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# Global Practice and the Transnational Flows of Knowledge: A Case Study on Diwang Tower, 1996

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## Abstract

Diwang Tower built in 1996 was the tallest building in Shenzhen before 2011. Its image was widely used as a symbol of propaganda showcasing the success of China's opening up policy and Shenzhen's economy. As a result of international collaboration Diwang Tower was a crucial node where transnational flows of knowledge intersected. Many foreign firms and experts contributed in such aspects as architectural design, structural technology, and construction and property management. Diwang Tower showed "Chinese" characteristics in subtle ways, while being "modern" and "international" at the same time. This paper focuses on the transnational flows of knowledge and the adaptation of modern aesthetics in the Chinese cultural context. It concludes that Diwang Tower is an important milestone in the contemporary architectural history of China since 1978, especially regarding the introduction of Western architecture and its adaptation in the Chinese context.

**Keywords:** contemporary architecture of China, architectural history of China, architectural knowledge, skyscraper design, transnational architecture

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## 1. Introduction

Since the opening up and reform in 1978, China's economic development - including the construction industry and architectural design practice - has been intertwined with global participation. Foreign, overseas influences on Chinese architecture have functioned as bridges between China and the West. Hong Kong in particular became the gateway for Chinese to approach the West and for the Westerners to enter China.[1][31–32]

In this context, Shenzhen, a small town at the border between mainland China and Hong Kong became the fore front to receive foreign influence. Shenzhen was declared a Special Economic Zone in 1980, and achieved astonishing economic success in the following years. It developed at an extremely fast speed, with its population increasing from 175,000 in 1985 to more than 10 million in 2015. Shenzhen's GDP (Gross Domestic

**Figure** 1: Diwang Tower (http://www.zj31.com.cn/ccc/index.php/View/42.html).

Product) grew at a very high growth rate of 40% per year between 1981 and 1993, compared to the average GDP growth of 9.8% for the country as a whole [2]. Shenzhen's economic success was exemplary in China from the 1980s to the 1990s, being widely regarded as a miracle. To a large extent, its economic success should be credited to the flows of goods, personnel, knowledge, information and money across the border between Shenzhen and Hong Kong since the opening up.

Among the multiple flows across the border, knowledge was a particularly important resource of capital for every sector of the economy including construction and architecture. Architectural knowledge including design thinking, construction technology and expertise, management methods and systems, came into China and contributed to the upgrade of China's architectural practice.

Diwang Tower, officially known as Shun Hing Square (信兴广场) is a critical case to examine this historical process (Fig. 1). The building was proposed in 1992 shortly after Deng's southern tour. In the late 1980s, Shenzen's economic development stagnated and social instability increased. The Tian'anmen Incident in the 1989 became an important turning point for the central government of China who decided to further open up the country while at the same time strengthening public control. Deng's southern tour in the early 1992 led China out of the swamp of ideological debate over socialism and capitalism, and encouraged Chinese people to fully embrace a "socialist market

economy." China's government officials were also encouraged to put the ideological concerns aside, and competed to attract foreign investment. Diwang Tower represented not just Shenzhen but also China's ambition to be modern and international. With a height of 384 metres and 69 floors, Diwang Tower was the tallest building in Shenzhen from 1996 to 2011, and the tallest in Asia at the time of completion. Its image widely appeared in various kinds of mass media as a symbol of China's economic achievement post opening up.

Notably, the project was a result of international collaboration. Many foreign firms and experts contributed in such aspects as architectural design, structural technology, and construction and property management. The project was a crucial node where transnational flows of knowledge intersected. The analysis of the project undertaken here reveals the role of foreign knowledge in China's architectural progress and the interaction between foreign and Chinese knowledge systems. This case is also important for the review of contemporary architectural history of China, especially regarding the introduction of international architectural trends since the 1980s and their adaptation in the Chinese context.

## 2. The Process of International Collaboration

Diwang Tower was born from global, collaborative practice. In October 1992, Shenzhen government listed a site in between Luohu district and Futian district for international tenders. It was considered to be the first case in China to invite international tenders for land use rights.

