



## Biuletyn Newsletter

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# The roles of Jingdezhen in the Ceramic Culture Heritage and Scientific and Technological Innovation of China

## Rola Jingdezhen w dziedzictwie kultury ceramicznej oraz innowacjach naukowych i technologicznych Chin

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### ABSTRACT

Porcelain is the foundation and core of Jingdezhen. Since AD 10th century, China has spread porcelain making skills and industrial civilization to Korea, Japan, and Europe. For westerners, Jingdezhen becomes an important window of understanding and learning Chinese culture and is one of industrial cities with the earliest seeds of capitalism in China.

This paper introduces the development and influence of the reform of the modern porcelain industry in Jingdezhen on the ceramic industry in 1930s to 1990s under the background of the prosperity of European ceramics and the decline of Jingdezhen porcelain industry. After the founding of the People's Republic of China, the government supported state-owned enterprises completed the mechanization of ceramic production and their own technological innovation in Jingdezhen and built a ceramic industrial system. Its successful modern porcelain manufacturing innovation and technological progress affected on the ceramic industry of China. However, with the "Ten Key Porcelain Factories" under the planned system were closed down, the institution such as Jingdezhen Ceramic Institute became the main force of technological advancement in China's ceramic industry. Some of the transformation of the research projects by the teachers of Jingdezhen Ceramic Institute replaced foreign products and promoted the development of China's ceramic industry.

With the formation of the state-owned "Ten Key Porcelain Factories", fortunately traditional handicraft porcelain was preserved. Besides the establishment of national-level

### STRESZCZENIE

Porcelana jest podstawą i rdzeniem Jingdezhen. Od X w. Chiny rozpowszechniły umiejętności w zakresie produkcji porcelany i cywilizację przemysłową w Korei, Japonii i Europie. Dla mieszkańców Zachodu Jingdezhen staje się ważnym oknem zrozumienia i uczenia się chińskiej kultury i jest jednym z miast przemysłowych z najwcześniejszymi załączkami kapitalizmu w Chinach.

Artykuł przedstawia rozwój i wpływ reformy nowoczesnego przemysłu porcelanowego w Jingdezhen na przemysł ceramiczny w latach 1930-90 w kontekście prosperity europejskiej ceramiki i upadku przemysłu porcelany Jingdezhen. Po powstaniu Chińskiej Republiki Ludowej wspierane przez rząd przedsiębiorstwa państwowe zakończyły mechanizację produkcji ceramiki i własne innowacje technologiczne w Jingdezhen i zbudowały system przemysłu ceramicznego. Sukces nowoczesnej produkcji porcelany i postęp technologiczny wpłynął na przemysł ceramiczny w Chinach. Jednak wraz z likwidacją „Dziesięciu Kluczowych Fabryk Porcelany” w ramach planowanego systemu, instytucja taka jak Jingdezhen Ceramic Institute stała się główną siłą postępu technologicznego w chińskim przemyśle ceramicznym. Część efektów projektów badawczych prowadzonych przez nauczycieli Jingdezhen Ceramic Institute zastąpiła zagraniczne produkty i przyczyniła się do rozwoju chińskiego przemysłu ceramicznego.

Wraz z utworzeniem państwowych „Dziesięciu Kluczowych Fabryk Porcelany” na szczęście zachowała się tradycyjna porcelana z rękodziełem. Poza ustanowieniem spadkobierców kultury niematerialnej na poziomie krajowej

intangible cultural inheritors, other measures have been taken to rescue recording traditional skills. In addition, the teachers of JCI play an active role in ceramic art creation so that more and more artists are beginning to pay attention to and inherit the traditional craftsmanship. The appearing of the "Jingdezhen Drifters and Returnees" ceramic art works in Jingdezhen breaks the pattern of contemporary art materials. They greatly promoted the development of contemporary ceramic art in Jingdezhen. The Ancient Kiln Porcelain Factory rebuilt the existed ancient kilns, remaining and recording the Jingdezhen traditional firing techniques so as to re-fire some imitated ancient porcelain wares. Renovation of Jingdezhen porcelain industry heritage gives it the modern cultural exchange display and leisure functions.

