

# Vocational Education and Training and the Labour Market – a Comparative Analysis of China and Germany



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# **Vocational Education and Training and the Labour Market –**

**a Comparative Analysis of China and Germany**

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# Preamble

Technical Vocational Education and Training (TVET) in Germany and China as well as issues related to it are a central aspect of this concise publication. The challenges faced are diverse and immense in Germany and China. The development of Technical Vocational Education and Training (TVET) is a major concern of the strategies in both countries.

The approaches of the TVET policy in Germany and China is outlined and contrasted in this publication. While describing emerging models for TVET in Germany and China the writers pose searching questions about the impact of the new trends on the German and Chinese TVET sector against the backdrop of globalisation.

The meaning and practice of work in knowledge economies, such as Germany and developing China, in globalized networks of production and trade are changing. The need for a highly skilled and productive workforce is shaping economies all over the world.

The two countries concerned partly cope with the challenges faced in similar and sometimes dissimilar ways. However, there are lessons to be learnt from case studies such as those described in this publication can serve as an impetus for further methodological analysis, policy and curriculum development.

The academic community is aware of the important implications of the development of TVET in fast developing countries. As China has enjoyed special attention in German development cooperation, the reforms in TVET and its structures are the subject of analytical debate in this book.

We hope that this book will be of service to both researchers and lecturers in the study of TVET in Germany and China, as well as for the broader context of internationalisation in TVET and programme delivery.

Magdeburg, November 2008

PD. Dr. habil. Frank Bünning


# Preface

## „Vocational Education and Training and the Labour Market – a Comparative Analysis of China and Germany“

The key role of education and training in national development has been universally recognized. Vocational education and training is one of the most productive elements of education. In addition to preparing individuals for the world of work by teaching them skills and competencies needed for economic competitiveness, TVET also assumes a degree of responsibility for the personal development of its learners, and for their effective participation in society. In addition, well-designed TVET programs have a particular capacity to contribute to sustainable developments. The meaning and the practice of work in knowledge economies and in globalized networks of production and trade are changing. The need for a highly skilled and productive workforce is shaping economies all over the world. To increase their chances for employability, young people and adults need skills that are flexible and relevant to the demands of today's societies, where individuals must possess a combination of knowledge, practical and social skills and positive attitudes, as well as the ability to think and act independently, creatively and responsibly.

This paper introduces the approaches and models of using the (vocational) education system to train skilled workers in order to meet labour market needs from both the German and the Chinese perspective, taking into account different cultural backgrounds, legal frameworks as well as historical and recent developments within the education system of both countries. The following areas are considered in detail:

- Which implications do the political frameworks of both China and Germany hold for the respective education systems and the access to the labour market?
- How are the vocational education and training systems in both countries organized? What are the legal foundations, how are the systems structured, which role does skill assessment play in achieving labour market compatibility?
- What are the strengths and weaknesses of both systems regarding labour market access? Which implications can be drawn from the comparison of both countries?



I hope that this paper will be of service to both researchers and vocational education professionals in the comparative study of vocational education and training in China and Germany as well as for the broader context of internationalization in the training of skilled workers for the labour market.

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# 1. Introduction

## 1.1. Aim and scope of the paper

China and Germany – two traditions, two systems, two possible solutions? Both countries are in the middle of the globalisation process and face new challenges. China is celebrated as the booming future market and Germany is acknowledged as one of the economic driving forces of the European economy. To maintain this acknowledgement, the best modern technology is to be developed and the employees are to be trained the best way possible. The TVET systems of these countries are also forced to adapt themselves to the requirements of the international market, especially the labour market.

This paper focuses on three different priorities. The first section describes the two different countries and the situations these countries are facing. A basic understanding of the different TVET systems, which are based on different traditions and issues, are to be given in the second section. Especially the differences of both systems are to be emphasised. This second section is the basis for the analysis of both labour markets and their requirements, which is the main focus of the third section. The third section contains the main question of this paper. The requirements of the labour markets as well as possible answers to these requirements by the TVET systems are to be explained. This part is to show the strengths and the weaknesses of both systems and deals with the question of how they can make profit mutually.

## 1.2. Structure of the paper

In order to give basic information the paper initially introduces the political frameworks of China and Germany. In the second section, the labour markets and the employment access systems of China and Germany are described. The needs of the labour markets and the special characteristics of both are to be explained. The TVET systems in China and Germany and especially the skills assessments are the focus of the third section. It is to be shown how the TVET systems are organised and what they offer the markets. The fourth section serves to compare the strengths and the weaknesses of the TVET systems in connection to the labour markets. In a comparison it is to be shown how both systems answer to the needs of their respective market.

In the last section, the conclusion, it is to be made clear what can be learned by this comparison and what needs to be considered in the vocational education.

## 1.3. Political framework of the TVET system in China

### 1.3.1. Political framework - introduction

The People's Republic of China is situated in East Asia and is the most populated country of the world with 1.3 billion inhabitants. It consists of 23 provinces, 5 autonomous regions and 4 centrally administrative municipalities. China has 56 ethnic groups, of which 93% are Han Chinese and 7% are minorities. China has a 4,000 years-old culture and today is considered a communist state by the western countries, in which the important decisions are made by political elites. The governmental structures are controlled by party members. The Chinese Communist Party is organised hierarchically in levels: village, county, province, and national. The country is regulated by the Constitution of the People's Republic of China. President is Hu Jintao and Premier is Wen Jiabao. Politically paramount are the People's Congress and the Communist Party of China (see The Central People's Government of the PRC, 2005).

The vocational education system is centrally controlled by the government. Over the past years shortages of skilled workers have emerged due to the rapid economical growth. The need to improve international competitiveness and adopt modern technologies in various industrial fields demands not only professionals and engineers, but also large quantity of technicians and manually skilled workers. Accordingly, China has dedicated itself to improve its vocational educational and training system in response to the period of economic transition. Vocational education in China is therefore promoted by the government and is seen as a possibility to improve the qualification of the skilled workers and accelerate the technical development. However, with the continuation of the economic reforms and the industrial restructuring, vocational education faced new challenges.

### 1.3.2. China's economy, the WTO and the future market

On December 11th, 2001, China joined the WTO. After fifteen years of negotiation it was a historical step into the international market (see Werner 2004, 11).

For China with its large market it made way for an important reform. The WTO, whose aim is the development of an integrated, functional, multilateral trading system, asked China to fulfil different standards. The government of China needed to make sure they accomplish the reduction of economic barriers against the international market.

In addition, it had to confirm that the rule of national treatment was in use, i.e. the foreign and the home competitors have the same status. It was also to be made sure that China granted each WTO member the same advantages regarding products and services. Different laws and orders had to be reformed, e.g. concerning financing.

The entry into the WTO meant a better situation in the international market for China. China, which was the sixth biggest trading nation in 2001, devotes itself through the WTO to

get better connections to the international market and to develop the domestic market (see figure 1). The new statistics of trading and productions of 2005 and 2006 and the annual rate of increase of economic activity (see International Monetary Fund 2007) seem to confirm these hopes.

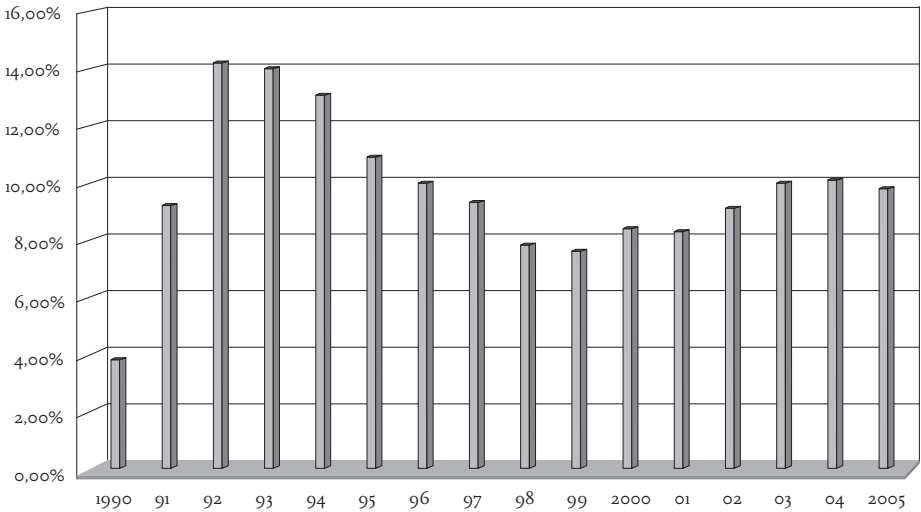


Figure 1: China’s Real GDP growth from 1990-2005 (See Fischer 2005, 19)  
 Source: National Bureau of statistics of China, 2005.

China seems to have arrived in the globalisation with both its advantages and disadvantages. Due to the fast technical progress and the world wide competition, China is in the position of having to find its own solutions. China has a high number of employees and a big outlet at its disposal, but it considerably lacks new technologies, know-how and the needed education to use these potentials in the best way.

Through the economic opening, China uses the chance to get foreign capital, modern technologies and new concepts of management and education into the country.

The low earnings and the low costs of living impact this development positively. China’s economic development is not an unforeseen event. The membership in the WTO was an opener to the fast development that can be seen now.

With the rapid economic development in China a significant structural changes in the sectors has also happened. Since 1978, the proportion of employment in the agricultural sector sank from 80% to 50%, while employment in the services sector increased from 10% to nearly 30% and in the industry sector from 10% to about 20%. Since 2000, the industry sector makes

up more than 50% of the Gross Domestic Product (GDP) at 2004: 53% (see figure 2). It can be seen clearly that the structural changes are profound, as the WTO offers the opportunities to open the services sector to foreign companies. It leads to restructuring of employment and human resource development (see *ibid* 2005, 12).

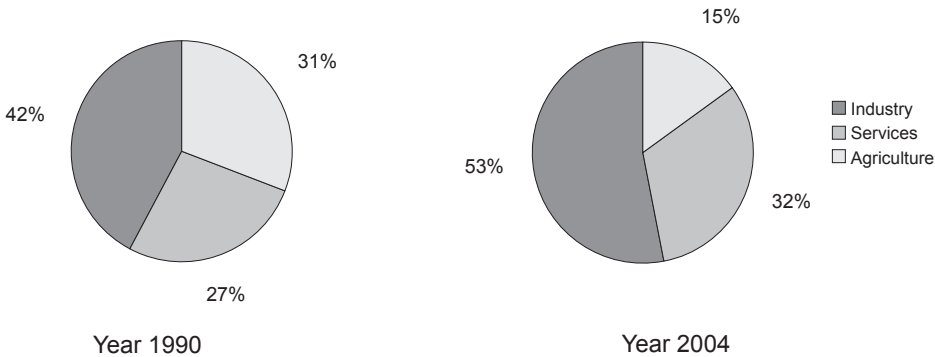


Figure 2: Structural Changes in GDP (See *ibid* 2005, 12)

As has been explained above, China experienced a reform process with the goal to transform the agrarian country into an international, competitive industry and services society. State properties and planned economy were reformed in a socialistic market economy. The development has led to the fact that today 90% of all companies and 50% of all employees work in the private economy sector (see figure 3) and is therefore one reason for these high growth rates of the last years (see Heberer 2005, 34). Another reason is the high foreign investment (see Werner 2004, 10).

