

Chinese Intellectual Property Strategy of Sustainable Development in High Education

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Abstract

More than ecological/environmental issue, sustainable development is a critical social issue. This study was to explore the methods and paths to realize the science integration and education in Chinese universities. Important mission, operation mode of the Research Center for the Big Data (BD) and Intellectual Property (IP) of one typical university were expound under the science integration and education. It was held that unique Chinese characteristic political advantage was found in all Chinese universities. But IP management and clinic education in Chinese universities was confronted with varied typical problems. Thus, the specific requirements of cooperation among universities, secondary college of university and teachers were put forward in the process of science integration and education. To promote and protect IP such as patents that can be transformed into practical applications, more funds should be upgraded by government. Then, the author suggested IP rights of teachers can be evaluated by judicial authentication. Finally, the author pointed out that a reasonable evaluation system of IP value should be built in colleges and universities. They can learn from the national judicial appraisal standards when necessary, and set the appraisal standards according to their own characteristics, so as to promote the sustainable development of higher education through the classified management and value identification of intellectual property rights.

Keywords

IP management. university. sustainable education. clinical psychology. value. judicial appraisal. build path

1. Introduction

Represented by Intellectual Property (IP) rights, science and technology was playing an important role in world economic growth Since the 21st century. more than 75% of economic growth in developed countries was contributed by Scientific and technological progress. and the transformation rate of scientific and technological achievements reached 80% in Japan and the United States. In contrast, in China, the transformation rate of scientific and technological achievements was only about 30%. At present, gradually moving towards the era of full data, China has entered the macro era of BD in an all-round way. IP issues involved would

be more diverse and complex in China at that time.

In 2018, China's 《 Notification on Deeply Implementing the National IP Strategy, Accelerating the Construction of a Powerful Country in IP, Promoting the Ministry of Planning and Technology, the Ministry of Education, the Ministry of Human Resources and Social Security, the Chinese Academy of Sciences, the Academy of Engineering, and the Special Action of Cleaning up "Only Papers, Only Professional Titles, Only Academic Qualifications, Only Awards" 》 mentioned that research and development institutions and universities should be encouraged to build specialized technology transfer institutions, cultivate a group of technology transfer institutions with demonstration and leading role to improve their service capabilities and level, encourage the continuous promotion of IP academic research and achievement transfer in universities and scientific research institutions, and guide universities and scientific research institutions to establish a

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scientific and standardized IP management system. Base construction, achievement awards and talent projects, to cleanup the practices involving "Only Four standards" should be focused on discipline evaluation and "double first-class" construction.

As a common, sustainability is the tasks of all university. [1] Sustainability is one of the critical societal challenges of the 21 century. [2] According to the United Nations Brundtland Commission (1987), A good balance between today and the future were dispensable to sustainability. [3] Sustainable Development Goals (SDGs) is universally applicable to all countries more than 2030 Agenda for Sustainable Development. To achieve the United Nations SDGs, sustained efforts were dispensible for the world. As places of education and research, universities play an considerable role in realizing sustainable development goals. [6] Education is consist of the fourth objective of SDGs, it is individually empowered to reflect on people's actions themselves, directly acted on the goal of society. [4, 5] The goal of education, was indivisible other than 16 SDGs, especially IP education and management of university.

As an member of the UN, sustainability was stressed around China. Now, Chinese governance strategy rule is being practiced in all fields [7, 8, 9]. Education, especially higher education, is the most important in basic field. To comprehensively promot the rule of law IP and BD were the critical contents of education as well as to strengthen the modernization of governance.

Compared with the traditional IP protection in the past, China's national IP strategy was based on the overall layout and promotion under the social background of big data and artificial intelligence. China's strategic layout was particularly critical in increasingly fierce Sino-US trade war. testing a country's IP protection level, Sino-US trade war verified whether a country can adhere to benign and sustainable development in the end.

However, less preparations was made by colleges and universities in the teaching of IP law and network security law. The combination of theoretical teaching and judicial practice was not optimistic.

Based on typical universities in China as an example, this study was to analyze how legal education supports and realizes the sustainable development with IP rights and big data.

