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Off target: China's vocational education and training system threatens the country's rise to industrial superpower status

Lack of practical relevance in vocational training. State prescribed commitment from companies. New impulses for German-Chinese cooperation.

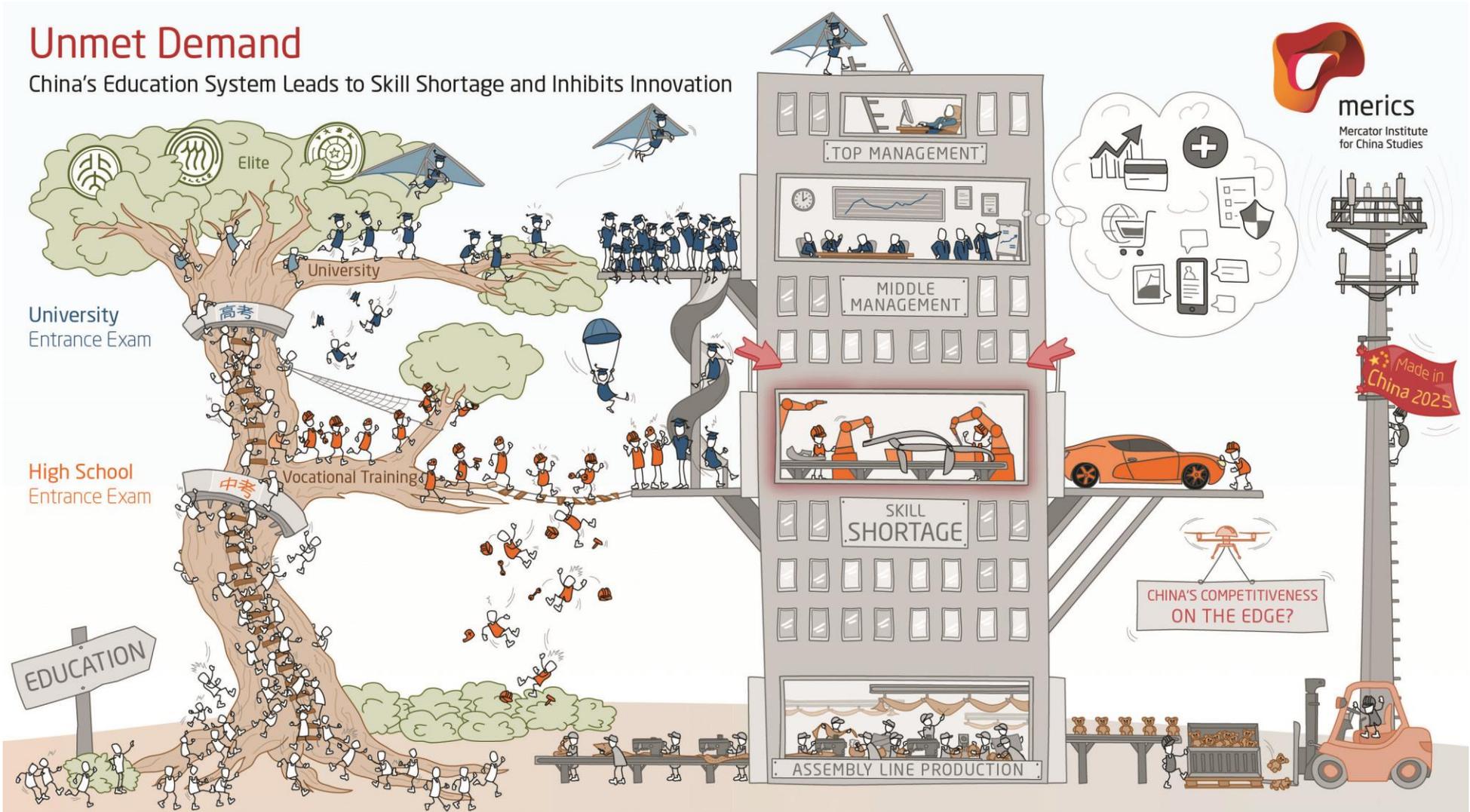
by Elena Klorer and Matthias Stepan

KEY FINDINGS AND CONCLUSIONS

- **Vocational education and training (VET) is the Achilles' heel of the restructuring of the Chinese economic model.** With the "Made in China 2025" strategy, China wants to transform into an innovation-driven industrial nation. This can only be achieved with a highly qualified workforce.
- **Reform of the VET system is long overdue.** Only if China succeeds in establishing a system that can be adapted to the changing requirements of companies will the dream of its political leaders to make the country an industrial superpower materialise.
- **The education system is not aligned with the demands of the labour market.** At the same time that university graduates are not able to find any suitable jobs, many industrial sectors are experiencing the first signs of a critical skills shortage.
- VET programmes focused on acquiring practical skills could provide relief. However, **China's VET system is in a dire state.** The main reason for this is insufficient coordination with Chinese companies and their lack of commitment.
- The Chinese central government wants to enhance the **quality and the social recognition of VET.** The aim is to improve mobility between university studies and higher vocational training.
- **China's skills shortage also has a direct impact on the German economy.** For the installation, maintenance and servicing of German industrial and consumer goods, highly-qualified Chinese skilled workers are needed. The shortage of such skilled workers is already one of the biggest challenges facing German companies in China. If production in China succeeds in climbing up the value chain, new markets will be created for German (high-tech) products as well.
- **The German dual VET model has an outstanding reputation in China.** The establishment of quality standards for vocational training in China inspired by the German example would not only benefit the Chinese VET system, it would also provide German industrial and educational enterprises with advantages over competitors in the Chinese market.

Unmet Demand

China's Education System Leads to Skill Shortage and Inhibits Innovation



1 Skills shortage poses a threat to China as a location for industrial production