**KEYWORDS:** Jingdezhen research, Ceramic culture heritage, Ceramic technology and innovation

wym podjęto inne działania w celu ratowania tradycyjnych umiejętności. Ponadto nauczyciele JCI odgrywają aktywną rolę w tworzeniu sztuki ceramicznej, aby coraz więcej artystów zaczęło zwracać uwagę na i dziedziczyć tradycyjne rzemiosło. Pojawienie się dzieł ceramicznych „Jingdezhen Drifters and Returnees” w Jingdezhen łamie wzór współczesnych materiałów artystycznych. Była to wspólna promocja rozwoju współczesnej sztuki ceramicznej w Jingdezhen. Fabryka Porcelany Pradawnej przebudowała istniejące piece starożytne, pozostawiając i rejestrując tradycyjne techniki wypalania Jingdezhen, aby odnowić niektóre naśladowane starożytne wyroby porcelanowe. Renowacja dziedzictwa przemysłowego porcelany Jingdezhen daje mu nowoczesne funkcje wymiany kulturalnej i rozrywki.

**SŁOWA KLUCZOWE:** badania Jingdezhen, dziedzictwo kultury ceramicznej, technologia ceramiczna i innowacje

## 1. A review of the glorious history and the world influence of Jingdezhen ceramics

Jingdezhen began to produce porcelain in the late Tang and Five Dynasties. In the Song Dynasty, Jingdezhen porcelain was exported to all parts of the world, including the Korean Peninsula, Japan, Southeast Asia, Central Asia, West Asia and the African continent. Deeply influenced by West Asia in the Yuan Dynasty, the making of blue and white ware made the porcelain industry in Jingdezhen go to another height. The gradual maturity of blue and white in the Yuan dynasty resulted from the economic and cultural exchange between China and West Asia. In the Ming Dynasty, due to the maturity of Jingdezhen porcelain-making technology and Chinese and foreign exchanges, porcelain made in Jingdezhen was increasingly become the favour of the people around the world, and the number of exports increased dramatically. Since the middle and late Ming Dynasty, Jingdezhen porcelain wares were continuously exported to Europe, and its value was comparable to the gold. It was regarded as a symbol of the wealth of Europeans.

## 2. The prosperity of European ceramics and the decline of Jingdezhen porcelain industry

Since the end of the 18th century, especially after the Opium War, China was forced to open its doors, and a large amount of foreign daily necessities poured into China. The modern porcelain industry in Jingdezhen was hit under such circumstances, although in the early and late 20th century it was reformed and

opened, promoted to recover and develop. In the end it did not bring a brilliant future. With the modern industrial revolution in China, more importantly, the world-made porcelain industry had entered an era of diversified development and pluralistic centers. The rise of modern and contemporary porcelain industry in industrialized countries such as Europe, America and Japan was a reflection of the trend of this era. Facing the great amount of industrial commodities were exported into China, the people of Jingdezhen could not keep up with the world development and the new ideas. The inheritance and innovation of ceramics technology were not as good as before, so that there were little new porcelain products in the market.

## 3. The development and influence of the reform of the modern porcelain industry in Jingdezhen on the ceramic industry

### 3.1.

In the late Qing Dynasty, the declining system made the domestic economy greatly affected. The traditional handicraft industry was impacted by Western industrialized products. In the 1920s and 1930s, the scholars from oversea-studying built a new factory, using the mechanical equipment of the Ceramics Laboratory. It has a ball mill, a mud extractor, a single-blade presser to form greenwares, and a coal kiln to fire porcelain. They tried to update the porcelain making process, from manual to mechanized manufacturing, from a decentralized independent production mode to a collaborative

centralized production mode. During the Republic of China, the limited reform stopped due to the Anti-Japanese War, but it laid the foundation for promoting the development of the porcelain industry.

### **3.2.**

After the founding of the People's Republic of China, the government supports the transformation of enterprises suitable for industrial production, and has established an organizational and management system guarantee for Jingdezhen's innovative porcelain technology.

During the socialist transformation in the early 1950s, the government adopted the principle of voluntary mutual benefit, typical demonstration and state aid methods conducted the individual craftsmen gradually to unite to form a socialist private-private joint venture porcelain factory and a handicraft cooperative. In 1958, in order to expand the scale of porcelain production and the degree of nationalization of the economy, several state-owned large-scale porcelain factories were formed on the basis of the original public-private partnerships and cooperatives, which were the famous "Ten Key Porcelain Factories" in history. The establishment of "Ten Key Porcelain Factories" meant that Jingdezhen traditional hand-made porcelain industry had completed the transformation of modern industrial production.