The project was won by a joint venture of Kumagai Gumi Group, one of the largest construction companies in Japan with a regional office in Hong Kong, and Shum Yip Group, a state-owned enterprise under Shenzhen governance. Hong Kong Clifford Investment was chosen to be the developer. The project also adopted the system of Engineering, Procurement and Construction (EPC), which was still new in China. (Engineering, Procurement and Construction (EPC) is a particular form of contracting arrangement used in some industries where the EPC contractor is made responsible for all the activities from design, procurement, construction, commissioning and handover of the project to the end-user or owner)

As both the largest shareholder and the main contractor, Kumagai Gumi Group was the backbone of the project. Its leader, Yu Yuanping had a legendary life. Yu was born in Shenyang. He once studied in a Japanese commerce school and moved to Hong Kong in 1950. He also worked in Japan before returning to Hong Kong in 1958. When Kumagai

Gumi Group entered Hong Kong in 1961, Yu became the representative of the company. After a series of successes, he became the largest shareholder of Kumagai Gumi Group Hong Kong. From 1988 onwards, Yu began to invest in mainland China. The first project was the industrial area of Yangpu, Hainan province. The project experienced setbacks in 1989, but was finally approved after Deng's southern tour in 1992. Then Yu began to have more confidence and soon started another two major projects - Diwang Tower in Shenzhen (1996) and the CITIC Plaza in Guangzhou (1997).[3]

For the Diwang project, Yu Yuanping aimed to achieve four "first-classes", namely, first-class architecture, first-class speed, first-class equipment, and first-class management. The architectural design competition was won by Chinese-American architect Kwok Yin Cheung in the name of the American Architectural Design Co. LTD. After winning the competition, Cheung moved from California, US to Hong Kong to work closely with the Kumagai Gumi team. The final 1:500 model was finished in Hong Kong just one month later.

The project became a truly international collaboration thanks to the Kumagai Gumi Group's international experience and network. The tendering process was carried out in Hong Kong and major subcontractors gathered there. The major subcontractors were companies based in Hong Kong, although many of them have origins in Japan and the West (See Table 1). From their different roles, we can see that Japanese and Western companies undertook tasks that required advanced technology and expertise, including design, engineering and management; whereas, the local Chinese companies mainly undertook the general works such as foundation piling, because they have lower labour cost.

The structural design was done by Maunsell Consultants Asia, Ltd., a civil engineering consultant firm in Hong Kong in collaboration with Nippon Steel, the largest steel construction company in Japan. The design scheme featured a thin and tall slab which caused difficulty for the structural design of the skyscraper. The problem was solved by a world famous American engineer Leslie E. Robertson, who was the structural engineer of the World Trade Centre built in 1973. (According to the interview with Kwok Yin Cheung by Ke Song on December 17, 2018.) The final structural design was tested at five research institutes in Japan, Canada and China.

For most of the project work it was often necessary for the foreign companies to collaborate with Chinese partners. For example, according to the law, the design development had to be undertaken by a Chinese design institute, so that it could meet the Chinese building codes and get approved by the government. Also noteworthy is that this collaboration actually gave the local companies and government opportunities

to learn from the more advanced foreign companies. At the time, China did not even have the codes and standards for the design and construction of such tall buildings, so the Diwang team referred to the standards of Japan, the UK and the US and negotiated with the local government in each step of the construction. This project prompted the establishment of codes and standards for super tall buildings, in many aspects including fire safety. (According to the interview with Kwok Yin Cheung by Ke Song on December 17, 2018)

Table 1: Major Collaborators in the Diwang Tower project.[3]

| Role | Firm | Origin |
|---|---|---|
| Investment | Kumagai Gumi Group (熊谷组) | Hong Kong-Japan[1)] |
| | Shum Yip Group (深业集团) | Shenzhen, China |
| Developer | Clifford Investment (祈福投资有限公司) | Hong Kong |
| Main contractor | Kumagai Gumi Group | Hong Kong- Japan |
| Architectural Design | American Architectural Design Co. LTD (美国建筑设计有限公司) | Hong Kong-US |
| Structural Design | Maunsell Consultants Asia, Ltd. (茂盛工程顾问有限公司)[3)] | Hong Kong |
| | Nippon Steel (新日铁)[2)] | US |
| Mechanical and Electrical Building Service | Fo Lyun Engineering Consultant (科联顾问工程师行)[3)] | Hong Kong |
| Cost Management & Quantity Surveying | Rider Levett Bucknall, Hong Kong (香港比利建筑工料测量师行) | Hong Kong-International |
| Design Consultancy & Review | Shenzhen Architectural Design Institute (深圳市建筑设计院) | Shenzhen, China |
| Construction Supervision | Shenzhen Jiuzhou Construction Supervision Co. (深圳九州建设监理公司) | Shenzhen, China |
| **Major Contractors:** | | |
| Foundation Piling | Shantou Dahao Construction Company (汕头达濠建筑公司) | Shantaou, China |
| Steel Structure | Nippon Steel (新日铁) | Japan |
| | China Construction Third Engineering Bureau Steel Structure Construction Engineering Company (中国建筑第三工程局钢结构建筑安装工程公司 | China |
| Concrete Structure | Paul-Y. Engineering (保华建筑公司)[5)] | Hong Kong |
| | China Construction Second Engineering Bureau Southern Company (中国建筑第二工程局南方公司) | China |
| | VSL, Hong Kong | Hong Kong-Switzerland |
| Electric Engineering | Unite To Branch Construction and Installation Co., LTD. (日本统一能科株式会社) | Hong Kong- Japan |
| | Shenzhen Pengyue Electric Equipment and Installation Co. (深圳鹏跃机电设备安装公司) | Shenzhen, China |