The time when China was a low-wage country is long gone. Production and non-wage labour costs are rising. China's competitive model as the world's "extended workbench" has reached an end. In order to become an advanced industrialised nation, the Chinese government needs to restructure the economic system. China's vision for its future economic model is to excel in the manufacturing of high-quality and advanced technological products, as well as to possess an effective service sector. In order for this to succeed China needs a considerable quantity of skilled workers. But in fact, there is a lack of them, especially in strategic key industry sectors like information technology (IT), the chemical industry and rail transport.ⁱ

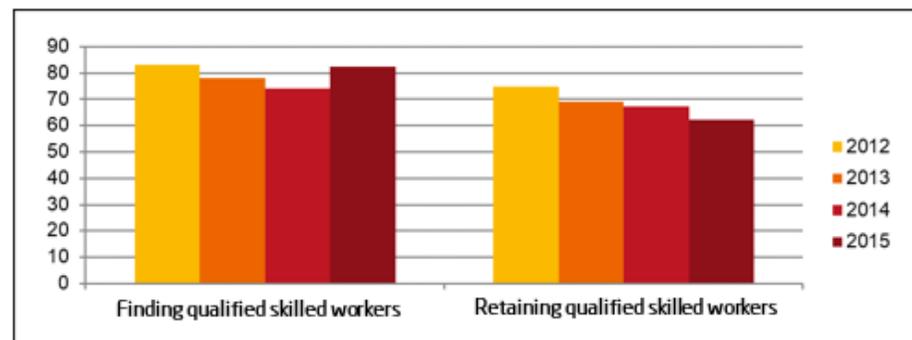
China wants to become an "industrial superpower": In mid-May 2015 the State Council published a strategy paper which outlined China's path to becoming an "industrial superpower" (工业强国) by 2049. The action plan "Made in China 2025" (中国制造 2025) lists specific measures and aims for the first milestone in 2025.ⁱⁱ By then China's manufacturing industry should have reduced the gap to established industrial nations with respect to innovation, quality and efficiency. A

core element of the action plan is the modernisation of industry through advanced information technologies (IT) under the heading of "Intelligent Production" (智能制造). This will result in the job profile of a worker employed in the industry and service sector changing substantially. Demand for IT knowledge, independent problem-solving abilities and systematic thinking will increase sharply.

China's skills shortage also has an impact on the German economy. China is one of the main markets for German products. The installation, servicing and maintenance of German systems and machines require well-trained specialists. The same also applies to consumer goods like cars which need maintenance. In particular, German companies based in China are directly affected by the skills shortage. For some time now companies have stated that finding and retaining qualified skilled workers is one of their greatest challenges.ⁱⁱⁱ With adequately trained staff China could in future establish industrial sectors that also open up new markets for German compa-

nies producing high-tech machines and systems or highly developed intermediates like those made by speciality chemicals companies.

*Overview 1: The **skills shortage is one of the biggest challenges for German companies in China** (Source: AHK Business Confidence Survey 2015, 2014). Data relating to the companies participating in the survey given in per cent.*



Vocational training is the Achilles' heel of the restructuring of the Chinese economic model.