### **3.3.**

The government supported state-owned enterprises completed the mechanization of ceramic production and their own technological innovation in Jingdezhen and built a ceramic industrial system.

After the completion of the public-private partnership factory system, the government began to restore and develop the ceramic industry. The "Ten Key Porcelain Factories" carried out technological innovation, realizing Jingdezhen from hand-made porcelain to molding mechanization and "Coal Replacing Firewood" firing change as well as decoration by decal. The mechanical processing technology basically realized the ceramic production mechanized such as Raymond machine replaced the water mill grinding raw materials, mechanical mining took the place of the manual operation, blade pressing machine, the rolling forming machine instead of throwing, the automatic glazing machine as well as the underglaze and onglaze decal. From 1953 to 1965, 200 coal kilns were built. And coal-fired porcelain accounted for more than 70% of the total output, which basically ended the history of Jingdezhen's firewood firing for more than one thousand years.

In 1958, the Jingdezhen Ceramic Institute was established. From 1978 to 1982, the Institute of Ceramic Industry of the Ministry of Light Industry, the Ceramic Workers University of Jingdezhen, and the Ceramic Industry Design Institute of Jingdezhen were established respectively. Meanwhile, the government also successively transformed factories such as the Chemical Factory for Porcelain, the Mold Factory and the Ceramic Kiln Factory, Ceramic Machinery Factory, Ceramic Kiln Installation Company, Ceramic Raw Material Factory. In this way a ceramic industrial system integrating scientific research, production, design and teaching was built in Jingdezhen. Especially Jingdezhen Ceramic Machinery Factory not only solved the ceramic machinery and equipment required by each porcelain factory in Jingdezhen, but also sold a large amount of equipment to China's major porcelain producing areas, and some were sold abroad.

During this period, Chinese and foreign technical cooperation was carried out to provide technical guidance and upgrade for ceramic production.

The technicians were sent to help ceramics production in the socialist countries such as North Korea, Mongolia, and Vietnam, Czechoslovakia and Poland. In May 1954, at the request of the Building Materials Industry Ministry of North Korea two teachers of Jingdezhen Kiln School worked in the Korean state-run Ling Kiln factory for one year. They solved a series of technical problems and increased productivity by 400%. And they also trained 47 people with technical talents. The North Korean Government Ministry of Industry awarded them the Model Workers Medal. In June 1955, eight technicians from Jingdezhen Ceramic Research Institute went to the Industrial Ceramics Factory in Ulaanbaatar City of the People's Republic of Mongolia to help design and build workshops and furnaces and train Mongolian skilled workers. In August 1956, two engineers of the Jingdezhen Ceramic Research Institute went to Vietnam to support the construction of the ceramic industry. In March of the following year, they completed their mission and returned to China, and won the certificate and medal of the government of the Republic of Vietnam. From September 1954 to February 1955, Jingdezhen Ceramic Research Institute provided Czechoslovakia, Poland, and Albania with a complete set of samples of fired porcelain technical materials and fine porcelain, pigments and glazes. In May 1965, Polish ceramics experts Slagikovsky, Seska and Karwalski spent the one-day and seven-day inspecting Jingdezhen ceramics technology, attending three technology symposium and two technical presentations.

### 3.4.

Following the mechanization of ceramic production, the technical transformation of kiln tunneling was carried out from 1967 to 1977. During the period of reform and opening of China, the technological transformation focused on energy upgrading and improving the level of basic industrial and high-tech applications. From 1977 to 1985, the technical transformation was centered on the promotion and application of new techniques and technology. From 1986 to 1990, technical transformation focused on energy upgrading, improvement of basic industrial level and high-tech application.

