



Research on the Development Trend of ASIIN Accreditation in China (2004-2023)

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Abstract. The quality of higher education teaching in Germany has always enjoyed a good reputation internationally, and its evaluation system is known for its rigor, practicality, and strong targeting. International accreditation of academic disciplines has been one of the focuses of higher education and teaching reform in China in recent years. This article conducts a study on the classification, geographical distribution, and types of academic disciplines of domestic universities participating in ASIIN accreditation in China, and studies the trend of Chinese universities participating in German ASIIN accreditation. It analyzes the characteristics of ASIIN accreditation in China's development process, such as the scale of expansion, integration of disciplines, and clustering of local radiation effects. It concludes that participating in evaluation can promote the reform of disciplinary structure adjustment and the improvement of teaching quality.

Keywords: German ASIIN Accreditation, International Certification of Degree Program, Chinese University.

1 Forward

The German certification institution “The Accreditation Agency for Study Programmes in Engineering, Informatics, Natural Sciences and Mathematics” (in German: Die Akkreditierungsagentur für Studiengänge der Ingenieurwissenschaften, Informatik, Naturwissenschaften und Mathematik, abbreviation: ASIIN) is an institution for engineering, informatics, natural sciences and mathematics research projects. It is a non-profit organization established in 1999 and an independent third-party quality certification institution, ensuring certification to promote the improvement of higher education quality and cooperation between higher education institutions and the business community. Currently, 39 majors in mainland China have passed the evaluation of ASIIN accreditation, including 17 majors by University of Shanghai for Science and Technology. As early as 2004, the two cooperative education majors of the University of Shanghai for Science and Technology passed the ASIIN accreditation, becoming one of the first majors in China to adopt the “4+0” teaching mode and to issue Dual German and Chinese diplomas for their students. The university has become the earliest institution to show the radiation effect of “local internationalization”. Multiple local majors

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of the university have successfully passed the evaluation, greatly enhancing the international recognition of the university's localized majors; At the same time, other domestic universities in China have successively carried out evaluation work by benchmarking against ASIIN's participation standards, and have achieved good results.

2 Overview of Domestic and International Research

Domestic experts for the German ASIIN certification focused mainly on the period of the last decade. For example, if we use ASIIN as the keyword to search CNKI, and 36 search results were obtained (search time: March 2023), including 33 journal papers, 2 Jianmin, Jiang Chen, Wang Zhonghou, Yang Huinan, etc; Their research focuses mainly on specific participating majors, such as mechanical engineering, combustion science, for example, articles like "Reform of the Teaching Model of Mechanical Engineering for International Engineering Education Certification" [1] (Dr. Jiang Chen, 2014), and "Exploration of Undergraduate Mechanical Dynamics Course Teaching Reform" [2] (Jiang Xiaohui, 2016) and "Combustion Science (in English) Teaching Practice in the Context of ASIIN International Certification university master's thesis, and 1 newspaper report. In addition to the "Investigation Report on German Engineering Education Certification, Reform and Development" [3] by the engineering education certification delegation at Tsinghua University in 2006, the earliest research achievement was the "Research on the Quality Evaluation System of Sino-German Engineering Education" [4] published by the author of this article (Xu Jingwei, 2012). Domestic researchers working on this topic are mainly industry experts from universities who were once involved in ASIIN accreditation work, such as Zhu" [5] (Yang Huinan, 2020). The 6 research scholars from the rest domestic universities are mostly from Tongji University, Tianjin University, Sichuan University, Nanjing University of Science and Technology, Shanghai Dianji University, and Chongqing College of Mobile Communication, for example, Wu Qing reported on "Research on ASIIN, a German Higher Engineering Education Certification Institution" [6] (2016), and Li Yadong wrote "From Following to Leading: Exploring the Development Path of Higher Education Major Quality Certification - Factor Analysis and Enlightenment Based on the German Certification System and ASIIN Major Certification" [7] (2019), and Hu Dexin wrote the "Construction Logic and Action Path of German Engineering Education Certification System" [8] (2022), etc.; Their research mainly focuses on the logic of the construction of the ASIIN accreditation body and the development of major certification in Germany and compares and analyzes it with the domestic certification system. The research on ASIIN accreditation in foreign countries is mainly written by some scholars from Germany. In recent years, mention has been made of ASIIN accreditation, including Frauke Zbikowski's research result of "Records of Research Policies and Education" [9] and Barbara Albert's research result of "Single Assessment: Self-Assessment and Quality Improvement" [10]; The rest studies are generally before the year 2010. These research results mainly focus on the evaluation methods of chemistry and architecture majors and are of rather little use in the study of the overall ASIIN accreditation system.

