, besides relation between government institutions and schools at all levels is ambiguous, more tragically, some unhealthy ways of working from government transferred to the educational field. There also exist quite a few problems in teaching methodology. First, lifeless classes from elementary to university result in a lack of innovative ability of Chinese students than their counterparts in United States. Second, higher education school lack clear objectives, almost all universities are aiming or already trying to becoming comprehensive university regardless of their own comparative advantage and the actual situation, which represent a air of fickleness among the education sector in China. Thirdly, the second problem mentioned ahead lead to another unsound situation. Quite a few universities have the same or exceeding similar majors, and structure is irrational, there have been an oversupply of graduates of many majors, meanwhile large-scale recruitment is still going on, and some specialization needed by job market can not be embodied in school. To this end, education system should adopt an independent policy and take responsibility, and school at all levels should be governed by themselves. There is a further need to deepen the educational reform, and open teaching methods should be promoted, in addition blind pursuit of the scale and number should be prevented.

Second, financial support for education from state should be reinforced. Compared with developed and some developing countries, China's spending on education is shamefully low in a long run, which is inconsistent with the dazzlingly rapid economic growth and the doubled fiscal revenues. Moreover, it is already clearly suggested by well-founded theory that education is a quasi-public goods with strong positive externalities, and adequate access to education is one of the fundamental rights of a modern citizen. Looking from point of view on national strategy level, we can see that Government can not shirk its duty, on the contrary it should take education as one of the main tasks, and enough investment in education should be guaranteed. We should make a law to fix a ratio between education funding and GDP growth and put it into practice without any hesitation, then after a certain period of time when economy becomes much stronger, this small proportion should be increased. Last but not the least, in order to implement strategy of service-oriented manufacturing, we need to vigorously develop vocational education. Traditional thinking or attitude towards book and education may have a bad

impact on supply of skilled personnel, the best admired purpose of education is to acquire a high position in government, and to be a technician can never substitute. This has led to a shortage of skilled workers in manufacturing industry, especially those with advanced skills. The great gap is seriously inconsistent with the developing momentum of China's strong manufacturing industry, which shows that vocational education are not able to keep up with real needs. According to some news reports which is very easy to find in internet, senior technicians are more precious and welcomed than doctor degree holders, some factories tried to recruit a senior technician by raising annual salary to hundreds of thousands which is several times larger than average, but failed. This fact shows that there are definitely some critical problems of vocational education. Vocational and Technical Colleges are currently deviated from their original goal, turning to blind pursuit of academy performance, under this circumstances, vocational schools seriously neglected the study of labor skills in daily teaching, as a result graduates lack the basic operational skills required by future employers. So, vocational education should cease to imitate regular colleges and universities and adhere to its own mission, highlighting career goals and connecting theory with practice with the latter occupying more school time, however the enhancement of skills need to be supported by knowledge. Schools need to allot adequately school time between theory study and practice to ensure that there is sufficient time to learn what they can put into use in real working environment. To this end, school may employ highly experienced technicians who are willing to teach and take guiding students as pleasure, who will encourage students boldly to venture and challenge existing technologies.

5 Conclusions

Spending on education from government, despite the fact explosion of enrollment in tertiary education and rapid growth of domestic economy, remain almost unchanged for several decades, even decreased in a few fiscal years. In order to accommodate huge amounts of students, schools at all levels have to expand in hard and soft resources, since they could not get enough appropriation from fiscal revenue, seeking loans from state-owned banks have to be the recourse only they turn to. It is reported the loans made by banks to universities have already become a gigantic burden to lender, which transfer indirectly to government and ultimately to the whole society.

Many employers complain that newly graduated students are far away from what they should be, products of universities fall short of basic requirements, and some even caused loss to the companies because of their arrogance, which made employers so angry that they became feared to hire new graduates. As time goes on, the bad impression about them will definitely have unfavorable impact on their future opportunities.

As manufacturing sectors has already become larger then next step is to make it stronger, it has been proved by successful practice in developed nations that without highly developed human resource there will be no highly competitive productivity. Not only the service-oriented manufacturing sectors but other areas need more talent which the education systems are supposed to supply.

References

[1] Yan Hong, Yang Zhonghua. Business Process Reconstruction Model under Supply Chain[J]. Modern Business Industry, 2008, 20(2): 48-49 (In Chinese)
[2] Lin Chongdei. Coordinate Modes of Western Education to Create T-type Talents[J]. Beijing Normal University Journal (Arts edition), 2001, (1): 8 (In Chinese)
[3] The Service Revolution in Global Manufacturing Industries[EB /OL].
[4] Pilat D. Wolfla. Measuring the Interaction Between Manufacturing and Services[M]. OECD Science Technology and Industry Working Papers, OECD Publishing, 2005, (5): 6-8
[5] Drucker P.E.The Future of Manufacturing[J]. Interview for Industry, 1998, 21(9): 9-16