2. Litratue

The science integration and education is an important concept and a basic principle of

contemporary universities (12). The integration varied from interaction, transformation and participation of research, teaching and students activities (12). The science integration and education is critical to higher education improvment, innovative talents cultivation and innovation synergy realization. (13). The integration of academic and occupational curriculum in science and technology education in light of issues developed after two historical failures. (14) Integration of higher professional education establishments, science and industry once was a historial issue in Russia. (15). During the integration in Kazakhstan, current education system was insufficient teaching staff (TS) training for higher school (16).

IP education is a practical education for sustainable development. In Japan, IP education was popular in high school curriculum system from 2002. However, IP education system was not established for limited courses, poor theory and poor application. For Japan, sustainable education of IP means to creativity and entrepreneurship, and environmental education of IP. [17] Thus, science integration is popular issue as well as education in the world.

Many measures were actively taken for UN's 17 sustainable goals by 2030. It was well known that sustainability needs a critical mass of actors as a brittle process. [10] Meanwhile, the whole society participation was dispensable to sustainable development. Sustainability is a system engineering. People were encouraged to voluntarily participate in sustainable development process. Since 2004, sustainability was reported a voluntary issued in universities. [11]

In the 19th Communist Party of China (CPC) National Congress, it was clearly stated that "To build a strong country in education is the foundation project for the great rejuvenation of the Chinese nation". "It is high time to give top priority to education, to deepen educational reform, to accelerate the modernization of education, and to provide education satisfaction". SDGs is Chinese's national strategy. The education is the basis goal of all other. The science integration, education and sustainability is the best way to achieve SDGs. At present, the contribution of Higher Educational Institutes (HEIs) is a constant evaluation to economic development and society. [19] The significance of IP on a global scale is a fact. [21] IP play an important role in the realization of human sustainable development, [20] so to a certain extent, IP maybe is a tool for sustainability of an organization. [18] It is necessary to develop

university IP education; it can make the training of the college students more effective and sustainable. [21]

3. Case Study

3.1 Background

Approved by the Chinese Ministry of Education, Qilu University of Technology was to merge with Shandong Academy of Sciences in 2017. Thus, Qilu University of Technology was became the vanguard of pilot project of science and education integration in Shandong Province. It was the only one university and one academy of science merged. So, its IP management and education were typical for the paper's topic.

In 2019, one research center for IP rights was built in Qilu University of Technology. After sorted out previous IP rights, the research center carried out resource integration, standard system construction and IP rights protection. It would be a theoretical support and practical protection of IP rights in university. Research Center was a joint measures of State IP Office and Ministry of Education to improve the public research and service network of big data and IP information between universities and society. Research center thoroughly implemented the national innovation-driven development strategy. What is more, Research center enhanced service ability of universities in big data and IP information. More than enhanced innovation ability and independent innovation ability, research center served cooperation between industry, academia and research.

To strengthen big data and IP rights was a strong guarantee and effective implementation of "Science and Education Integration Strategy" and "Eight Action Plans" in Qilu University of Technology's. It was a strong guarantee to rapidly develop into a first-class university and a first-class discipline for Qilu University of Technology.

With more than 4, 000 college teachers, Qilu University of Technology mastered advanced technology theories and skills in such various emerging industries as light industry, chemistry, materials, brewing, machinery and other traditional industries. It was a valuable resource of big data for IP application and transformation. Patent application and other IP protection were supported by a large amount of funds every year. That the success rate of application was poor before was reasoned lacking school's policy guidance, effective system monitoring and standardized services.

To strengthen the protection of big data and IP rights was an inherent need to be an innovative country. It was focused on by domestic famous universities and industrial universities. With the pioneers of Peking University and Shanghai University, IP major was set up in 71 domestic universities. IP industrialization colleges were set up more than 30 universities (2016). However, the systematicness, integrity and geographical universality of IP resources were better done in Qilu University of Technology.

3.2 Study

3.2.1 Purpose

The aim of this study is to explore the main problems. To integrate science and education in Chinese and other country's universities with an effective method.

3.2.2 Method

The practical cases of Qilu University of Technology were enumerated through empirical experience. Research Center for Big Data and IP were expounded with science integration and education.

3.2.3 Statistics

(Table 1)

(Table 2)

(Table 3)

(Table 4)

3.2.4 Analysis

The whole picture of IP rights and IP management was reflected by data above of Qilu University of Technology. Based on data above, the following conclusions can be drawn.

3.2.4.1 Low IP success

Invention patents account for the majority patents 2016-2019 (Table1). Utility Model and Design Patents accounted for a small part. Design Patent accounted almost negligible (Table1).