In a word, domestic and foreign experts and scholars often focus on major quality aspects or certification methods for ASIIN accreditation research, while the overall systematic research on ASIIN accreditation work in China is relatively weak, which is not conducive to the induction of international certification work. Through further analysis and research on various types of Chinese universities participating in ASIIN Accreditation, favorable reference opinions can be provided for future evaluation work.

3 Analysis of the Current Situation of Chinese Universities Participating in ASIIN Accreditation

During the period from 2004 to 2023, eight Chinese universities have successfully participated in and passed the evaluation of German ASIIN, involving 39 majors in total, including mechanical design, electrical engineering, information technology, food science, etc. Among them, the University of Shanghai for Science and Technology, as the earliest Chinese university to pass German ASIIN accreditation, had two majors certified in 2004; As of October 2023, a total of 17 majors in this university have passed the evaluation. The following table gives an overview of the Chinese universities which passed ASIIN accreditation. The following table shows the details about the passed date and institutions of the passed majors (Table 1. Overview of ASIIN accreditation information in China).

Table 1. Overview of ASIIN accreditation information in China.¹

	date	University	passed Major
1	20041214	University of Shanghai for Science and Technology	Maschinenbau (Fertigungstechnik)
2	20041214	University of Shanghai for Science and Technology	Elektrotechnik (Automatisierungstechnik)
3	20101001	University of Shanghai for Science and Technology	Automatisierungstechnik mit Test DaF
4	20101001	University of Shanghai for Science and Technology	Internationale Wirtschaft und Außenhandel mit Test DaF
5	20101001	University of Shanghai for Science and Technology	Maschinenbau (Fertigungstechnik) mit Test DaF
6	20140328	University of Shanghai for Science and Technology	Analytical Instruments, Measurement and Sensor Technology
7	20150327	University of Shanghai for Science and Technology	Energy and Power Engineering
8	20150327	University of Shanghai for Science and Technology	Mechanical Design, Manufacturing and Automation

¹ The above data statistics are all collected from the official website of ASIIN in Germany, homepage: <http://www.asiin-ev.de/pages/de/asiin/akkreditierung-studiengaenge/akkreditierte-studiengaenge.php> accessed 2024/6/30.