| Role | Firm | Origin |
|---|---|---|
| Air-Conditioning, Water Supply, & Drainage | Shin Nippon Air Technologies Co., Ltd. (新日本空调株式会社) | Japan |
| Elevator | Hong Kong Mitsubishi Electric Elevator (香港菱电升降机有限公司) | Hong Kong- Japan |
| Curtain Wall System | Toyo Aluminium (东洋铝材) | Hong Kong-Japan |
| Light-Current Engineering | Shenzhen Telecom Equipment Company (深圳通讯器材公司) | Shenzhen, China |
| Fire Fighting | Shenzhen Shenkong Firefighting Engineering Co. LTD. (深圳深港消防工程公司) | Shenzhen, China |
| **Property Management** | | |
| Property Management | Hong Kong Leung Chun-ying Surveyor (香港梁振英测量师行)[6] | Hong Kong |
| | Shenzhen Kumagai Gumi Property Mangagement Co. LTD. (深圳熊谷组物业管理有限公司) | Shenzhen-Japan |

Construction of the Diwang Tower started in April, 1993 and ended in June, 1996. The construction process was very fast and efficient thanks to the scientific management and coordination of the Kumagai Gumi team. They adopted an optimized method to integrate the design and construction processes (Fig. 2). When the schematic design was approved, they immediately worked out a construction schedule and plan. In the process of design development, they started the tendering process, and the selected sub-contractors began to work on shop drawings and method statements under the coordination of the architect and the main contractor. This method was different from the old construction methods in China, neither ”first deign, then construction” nor ”design and construction side by side.”[4]$^{i-ii}$

The project adopted a series of new technologies, including the ”reverse construction method,” ”hydraulic climbing formwork” among others to speed up the construction. The speed of the steel structure construction reached 1 floor per 2.25 days. It was even faster than the construction of the 160-meter Guomao Building -the tallest building in China completed in 1985. The construction of the Guomao Building was widely publicized as ”three days, one floor,” and later extolled as a literal interpretation of ”Shenzhen speed.” Diwang Tower similarly became the embodiment of “Shenzhen speed” in the 1990s.

In the process of construction, Li Jiaqi and Ye Zhaoping, two journalists of *Shenzhen Special Zone Daily*, wrote a series of reports about the construction of Diwang Tower, entitled ”The No.1 Skyscraper of China: Reports from the Construction Site of Diwang Tower”. They expressed absolute admiration for the chief manager of the project, Mr. Uchiyama from Kumagai Gumi Group. Mr. Uchiyama introduced strict regulations for working on the construction site; regular meetings every morning and night; and