Patent application fees supported by the school was collected by the off-campus agency (Table2). However, income and tax had nothing to do with school (Table2). As right holder, the legitimate rights and interests transferred within the school was note well protected and the rights. The costs of patent application were high in university, whereas costs of keeping patent valid were higher. For most teachers in university, patent application and authorization just were used to evaluate professional titles but no other effect. It was fundamentally unprofitable to university.

Quantity of patent authorization was low compared with the number of applications, (Table 3). Trend of patent authorization from 2017 to 2019 was in decline, and all patents were invention patents. the trend of design and utility model patents was on rise, albeit too small proportion.

The comprehensive data representation (Table 4) showed the comparison between patent application and patent authorization from 2017 to 2019. The overall patent authorization rate was 26.2%. High application rate with low success rate showed too low success rate of application. It was reasoned that it was not clear whether the related teachers really pursue the patent agency to pursue the legal responsibility for its unsuccessful agency, and safeguard the legal rights and interests of the school.

3.2.4.2 difficult for funds perfect return.

There are more than 4,000 teachers in Qilu University of Technology. The average annual success rate of application was less than 30% if there were 500 pieces' patent application every year. The proportion of expenditure on scientific research funds, incentive funds and income from achievements was showed upside down. It seriously violated the value and significance of IP rights existence. Science integration and education was not really realized.

3.2.4.3 School disadvantage of IP rights

The specific conditions of application, filing or approval of registered trademarks and copyrights were not included in data above. Nor were the detailed data of legal dispute resolution of IP infringement occurred in operation process of the enterprises IP rights located. As the owner of post-related IP achievements, current IP operation management office was managing as a whole in school. One special organization should be responsible for application, transformation, application and protection of IP rights. Professional research services should be provided. At the same time, operation process and results should be fed back by teaching and research. Thus, teachers' ability of scientific research transformation in IP rights was improved. The integration of production, education and research were realized. The teaching, social and economic benefits were maximized in school.

4. Results

4.1 Big Data

4.1.1 Guarantee for relevant basic teaching work

Big data and IP rights would carry out related theoretical teaching in different directions. It was to ensure that professional teaching was carried out in an orderly manner.

The Research Center for Big Data and IP was based on the College of Political Science and Law. It was supported by Social Science Division, IP Operation and Management Office, Library Information Retrieval Center, Strategic Information Institute, Social Science Division, Science and Technology Division and Network Security College. Focusing on management and protection of IP of big data, the Research Center can realize e professional theoretical teaching and practical services of IP management.

4.1.2 To establish a research and practice department for the application and transfer of big data and IP rights. To achieve the science integration and education.

Cooperate with Entrepreneurship Institute, Big Data and IP Research Center would encourage outstanding teachers from above majors on the basis of the top-level design. Theoretical research and practical operations were conducted on the application, and big data and IP rights were transferred according to actual needs. As the goals of data consolidation, IP design, application, authorization, taxation and legal protection, different departments for IP application, transfer, finance, training and the implementation of specific functional orientation of Big Data and IP Application and Transfer Research and Practice Department were classified and established: IP Application, IP Transfer and IP Finance.

4.2 IP and education

As of Chinese higher education, a large number of university patents and IP rights were set up. However, patents based on professional title evaluation were poor in practical application. The conversion rate of achievements was extremely low. The establishment of the Research Center for Big Data and IP in Qilu University of Technology well met the needs of theoretical teaching, student internship and social service in China's higher education. It was concluded that the science integration and education in China's higher education would be a general trend. Science integration and education was an important support point for the rejuvenation of the Chinese nation. Generally, the integration needs the following three subject's cooperation each other.

4.2.1 Schools

Big Data and IP Research Center served teaching, scientific research and social practice. Comprehensive services and long-term development were provided by Big Data and IP Research Center.

4.2.2 Second-level colleges

As a scientific research sites with equipment, Second-level colleges completed legal agreement with school's rights, obligations and responsibilities. Such managing institutions as Big Data and IP Research Center were operated orderly according to law. The influence of the college at home and abroad were achieved in such colleges/enterprise's substantive integrated with social practice departments, as big data, big data management departments, IP offices, judicial organs, law firms and IP agencies.

4.2.3 Teachers

To adapt the college, professional direction was adjusted in a timely manner. Professional direction actively participated in the center. The service consciousness of IP teaching, teaching and research should be integrated with scientific research and practice. The corresponding role should be timely changed ahead.