9	6	Ningbo University of Technology	Transport
10	20180629	University of Shanghai for Science and Technology	Process Equipment and Control Engineering
11	20180629	University of Shanghai for Science and Technology	Renewable Energy Engineering
12	20180928	University of Shanghai for Science and Technology	Elektrotechnik (Automatisierungstechnik) mit Goethe-Zertifikat B2
13	20180928	University of Shanghai for Science and Technology	Internationale Wirtschaft und Außenhandel mit Goethe-Zertifikat B2
14	20180928	University of Shanghai for Science and Technology	Maschinenbau (Fertigungstechnik) mit Goethe-Zertifikat B2
15	20190628	Shanxi Agricultural University	Mechanical Design, Manufacturing and Automation
16	20190628	Shanxi Agricultural University	Network Engineering
17	20190628	Chongqing College of Mobile Communication	Internet of Things Engineering
18	20190628	Chongqing College of Mobile Communication	Electrical Engineering and Automation
19	20190628	Chongqing College of Mobile Communication	Software Engineering
20	20190628	Chongqing College of Mobile Communication	Communication Engineering
21	20200320	University of Shanghai for Science and Technology	Network Engineering
22	20200320	University of Shanghai for Science and Technology	Computer Engineering
23	20200320	University of Shanghai for Science and Technology	Intelligent System Engineering
24	20210316	Shanghai Ocean University	Food Science and Engineering
25	20210316	Shanghai Ocean University	Food Quality and Safety
26	20210316	Shanghai University of Electric Power	Energy and Power Engineering
27	20210618	Shanghai University of Engineering Science	Thermal Energy Engineering & Building Environment and Energy Application Engineering
28	20210713	Shanghai University of Engineering Science	Vehicle Engineering (Rail Transit Vehicle)
29	20220318	University of Shanghai for Science and Technology	Applied Chemistry
30	20220624	Shanghai University of Electric Power	Information Security
31	20220624	Shanghai University of Engineering Science	Rail Transit Signal and Control
32	20221209	Jinzhong College of Information	Electrical Engineering and Automation
33	20221209	Jinzhong College of Information	Software Engineering
34	20221209	Chongqing College of Mobile Communication	Telecommunication Engineering and Management
35	20230324	Shanghai University of Engineering Science	Railway Engineering
36	20230623	Shanghai University of Electric Power	Mechatronic Engineering

37	20230623	Shanghai University of Electric Power"	Mechanical Design Manufacture and Automation
38	20230922	Shanghai Ocean University	Energy and Power Engineering
39	20230922	Shanghai Ocean University	/Built Environment and Energy Engineering

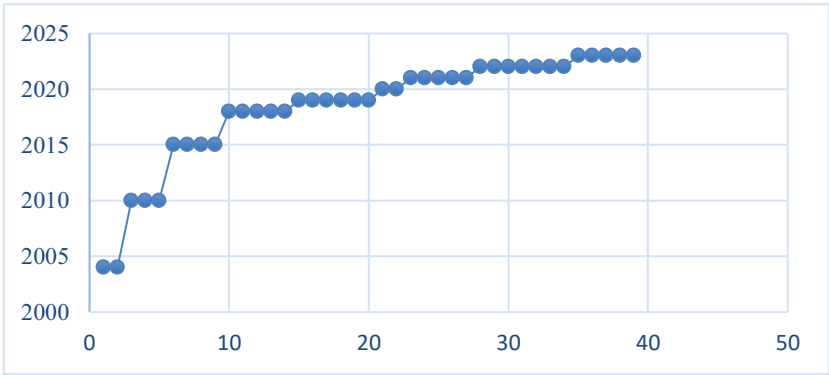


Fig. 1. Distribution of certified majors from 2004 to 2023.

As can be seen from the above chart for 2004 to 2023, of the 39 programs that were accredited, most were accredited after 2014 (Fig. 1 Distribution of certified majors from 2004 to 2023). On the one hand, this indicates that there has been a growing preference of domestic universities for quality certification in the post-2014 era, while the recognition of international certification by domestic universities has been increasing since then; On the other hand, after the 18th National Congress of the Communist Party of China (CPC), the importance of opening up of education to the outside world has been further enhanced, while the high quality of Chinese university education has been gradually recognized by other countries, especially by Germany.

The types of majors in which Chinese domestic universities participate in the German ASIIN accreditation have certain characteristics. Among all the 39 certified majors, there are 27 traditional engineering majors, including 4 majors in cooperative engineering; there are 7 majors in management science, including 3 majors in cooperative education; and also, there are 1 major in science and 4 majors in interdisciplinary. Engineering education, as the core of German higher education, has a very comprehensive quality assurance system. Therefore, the vast majority of majors of Chinese universities participating in German ASIIN accreditation are engineering majors, accounting for about two-thirds of the proportion. Another trend that needs to be noted is that interdisciplinary studies account for nearly 10%, which is also a reflection of disciplinary integration and China's new engineering education reform. It is worth mentioning that Chinese domestic Chinese-foreign cooperative programs still account for a large proportion of the German ASIIN accreditation, about 19%. This shows that Sino-foreign cooperative programs are still an important driver for Chinese universities to participate in the German ASIIN accreditation (Fig. 2 Number of majors passing ASIIN).