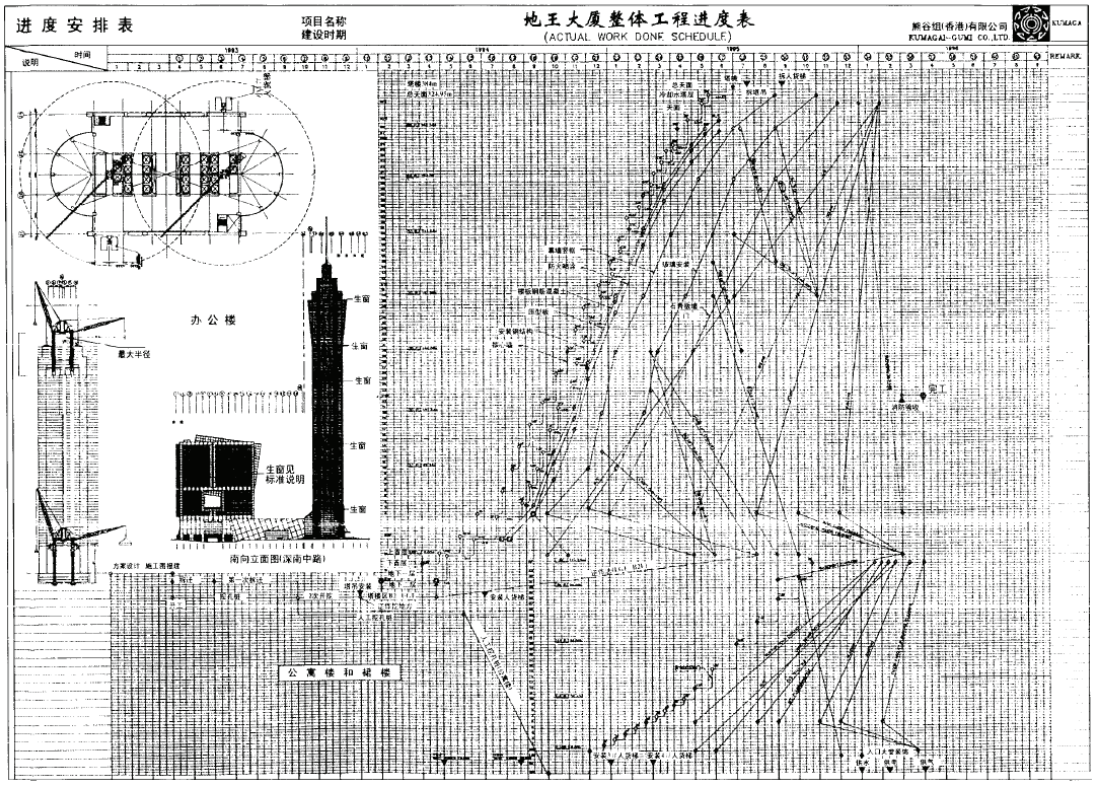


**Figure** 2: Construction schedule by Kumagai Gumi Group.[3][81]

minute-by-minute timing for sub-contractors' teams. [4][128] The Diwang project became a benchmark case in China in the area of project management.

The journalists noted the power and efficiency of the EPC system. They asked why the EPC, as a norm in the world, could not be a norm in Shenzhen? They discussed the reasons: it was due to the lack of a specialized division of labour and the ignorance of the developers. But the most important reason was that the developers did not want to give away their power and interest in construction. They concluded that there was still a long way to go in the project management system for the construction industry of Shenzhen. [4][128]

As a consequnce, the Diwang project became an exemplary project for the Chinese construction industry. It contrasted with the existing systems used in China that lacked aspects of management expertise. The experience of working with Japanese managers greatly inspired Chinese practitioners to 'catch up' with the international standards and to modernize their way of doing things.

## 3. Adaptation to the Chinese Context

As discussed, the Diwang Tower project largely relied on foreign technologies and expertise. However, the architectural design demonstrated a clear intention to engage with Chinese culture. This could not be possible without the skills and intelligence of the architect Kwok Yin Cheung.

Diwang Tower is a complex consisting of three main parts above the ground: office tower (east), apartments (west), and shopping mall (podium at the middle) (Fig. 3). A key challenge in the design was the limitation of the triangular site on the northern side of Shennan Avenue, Shenzhen's major east-west artery. The architect used circular geometries to respond to the triangular site and tested alternative schemes (Fig. 4). The finally chosen, Scheme 1 had the best response to the site, and presented a continuous facade facing Shennan Avenue. Its geometry was crisper than those of others, while still keeping the round corners to show a friendly gesture to the road intersection. The master plan was highly symmetrical, premised on a clear axis, showing the intention to make the building more monumental. This was unusual for such an irregular site. The treatment of the corner and the symmetrical arrangement all conformed to traditional Chinese aesthetic preferences i.e. the intention to make an important building symmetrical, monumental, and harmonious with the surrounding environment.