After 1986, the coking gas tunnel kiln was built, which improved the energy saving effect and promoted environmental improvement. The production of coking gas tunnel kiln in Guangming Porcelain Factory saves energy by 50% compared with the use of heavy oil to fire porcelain. With the automation and innovation technology, Jingdezhen has become one of the pilot cities of China's microelectronics technology transformation traditional industry. The "Export Ceramic Pattern and Device Design Receiver Auxiliary Design System" developed by Jingdezhen Ceramic Workers University filled the blank of domestic ceramic product CAD. And the microcomputer controls the roasted flower kiln saving 30%-50% of electricity while the quality of the decorated porcelain was increased by 2%. At the end of 1990, Jingdezhen daily-use porcelain had formed thirteen major categories, 250 series, more than 2,000 types, more than 5,000 decorative pictures, with an annual output of 340 million pieces. The products were sold well all over the country and also were exported to more than 140 countries. From 1979 to 1990, the quality products won 26 international gold awards, 9 national gold awards, and 6 national silver awards. 178 ceramics scientific and technological achievements were awarded, including 1 international invention award, 21 national-level achievements, and 64 management achievements.

### 3.5.

The scientific research achievements of the institutions as Jingdezhen Ceramic Institute transformed the new ceramic industry technology and had a social impact.

In the 1990s, China's market economy was transforming. Jingdezhen ceramics enterprises faced difficulties in upgrading their industries. With the "Ten Key Porcelain Factories" under the planned system were closed down, the institution such as Jingdezhen Ceramic Institute became the main force of technological advancement in China's ceramic industry.

In the 1990s, the transformation of the research projects by the teachers of Jingdezhen Ceramic Institute replaced foreign products and promoted the development of China's ceramic industry. Professor Zhou Jianer presided over the "advanced low-expansion acid-resistant bricks", which was transferred to Pingxiang Porcelain Factory in Jiangxi Province in 1991 and replaced the expensive products made by German DIDER Company, quickly occupying the market and generating huge economic benefits. Professor Zhou Jianer presided over the development. The acid-resistant tableware was transferred to the Xiushui Porcelain Factory in Jiangxi Province in 1992. In one year, it created the value of 4 million RMB yuan with a profit of 1 million RMB yuan, making the heat-resistant ceramic pot a famous brand product in Xiushui County. The four-stage flow diaphragm pump developed by Professor Lin Yunwan team was transferred to Jingdezhen Ceramic Machinery Factory. The vibration-absorbing vibrating sieve developed by Professor Bao Zhong was transferred to the research institute of Nanchang Railway in Jiangxi Province. The dry powder granulation developed by Professor Zhang Baiqing was transferred to the Shashi 949 Factory in Hubei Province.

In 1996 and 1997, Jingdezhen Ceramic Institute successively cooperated with Jiangxi Dexing Copper Mine, Jiangxi Gaoan Peak Ceramics Company, Xiushui Kangshun High Heat Resistant Ceramics Group Company, Sanle Ceramics Company of Fujian Province and Jingdezhen Ceramics Co., Ltd. Jiangxi Province. JCI helped to deal with the comprehensive utilization of copper tailings, the replacement of heat-resistant ceramics, the new decorative technology of building ceramics, the new formula, the new glaze, the research on the formulation of talc high-grade daily-use ceramic glaze. On the other hand, Jingdezhen Ceramic Institute transformed the achievements of "Development of Grand Red Pigment", "Zirconium Oxide Series Ceramics", "Imitation Granite Microcrystalline Glaze Technology", "Tail Sand Comprehensive Treatment and Utilization" and "Multi-functional Remote Control Table Lamp", which achieved good social and economic benefits. At the same time, the school also uses its own scientific research strength to carry out extensive technical service activities and explore new ways of technology development.

In 1996 and 1997, JCI sent engineering and technical staff to the Jinjiang area of Fujian Province, where the construction ceramics factory was contracted for production technology. The technicians were sent to the colour glaze factory in Xinmi City, Henan Province for on-site technical guidance. The technicians went to Jiangsu Jingjiang Pacific Refractory Company to carry out production and technical services. In 2000,

Professor Zhou Jianer's research group was entrusted by the company to develop large-scale aluminium titanate-cordierite honeycomb ceramics, which had successfully achieved industrial production. The products earned high praise from DULL Company of the United States. And the first batch, the second batch and the third batch of products were exported to the United States. The university was invited to invest in technology to establish New Yaxin Company in Xinyu City of Jiangxi Province. The transformation of many achievements better served the development of China's ceramic industry and the economic construction of Jiangxi Province.

### **3.6.**

After entering the 21st century, Jingdezhen Ceramic Institute put forward the strategy of establishing a bridge-head in the forefront based on a comprehensive analysis of its own research and innovation capabilities and the investigation of the most dynamic ceramic industry in Foshan City, Guangdong Province and its surrounding areas.