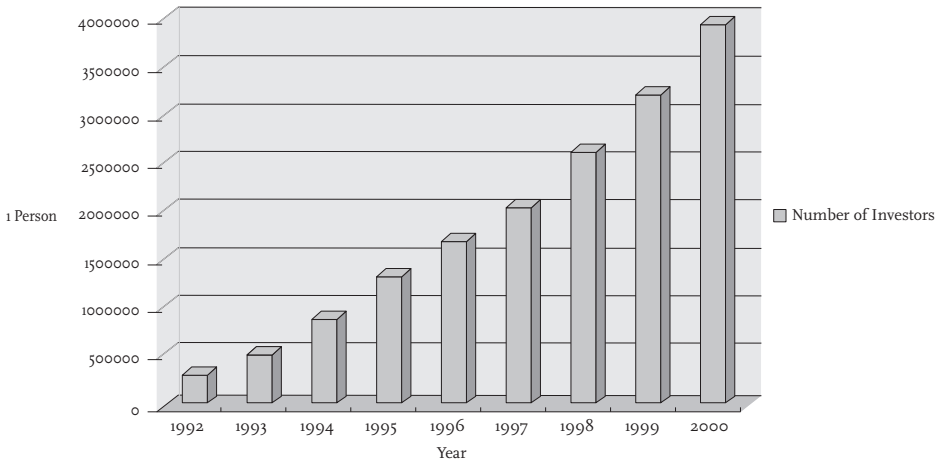


Figure 3: Growth of number private owners and investors in China  
(See Huang P., Frank N. Pieke, 2003)

Source: National Statistical Bureau, 2001

In the last years a lot of different joint ventures were arranged. Many different multinational companies built their manufacturing and production facilities in China. Also different centres of research and development were established. The Chinese state economy tried to use western concepts of management and company systems to modernise their companies and to start the economy moving.

In the course of new joint ventures also modern technology and equipment were imported to China. The Baoshan steel company in Shanghai, which introduced the modern concepts of management and the modern technology, is just one example. Today it is one of the most competitive companies in China. A lot of German investors also established joint ventures in China, as for example Volkswagen, Siemens, Bosch, BASF, Bayer, Thyssen and a lot more (see Xu 2003, 34f).

These joint ventures have led to highly-developed technologies and products, but in many fields standards are still missing. In this regard the government started programmes to support centres of development and research (see Fischer 2005, 13).

Therefore, the Chinese system is confronted with a new problem – the education of technicians in theoretical and practical know-how. The rapid development of the economy goes together with a structural change, which also affects the labour market and the demand on employees.

### 1.3.3. Issues and Problems

#### **Lack of Resources and Environmental problems**

The great demand for goods (e.g. oil, coal, copper and hematite) and energy leads to a big problem. In many parts of China the supply of these goods is not assured. Therefore, China is obligated to import these resources from other countries, which leads to higher prices for such goods on the international market and the products on the market in the home country (see *ibid* 2005, 11). Another problem the Chinese government pointed out is the ineffective use of such goods. It becomes clear that the economic growth is based on an ineffective use of goods and energy. As an answer, the government started a plan to reduce the use of goods and energy in a restricted area by about 20 percent (see Liu/Jiang/Trowe 2006, 38). Another answer was to develop new forms of energy gaining, which has led to new problems.

In the international press, the building of big dams was highly recognised. They were to help gaining energy, but the politics of resettlement of people living in this area and the way of building was sharply criticised (see *ibid*, 39).

Not only the problem of a lack of resources, but also the environmental problems increase. The problem of the damaged environment and of poisoned rivers, air and ground is a consequence of China's economic boom. Smog over the big economic cities seems to be a normal appearance due to the new economic development. It needs to be pointed out that this is a sign for heavy pollution and is a health risk. Liu, Jiang and Trowe made clear that it is also in the responsibility of vocational education to sharpen the understanding and to improve the education regarding the environment.

#### **Migration Issues**

According to a survey in 2000, there were 131 million migrations in China, who left their places of household registration and moved to middle and urban cities. (see Boyd.2005, 29). A recent report in the magazine of Chinese Academy of Social Sciences estimated the number of rural migrants to 150 million (see Tang Jun, 2005). The shrinking agricultural sector and expanding industrial and service sectors, together with the political reform in the last decades lead not only numerous state-owned companies to bankrupt, through which between 40 and 200 million surplus labour force emerged (see Hesse 2005, 3) but also compel 80-150 million non-trained surplus workers from rural areas try to find employment in urban areas with the expectation of low salaries (see Fischer 2005, 14).

According to the 1% annual growth rate in urbanization, it is believed that the migration population will increase to 300 million in the next 20 years. Currently the urbanization rate is 1.4% and it reveals that each year about 20 million farmers become urban residents (see Liu He, 2006).

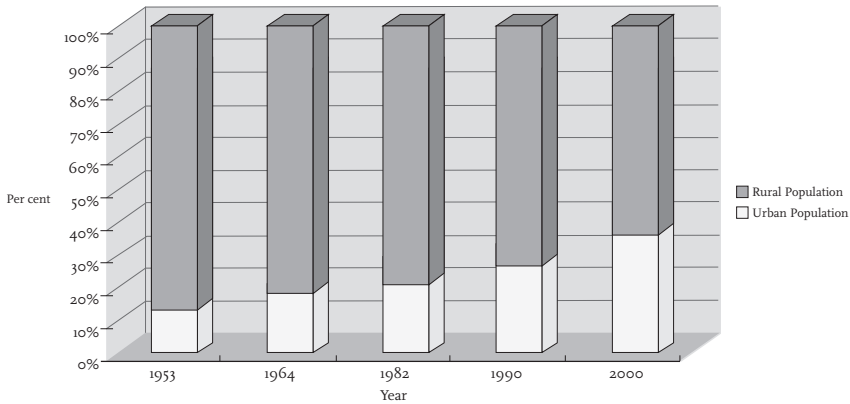


Figure 4: Rural-urban population ratio in the 2000 national census (Huang P., Frank N. Pieke, 2003)  
 Source: National Statistical Bureau, 2002

### Educational Background

According to a survey in 1999, most migrants had a junior high school diploma, obtained after completing the nine years of compulsory education, only few of them have received vocational skills training in vocational education schools (see Figure 5). It is an index that human capital of migrants in China is far not enough to meet the economical and technical challenge.

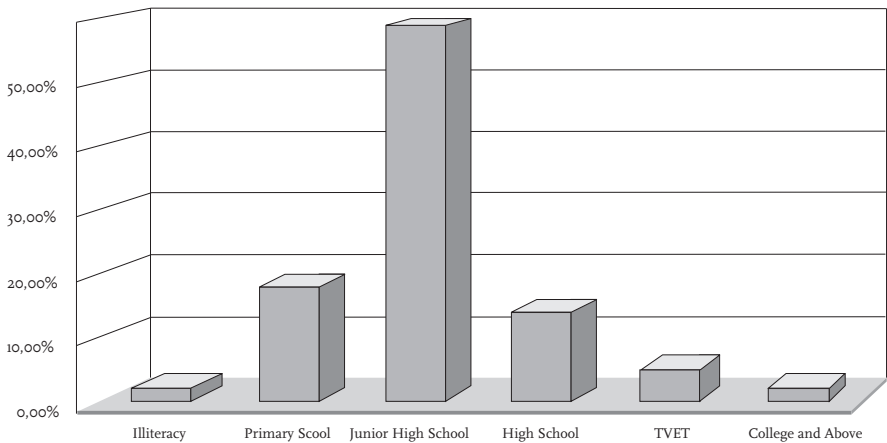



Figure 5: Educational background of rural labour migrants, 1999 (Huang P., Frank N. Pieke, 2003)  
 Source: Employment and Migration of Rural Labourers in China, 1999



Though their plight was overlooked for many years, improving educational opportunities and conditions for migrant workers has now been promoted to the top of the national agenda. Through the opening political measures and the experiences gained from international co-operations, China and Chinese companies have benefited from Western industrial countries. At the same time, the Chinese TVET system is confronted with new requirements.

## 1.4. Political framework of the TVET system in Germany

### 1.4.1. Political framework – introduction

The Federal Republic of Germany is a country in middle Europe with a population (2006 est.) of 82.5 million people (Das Deutschland-Portal 2006). As the name of the country implies, it is ruled and politically organised by the concept of federalism. The rules, regulations and laws usually form a guiding framework, which the 16 Länder (federal states) that constitute the Federal Republic of Germany have to complement with specific laws according to the right of the federal state. While in some cases and fields the political powers and rule-giving responsibilities are shared between the federal government and the 16 federal states, other fields (such as education) fall within the lone jurisdiction of the Länder.

Germany's technical and vocational education and training (TVET) system, and especially the dual system, is one of the fields in which government and Länder share responsibilities. Here, different rules, regulations, actors, goals and emphases play a significant role in the historical development and design of the system.

Overall it can be stated that the Vocational Education Law (Berufsbildungsgesetz – BBiG), first passed in 1969 and reformed and amended in 2005, covers regulations for the vocational education system as a whole for all of Germany (a more detailed introduction to the law will be given later). However, any part of vocational education delivered in vocational schools is regulated by school laws (Schulgesetze) under the jurisdiction of the Länder, since they are autonomously responsible for school-related issues. An overview of the different vocational pathways will be given later in this paper. The following figure shows the actors in the vocational education system of Germany on the various levels.



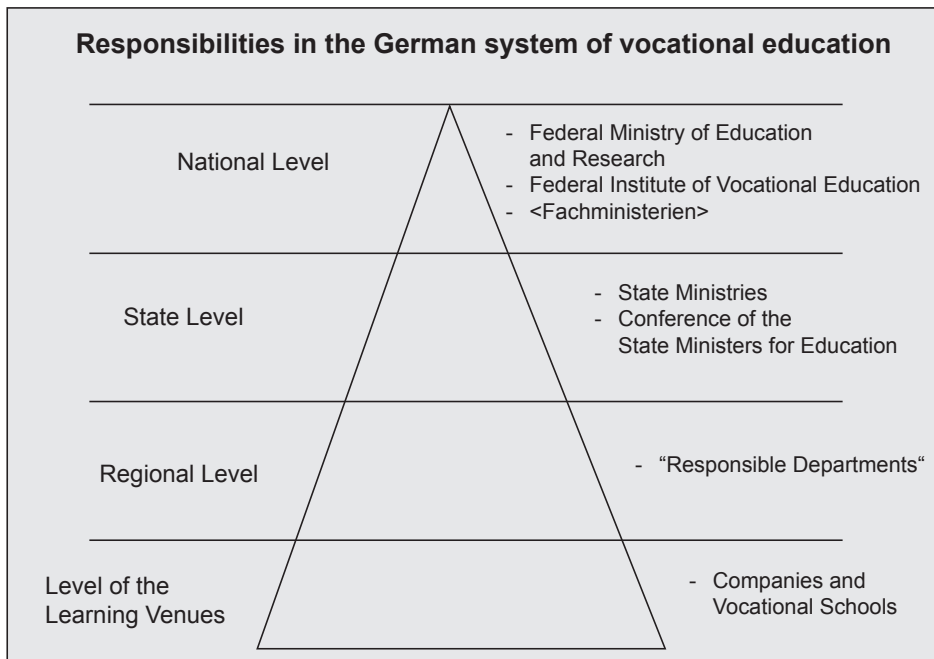


Figure 6: Responsibilities in the German system of vocational education (own chart, taken from Bundesministerium für Bildung und Forschung 2007)

Thus, in Germany's dual system of technical and vocational education and training these parts of vocational education delivered in companies is regulated by government law, while the content delivered in vocational schools might be regulated by 16 different laws and regulations for the same profession.

#### 1.4.2. Germany and the European Union and the reform of the economic motor

At the beginning of the 21st century, Germany began to reform its system to be prepared for the new global economic situation. The Agenda 2010 and the following reforms were milestones on the way of the development. The goals are to reform the economic system, the financial system and the labour market, but they also have effects on the education, especially on the vocational education system. The reform was to ensure that Europe and especially the economic motor Germany go through an economic growth again and that the level of employment becomes higher again, but the quality of education remains at the same high



standard. Therefore, the question of these reforms is not how Germany can grow despite the fact of globalisation; the question is how Germany can grow with the globalisation.