5. Conclusion

Sustainability of IP openness was not definitely lead to higher sustainable development of society. [22] IP absolutely was critical for nation, company as well as university. Knowledge management (KM) were acknowledged from sustainable development. [23] Knowledge management (KM) is the most important project for China as other countries.

5.1 Problems of Sustainability

The argument above was one typical case of China university. Most serious problems were alike in most Chinese universities.

First, large number of patents cannot be applied in practice. In university, patents or IPs were used for awards and evaluate titles by teachers more than their productivity. The key reason for ineffective applying funds lied it was provided by their affiliation, but not by themselves. Meanwhile, there was about RMB4000 award for every IP by Chinese government, it aggravated the unreasonable phenomenon. Fortunately, Chinese government now found the seriousness of this problem and began to revised it.

Second, universities were lack the psychological cognition of the overall situation of sustainable development. Funding was only used to support the

authorization of IP, but not its productivity.

Third, there was a serious shortage of IP and BD faculty. Even with the existing faculty, the typical problem was lied in the disconnection between teaching and judicial practice represented by artificial intelligence (AI) or BD. Implementation of Chinese forward target was hindered by these problems.

5.2 Implementation of sustainability

Education is the basic goal of SDGs of UN. University education and its IP management should be the National Strategy of all the countries. This is true for China as well as others. Although universities faced with various difficulties, it was believed that higher education should be sustainable as long as there were feasible measures to be resolutely implemented. IP management would certainly support for the sustainability of universities.

5.2.1 under IP strategy, government should upgrade more funds to promote and protect IP rights. Patents would be more apt to practical applications. The Chinese government once was deeply aware of this problem, and begun to take measures to adjust the incentive policies for patents and other IP rights. Instead of rewarding the right holders who apply for and obtain patents, the funds would be used to support IP rights applied in practice.

5.2.2 To improve sustainable psychological cognition for university leaders. Why colleges and universities used a large amount of scientific research funds to support authorized patents? On the one hand, leaders of colleges and universities were guided to cater to and complete the tasks assigned to colleges and universities under national policies. On the other hand, the number of authorized IP rights such as patents were directly related to the ranking of universities in China and even in the world, and to the achievements and contributions of university leaders. These were probably the basic reason for the current situation of IP management in colleges and universities, and the inability to organically integrate IP with the education of various majors in colleges and universities. Therefore, it was no doubt that the change of the consciousness of university leaders changed with the change of national policies

5.2.3 Number of theoretical and practical IP teacher should be further maintained. An embarrassing reality in Chinese universities was

that many teachers were only interested in theoretical teaching. Lacking experience and interest in social practice would lead to the lack of basic training in IP clinic social application for students' teaching. The universities above begun to explore the introduction of experts in IP practice into classroom teaching, but the actual effect needs to be further tested. This would be an awkward worldwide.

5.2.4 Clinic tracking should be included in the curriculum. In order to realize the sustainable development of education, colleges and universities should not stay at the level of scientific research, should not require teachers to have practical experience. More importantly, on the one hand, teachers should be encouraged to actively apply for IP rights that can be transformed into real productivity, emphasizing the value of its social practicality. On the other hand, they should follow the rules of scientific research feeding back teaching, put forward standards. But require teachers integrate the theory and practice of applied IP rights with teaching, to promote the high-quality development of teaching.

5.2.5 Theoretical teaching of IP and judicial practice of contact should be strengthened together. Professional level would be enhanced as well as practical ability for graduate students. To realize the sustainable development of education, colleges and universities should not stay at the level of scientific research, should not require teachers to have practical experience as well. More importantly, on the one hand, teachers should be encouraged to actively apply for IP rights that can be transformed into real productivity, emphasizing the value of its social practicality. on the other hand, they should follow the rules of scientific research feeding back teaching, put forward standards, and require teachers to closely integrate the theory and practice of applied IP rights with teaching to promote the high-quality development of teaching, which is important for the sustainable development of higher education.