In process of China's reform and open, many teachers of JCI were attracted by the preferential Policy of Guangdong Province. They left JCI with their research projects and set up their own business in Foshan City Guangdong Province. The gathering of alumnus from JCI supported the building ceramic industry in Foshan City. On January 14, 2002, Professor Qin Xilin, the Party Secretary and President of Jingdezhen Ceramic Institute, signed the first cooperation agreement with Nanzhuang Town Government. The Nanzhuang Town People's Government was responsible for the capital contribution. The Jingdezhen Ceramic Institute was responsible for technology with the backbone of science and technology stationed and enjoys shares. They agreed to register Nanhai Huaxia Building Ceramic Research and Development Center Co., Ltd. In November 2003, Zhou Jianer, the Vice President of the Jingdezhen Ceramic Institute, was in charge of the Huaxia Building Ceramic Research and Development Center. As the undertaker, JCI cooperated with Keda Jieneng Company (formerly Keda Electromechanical Company) and Dongpeng Ceramics Co., Ltd. to develop the large scale ultra-thin building ceramic tile industrialization technology. It was approved by the Ministry of Science and Technology as a national science and technology research project. In November 2004, the Ministry of Science and Technology approved the establishment of the (National) Building Sanitary Ceramics Productivity Promotion Center. In October 2005, the Building Ceramics Analysis and Testing Center invested more than 15

million yuan became the only accredited laboratory of the international ceramics authority, the British Ceramic Research Association (CERAM) in China. The data of the test samples are authoritative in the entire E.U. which provides quality assurance for China's ceramic products to enter the European Union.

The Ministry of Science and Technology of China and the Jiangxi Provincial Government have jointly established a series of ceramic technology R&D and service platforms in JCI, such as the National Engineering Research Center for Domestic and Building Ceramics.

Following the Huaxia Building Ceramics Engineering Center, in 2003, Jingdezhen Ceramic Institute and the Ministry of Science and Technology of China and the Jiangxi Provincial Government jointly established the national-level projects, including the National Engineering Research Center for Domestic and Building Ceramics and the National and Local Joint Engineering Research Center for Ceramic New Materials. Engineering Research Center for Green Ceramics by Ministry of Education, China Ceramics Intellectual Property Information Center, National Ceramics Document Information Center, National Ceramic Product Quality Supervision and Inspection Center and other 31 provincial and ministerial level scientific research service platforms, formulating and revising more than 130 national standards and industry standards Projects, more than 300 scientific research achievements have been successfully transformed into productivity, which has promoted the transformation and upgrading of China's ceramic industry and scientific and technological progress.

Jingdezhen Ceramic Institute plays a leading role in the development of scientific and technological innovation of China. For instance, a large-area flat-plate anode-supported solid oxide fuel cell (SOFC) was successfully prepared using a two-layer aqueous system casting and co-firing of an anode/electrolyte complex. The foam ceramics metallurgy industry uses foam ceramics to filter molten steel, molten iron, and aluminium water to improve the quality of aluminium, copper, and iron product castings. It is widely used abroad as a filter absorber, a solid heat exchanger, a catalyst carrier, a packing for contacting reaction towers and gases, an in-line mixer, a diffuser tube, and a heat preservation and heat storage body. Microwave dielectric materials are used to manufacture frequency devices for mobile communications and radar devices, such as filters, resonators, duplexers, and antennas. Inorganic Nanoparticles Modified Ceramic Microfiltration Membrane a ceramic microfiltration membrane with high separation efficiency, high permeation flux, resistance to oil contamination, and easy to clean regeneration developed for the treatment of oily wastewater and stable

oil-water emulsion separation. Metal halide lamps are one of the High Intensity Discharge (HID) lamps and are the main source of light for large-area lighting and special occasion lighting.

#### **4. The Decline of Jingdezhen Domestic Porcelain and the Return of Handicraft Porcelain**

The application of large-scale mechanized porcelain in the “Ten Key Porcelain Factories” in Jingdezhen made the traditional porcelain making techniques face the danger of being eliminated. However, with the closure of the state-owned “Ten Key Porcelain Factories”, traditional handicraft porcelain was preserved. So Jingdezhen is facing the ceramic culture heritage under the shock of market economy.