The reforms were to rearrange the taxes, the social security contributions and the conditions at the labour market, so that Germany was able to become competitive to the other countries in the world.

The reforms affect different areas. Concerning the economy a new framework has been planned, so that the trade rules are able to be changed and the qualification of workers are able to be improved. Another aim was to support and strengthen the economic middle class, which is very important for the German economy. By changing the salary charges, this middle class is to become more employable and more competitive. Furthermore, the lowering of taxes for companies is to support this step.

With regard to vocational education special programmes for young people have been created. They are to strengthen the education and help to improve the bad situation at the labour market due to a lack of qualified personnel. Furthermore, the practical and theoretical content of vocational education has been revised, which is to help guaranteeing the high education standards.

This reform of the vocational education, especially the reform of the Vocational Education Law (Berufsbildungsgesetz – BBiG), is the basis of a modern and internationally accepted education system.

The creation of basics for a reorganisation of education and training is important. Furthermore, new procedures for tests and exams, better networks of education and further education, installing instruments of quality assurance and increasing possibilities for going abroad are to give the education and training the quality it needs to compete on a high level internationally.


Furthermore, the basic education, which is important for vocational education, was supported.

The spending on education was raised and the facilitation of education of young people was improved. Therefore, the full-time day schools were promoted in order to offer a better basic education.

First results seem to show the success of these reforms, as for example in the decrease of the numbers of unemployed persons.

### **1.4.3. The challenges of the German economic development**

One of the issues the government faces regarding the German labour market is the high cost for social security contributions. It seems that they are responsible for higher prices and higher costs of production. They also seem to be an obstacle for the creation of new jobs.



The unemployment rate is another problem concerning the German economic environment. One of the consequences of this issue is that additional money needs to be raised through higher taxes and charges. The companies are also affected because they are burdened by these dues. Therefore, the problem of high unemployment also slows down important developments which are needed in the market, because state and companies need to use their power and capital to solve this problem. For over a year now the development has been going into a new direction and the unemployment rate has decreased, and therefore there is spare capacity for new developments.

New developments and new economies also need the best qualified workers. However, the number of qualified workers on the labour market in Germany does not always meet the demands of certain branches in industry and trade, which in turn results in vacancies that cannot be filled due to a lack of workers with relevant qualifications for those vacancies on the market. Nevertheless, the German system of vocational education offers a variety of possible solutions to this aspect.

Some research also shows that a small percentage of an age group lacks knowledge in certain areas of general education. Not every young person who enters the vocational education system has the basic knowledge that is needed as a starting point for a good vocational education. Germany's vocational education system strives to offer preparatory pathways for those in need of additional general education in preparation for a vocational training course.

## **1.5. Two markets- two possible solutions?**

Under these conditions the two states try to find their best way to solve the problems. It seems to be evident that a good education and a good qualification are the basis for better chances in these labour markets. The markets need the best qualified personnel for more success – that seems to be sure.

But what exactly do the markets need? What is their demand? And how do the different education systems react to this demand? The next sections of this paper will try to give answers to these questions, will point out the differences in these answers and try to explain what one is able to learn from them.

# 2. Labour markets and employment access systems in China and Germany

## 2.1 Labour markets in China

The rapid economic development results in environmental issues, income disparities and the restructuring of the industrial sectors. Meanwhile the changing process from labour intensive to high-order production has happened gradually. In 2004 the share of workers employed in the agricultural sector amounted to 50%, in the service sector to 30% and in the industrial sector to 20% (see Fischer 2005, 12). The need to improve international competition and adopt modern technologies in many branches of industry demands increasingly technicians, manually skilled workers and administrative personnel. The quality and quantity of the labor force has a great impact on the economical development. This means that the connection between economy and vocational education in China is closer than before.

However, due to the underdeveloped vocational education system, the qualification requirements of skilled workers in China have increased rapidly and enormous problems have emerged on the labour market. For instance, the demand for high-qualified workers is far higher than the supply. Both quality and quantity of manpower are by far not enough to meet the demand of the market. At present there are 70 million skilled workers in China, of which the semi-skilled workers represent 60% and the intermediate workers 35%, while the high-qualified workers (senior skilled workers) only amount to 5%. The last number is around 30 – 40% lower than in the developed countries (see figure 7). The low-qualified workers lead to a low productivity. At present the productivity of each worker in China amounts to only 1/26th compared to Japan and 1/25th to the USA (see Yuan, Chao, 2002).

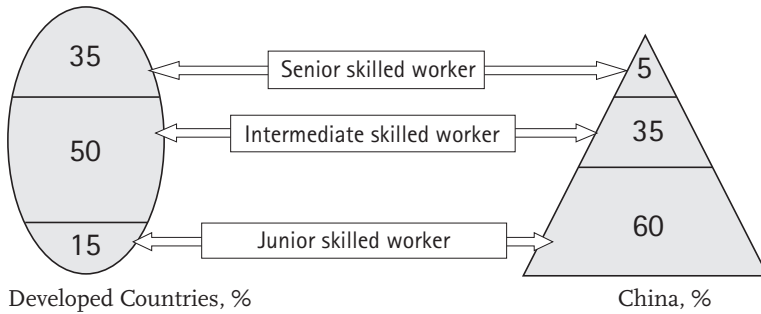


Figure 7: Comparison of the qualification structure of skilled workers in developed countries and China (Jiang 2006).

## 2.2 Employment access systems in China

In order to co-ordinate the discrepancy between the qualification of the skilled workers and the requirements of the labour market, a National Vocational Qualifications system has been developed in the last few years. This system is a special vocational examination system (Categorisation Examination), which evaluates and reflects the work-related, competence-based skills and knowledge of the candidate (see Evaluation of National Vocational Qualifications, 2006). This examination is open to everyone at any age or stage of their career. Academics, skilled workers as well as the graduates of vocational schools are supposed to take part in the “Categorisation Examination” to get a “Vocational Categorisation Certificate”, which is awarded by the Ministry of Labour and has been nationally unified in the last few years. The Categorisation Certificate is taken as application requirement for most state authorised professions (see Zhao/Zhiqun 2003, 17) and differentiated into five levels (see figure 7) from the semi-skilled worker level to the high-qualified and professional level (see Ministry of Labour and Social Security PRC, 2005a). Each candidate is supposed to fill the correspondent formal entry requirements according to their academic or practical background. This vocational certification system has been improved gradually in response to the new economical and technical challenge in the globalisation era.

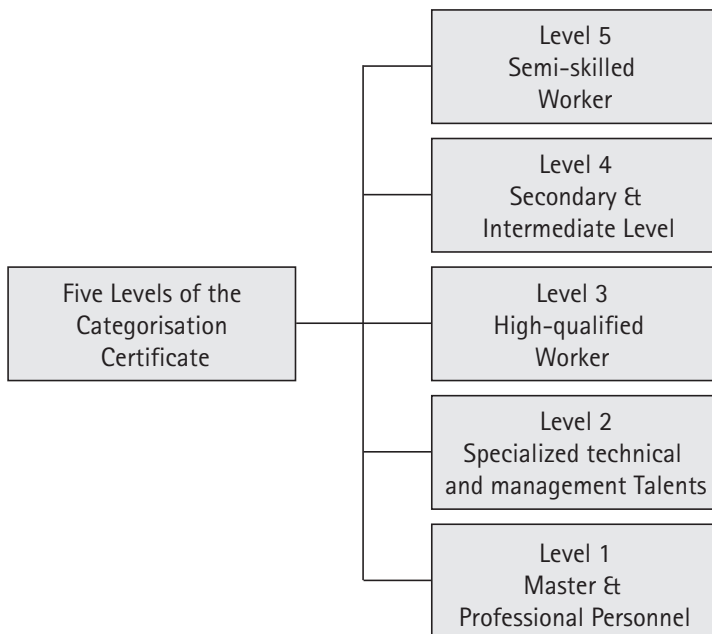


Figure 8: Five Levels of the Categorisation Certificate in China (own chart)

In China, the “vocational classification” is issued by the government in the “Labour Law of the P.R. of China” and orientates itself towards concrete professions, which are totally different from the “Ausbildungsberufe”<sup>1</sup> in Germany. „Vocations Catalogues in the P. R. of China“ represent the concrete vocational classification that is jointly compiled and authorised by the Central Government and numerous researchers and experts. This Catalogue was formally issued in 1999 and includes eight major categories, 66 categories and 413 subcategories. Totally there are 1,838 small categories (vocations). The eight major categories are (see Vocations Catalogues of P.R. of China, 2005):

- state organs, the relation between the responsible persons of organisations, enterprises and institutions;
- professional and technical personnel;
- staff and associated personnel;
- commercial, service personnel;
- personnel working in agriculture, forestry, animal husbandry, fishery and in the water

<sup>1</sup> The concept of „Ausbildungsberufe“ will be explained further in section 3.1.1.

- conservancy industry;
- production, transport equipment operators and related personnel;
- military personnel;
- the classifications of employees not named.

According to the rapid technical and economic development new vocations emerge instantly. In 2004, 1979 vocations were issued and most employment access was directly related to a „national vocational qualification certificate“ (see Xinhua, 2007).

From 2007 on, the “Categorisation Examination” will be nationally organised in a unified way (see China Labour Market, 2007), which means the examination centres from all over the country are centrally controlled and arranged; the evaluation criteria for each vocation and the Vocational Categorisation Certificate are centrally issued by the government and the Ministry of Labour (see Ministry of Labour and Social Security PRC, 2005b). The skills assessment and the evaluation criteria are based on both the “vocational classification” and the national occupational qualification standards. These standards are statements of performance that describe what competent people in a particular occupation are expected to be able to do. The skills assessment standards have diverse dimensions and represent theoretic knowledge as well as practical activities of the candidate (see Ministry of Labour and Social Security PRC, 2006).

Until now there have been 11.82 million people participating in the “Categorisation Examination” and 9.25 million of them have been granted a “Vocational Categorisation Certificate”. It is presumed that in 2007 more attention will be paid on developing the evaluation criteria of modern manufacturing, construction, energy, environmental protection, traditional industries, electronic information, aerospace, new technology industries and services sectors (see Xinhua, 2007).

## 2.3. Labour Markets and Employment Access in Germany

In Germany, the employment rate of currently 65.4% is slightly above the European Union average of 63.8 %. The majority of these 65.4% are employed in the services sector (approx. 24.7 million) and within that sector predominantly in public and private services (approx. 10.8 million). The industries and trade sector is the second largest employer in Germany with approx. 7.2 million employees. The construction business is third with approx. 1.7 million workers. The agricultural sector only has a small (and declining) share in the labour market with about 445.000 employees (see Bundesagentur für Arbeit 2006).

Supply for the labour market in Germany is primarily secured by two main sources. On the one hand, there are young people entering the labour market after finishing tertiary education at universities or universities of applied sciences. On the other hand, there are students joining the work force after finishing vocational education in the dual system or in full-time vocational schools (especially for health care professions – for an overview of the German education system see chapter 3. 2). 19% of an age group had achieved a university

degree in 2002 (see BMBF 2004).

However, the demand for specialised skilled workers is very high. There is a deficit in medical specialists as well as highly specialised engineers (e.g. electrical engineers with a focus on medical technology or mechanical engineering) (see Bundesagentur für Arbeit 2006). Thus, as Schleicher points out, job entry qualifications obtained in the tertiary education sector in Germany have bigger relative advantages compared to those obtained in secondary education than in most of the other OECD-countries (see Schleicher 2006, 433; Koch 1998, 13). This is because manual and routine labour, as Tessaring (1996) argues, is becoming less important in favour of complex work tasks in highly specialised working environments, at flexible industrial facilities as well as in specialised, consulting-intensive services (see Tessaring 1996, 35). From this argumentation it can be reasoned that on the German labour market, a shift in demands and a shift in job specifications has been taking place.