Without an adequate number of skilled workers this process is doomed to fail. The related risk of a massive slump in China would have far-reaching consequences not only for Germany, but also for the entire global economy. The Chinese government has recognised the problem

and wants to counter the skills shortage with a significant strengthening of vocational training. The plan is to build up a modern VET system by 2020. For Germany the question is how involved it wants to be in this process. Compared with the start of German-Chinese cooperation in the area of vocational training in the early 1980s, the focus of the political debate today has shifted more to economic questions regarding competitiveness and markets.

2 Education not meeting the requirements

Currently China's education system does **not** promote the abilities that are needed for an innovation-driven economic system. Equally, not enough skilled workers are being trained. Instead of looking at the demands of the labour market, the education system has predominantly focused on academic studies (see graphic "Not meeting the requirements"). This is also reflected in societal attitudes. It is the aim of every pupil and their parents to be accepted by one of the elite universities. Memorisation and knowledge testing are key elements in making it to the top. This summer a record figure of nearly 7.5 million higher education graduates are seeking their first jobs.^{iv} No generation before has attained such a high

level of education. Nevertheless, the chances of finding jobs relevant to their degrees are considerably worse. Whilst many of the graduates from elite universities find it relatively easy to gain access to the labour market, the majority of graduates have to make significant compromises with respect to their job expectations or may even end up unemployed. Despite the clear surplus of qualified academics without practical experience and, at the same time, the shortage of qualified skilled workers, both pupils and parents continue to prefer university education to vocational training. In 2014 only 5.7 million Chinese obtained degrees from vocational secondary colleges.^v Along with general vocational colleges at secondary level this also includes technical colleges. This can be largely ascribed to the bad reputation of vocational training in China.

3 China's vocational education and training system is inadequate

In many areas China's VET system is in a dire state. In society it is regarded as a fallback for those who failed their exams and a second-class education. For many years, vocational training was politically and financially neglected in favour of university expansion. When it was the "world's extended workbench" China had little need for

skilled workers. Unskilled workers had been perfectly satisfactory for jobs in factories. Now there is need for a radical turnaround. The number of unskilled workers being replaced by industrial robots is increasing rapidly.^{vi}

Up to now companies were hardly involved in apprenticeships. Vocational schools and colleges have been the main pillars of the VET system.

In contrast to the situation in Germany, companies, industry associations and trade unions have a minor role in the governance of VET. In light of the great employee fluctuations, many companies show little interest in increasing involvement in this area. They criticise the high costs associated with the training of vocational apprentices. Furthermore, there is no guarantee that apprentices will remain with the company in the long term. Instead of participating in vocational training, companies prefer to provide further training targeted at the specific jobs workers undertake for the company.

As a result there is a lack of practical relevance in vocational training.

In most cases an industrial work placement is the only contact point between companies and vocational colleges.^{vii} And even during these placements it is rare that any mentoring or guidance is provided. In-

stead vocational apprentices are frequently given only simple tasks to perform. This makes it difficult to acquire any noteworthy practical qualifications. The lack of practical relevance also becomes apparent when looking at the facilities offered by vocational colleges and the teaching staff. Here there are great disparities. Some colleges have antiquated machines that are no longer used by any companies. Other colleges have machines that meet the current industry standards but often don't have qualified teaching staff that are familiar with their operation. In 2012 only 35 per cent of teachers had industrial experience.^{viii}

Nevertheless there are also some very successful vocational colleges. They are often located in China's economically advanced coastal regions, and there are also cooperation projects between international corporations and Chinese vocational colleges. An example of such cooperation is the **dual training at the Jinan Vocational College**, in which several German medium-sized enterprises are involved. Apprentices receive comprehensive practice-orientated vocational training and leave with a degree that is widely acknowledged by employers. The awarding of the "National State Prize for Educational Performance" to the AHK Shanghai underlines the Chinese government's recognition of the

contribution made by German companies in modernising vocational training in China. The AHK had tested, together with the Chien Shiung Institute in the city of Taicang, a practice-orientated apprenticeship training model.^{ix}

4 The Chinese government wants to strengthen vocational training

In order for China to become a technology-driven industrial power it is necessary that the country increases investment in apprenticeships and the further training of skilled workers. According to the action plan published in 2014, China's government wants to create a modern, demand-orientated VET system by 2020.^x

In the drafting of the reforms, China has essentially followed international models. The German vocational training model is highly respected. But other countries like Australia and the United Kingdom are also regarded as reference models. However, China doesn't aim to wholly adopt a specific model. Instead the government is picking out certain elements in order to modernise the Chinese system.