##### **4.1.**

Through the establishment of national-level intangible cultural inheritors, rescue recording traditional skills and other measures, retaining the hand-made porcelain craftsmanship that has been passed down for thousands of years.

Through the establishment of national-level intangible cultural inheritors, some skilled potters are entitled to teach the traditional porcelain techniques to the young people. In addition, The Ministry of Culture of China sponsors ceramics culture by sponsoring colleges to hold traditional ceramics talents. To inherit the traditional Jingdezhen porcelain techniques, the professor team of Jingdezhen Ceramic Institute made a TV program to record the whole processes of traditional hand-making porcelain in Jingdezhen, such as mining, forming, under-glaze decoration, firing, on-glaze decoration and so on. For some potters are very old and the techniques are facing the danger of disappear with the development of mechanized production, it is worthwhile for the TV program to show the detailed the processes in Chinese and English in order for us and our future generation to recall the history. It was rewarded “the Excellent Publication of China in 2017”.

##### **4.2.**

With the prosperity of cultural industry, the teachers of JCI play an active role in ceramic art creation so that more and more artists are beginning to pay attention to and inherit the traditional craftsmanship.

The ceramic art creation by the teachers and students of Jingdezhen Ceramic Institute combines the traditional ceramic crafts and decoration, mixing the performance of ceramic materials with ceramic art cre-

ation. Their works emphasize the beauty of ceramic art, the beauty of artistic conception, the beauty of materials and the beauty of decoration. They received high praise in the exhibition at home and abroad, and won many awards and honors. They expanded the reputation and influence of Jingdezhen in the world by sending teachers to study abroad, participating in international art exhibitions, and sharing their achievement at international academic conferences.

As a result, many ceramic masters and professional talents gather in Jingdezhen. Every year, thousands of domestic and overseas ceramists are attracted here to create and exchange, which forms a large and abundant ceramic team. For example, International Artist Workshop and International Ceramic Summer Training College are organized. “JCI-WVU International Ceramist Workshop” project is listed as “the model and new peak of Sino-US nongovernmental exchanges” in Sino-US: 200 Years Relation published by US State Department. In recent years, with the development trend of international ceramic art and the profound ceramic culture of Jingdezhen, Jingdezhen Ceramic Institute has organized more than 10 international ceramic engineering, art, culture, education seminars. On behalf of China, Jingdezhen Ceramic Institute has organized ceramic art work exhibitions of teachers and students in UNESCO head office, Louvre in France, University of Cambridge in Britain, Asian Museum in Greece, the Royal Palace in France, and other important places, which fully shows that it has achieved outstanding achievements in ceramic art education and creation. It greatly promotes Chinese ceramic culture and art to move forward the world.

##### **4.3.**

Chinese and foreign ceramic art exchanges have attracted a large number of ceramic lovers from home and abroad to settle down in Jingdezhen, forming a new cultural phenomenon “Jingdezhen Drifters and Returnees”.

With the continuous growth of the “Jingdezhen Drifters and Returnees” family, especially the joining of hundreds of foreign ceramic artists, Jingdezhen has gradually become a gathering place for a new generation of Chinese artists. The appearing of the “Jingdezhen Drifters and Returnees” ceramic art works in Jingdezhen breaks the pattern of contemporary art materials. They fully employed the resources of the traditional hand-made porcelain industry chain retained by the local community, learned the craftsmanship from the exquisite ceramic artisans, explored the contemporary art language, chose to use ceramic materials to express their views, and greatly promoted the development of contemporary ceramic art in Jingdezhen.

#### 4.4.

The development of porcelain music instruments enriches the cultural and artistic expressions of porcelain.

In the exploration of ceramic culture creativity, the potters take the use the characteristics of sounding like a chime and developed the the porcelain musical instruments such as porcelain plates, porcelain qing, porcelain chime, porcelain erhu, porcelain flu and so on. Playing the porcelain instruments are taught as a part of art education in Jingdezhen primary and secondary schools. Porcelain music has often become a performance program for Chinese culture in some international activities.

#### 4.5.

The traditional craftsmanship will be restored by rebuilding the ancient kiln re-firing and using the remaining porcelain factory to develop the tourism culture industry of Jingdezhen City.