Some authors (Eichhorst/Profit/Thode 2001, 12; Rothe 2004, 29) even argue that a structural “mismatch” between supplied and demanded qualifications on the labour market can be identified. Koch (1998) characterises the change in job specifications and the tendencies in qualification demands as follows:

- declining demand for employees in production-orientated tasks and primary services (such as general office work);
- declining demand for unskilled labour because of the increasing use of microelectronics and the shift of work-intensive tasks to countries with low variable costs;
- increasing demand for highly skilled labour because of the introduction of new production and work concepts for dynamic markets;
- increasing importance of the ability to plan, coordinate and supervise automated production processes;
- increased requirements through the use of information technology;
- increased requirements in personal competence in dealing with customers as well as in co-operating on the job (see Koch 1998, 13).

The aim of the paper, as introduced in Chapter 1, is to discuss whether the vocational education systems in Germany and China are able to correspond to this changed demand in qualifications and skilled labour. Therefore, after the introduction of the labour markets and employment access systems in China and Germany were introduced, an overview of the (vocational) education systems of both countries is given in chapter 3 to be able to draw a critical comparison in the concluding chapters.



# 3. TVET systems in China and Germany

## 3.1 Legal Framework

### 3.1.1 Germany

As already introduced earlier, the Vocational Education Law (Berufsbildungsgesetz) is the overall law for vocational education and training, including the dual system, in Germany. Apart from that, the school laws (Schulgesetze) of the federal states play a significant role in the design of the vocational education system. Vocational Training Directives (Ausbildungsordnungen) describe rules and regulations for the training in specific professions<sup>2</sup> for the in-company part of vocational education.

The Vocational Education Law provides for the following fields of vocational education:

- Part 1: General rules and regulations;
- Part 2: Vocational education (including regulations on the dual system, further education, vocational education preparation etc.);
- Part 3: Organisation of vocational education;
- Part 4: Vocational education research;
- Part 5: Federal Institute for Vocational Education and Training;
- Part 6: Monetary fine regulations;
- Part 7: Transfer- and final regulations (see Bundesinstitut für Bildung und Forschung 2005).

Part 1 of the law gives detailed explanations about the overall aim of vocational education. In § 1(3) it states that vocational education and training needs to supply (in a formally structured vocational pathway) the vocational knowledge, skills and competencies necessary to carry out a qualified profession in an ever-changing working environment. Furthermore, it is to make the acquisition of working experience possible (see *ibid.*, p.4). §2 distinguishes the places where learning in the system of vocational education takes place (Lernorte). These are companies for the company-based vocational training and schools for the school-based part. The two “learning locations” need to co-operate according to §2 (3, 2) of the Vocational Education Law.

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<sup>2</sup> Vocational education science in Germany distinguishes between different concepts of “profession”: “job” (Erwerbsberuf) as a means to earn money as opposed to “training profession” (Ausbildungsberuf) as a formally structured, officially recognised set of skills and knowledge acquired through a vocational training course.

In §5, the Vocational Education Law also provides regulations for the design and content of Vocational Training Directives (Ausbildungsordnungen).

As mentioned above, these policies formalise professions that students in the vocational education system can choose to be trained in and which conclude with a formal examination and a certificate that is universally recognised all over Germany.

According to the law, these policies need to include the following points for every formalised profession to be obtained through vocational training:

- name of the profession;
- duration of training (not more than 3, not less than 2 years);
- the knowledge and skills at least to be obtained in the vocational training;
- a guideline for the factual and timely structure of the dissemination of the skills and knowledge required;
- examination requirements (see *ibid*, p.4)

At the time of writing, students entering the dual system of vocational education and training can choose from 343 officially recognised professions for which Vocational Training Directives are laid out (see Bundesinstitut für Berufsbildung 2006). It has to be pointed out, however, that these directives only cover regulations for the in-company part of vocational education.

Since the learning locations (Lernorte) in the dual system are co-operating by law, regulations have to be laid out for the school-based part of vocational education. The question of education in general, as explained earlier, falls within the responsibility of the federal states. Therefore, specific rules and regulations on (vocational) schools can be found in the school laws of the Länder. Since a large proportion of students entering the vocational education system leave secondary school at the age of 16, compulsory schooling (Schulpflicht) still applies. The number of years that students in Germany have to remain in school varies in the different states. On average, however, the mandatory time in school is 9 years. Therefore, vocational schools in the dual system not only fulfil the role of a vocational education provider, but also cover compulsory schooling for those students leaving secondary school. An overview of the German education system in general and the vocational education system specifically will be given in section 3.2.1.

### 3.1.2 China

Vocational education is one of the most important components of the entire education system in China. In 1996, the first „Vocational Education Law“ in China was formally promulgated and implemented, providing legal protection for the development and perfection of vocational education.

The vocational education law in China is difficult to implement regarding the concept of the school management, the co-operation between vocational schools and enterprises as well as the regional diversion. In the recent years, vocational education and training in China is compelled through gigantic economical dynamics. Now it is time to reconsider and reflect on

the implementation of the “Vocational Education Law”.

The Vocational Education Law includes the following important elements (see Ministry of Education PRC, 1996):

- Part 1: General Provisions ;
- Part 2: The System of Vocational Education ;
- Part 3: The Implementation of Vocational Education ;
- Part 4: The Guarantee of Vocational Education ;
- Part 5: Supplementary Provisions.

The education administrative department, the labour administrative department and other relevant departments of the State Council are jointly responsible for the Vocational education and training schools (see Ministry of Education PRC, 1996). At the beginning of the 1980s, the Chinese Government paid almost all the costs of vocational education. Today the source of funds of vocational education comes from the educational budget of the Central Government as well as state and private finance. However, the Central Government still plays the most important role for the finance of vocational education schools (see figure 9).

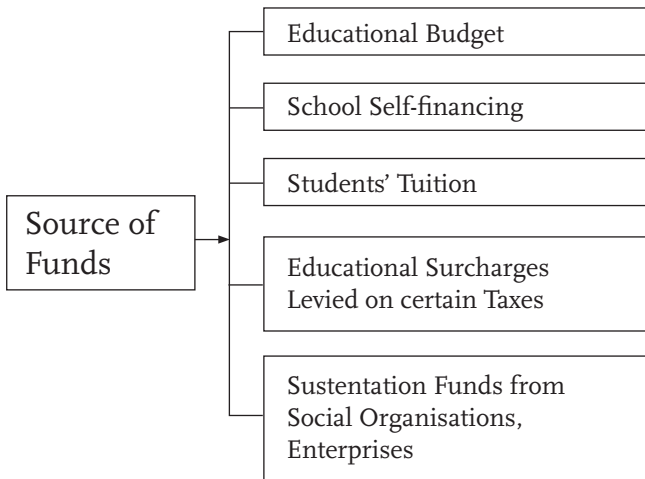


Figure 9: Source of funds for the VET system in China (Jiang, 2006)

However, the Vocational Education Law is supposed to be filled with more detailed regulations. Compared with the German vocation education law, these regulations and policies are relatively roughly stated. It provides neither the regulations for the design and content of Vocational Training Directives (like Ausbildungsordnungen in Germany), nor specific policies for formalise professions.

Another example, in Chapter 2 (14) states that vocational training includes the following various kinds of training forms: training for army personnel who is transferred to civil work, training before employment, training for apprentices, on-the-job training and other transfer training etc. However, in Chapter 3 (23) it has no particular provisions for the conducting of vocational training:

**"In conducting vocational education, vocational schools and vocational training institutions shall combine education with practice, serve the local economic construction, maintain close ties with enterprises and train practical personnel and skilled workers. Vocational schools and vocational training institutions may run enterprises and training places regarding the vocational education."**

And in Chapter 4 (37):

**"Enterprises and institutional organizations shall accept students and teachers from vocational schools and vocational training institutions to do practice; those doing practice on certain posts shall be paid properly." (see Ministry of Education PRC, 1996)**

Although it is stated clearly that the acquisition of vocational training and payment for practical personnel and skilled workers is possible through the support by enterprises and vocational training institutions, without detailed provisions the cooperation relationship between companies and vocational schools is troublesome to be implemented in China.

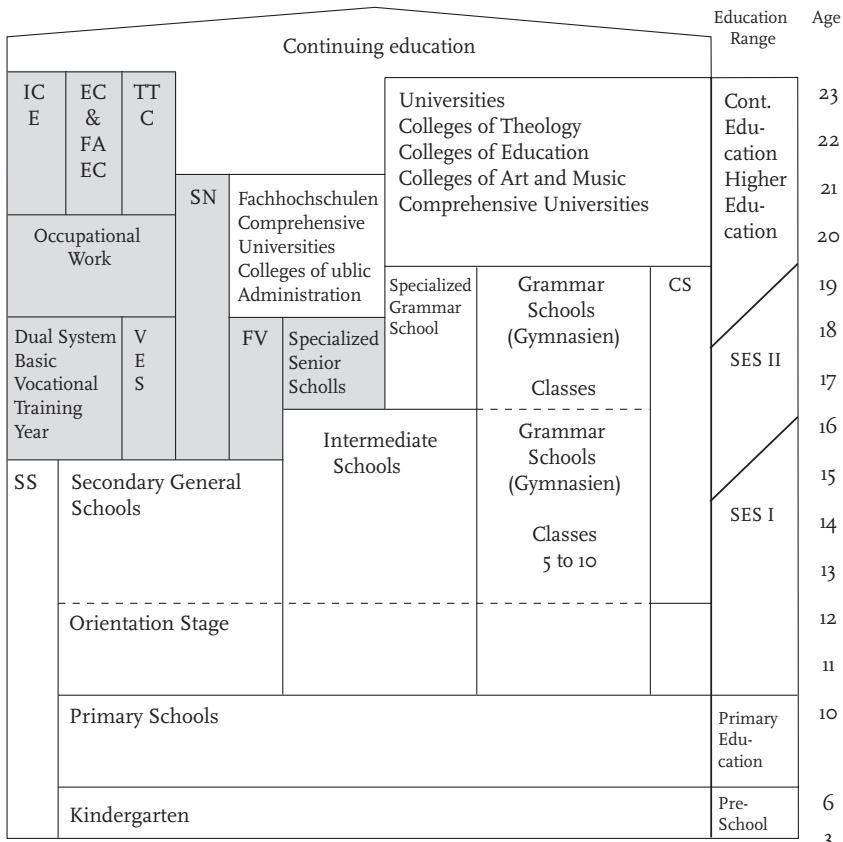
## 3.2. Structure

### 3.2.1 Germany

The figure (see Figure 8) below gives an overview of the German education system. The vocational education system within that system is highlighted.

As can be seen from the figure, vocational education in Germany starts after finishing secondary general education at the earliest. In Europe, Rothe points out, Germany is seen as the country of primary vocational education, especially in the form of in-company training (see Rothe 2004, 28).

However, the average age at which students joined the vocational education system in 2003 was with 18.9 years (see *ibid* 2004, 29). This is due to a variety of reasons like entry into military service prior to continuing education, desire to obtain the highest degree possible in the general school system (Abitur) or lack of apprenticeship placements, to name a few.