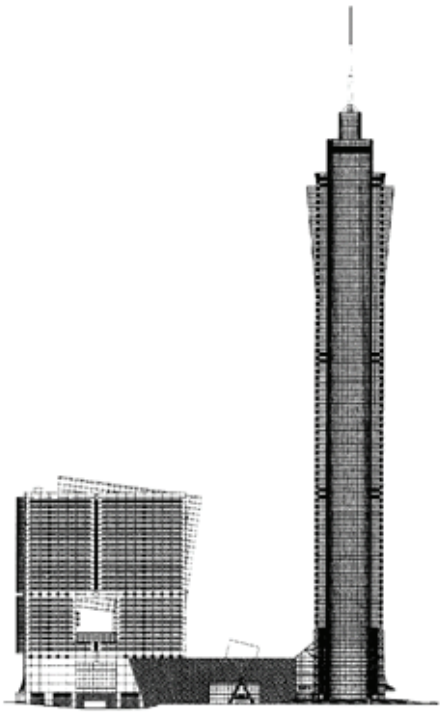

**Figure** 3: Elevation facing Shennan Avenue. [4]

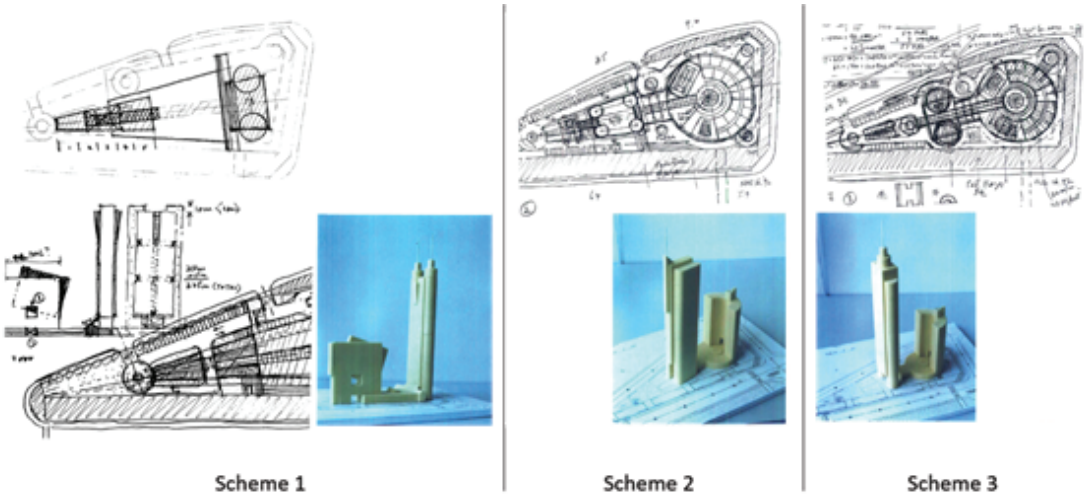


**Figure** 4: Conceptual schemes by the architect. [4]

The architectural design demonstrated a subtle combination of “Chinese” characteristics and the “modern” and “international” look. Two issues were core design concerns the use of symbolism and the adoption of modern aesthetics. First, symbolism was a powerful tool to conceptualize and to sell a design in China. A key feature of the project was the twin towers at the top of the building. The architect argued that the prototype of “twin towers” could be found in both Chinese and Western architectural traditions, and often succeeded to be iconic in a city.[4] [15] This idea was welcomed by the Chinese clients and the government officials who thought it represented the two investors, Kumagai Gumi Group and Shum Yip Group, and further the collaboration between a Chinese and a foreign company. (According to the interview with Kwok Yin Cheung by Ke Song on December 17, 2018) This kind of interpretation based on symbolism was popular in China. The architect understood this very well, and his own Chinese American identity explained his familiarity with this thinking paradigm.

In addition, the juxtaposition of squares and circles used in the Diwang Tower design was symbolic of ancient Chinese geomancy, cosmology and traditional philosophy. In both the master plan and floor plan of the Diwang project, circles and semi-circles were attached to rectangles at the turning points. For example, the circular plans of the twin towers were attached to the main body of the office buildings with a rectangular plan. In traditional Chinese culture, the circle was used to represent the “sky,” while the square referred to the “earth.” The combination of circle and square not only satisfied the functional requirements of the project, but also denoted “harmony between the sky and the earth”.

Symbolism was also used in subtle ways in the Diwang Tower design to strengthen the links between modern architecture and traditional Chinese aesthetics. The architect

**Figure** 5: Wangfu Hotel, 1985-1990. (http://www.wcwp.hk/projects/the-peninsula-beijing/?lang=en&typology=hospitality).

paid much attention to the design of architectural details, including the proportion of the horizontal lines on the tower, the subdivision of the glass curtain wall, the A-shape truss at the entrance, and the pattern of the ventilation outlets. Many details were reminiscent of Chinese traditional artefacts including architecture and clothes. For example, the pattern of the south and north facades of the office building featuring a central vertical line and repetitive horizontal lines are said to imitate traditional Chinese clothing called "*Duijinshan* 对襟衫".[4][18] The reference to traditional Chinese artefacts also inspired the architect to adopt subtle treatments with genius and originality. For example, the central vertical line of the office tower was translated into a central vertical interstice on the facade of the apartment building. This maintained the formal continuity of the two separated parts, but gave each of them a clear identity.