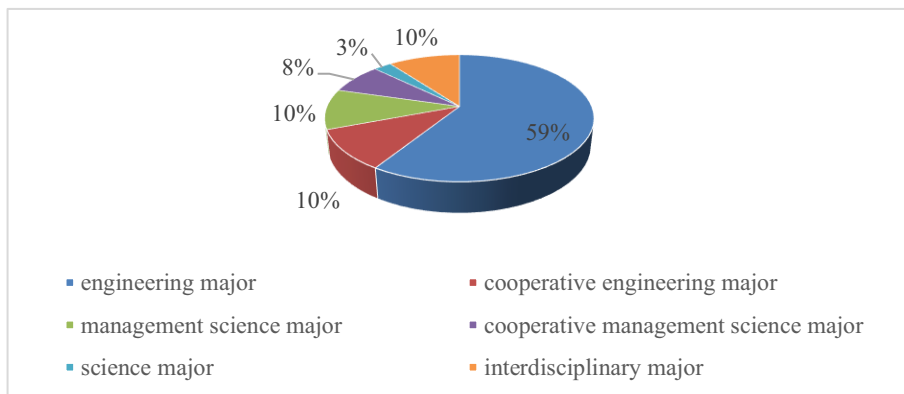


Fig. 2. Number of majors passing ASIIN.

The distribution of universities participating in ASIIN accreditation in China is relatively concentrated. According to geographical distribution, Chinese universities participating in ASIIN accreditation are mainly distributed in East China, North China, and Southwest regions, and are relatively concentrated among universities along the east coast of China. Among them, there are 4 universities in Shanghai, 2 in Shanxi Province, 1 in Zhejiang Province, and 1 in Chongqing. Universities in the East China region have been certified with 30 majors, the universities in North China have passed 4 majors, and universities in Southwest China have passed 5 majors. Compared to other provinces, universities in Shanghai have some advantages in terms of education opening and cooperation with Germany (Fig. 3 Graphical distribution of ASIIN-certificated majors in China). Ningbo University of Technology, the only one in Zhejiang Province that has passed ASIIN certification, became a pilot in China in 2015. At that time, the university's master's program in Transportation Engineering did not start enrolling students. However, through the simulation program operation analysis of German partner universities, the program was also recognized by ASIIN evaluation institutions. In recent years, the trend of ASIIN certification has shifted from evaluating a single major to evaluating the entire discipline. The advantage of this lies in the ability to evaluate similar disciplines more systematically, providing new opportunities for interdisciplinary integration.

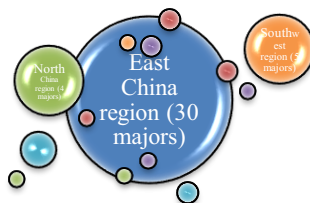


Fig. 3. Graphical distribution of ASIIN-certificated majors in China.

4 Development Trend of ASIIN Accreditation and Certification in China

With the normalization of the epidemic, a further study of the role of the German ASIIN Accreditation allows for a better assimilation of high-quality educational and teaching resources from abroad, further refines the advantages of universities in “locally internationalized” education and teaching, and promotes the internationalization of teaching reform and high-quality education development in Chinese universities. Through the analysis of the current situation of Chinese universities participating in ASIIN accreditation, we can see that the development trend of ASIIN accreditation in China has the following characteristics.

Firstly, the scale of ASIIN accreditation in China. In the past decade, the universities in China that have participated in the German ASIIN accreditation have shown a trend of change from concentration to dispersion, and from the eastern coast of China to the mainland in depth. More and more universities are realizing the importance of improving major quality assessment under the international certification framework, which cannot be underestimated. Comparatively speaking, the quality of German higher education enjoys a good reputation globally, which further enhances the recognition of ASIIN accreditation. This certification system also provides great inspiration for the reform of the education quality evaluation system of domestic universities.