- Abbreviations:  
 CS – Comprehensive Schools  
 SS – Special Schools  
 FV – Full Time Vocational Schools  
 SN – Schools for Nurses  
 VES – Vocational Extension Schools  
 EC & FAEC – Evening Classes and Fulltime Adult Education Colleges  
 TTC – Trade and Technical Schools  
 ICE – In-company continuing education  
 SES I – Secondary Education Stage I  
 SESII – Secondary Education Stage II

Figure 10: Basic Structure of the Education System of the Federal Republic of Germany (own chart, see Bundesministerium für Bildung und Forschung 2007)

Following the decision to enter vocational training, different vocational pathways are open to the students. They may choose to enter into the dual system, which is the focus of this paper. Prior to this, some students may decide to attend a basic vocational training year. Other pathways are: entering a vocational extension school, opting for full-time vocational education (school-based only), attending schools for nurses and midwives or choosing to continue education with a vocational training focus at a Fachoberschule. The following table summarises the different options.

Table 1: Vocational pathways in Germany’s vocational education system

Vocational pathway	Description	Minimum qualification for entry	Qualification upon completion
Dual system	Vocational training is provided in companies and schools. More than 60% of an age group are involved in dual vocational training.	Secondary general school certificate	Craft certificate (Facharbeiterbrief)
Basic vocational training year	“Full-time or part-time classes provide basic general knowledge or basic vocational knowledge relating to a certain occupational field” (Bundesministerium für Bildung und Forschung 2007)	none	Secondary general school certificate equivalent
Vocational extension school	Vocational extension schools are attended by students who undergo vocational training or who are employed. Most of these schools are specialised in certain subjects. Training duration is 12-18 months.	Secondary general school certificate	Certificates equivalent to intermediate school certificates

Full-time vocational schools	Full-time vocational schools offer courses of at least 12 months' duration. Attendance is voluntary after completing full-time compulsory schooling. They prepare for an occupation or provide full-time vocational training	Secondary general school certificate	Certificates equivalent to intermediate school certificates/ qualification for a recognised profession (according to training directive)
Schools for nurses and midwives	These schools provide training for non-academic health care professions.	Secondary general school certificate	Qualification for a recognised profession in the health care sector
Fachober-schule	Full-time attendance for at least one year or part-time attendance for up to 3 years.	Intermediate school certificate or equivalent	Qualification to study at Universities of Applied Sciences (Fachhochschulen)

Regardless of the vocational pathway chosen by the students when entering into the vocational education and training system, the overall aim of vocational education in Germany always remains, metaphorically speaking, to supply the students with a universal “key” to open as many doors as possible on the labour market (see Elbel/Laake 2001, 10). This “key” is usually translated with the concept of decision-making and responsibility competence (Handlungskompetenz).

Decision-making and responsibility competence as the aim of vocational education in Germany means the ability and willingness to master professional requirements goal-orientated and independently on the basis of knowledge and experience as well as own ideas. In addition, it describes the ability to judge found solutions and to develop the own skills and knowledge further (see *ibid* 2001, 10).

Skills assessment in the vocational education and training system plays a vital role in determining whether or not the students have mastered the learning requirements as laid out in the vocational training directives in order to obtain decision-making and responsibility competence.

Therefore, skills assessment in Germany’s TVET system will be described in section 3.3.

### 3.2.2 China

The vocational educational system in China is divided into three stages: junior, senior and tertiary vocational education. The senior vocational education is the most important component in the entire vocational education system (see figure 4).

In the following, all different types of schools of senior vocational education will be introduced, according to access conditions, graduation qualifications and duration permeability (horizontal and vertical). Relating to the current social and economic transition process as well as the various school types, the relevant reform tendency will be considered. The tertiary vocational education is represented by vocational higher colleges (see Xu 2003, 57-58), and vocational short and advanced training with different access possibilities play an increasingly important role in the vocational education system in China.

#### Junior Vocational Education

The junior vocational education takes place in the vocational middle school. The admission condition for students attending the vocational middle school is the primary school certificate. Junior vocational education is part of the 9-year compulsory education and lasts for about 3 to 4 years. It is aimed at training future workers, peasants and employees in other sectors with basic professional knowledge and certain professional skills. In order to meet the demand of the labour market regarding the development of the rural economy, junior vocational schools are mainly located in rural areas where the economy is underdeveloped (see Ministry of Education PRC, 2001).

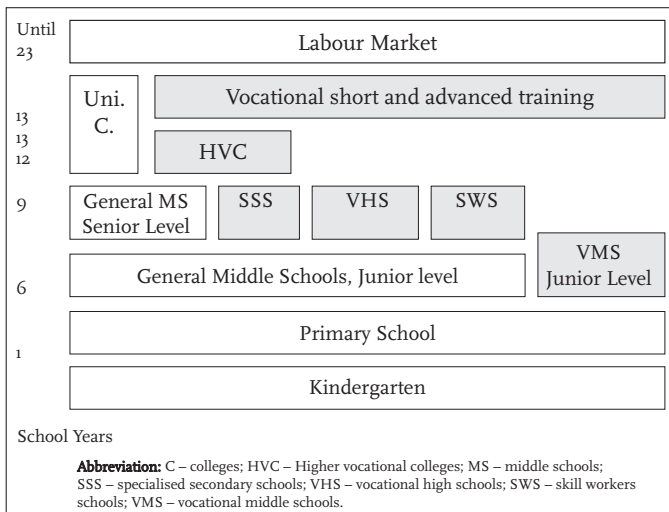


Figure 11: Structure the school system in the P. R. of China (see Zhao 2003, 11)



## Senior vocational education

Senior vocational education begins after the 9-year compulsory education. There are three different school types of senior vocational education: vocational high schools, specialised secondary schools and skilled workers schools. The difference among these school types has been reduced in the last years (see Xu 2003, 58); a horizontal permeability of different school types in the senior (secondary) vocational education is unknown.

## Vocational high school

The vocational high school recruits junior high school and vocational middle school graduates. Normally an access examination is also carried out. The regular schooling lasts 3 years. Its main task is to train secondary-level graduates, who are practice-orientated, talented and have comprehensive professional abilities and all-round qualities and can be employed in the forefront of production, service, technology and management.

Accordingly, the specialist fields offered in vocational high schools are mainly related to the tertiary sector (see Ministry of Education PRC, 2001).

In order to promote the participation in vocational training, the applicants, especially those coming from rural areas, do not have strict admission requirements for short training courses in vocational high schools. However, those short trainings do not directly lead to an acknowledged certification (see Xu 2003, 58).

In 1998, there were altogether 17,090 secondary vocational schools (including vocational high schools, specialised secondary schools and skill workers school), having 11,460,000 students enrolled, while the recruitment for that year was at 422,900,000 students (see Ministry of Education PRC, 2001)

## Specialised secondary schools

Specialised secondary schools consist of secondary technical schools and normal schools, where general junior school graduates enrol. Schooling usually lasts 4 years, sometimes also 3 years. A few specialist fields, in which schooling lasts 2 years, are open only to senior high school graduates. The basic tasks of these schools are to train secondary-level specialised and technically talented graduates in order to employ them in the forefront of production in some special fields, for example mechanical and electrical engineering.

All students are to master the basic knowledge, theory and skills of their specialist field in addition to the cultural knowledge required for higher school students (see Ministry of Education PRC, 2001). The specialised secondary schools play the most important role in senior vocational education with relatively advanced teaching staff and equipment. Currently they are in a transition process: The specialised secondary schools and the vocational high schools will be combined to one school type named “vocational-technical schools of secondary II”. The Ministry of Education has already begun to develop a coherent and unified political framework (see Zhao 2003, 12).

## Skilled worker schools

Skilled worker schools accept general junior school graduates and aim at training secondary-level skilled workers. The schooling lasts 3 years. Having practical skills, the graduates will directly be employed in production activities. Usually large enterprises, local administrations or the Labour Bureau are responsible for skilled worker schools.

The training programmes of the skilled worker schools are mainly orientated towards professions in industry fields (see Zhao 2003, 12).

Compared to the vocational high schools, the skilled worker schools are more practice-orientated. Theory and practice in skilled worker schools are taught in the ratio of 1 to 1 (see Xu 2003, 59). Since the 1990s, the intake of pupils by skilled worker schools obviously has decreased. As a consequence, various training programmes were developed, such as vocational advanced training, re-education for skilled workers and short-time training for unemployed adolescents. Skilled worker schools have increasingly changed into training centres for short-time and advanced training (see Zhao 2003, 12).

Chinese VET is organised by a monopoly administration, i.e. that VET in China is mainly school-based. There are different kinds of learning venues (Lernorte): the classroom for teaching theory and general education; the laboratory/demonstration workshop for learning vocational technologies and demonstrating technical procedures and mediating innovative techniques; the practical training places for applying specific vocational knowledge, systematic training of complex assignments and handling complicated technical devices. During the learning and working processes students can learn vocational practice as well as social competence (see Wang 1995, 78).

Generally speaking, senior vocational education in China lasts three years. In the first and second year, students learn theory in vocational schools. In the third school year students complete internships in the forefront of production. The lessons in the vocational school consist to two-thirds of technical instruction and to one-third of theory and general education (see *ibid.*, 79).

## Tertiary vocational education

Tertiary vocational education mainly accepts graduates from regular high schools and secondary vocational schools. The schooling lasts 2 to 3 years. Tertiary vocational education is promoted by the globalisation of the economy. Most of the higher vocational colleges are located in economically developed areas, e.g. in large cities and the coastal regions. According to the Vocational Education Law, the tertiary vocational education is carried out by vocational universities and vocational colleges. The entrance requirements for tertiary vocational education are the successful graduation from senior vocational education or general middle schools (senior level).

In addition, the graduates from senior level still have to take part in the National College Entrance Examination to enter the tertiary vocational educational schools. The entrance requirements of the tertiary vocational education are reasonable lower than those of Bachelor education.

Tertiary vocational education aims at training middle and higher qualified specialists of the industry and economy as well as administrative employees with good practical competencies (see Xu 2003, 61). The target of tertiary vocational education is to train high level specialized technical and management talents, who will be needed in the economic construction. Tertiary vocational education emphasizes the practice-oriented and craft-oriented training. In recent years, the proportion of graduates from secondary vocational schools has increased. That means, the link between secondary and tertiary vocational education is establishing gradually (see Ministry of Education PRC, 2001).

At present, institutions providing tertiary vocational education are divided into five types: The first are higher vocational technology colleges; the second are short-circle practice-orientated vocational universities; the third are the 5-year higher vocational classes provided in regular specialised secondary schools; the fourth is the tertiary vocational education provided in some regular higher education institutions and adult higher education institutions (see *ibid.*), which has been carried out in over 130 specialist fields in 180 institutions; the last are the reformed regular institutions, offering 2 to 3-year higher education focussing on the training of practice-orientated talented graduates, who are also named high-level professional technical talents. It aims at promoting the talents for the forefront of production (see Ministry of Education PRC, 2001).

### **Vocational short and advanced training**

The vocational short and advanced training contains apprentice training, on-the-job training, work-based advanced training and re-education courses. At the end of the short training the participants are expected to take part in a “Categorisation Examination” (see Chapter 2.2) to get the Vocational Categorisation Certificate. The vocational short and advanced training is managed and carried out by educational institutions of different industry sectors, labour departments, enterprises, public and private organisations as well as some vocational schools. In addition, it also includes the training related to agricultural technologies and in-plant training. The vocational short and further training is market-orientated and focuses on new technologies (e.g. computer skills training). It develops very fast in response to the economic boom (see Zhao 2003, 17).

In 1997, there were 2800 further educational centres with the capacity of three million pupils each year. In 2000, there were 20.000 in-plant training centres with the capacity of 30 million pupils each year (see Xu 2003, 62).

## 3.3 Skills Assessment

### 3.3.1 Germany

As already described in section 3.1, training directives describe skills and knowledge to be disseminated by vocational education professionals in companies and to be acquired by students in order to be formally and officially able to carry out a certain profession.