To protect the eco-environment, the municipal government of Jingdezhen prohibited the wood kilns except the special purpose. As a revival culture program, the Ancient Kiln Porcelain Factory rebuilt the existed ancient kilns for instance, the dragon kiln (long kiln), calabash style kiln, round kiln as well as the imperial kiln such as kiln for color glaze wares, kiln for blue and white wares and kiln for saggars. These kilns remain and record the Jingdezhen traditional firing techniques and refired some imitated ancient porcelain wares. China's central media and some cultural celebrities come and congratulate the success. Tourists usually visit them to recall their imagination of the historical site. One of the wood kilns will be fired once a year for important culture activities such as Jingdezhen International Ceramic Fair.

#### 4.6.

Renovation of Jingdezhen porcelain industry heritage gives it the modern cultural exchange display and leisure functions.

Jingdezhen is a world-famous "porcelain capital". Porcelain is still its important industry. The ceramic production history of more than one thousand years has retained a large number of industrial relics. When reconstructing the "Yuzhou Porcelain Factory" (Tao Xi-chuan), which was aided by the Soviet Union among the "Ten Key Porcelain Factories" in the past, it was intended to completely retain the two first 1960 inverted flame coal kiln (commonly known as "Shantou Kiln") in the firing workshop. The Factory was built in 1956 and later

three tunnel-type coal-fired kilns were built. With the change of technology, two of them were transformed into the oil-fired tunnel kilns in the 1970s. Furthermore a gas-fired tunnel kiln was built in the 1980s. It covers almost all traces of the firing process of Jingdezhen ceramics in modern production. The remaining tries to evoke the elements of historical memory.

The entire plant area is transformed from its architectural forms, structures, materials and environmental construction to protect its overall authenticity while cleverly implanted modern functions and facilities. As it was stated in the 2017 UNESCO Asia-Pacific Heritage Innovation Awards: "Based on the least intervention principle of heritage protection, the improved modern industrial aesthetics of the transformation choices echo the shape and atmosphere of the old factory industrial buildings in the middle of the 20th century. The soft background, and the remains of the kiln in each period are placed in the center of the stage. The combination of the tonality of contemporary materials and the juxtaposition of the original brick structure creates a dramatic contrast. The new design not only respects the form and scale of the original factory, but also creates A new way of dialogue with famous ceramic production equipment."

## 5. Conclusions

Facing the progress of world ceramic production technology, the effort and practice of change the decline of Jingdezhen porcelain industry by the return of scholars had laid the foundation for the ceramic technology innovation and transformation of Jingdezhen modern ceramic industry system in New China (PRC).

The rebuilding of the country after many years of war, the People's Government has a strong mobilization force. According to the principle of voluntary mutual benefit, the methods of the explanation, conduct, typical demonstration and state aid had effectively mustered individual artisans to complete the Jingdezhen public-private partnership. At the same time, under the planned economic system, the financial and human resources were assembled to restore and develop the modern ceramic industry in Jingdezhen. It guaranteed the establishment of the complete ceramic industry system integrating scientific research, design, production and education and provided production technical services and experience for the other ceramic production area in China. During the transformation of the market economy, the executive order from the government also caused the closure of the Ten Key State-owned Porcelain Factories.

The implementation of the market economy and the closure of the Ten Key Porcelain Factories caused

Jingdezhen's mature ceramic industry technology and technical staff to flow out into the other porcelain producing areas, especially to Guangdong Province, the frontier of China's reform and opening. The gathering of the teachers and alumni of Jingdezhen Ceramic Institute in Foshan promoted the rapid establishment and development of the building and sanitary ceramics industry in Foshan City, Guangdong Province.

The technical guidance and transformation of scientific research achievements by the teachers of Jingdezhen Ceramic Institute positively promoted the upgrading of China's ceramic industry and technological progress. Facing high-tech development, it is the future efforts of Jingdezhen Ceramic Institute to enriching social pro-

ducts, meet the people's different needs and revitalize China's ceramic industry on the basis of traditional ceramic education.

The traditional porcelain craftsmanship and ceramic industry remains deposited in the millennium Porcelain Capital has become the historical memory left by the post-industrialization. Jingdezhen Ceramic Institute actively organizes teachers and students to participate in the domestic and international art exhibitions and has built various ceramic art and technology exchange platforms. It has enriched the cultural exchanges between Chinese and foreign ceramics and promoted the academic exchange of ceramics and the prosperity and development of ceramic art.

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