5.2.6 Finally, colleges and universities should have a reasonable IP value evaluation and appraisal system. consistent with the national IP judicial authentication standard system, the system should combine the characteristics of colleges and universities to evaluate the value of teachers' IP. Such distinctive factors as teaching, scientific research and social services should be combined to decide whether to give rewards and support. High

scientific research value IP could be fed with well teaching and provide high-quality services for the society. Even some teachers encouraged to use IP to invest in industrial companies affiliated to universities. Reasonable restrictions should be imposed on IP rights of scientific research nature that only obtain IP qualification certificates without obvious social benefits or even fail to feedback teaching. Such policy guidance would give high-quality IP a reasonable value orientation. at the same time, IP in colleges and universities would be consistently integrated with the national IP strategy with a better promote the sustainable development of higher education.

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Legends of Tables

Table 1. General trend analysis of Patent application in Qilu University of Technology (2017-219)
 (* data was from State Intellectual Property Office Network in China)

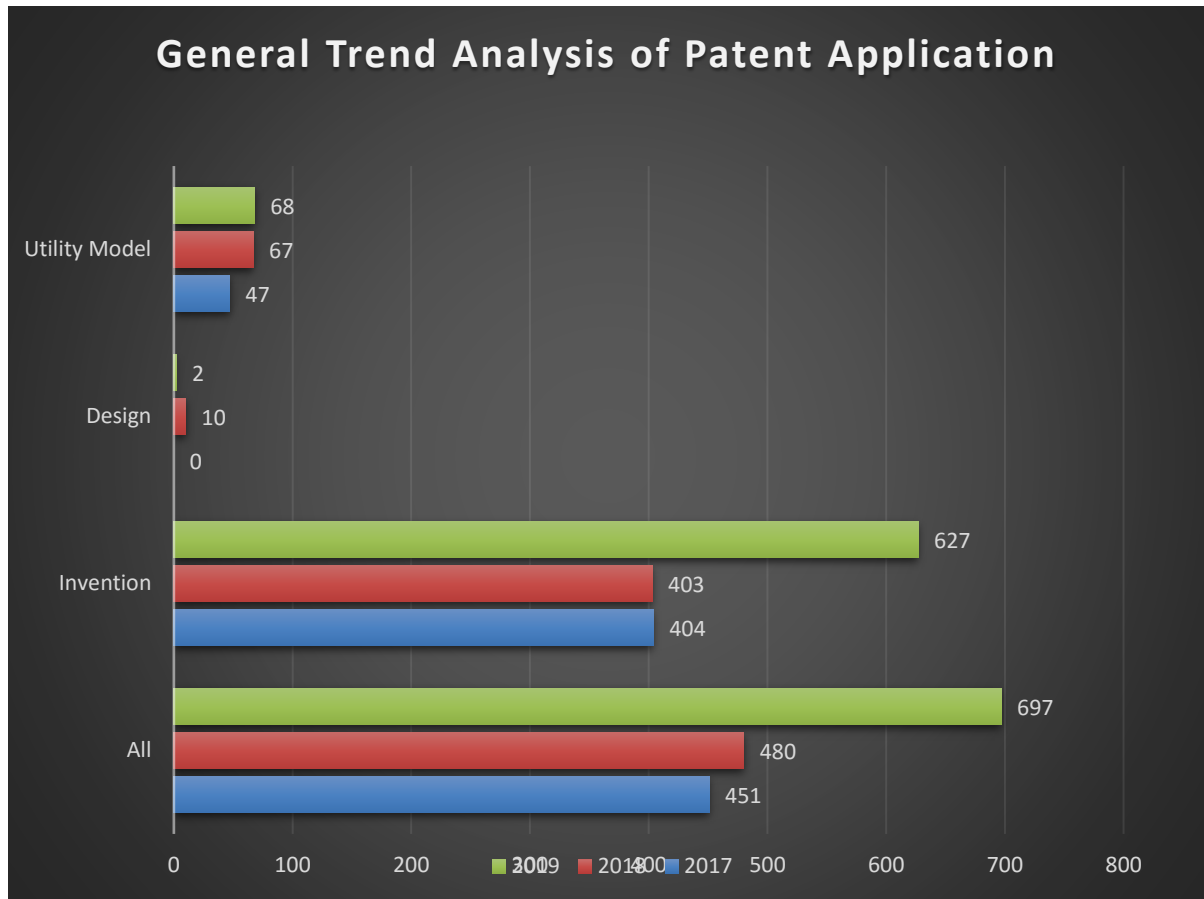


Table 2. General Fees analysis of Patent application in Qilu University of Technology (2017-219)