Starting point in establishing a new training directive always is a qualification need signalised by the labour market.

The process of creating a new training directive involves different actors on various administrative and governmental levels. In a proposal to the federal ministry in charge, usually the Ministry for Economy and Technology (Bundesministerium für Wirtschaft und Technologie – BMWI), cornerstones of the directive are being discussed and determined between the Federal Ministry of Education and Research and workers' as well as employers' unions. These cornerstones form the basis for the development of a draft of the new directive and its co-ordination with the framework curricula (for the school-based part of the training) of the Conference of German Cultural Ministers (Kultusministerkonferenz – KMK) (see Bundesinstitut für Berufsbildung 2007). The draft (for the in-company training part) is being developed under the lead management of the Federal Institute for Vocational Education and Training in co-operation with experts from employers' and workers' organisations. The draft for the framework curriculum (for the school-based part of the training) is developed by experts of the Länder which are appointed by the Cultural Ministers of the federal states.

The co-ordination as regards content and time is accomplished by jointly taking part in meetings of the experts from both sides (see *ibid* 2007). Among other points, as shown in section 3.1, training directives put down examination guidelines and requirements to be passed in order to be able to carry out a formalised profession.

Traditionally, skills assessment in vocational training for a certain formalised profession within the dual system of vocational education was done in two steps. The first step was an intermediate testing after the first part of the training course (which generally lasts 3 years). The aim was to check the students' progress during the training course. The intermediate testing did not influence the final exam results. At the end of the 3-year vocational training, a final examination had to be passed by the students.

The aim of the final examination was to check whether decision-making and responsibility competencies had been achieved in the professional field and for the respective profession in question.

Reforms in the examination system in recent years have seen a change from this two-step system towards a "stretched" examination system.

The "stretched" examination system is an alternative to the traditional skills assessment system and is as such anchored in the Vocational Education Law after the reforms in 2005 (see

Ebbinghaus 2005, 8). Its main characteristic is that the final examination is now split up in two parts (see figure 12), substituting the intermediate testing for the first part of the final examination. This part weighs in with 40% towards the final result.

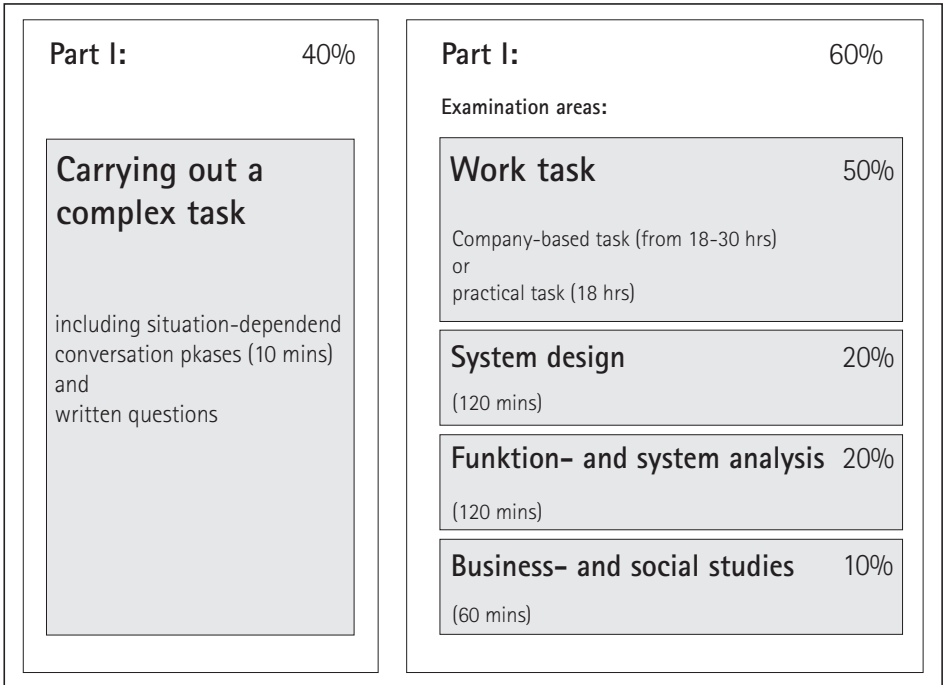



Figure 12: Stretched examination system in Germany's TVET system (own chart, taken from Borch 2007)

The second part of the examination is taken at the end of the vocational training course, constituting for 60% of the final grade (ibid 2005, 8). When developing new training directives for new formal professions, it has to be analysed by law which form of skills assessment (traditional or "stretched") should be implemented for the final examination in that profession.

Regardless of the form of skills assessment, similar testing methods can be identified. The final exam for a majority of professions in Germany includes solving complex tasks, e.g. a customer relations issue or a small-scale project. In these tasks, the students are asked to demonstrate problem-solving skills, incorporating the knowledge and skills for their respective profession acquired in the vocational training course.



The final examination to obtain a craft certificate, enabling the student to officially carry out the formal profession, is organised and conducted by the “responsible department” (zuständige Stelle), which is the governing body for that profession. The final examination for a certain profession is standardised nationally. These “responsible departments” can be the Chamber of Commerce, the Chamber of Crafts or any other body formally governing and structuring business, industry and trade.

While there is an additional final examination at the vocational schools, the binding examination to obtain the crafts certificate is conducted by the “responsible department”.

Thus, the vocational education and training course in the dual system ends with a craft certificate (Facharbeiterbrief), proving a unified and nationally acknowledged and accepted set of skills for a certain profession. As Schömann points out, “[t]his supports the view that educational credentials have the character of productivity indicators to employers, but the more people have them, the lower their value” (Schömann 1997, 99). This argument will be picked up and expanded in the next chapter, dealing with strengths and weaknesses of the German TVET system in responding to labour market needs.

### 3.3.2 China

In China’s vocational education law, Chapter 2 (25) states that after passing the examination of the vocational school, students shall be issued academic credentials in accordance with relevant provisions of the state. Similarly, after passing the examination of the vocational schools or vocational training institutions, the students who receive vocational training shall be issued training certifications in accordance with relevant provisions of the state. Furthermore, academic credentials and training certifications shall be used as certifications of graduates and trainees when they search for jobs and are employed (see Ministry of Education PRC, 1996).

However, the examination system in vocational schools in China varies due to the lack of a national standardised curriculum. Normally, the local educational offices and each vocational school respectively arrange the examinations for the end of each semester as well as the final examination.

After passing the final examination or training, academic credentials or training certifications are granted. But due to the out-of-date teaching materials and the theory-orientated teaching methods, those credentials and certifications cannot stand the new challenges in this rapid developing transition time and possess low recognition in the labour market.

In order to co-ordinate the discrepancy between the qualification of skilled workers and the labour market needs, a “Categorisation Examination” is open to everyone at any age or stage of their career (see figure 13). Skilled workers as well as the graduates of the vocational schools are supposed to take part in the “Categorisation Examination” to get a “Categorisation Certificate” (see Chapter 2.1), which is awarded by the Ministry of Labour and is nationally unified. Categorisation certificates help graduates from vocational schools significantly with

their job seeking. The examination centres all over the country are controlled centrally and the evaluation criteria for each profession are issued centrally by the government and the Ministry of Labour. Both the “Academic Credentials (or Training Certifications)” and the “Categorisation Certificate” are called “Double Certificates”, which are necessary for vocational education graduates and are taken as application requirements for most state-authorized professions (see Zhao 2003, 17). Regardless of the national comparable “Categorisation Certificate” system, the qualification levels of skilled workers are still very different due to the various professional and educational backgrounds. This is a barrier for the implementation and establishment of nationally unified qualification criteria (national occupational standards) and hinders the mobility of skilled workers. As a result, teaching and learning material as well as the final examination in vocational schools are to orientate towards the national “Categorisation Examination” system.

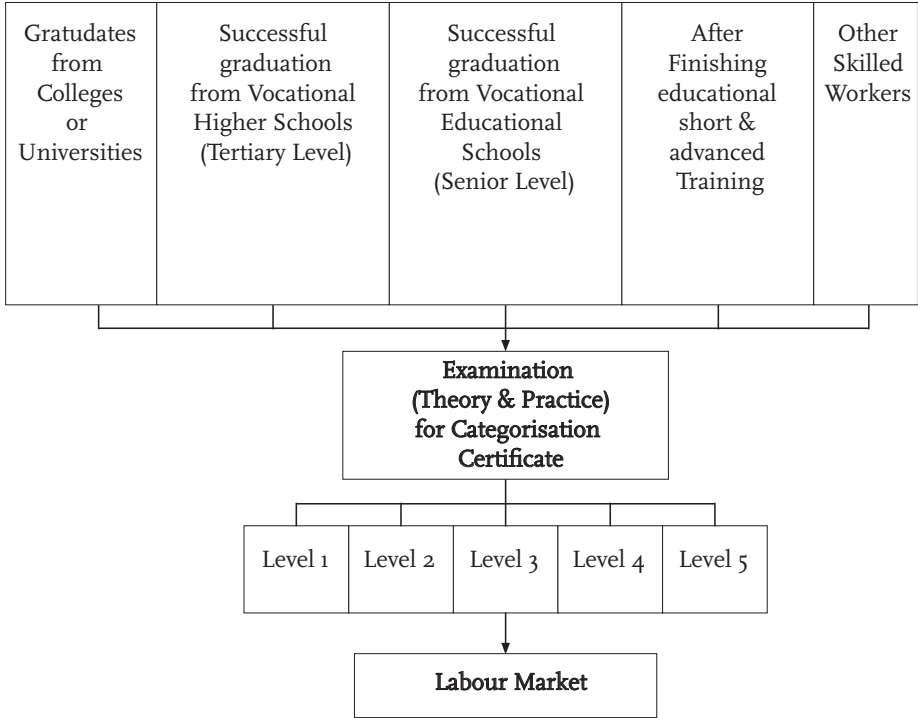


Figure 13: State’s Skills Assessment in P. R. of China

## 3.4 Comparative Synopsis: TVET systems in Germany and China

As can be seen from the previous sections, the TVET systems of both countries are obviously different. The following table shows clearly the main difference of the both vocational education systems according to a certain criteria (see table 2).

Table 2: Systematic Comparison of Vocational Education between Germany and China  
(see Sun, Y. 2007, 56)

Categories	Germany	China
System	dual system (vocational school and company)	monopoly system (vocational education at school)
Learning venues	learning workshops, company (production, trade, administration), interplant training centres (external training centres), classroom, specialist rooms...	classroom, laboratory, training workshop, workplace, vocational training centres...
Responsible bodies/financing	companies; public administration... resources: municipalities personnel: federal state	government, company (school for skilled workers) and tuition fees
Jurisdiction	the Federation (company) the federal state (school) regulated in detail	government no concrete implementation measures
Responsibility for vocational education	horizontal and vertical administration	hierarchical structure, vertical administration



Regulations	BBiG/HwO training directives (for the in-plant training) school laws, framework curricula by the KMK respectively by the federal state (for the school-based training), professions that require training	regionally different, no standard curricula. Each province or city implements own syllabus, subject area (no professions that require training) is the quality criterion
Didactical approaches	framework curricula are structured according to learning fields, action competence is being developed, trainees are to plan, check, correct and evaluate independently	lessons are structured according to subjects, theory-accentuated „chalk and talk“, trainees are objects of the professional action by the teacher, often there is no connection to application, existing previous knowledge is not being integrated
Certificate	craft certificate/certificate of apprenticeship/certificate of management assistance in wholesale and export trades (chambers), vocational school qualification, school qualifications in courses with double qualifications	school certificates (vocational school), vocational classification certificates (work administration, double certificate)
Teacher training	nine semesters of teacher-training course, two state examinations, each teacher is responsible for vocational specialist and general lessons	no uniform staff structure for vocational school teachers, theory and practice lessons are separated, there are too many theory teachers but insufficient practice teachers
Characteristics	long tradition relating to trades and well-known dual system; action competence; concrete regulations and detailed law	confucianism; considerable economic development; regional differences; development of quality and quantity; strong central control and regional flexibility



Following this overview, three differences between both systems are summarised:

The first difference lies within the vocational education systems themselves. Germany has a dual system, which is ruled and financed by two independent sectors – the government and the companies. Complex and various teaching and learning processes take place both in vocational education schools and companies.