The Chinese government is particularly focused on five areas:

- **A more active role for companies.** In order to provide vocational training with a much greater emphasis on practical experience, the intention is to have more than 80 per cent of large- and medium-sized enterprises enter into official cooperation agreements with vocational schools and colleges. State-owned enterprises are a particular target group. So far the exact form of the cooperation has not been determined. Amongst other things it could mean work placements for students or further training of teaching staff. Companies are obliged to document their activities in so-called *Corporate Social Responsibility Reports*. In return they will receive tax relief.^{xi}
- **Privatisation measures for diversification and expansion of service range.** Next to state-run vocational colleges a concerted effort is to be made to create private vocational colleges and expand the range of services in the education sector. The government gives new incentives to education providers in economically underdeveloped regions.
- **More freedom for local governments** In particular, **provincial governments receive greater powers** to adjust the range of training courses offered by vocational colleges in order to meet the requirements of local companies and enterprises.^{xii} However, the central government will retain

responsibility for general inter-ministerial coordination, which amongst other things will determine job profiles and standards for course content.

- **Vocational colleges as focal point for further education and training opportunities.** China has never possessed a systematic further education market for specific skilled qualifications.^{xiii} In light of the structural change and progressing automation in production, the demand for continued further education and training is rising.
- **Equal treatment of higher vocational training with university studies.** Presently transfers from a vocational training colleges to universities are almost impossible. With the introduction of Universities of Applied Sciences, higher vocational training is to be put on an equal footing with university studies.^{xiv} Bachelor's degrees at such institutes are to provide access to master's programmes at universities.

5 The reform proposals don't tackle the actual problems

The reform proposals clearly highlight the weaknesses in vocational training. However, the

measures are vaguely worded and don't address the fundamental problems.

The government primarily sees companies as executing entities. Companies will still not have much influence over course content and job profiles.^{xv} For this reason the system lacks the flexibility needed to react to short-term changing economic requirements. In light of the dramatic changes in economic structures China needs exactly this adaptability. The Chinese system will in future still not be able to provide flexible coordination of the vocational college courses with the needs of the labour market.

Standard setting and quality management in vocational training remain problematic. Support of vocational training by large corporations and privatisation measures won't provide a systemic improvement. This is especially a disadvantage to small- and medium-sized private enterprises that, due to their size and financial resources, are not able to enter into cooperation agreements with vocational colleges. The increasing diversification complicates the necessary quality management. As long as the government continues to determine quality standards for apprenticeship courses without adapting their content to meet the current needs of industry, the

Chinese system will not be able to offer high-quality vocational training across company boundaries. There is a clear need to give companies a voice in this area. The project Sino-German Automotive Vocational Education (SGAVE) demonstrates impressively the positive contribution that can be achieved through cooperation amongst competitors.

Info box 1:

Sino-German Automotive Vocational Education (SGAVE) was established in 2011 as a cooperation project between the Ministry of Education of the People's Republic of China, the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) on behalf of the German Federal Ministry for Economic Cooperation and Development (BMZ) and five German car manufacturers. It has significantly contributed to the standardisation and qualitative improvement of the automotive mechatronics engineer apprenticeship.

Despite formal equality, vocational education will continue for some time to be seen only as a second choice. The introduction of Universities for Applied Sciences doesn't necessarily lead to qualitative improvement or a better reputation for vocational training within Chinese society. In fact, the objective is to enable general mobility between the systems of academic and vocational training from secondary level onwards in order to avoid stigmatising vocational training from the outset as a second class education option.

6 Strategies and courses of action

The reforms of the Chinese vocational system in conjunction with structural economic reforms open up new opportunities and operating areas for German stakeholders. At the beginning of the 1980s Germany was the first cooperation partner for China in the area of vocational training. Foundations, chambers and companies have in the meantime been actively involved in China's education sector for more than three decades.^{xvi} The environment for cooperation has changed fundamentally in the meantime. China is no longer a developing country but the second biggest economy in the world and Germany's third most important trading partner. This new relationship should also be reflected in the education exchange. For German stakeholders this means:

German companies producing in China should look to cooperate more with each other with regard to questions concerning the training of skilled workers. The timeframe for competition for talents and skilled workers has also shifted. In future it will take place before the start rather than on completion of the apprenticeship. Under pressure from the Chinese government, Chinese state-owned enterprises in particular will be more active in relation to vocational training. In order to offer more attractive appren-

ticeships than the domestic Chinese competition and to guarantee uniform quality standards, German companies should look increasingly at working together in the area of vocational training.