Project name	Numbers of Patents application in Qilu University of Technology
2017.1-2019.12 (Year)	1628 pieces
Average annual	542.7 pieces
Agency fee per piece	5000 yuan
Total patent application agency fees	8.140 million yuan (3 years)
Average annual agency fee for patent application	Rmb 2713333.3 yuan

Table 3. General trend analysis of Patent Authorization in Qilu University of Technology (2017-219)
 (* data was from State Intellectual Property Office Network in China)

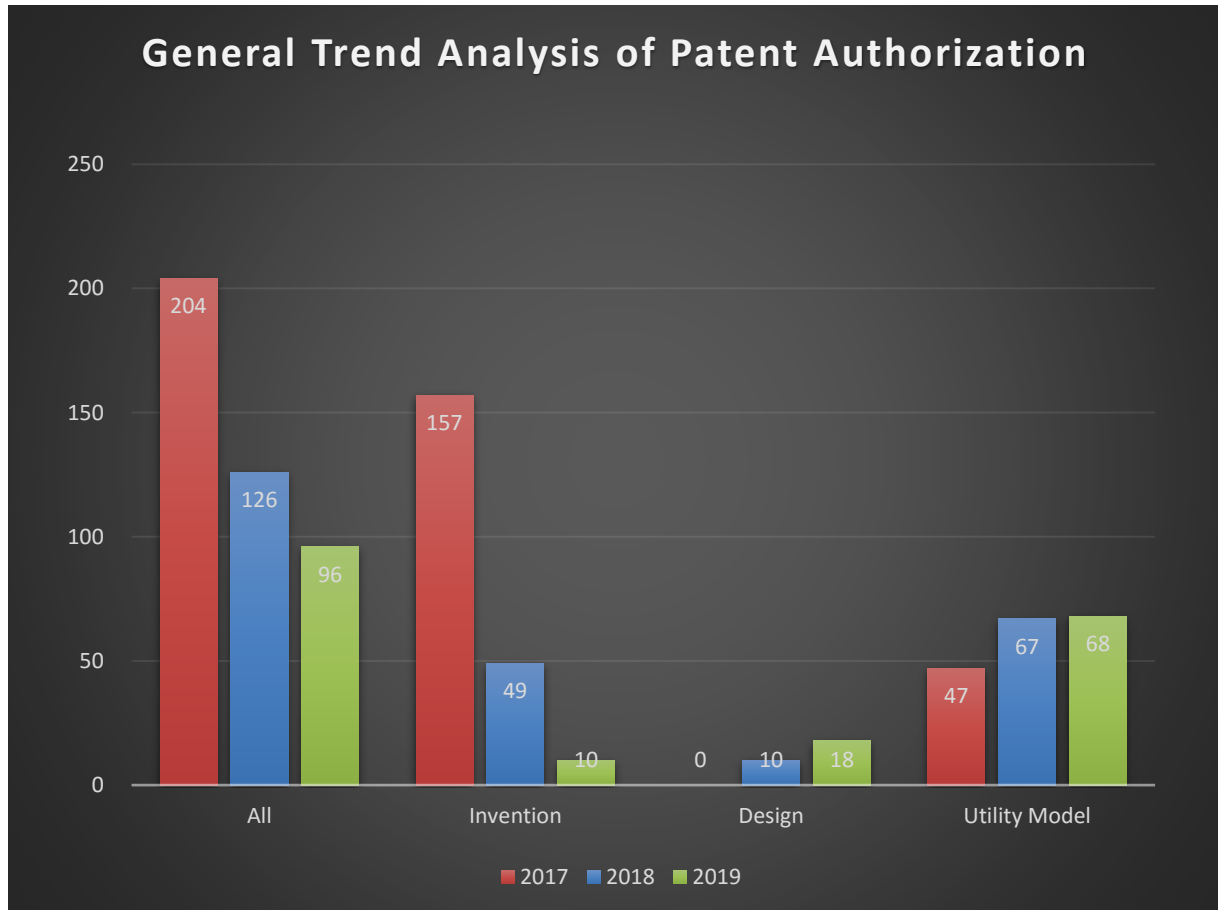


Table 4. General Application Success Rate analysis of Patents in Qilu University of Technology (2017-219)

Project name	2017	2018	2019	Total
Number of patent application(piece)	451	480	697	1628
Number of patents authorization(piece)	204	126	96	426
Patent application success rate	45.2%	26.3%	13.8%	26.2%