Vocational education schools and companies carry out their self-dependent apprenticeship and vocational training according to the framework curricula (Rahmenlehrpläne) and training directives (Ausbildungsordnungen), in order to provide an effective combination of theory and practice.

China has a monopoly school system which is ruled and financed basically by the government. Vocational training takes place in the classroom of vocational schools without strong connection of theory and practice. Only very few large companies undertake vocational training for VET schools.

The second difference relates to the organisation and responsibilities of the VET systems. VET in Germany has different regulations and organisations which strongly support the planning, implementing and controlling of vocational training, while VET in China has not been promoted in the last decades and therefore has underdeveloped organisational concepts.

The Vocational Education Law in China just serves as political information; therefore, the involvement of companies (the economy) will only be legitimately supported, without complete implementation. Unified and detailed regulations related to curricula, examinations, teacher training and the co-operation with companies hardly exist because of the regional disparities as well as the incomplete organisation concept.

The third difference results from the tradition and the learning culture in both countries. Germany has a long history and tradition of vocational training and the dual system. Technicians and qualified skilled workers face a high prestige in society. At the same time, independent learning, critical thinking and innovation competence have always been emphasised in the learning process. In China, theory plays a much more important role than practice because of the deep cultural fundamentals. Therefore, vocational training is not as widespread as general education. Working processes are always neglected during vocational training. This conservative learning culture in China only prepares for recalling the given knowledge.

# 4. TVET system and labour market in Germany and China

## 4.1 Germany

### 4.1.1 Strengths of the system in responding to labour market needs

The strength of the German TVET system and of the dual system especially lies undoubtedly in the fact that it produces graduates in possession of nationally unified and universally recognised and comparable qualifications in the form of the crafts certificate.

Furthermore, the regulatory framework for training professions in Germany and its documents (such as vocational training directives) is triggered by industry needs (as laid out in section 3.3). Thus, it could be argued that the TVET system is orientated towards the labour market through designing training professions that represent labour market demands. The fact that the vocational pathways in Germany offer a wide variety of different training professions can also be seen as a positive aspect of the system in relation to labour market needs. By having a highly diversified field of training it can be ensured that the system can provide skilled workers for almost any industry or trade.

Some authors also argue that the vocational education system of Germany has a great impact on unemployment ratios. Thode points out that the gap between general unemployment and youth unemployment in Germany is comparably small (in relation to other OECD countries). This is mainly due to the dual system of vocational education which, even though it has been facing a lack in apprenticeship placements in the last years, opens up good possibilities for young adults to enter the world of work (see Thode 2006, 240). Eichhorst/Profit/Thode support this argument by explaining that the “business location Germany” benefits greatly from the dual system since it achieves a high rate of integration of youth into the labour market (see Eichhorst/Profit/Thode 2001, 11).

### 4.1.2 Weaknesses of the system in responding to labour market needs

The German vocational education system, as pointed out by various authors, is responding – due to its very complex structure - slowly to change. This has an impact on the orientation of the system on labour market needs. Koch argues that the structure of the vocational training system and the offering of internships and training placements is characterised by the orientation towards traditional

crafts and industry of the dual system. In the past, the system has shown a weak ability to change in responding to the economical and structural changes of the information society (see Koch 1998, 319).

Furthermore, the concept of life-long learning is not incorporated thoroughly into the German vocational training system. Stooß points out that a successfully completed vocational training course alone is not sufficient for a long professional career (see Stoß 1996, 31).

It has to be pointed out, too, that the traditional setup of the vocational education system in Germany was catering for students finishing basic education (see section 3.2.). This approach to the qualifications disseminated and the educational level chosen as the starting point in the system has seen some changes in the past years. As Rothe explains, the dual system with its officially recognised training professions has been attached to an educational level which is based on the secondary general school certificate. However, nowadays a large proportion of students entering the dual system have already achieved an intermediate school or grammar school certificate (see Rothe 2004, 30). This fact shows that the vocational training system is in need of a more formally structured and integrated further qualification component. This has been realised (among other reforms) by shifting from the traditional, subject specific curriculum to the approach of “fields of learning” which allows for a more integrated and complex knowledge dissemination. Furthermore, student-centred teaching approaches are used to involve the students more in classroom settings. Through this measure, interdisciplinary tasks can be assigned and different areas of competence can be developed.

Summarising it can be stated that the vocational education and training system in Germany clearly marks a competitive advantage for the country. Nevertheless, as discussed by Eichhorst/Profit/Thode, the slow rate of adaptation to change as well as the lack of opening up sufficient possibilities for further vocational education and training arguably marks the greatest weakness regarding labour market needs.

## 4.2 China

### 4.2.1 Strengths of the system in responding to labour market needs

In the last years, the Chinese government has made great efforts to promote the development of VET and has come to a lot of decisions to expand the participation in VET schools in both economically developed and underdeveloped areas. Young people from rural areas have much more opportunities for vocational training. It is planned that from 2006 to 2010, 14 billion € will be invested in the vocational education and training in China (see Wen, 2006). Meanwhile, a lot of reforms relating to the VET system are on the way, responding to the rapid social and economical change.

New professions, new skills assessments and new curricula are improved instantly in response to the demands of the industry and labour market.

At present, many vocational schools devote themselves to study the national occupational standards and Categorisation Examination in order to update their curriculum (see Xinhua, 2006). The various political decisions about VET, which took place in the last few years, represent the

ambitions of the Chinese government to promote VET, considering the current social and economic conditions.

In addition, the development of a National Vocational Qualifications system reflects the improvement of the connection between labour market and industry or trade. The fact that the “Categorisation Certificate” is taken as application requirement for most state-authorized professions and that the “Categorisation Examination” is open to everyone at any age or stage of their career, have greatly encouraged the expanding participation among skilled workers and graduates in vocational schools. The “Categorisation Examination” is organised nationally in a unified way, which means the examination centres all over the country are controlled and arranged centrally. This unified National Vocational Qualifications system is advantageous for the standardisation of comparable qualification requirements on the labour market and it also serves as impulse to update the teaching and learning materials in vocational schools.

Moreover, the examination contents are triggered through international vocational qualification standards which include not only theoretic knowledge but also practical skills. This examination approach leads to a new tendency of qualification evaluation and improves the traditional assessment system in China.

#### **4.2.2 Weaknesses of the system in responding to labour market needs**

Due to the lack of co-operation with companies, the students of vocational schools do not have sufficient opportunities to practice their theoretical knowledge in the forefront of production or service sectors. Meanwhile, it always has been criticised that the teaching and learning materials in vocational education schools are only theory-orientated and not equivalent to the requirements of the labour market and the industry. As a consequence, skilled workers lack work-related, competence-based skills and knowledge, which are necessary to stand the new technical and social transition challenges (see Xu 2003, 74).

Moreover, regardless of the government’s efforts promoting VET in China, a great number of non- or semi-skilled job seekers are supposed to get the opportunity of taking part in further education and training, especially social disadvantaged groups (those moving from rural areas to big cities).

The unqualified disadvantaged groups obviously hinder the social stabilities and could arguably be seen as a waste of human resource. This phenomenon requires the government to put advanced efforts on expanding the scale of VET in China. A further problem is the huge disparity of the regional social and economic development and the quality and levels of vocational schools. These weaknesses have evidently held back the development of national unified curricula for vocational schools.

Although the “Categorisation Examination” system orientates itself towards the labour market and is comparable nationally, the qualification levels of the candidates are very unequal due to the various professional and educational backgrounds. This is a barrier for the implementation and establishment of nationally unified qualification standards and hinders the mobility of skilled workers. Moreover, the examination contents in vocational schools are still not relevant to those of the “Categorisation Examination”. As a result, the curricula in vocational education need to be updated,

teaching and learning materials as well as the final examination in vocational schools are to be restructured and reformed according to labour market needs. The “Vocational Education Certificate” is to be increasingly triggered by the requirements and standards of the national “Categorisation Certificate” system (see Xinhua 2006).

Shortly speaking, considering the regional differences, VET in China is to catch up with the developing speed of the industry and economy. More and more practical-orientated skilled workers and technicians are supposed to be promoted in vocational schools in order to meet the developing economical and social demands.

### 4.2.3 Specification

#### Political reform and appeal to vocational education

The traditional and the cultural background have strongly influenced the understanding and the way of thinking of the Chinese. The Chinese Government has carried out many political reforms and measures during the last years in order to promote vocational education in China.

In 1978, China faced a new era, which globally opened the country doors. During the 1980s, the VET system was on the upswing due to the technical-economic change, which made a stronger legal establishment of vocational education within the education system necessary (see Zhao 2003, 8). In 1980, a “report about the structural reform of secondary education” was written by the Chinese Cultural Ministry. It was indicated that the aim was a modernisation of society. Secondary education was to be restructured and vocational education was to be greatly promoted and developed further (see Ministry of Education PRC, 2001b).

In 1986, the Central Commission of the Party pointed out the importance of the development of VET within their resolution for the reform of the education system. The development of modernisation not only needed highly qualified scientific and technical experts, but also many engineers with primary and medium qualifications, administration personnel, skilled workers and other workers with a good and sound vocational education (see Xu 2003, 63).

On the 1st of September 1996, the Chinese Government published the law for vocational education: “Vocational education law of the PR of China”. The law defines the basis for the position and function of VET by stipulating the way of school organisation, the responsibility regulations, the administration orders, the political guidelines as well as the financing channels. It also is a sign for the re-evaluation of vocational education (see Zhao 2003, 8).

In 2002, the Counsel of State passed a “Resolution for the promotion and acceleration of vocational education”. Within the context of VET in China, in the time frame of the 10th five-year plan (2001 – 2005) over 26 million skilled workers were trained and more than 400 million workers in the cities took part in further education measures (see N.N 2006).

In the course of a conference in 2005 (Chinese education policy for the 21st century) it was planned that by 2010, the number of students admitted at middle schools providing vocational education was to be 8 million, approximately as much as at middle schools providing general education. The number of admissions at higher vocational education institutes are to exceed that at

tertiary institutes providing general education. In the time frame of the 11th five-year plan (2006 – 2010), 25 million graduates of middle vocational schools and 11 million graduates of higher general education institutes are to be educated. Annually, 100 million rural and urban workers are to be trained. These measures will evidently improve the quality of the Chinese workforce (see Wu, Qidi 2005).

Four projects were planned by the Ministry of Education in November 2005 in order to restructure the economy (see Ministry of Education PRC 2005):

- The “national project for the training of skilled workers“,
- The national project of “re-orientation“ for rural workers,
- The national project of training of practice workers for rural areas,
- The “project of further education and re-employment training for adults“.

Furthermore, the Government decided to invest 14 million € in vocational education in the time frame of the 11th five-year plan (see Wen, Jiabao 2006). The structure of the middle education (secondary school level II) will greatly improve through that. Nowadays, VET is an important element of the national education system.

All these policies, regulations and laws have not only created an unprecedented good social environment for the development of vocational education, but also show the direction for the reform and development of vocational education in the 21st century.

After having joined the WTO, China has been facing a transformation process effecting different social and economic factors, which initiated the promotion of vocational education in China. All appeals, resolutions and regulations mentioned above have clearly improved the prospects of the development of vocational education in China in the 21st century.