Second, despite the symbolism that pointed to a Chinese tradition, the building shows uncompromising modern aesthetics. Diwang Tower's architectural language is based on an abstract composition of geometric volumes without applying any purely decorative elements. The introduction of oblique elements is a key move that distinguishes the design from being ordinary. An inverted glazed trapezoid on the upper part of the office tower changes the relationship between the tower and the city – the tower is not an indifferent object in the city, but rather looks downwards at the city. The oblique red square volume sandwiched by the two facades of the apartment building is also crucial to give the whole complex a strong sense of dynamics. It combines form and function – the upper part is used to hide the cooling tower so that the rooftop space of the podium is freed up and away from public view. The lower part of red square in the hole camouflages the large beam. Oblique elements also appear as the grid pattern of the

facade of the podium, reminiscent of gift box packaging. This demonstrates an easy and relaxed attitude in design, which was influenced by Western pop art. [4][17]

In fact, the project's intention to combine the Chinese and the modern was not new. Chinese architects had a long quest of this ideal throughout the twentieth century. In the early 1980s, I. M. Pei's Fragrance Hill Hotel re-ignited the discourse on the synthesis of the modern and the Chinese after the silence of architectural discussion in the 1970s. His historicist concern was further stimulated by postmodernism that was newly introduced to China from the West. Traditional Chinese architectural symbols and the spatial arrangement reminiscent of Chinese gardens became a common language of the time.

In the 1980s, the architect, Kwok Yin Cheung designed the Wangfu Hotel in Beijing (1985-1989) before undertaking the Diwang project (Fig. 5). The Wangfu Hotel features a large Chinese style roof, reminiscent of the National Style promoted in the 1950s. It demonstrates a historicist concern resurfacing in the 1980s, and was influenced by postmodernism, then newly introduced to China. It proves the architect's dexterity in using traditional Chinese symbols in modern architecture.

But when tall buildings appeared? in the 1980s as a new building type, exemplified by the Great Wall Hotel (Beijing, 1983), Jinling Hotel (Nanjing, 1983), Jing Guang Centre (Beijing, 1989), and Shanghai Centre (Shanghai, 1990), the expression of Chineseness became a less important issue. In fact, these tall buildings are purely modern and international.[5] This is probably due to the difficulty of expressing Chineseness on a tall building. I. M. Pei's Bank of China Tower (Hong Kong, 1990) once again offers a possible way to synthesize the modern and the Chinese in a tall building, initiating a new trend again. A series of tall buildings completed in the 1990s including the King Tower (Shanghai, 1996), Diwang Tower (Shenzhen, 1996) and CITIC Plaza (Guangzhou, 1997) show the intention of the architect to express Chineseness in modern tall buildings through symbolism and proportion at the time.

Among this group of buildings, Diwang Tower stands out because of its subtlety and ingenuity in the use of symbolism and the adoption of modern aesthetics. More importantly, the two extremes, the Chinese and the modern, are perfectly combined and synthesized in the case of Diwang as compared to other contemporary buildings. The Diwang Tower design proves that the answer to the conundrum of the Chinese modern architecture is always subject to the specific context of the project and is always based on the architect's deep understanding of both Chinese and Western culture and architecture.

## 4. Conclusion

The study of Diwang Tower offers an opportunity to reflect on the economic miracle of Shenzhen. The rapid development of Shenzhen was supported by global business networks and transnational flows of ideas, technology, knowledge, personnel and capital across the border between Shenzhen and Hong Kong. It was this global network that made Diwang Tower possible.

The transnational flows of knowledge that converge in the project of the Diwang Tower set a benchmark for China's construction industry. It brought to China not just new design ideas and the latest building technologies, but also inspired the Chinese to reflect on their construction management systems and the ways of doing things.

Another observation is in regards to the synthesis of Chinese identity and modern Western aesthetics. The Diwang Tower showed "Chinese" characteristics in subtle ways, while being "modern" and "international" at the same time. The Diwang Tower represents a strong tendency of expressing Chinese identity in the design of super tall buildings in the 1990s in China. The mediation of the two extremes, the Chinese and the Western, without concessions on either side, was based on the originality and ingenuity of the architectural design. In this regard, the Diwang Tower should occupy a key position in the architectural history of China since 1978.

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## Conflict of Interest

The authors have no conflict of interest to declare.

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