German education providers should coordinate their activities better in order to systematically exert influence on the shaping of the Chinese VET system. Education providers and projects supported by German industry should focus on the development and **quality management of apprenticeship courses** that help in the **long term to secure sales markets in China for products "Made in Germany"**. In particular, there are opportunities to expand German-Chinese cooperation in areas that the Chinese government is looking to strategically support.

Beyond this, education providers should increase their **focus on new cooperation options in the area of further education and training**. Demand will continue to rise in line with the transformation of the economic system.

The German government should politically support the cooperation initiatives in the area of vocational training. It should continue to provide assistance for existing platforms of coordination and information exchange between

German education providers in China. Particularly in the area of quality management, German approaches are globally highly regarded and can make a valuable contribution in China. The expansion of already established **vocational training boards and examination boards** in China, however, will require the necessary political backing.

The restructuring of the education system will play a crucial role in the success or failure of

Chinese economic reforms. The repercussions of failure would also seriously affect the German economy. If industrial production in China is able to climb the value chain, however, significant parts of the German economy would benefit in the long-term. New markets would emerge for German products including high-tech machines and systems, modern components like control chips or highly developed intermediate products made, for example, by speciality chemicals companies.

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<http://learning.sohu.com/20150614/n414990956.shtml>

ii Wübbeke, Jost und Björn Conrad (2015). "Industrie 4.0: Deutsche Technologie für Chinas industrielle Aufholjagd".

http://www.merics.org/fileadmin/templates/download/china-monitor/China_Monitor_No_23.pdf

iii AHK Business Confidence Survey 2014, http://china.ahk.de/fileadmin/ahk_china/Dokumente/Publications/Business_Surv_2014_de.pdf, AHK Business Confidence Survey 2015 http://china.ahk.de/uploads/pics/Business_Surv_2015_cover_final.jpg

iv http://www.chinadaily.com.cn/china/2015-07/09/content_21237438.htm

v <http://www.chinanews.com/edu/2015/03-03/7095792.shtml>

vi From 2013 to 2014 the number of industry robots per 10,000 industrial workers has nearly doubled to 30. In Germany it is close to 300 <http://www.ifr.org/industrial-robots/statistics/>, <http://www.reuters.com/article/2015/02/05/robots-china-idUSL6N0VF52O20150205>

vii In 2014 Chinese vocational apprentices spent only 73 days outside the vocational college gaining practical experience. http://www.gov.cn/xinwen/2015-07/23/content_2901477.htm

viii State Council (2014). 现代职业教育体系建设规划（2014-2020年）

http://www.moe.gov.cn/srcsite/A03/moe_1892/moe_630/201406/t20140623_170737.html

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http://www.china.diplo.de/Vertretung/china/de/202-shan/_seiten/20150212-berufsbildung-ahk.html

x State Council (2014) 现代职业教育体系建设规划（2014-2020年）

xi Ministry of Education People's Republic of China (2014). 高等职业教育创新发展三举措行动规划（2015-2017年）

<http://www.gdpi.edu.cn/cms/ci/xsst/resource/80aebd7599a9dfb5ea969a4cf03ddee7.pdf>

xii Provincial government have since September 2014 released specific implementation plans e.g. 关于加快发展现代职业教育的实施意见

<http://mianyang.zxبتz.net/News2/17899.html>

xiii Molnar, M. und V. Koen (2015). "Providing the right skills to all in China: 'From made in China' to 'created in China'". OECD Economics Department Working Papers No. 1219.

<http://dx.doi.org/10.1787/5js1j18g4tlx-en>, http://www.oecd-ilibrary.org/economics/providing-the-right-skills-to-all-in-china_5js1j18g4tlx-en?crawler=true

xiv The 640 Universities for Applied Sciences are not going to be newly established. Previously existing universities at provincial level are to undergo status change. The actual selection process is still open. Most of the universities are sceptical about the conversion.

xv Ministry of Education People's Republic of China (2014). 高等职业教育创新发展三举措行动规划（2015-2017年）

<http://www.gdpi.edu.cn/cms/ci/xsst/resource/80aebd7599a9dfb5ea969a4cf03ddee7.pdf>

xvi Zentralstelle für Weiterbildung im Handwerk – ZWH. China-Deutschland Deutschland-China. Cooperation in vocational training, 2. Edition. Link to 1. Edition (30 years cooperation in vocational training): http://www.q-zwh.de/zwh/fileadmin/PDF/Publikationen/chinabroschuere_zwh.pdf