Secondly, ASIIN accreditation is gradually transitioning from traditional disciplines to interdisciplinary and integrated majors. In 2004, domestic universities passed ASIIN accreditation in two majors: Electrical Engineering and Automation, and Mechanical Design and Manufacturing and Automation. These are not only the core foundational majors of German engineering majors, but also the traditional strength of engineering majors in China. However, with the advancement of biomedicine, intelligent manufacturing, medical-industrial crossover, a fusion of science and art, and "Internet+", some new interdisciplinary disciplines and integrated majors have emerged in domestic ASIIN accreditation majors, which are also important fields for domestic universities to participate in ASIIN accreditation in the future.

Thirdly, the trend of “Internationalization at Home” has driven the continuous expansion of the local radiation effect of ASIIN accreditation. The three-year epidemic has had some impact on domestic ASIIN accreditation, but it has, on the other hand, objectively promoted the reform of certification mode. The important point is that the influence of “Internationalization at Home” is constantly emerging. Compared to the past, Chinese students have more options than ever before to choose between studying abroad and staying at home to enjoy international educational resources. Secondly, the ASIIN accreditation body itself has changed the previous single language of accreditation from German to both English and German, which allows more programs to be accredited against German higher education quality accreditation and increases the range of potentially creditable programs for ASIIN. In addition, due to the impact of the previous epidemic, the ASIIN agency has adjusted the field assessment session of the accreditation, while retaining the previous mode of commissioning expert delegations. In special circumstances, the assessment can also use a combination of on-site online live inspection and a representative assessment system, which can objectively

enhance the efficiency of the accreditation of China's domestic colleges and universities, especially for local programs.

Fourthly, the degree of integration between ASIIN accreditation and various certification systems has become closer. In recent years, the cooperation between ASIIN accreditation and other certification systems such as the Akkreditierungsrat (AR) and the European Accredited Engineering Programs (EUR-ACE) has become more intensive and inseparable. After the participating majors of Chinese universities have passed the assessment of ASIIN, they can not only get the certificate of accreditation of ASIIN but also apply for AR, EUR-ACE, Euro-Inf (European Association for the Accreditation of Informatics), EQAS-Food (EQAS Food Professional Labeling) and so on at the same time, while obtaining the title of the relevant majors' vocational qualification recognition in Europe.

Fifthly, ASIIN accreditation has great room for advancement. ASIIN accreditation agencies have gradually evolved from a single major quality certification model to a combination of systematic and major quality certification for disciplinary systems, and have achieved good results in their implementation in Germany. Similarly, some universities in China with disciplinary characteristics can consider participating in systematic certification when they participate in ASIIN accreditation in the future. Such a model helps us save time and economic costs and enhance the holistic nature of the discipline.

5 Conclusion

The cooperation model between domestic universities in China and ASIIN accreditation institutions in Germany is undergoing subtle changes. In October 2023, the University of Shanghai for Science and Technology was invited to attend the "ASIIN Global University Network of Excellence (AGUNE)", and since June 2015, USST and the ASIIN institutions established the "USST-ASIIN Sino-European Higher Education Research Center" in Shanghai by USST, which has also become an important platform for China's domestic major quality assessments to benchmark against German higher education quality standards. Through this platform and direct communication with ASIIN headquarters, the experience gained and challenges encountered by Chinese universities in the process of participating in international accreditation are constantly discussed, which is useful for breaking the bottleneck of major quality optimization, and at the same time can play a certain role in promoting the influence and competitiveness of Chinese universities in the international profession. Over the years, the German ASIIN assessment and accreditation system has played a certain role in promoting disciplinary structure adjustment and the optimization of training programs of the participating majors in China. Such optimization not only makes up for the shortcomings of Chinese domestic majors to a certain extent but also gives students of Chinese universities more opportunities to share international excellent resources. At the same time, instead of passive participation, Chinese universities should actively explore cooperation with more foreign accreditation organizations, further absorb the advantages and

experiences of international accreditation, and obtain more methods of education quality improvement in line with the actual situation of Chinese higher education when promoting the opening of education to the outside world.

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