### The rapid expansion of vocational education in China

In the following, the current situation of the development of VET in China is described in detail. Over the last years, the number of students in middle schools which provides general education has risen faster than that of students in vocational schools where the number of registered students fell in the year 2000 (see Zhao 2003, 17). (see table 3).

Table 3: number of registered vocational school students in the secondary school level II from 1996 to 2000 (see Zhao 2003, 14)

year	in total	specialised middle schools	skilled worker schools	vocational middle schools
1996	10103500	4227900	1918100	3957500
1997	10895100	4654100	1931000	4310000
1998	11260000	4980800	1730000	4549200
1999	11153900	5155000	1560500	4438400
2000	10442100	4895200	1401300	4145600

The rush to universities is growing steadily. At the same time the Chinese society tends to neglect the possibilities of vocational and skilled worker training. The students attending vocational schools are seen as failures. In a few regions in China, this has already led to a lack of technicians.

Due to the considerable economic boom and the lack of skilled workers, VET is heavily promoted by the state and the education commission. Statistic data from 2000 to 2006 shows that the number of new students in vocational school has risen from 4.12 million to 7.52 million (see figure 10).

It is planned that the capacity of students in vocational middle schools is to comprise 8 million students in the year 2007 and with that 50,000 students more than in 2006 and about the same number as at general middle schools. The scale of capacity of students at higher education institutions is to exceed the admission of students to tertiary education institutions providing general education (see Ministry of Education PRC 2006a).

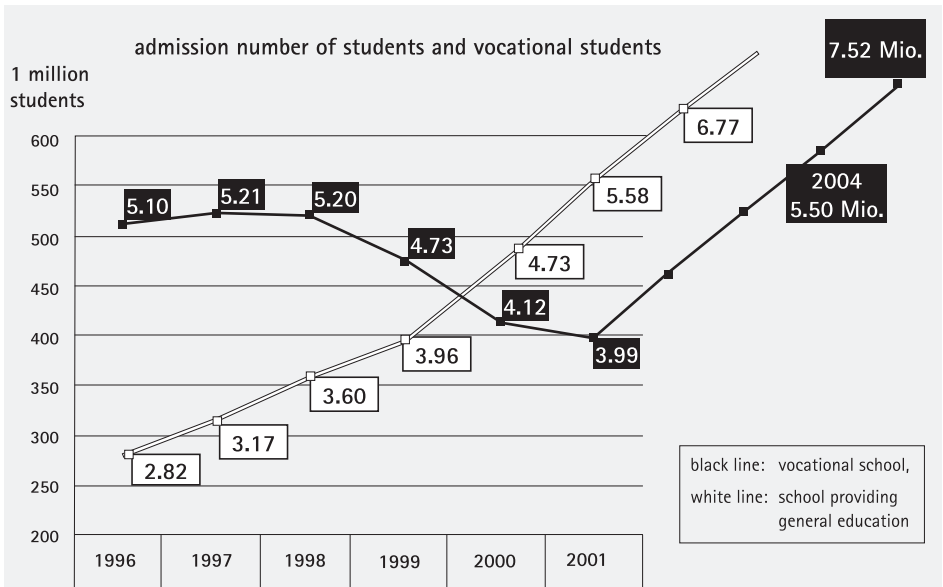


Figure 14: The ratio of admission numbers between students and vocational students (see Yang Jintu 2005)

### Promotion of the disadvantaged

Due to regional differences and the irregular economic development of the whole country, the injustice of the Chinese education system is still strong.

In the cities, the school system is relatively completely developed offering a broad supply of vocational training possibilities that reach to elite education at universities. In the under-



developed rural regions, the school system is characterised by a backward equipment, bad teachers and low financing. School education in China is still strongly influenced by the historic selection system. The national university entrance examination is standard but there is a very unjust evaluation procedure. In a big and highly developed city, like for example Beijing or Shanghai, the university entrance criteria are much lower than in poorer regions. In many economically under-developed regions numerous adolescents have no possibility to find an apprenticeship. Every year numerous adolescents enter working life directly after secondary school level I and II without being trained (see figure 11).

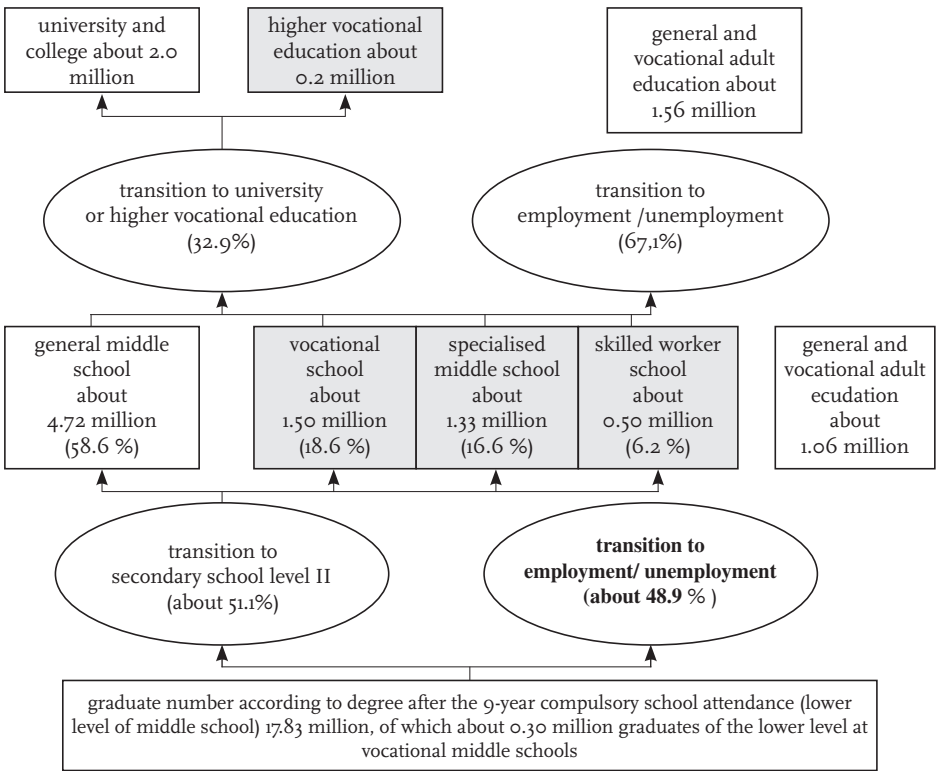



Figure 15: Admission number of students regarding the school forms in the education system in China in the year 2000 (see Xu 2003, 62)



As can be seen in the figure, nearly half of all students did not further attend any school after the 9-year compulsory school attendance (secondary school level I) in the year 2000; after the secondary school level II 67.1% of all students were unemployed or entered the labour market directly. Every year millions of adolescents do not get a place at universities or colleges after the upper level of middle school. Without any further education opportunity the adolescents have no chance to gain vocational skills, which leads to a wasting of economic resources (human capital). Most migrant workers belong to this graduate group. Therefore, the training and further education opportunities are necessary. Accordingly, the Chinese education commission passed a new regulation: With a degree of the upper level of middle school, everyone gets an apprenticeship at a vocational school. After one year of training and a qualification exam the vocational education certificate is awarded (see Ministry of Education PRC. 2006b).

Furthermore, the Ministry of Finance decided to invest further 4 million € of the 11th five-year plan (2006 – 2010) in the adolescents living in economically under-developed regions in order to get them an apprenticeship in a vocational school. In the year 2006 alone, the regional tax offices subsidized 80 million euros for 560,000 poor trainees. From 2006 to 2010, 12 billion € will be invested by the regional tax office in trainees coming from poor families (see Ministry of Education PRC. 2006c). The abolition of injustice in the education system in China is one of the most important tasks of the reform of the Chinese education system.

# 5. Conclusion

In China, there were approx. four million graduates from vocational schools on the middle level, but because of lacking qualifications, the graduates faced great difficulties in finding employment. It has been criticised for quite some time now that vocational education in China is not orientated towards labour market needs. The education commission as well as the Ministry of Labour have therefore developed the “Double Certificates” system. This system was implemented in China as a mandatory requirement in order to enter the world of work.

The implementation has seen some positive impact on the orientation of the VET system towards the labour market. However, there are still great obstacles to overcome. One of the most severe is the fact that there are still no nationally unified curricula in vocational schools. The discrepancy between the content of the examinations and the requirements of the labour market leads to great difficulties in judging the qualification level of vocational school graduates. In order to solve this problem, the aim was to extend the function of the “Double Certificates” (see section 3.3). In addition, the following objectives are supposed to be developed:

- co-ordination of the qualification levels of the “school certificate” and the “vocational categorisation certificate”;
- development of an interdisciplinary curriculum to adapt the teaching and examination content to the economic and technological change;
- for the “Categorisation Examination” an examiners board is to be appointed, in which the evaluators are chosen by vocational schools, companies, dedicated ministries as well as the Ministry of Labour. The authority of this examiners board is to be regulated by laws. Here, a vocational education examiners board with distinct qualification criteria is required.

In Germany, the vocational certificate enjoys a great reputation and secures vocational qualifications. The connection between the labour market and the vocational certificate is explicitly constituted. To ensure sustainability of the development of vocational education and training in China, the fundamental certification constraint needs to be dissolved.

If the recognition of the vocational certificate secures the vocational qualification of the students and connects it with the direct labour market entry, parents will send their children to vocational schools automatically.

The upgrading of a vocational education certificate would displace the inferiority of vocational education and can be seen as a major inner stimulation for the sustainable development of vocational education in China.

The boost of VET in China has not taken place due to the legitimately issuing of vocational education but due to the dynamic economic progress since the entrance into the WTO. The rapidly increased qualification demands on the labour market urge re-evaluation and reforms of VET by expanding the intake of students and integrate the economy into the VET system.



Companies and the Chamber of Industry and Commerce are expected to play an increasingly important role in the VET system. Meanwhile, the environmental problems, income disparities, restructuring of the industry sectors and changing processes from labour intensive to high-order production are the main reasons for China to find its special way to develop VET. By the comparison of the vocational education systems of China and Germany it can be shown that the German experience in vocational education with its elements (such as regulatory measures, learning fields etc.) is quite valuable for the Chinese situation. However, according to the cultural, political and economic background, a direct transfer of the system is not possible. China will have to find its own approach and its own way for the modernisation of vocational education.

It also needs to be stated that in terms of “lessons learnt“ from the comparative analysis of vocational education systems and labour markets in China and Germany, no “perfect” system can be established. There are advantages and disadvantages on both sides in terms of regulating frameworks, system design as well as cultural and historical aspects. While China’s TVET system is very flexible, for example, the German system is quite rigid and responding slowly to changes. In the Chinese context, this flexibility is absolutely necessary and has developed as a result of rapid economic growth. The lack of flexibility in the German system also is a result of historical developments, since the TVET system has its roots in medieval times and has been growing and developing over time.

However, despite fundamental differences, some common ground as regards system design can be identified.

On the one hand, it became obvious that nationally and universally recognised vocational training certificates are a basic requirement for a vocational training system to be able to correspond to labour market needs.

The training courses to be completed in order to achieve such a certificate have to be designed according to impulses from industry and trade.

Furthermore, a national regulatory framework and a national governing body for the vocational education and training system need to be in place.

Finally it can be stated that in order for a vocational training system to function according to labour market requirements, a certain level of autonomy needs to be granted on the local level in order to be able to respond quickly to specific local framework conditions.

Overall, the comparative analysis of the situation in China and Germany has shown two very different systems, but systems which also offer valuable insights into reform tendencies and basic challenges that hold true for both countries.

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