

CHAPTER V

FROM A FERTILIZER FACTORY  
TO A BUSINESS PARK:  
A CASE STUDY OF THE ARCHAEOLOGY  
INDUSTRY LOCATED AT NANGANG  
DISTRICT, TAIPEI CITY

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**Historical Background**

Nangang District is located on the eastern side of Taipei City with a land area of 21.8424 km<sup>2</sup>, of which 28.67% is flatland and 71.33% is hilly land.<sup>1</sup> The earliest developed area of Nangang District was along the Keelung (基隆) River. Before the Han (漢) immigrants came to settle, the Ketagalan (凱達格蘭) aboriginal people engaged in hunting and fishing around this area. Beginning in 1736, a large number of Han immigrants from Fujian Province navigated across the Taiwan Strait to a harbour at Tamsui (淡水) and then sailed upstream along the Tamsui River to a tributary, the Keelung River, and then to a small port on the south bank. The Han immigrants cultivated small patches of the flatland around the port which was later known as Nangang (南港, literally, “south port”). By the 1850s, streets and markets were already developed to some extent in this area. In 1885, Taiwan became a province of Qing China and the first Taiwan Governor, Liu Ming-chuan (劉銘傳, 1836-1895), initiated the construction of a railroad in 1887,

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<sup>1</sup> For the land area of Taipei City, see the Department of Budget, Accounting and Statistics, Taipei City Government 臺北市政府主計處, Taipei City Government Statistics Database Query System (臺北市政府統計資料庫查詢系統), <http://210.69.61.217/pjweb2007-tp/Dialog/Saveshow.asp>, accessed on 4 October 2016.

connecting Keelung and Taipei with a station located at Nangang. However, communication between Nangang and the nearby Neihu (內湖) relied mainly on water transportation along the Keelung River. Nangang was a distributing centre for goods such as tea, tobacco, rice, bricks and tiles, all of which were produced around the area. During the Japanese Colonial Period in Taiwan (1895-1945), administratively, Nangang was combined with Neihu, in 1920, under the jurisdiction of Neihu Village (內湖庄). After World War II, in 1946, Nangang and Neihu were separated into two townships (zhen 鎮) under the jurisdiction of Taipei County. In 1967, when Taipei City was up-graded to a special municipality, Nangang Township was incorporated into Taipei City and became Nangang District (Lin Wan-chuan 1984: 63-68; *The Nangang Gazetteer* 1985: 23-24, 30-31; Zhang Zhe-sheng 2014.11.12; Jiang Fu-gui 2015.12.01).

In the early 1940s, the Japanese established two large-scale factories at Nangang. The first factory, established in 1940, was a rubber factory to manufacture tyres and shoes; this factory was transformed in 1959 to Nangang Tyre Factory, which became the biggest of its kind in Taiwan.

The second factory was established in 1943 to produce corks; this factory was changed in 1958 to Nangang Bottle-Cap Factory and belonged to the Taiwan Tobacco and Wine Monopoly Bureau (Zhao Ju-ling 1997: 295).

In the 1950s, the government initiated the development of industry at Nangang and, with the expectation of increasing job opportunities, local residents were willing to sell their land at low prices to facilitate the building of factories. Some large-scale factories were constructed at Nangang to produce fertilizer, flour, tyres, and automobiles. Thus, Nangang was known as an “industrial zone” (*Liberty Time* 2015.09.15).

Although industrial development accelerated economic prosperity at Nangang, it also induced serious pollution problems, such as hazardous smelt and smoke released from the fertilizer and tyre factories. The sky was always covered with dark smoke and Nangang became a notorious “black country” (黑鄉). Moreover, prior to 1970, Nangang also provided a site for garbage-piling at Shanzhuku (山豬窟). This site was transformed to a sanitary landfill in 1994 and the treatment of solid waste was improved. In 2010, Taipei City reached its goal of a zero rate of garbage burial and, in 2011, the Shanzhuku site became a space for decomposing recyclable solid waste and part of it was changed to an ecological park (*The Nangang Gazetteer* 1985: 76-77; Zhuang Yong-ming 1991: 262-269; Zhao Jü-ling 1997: 295-296). In the last two decades, Nangang has gradually transformed

from a polluted industrial zone to a business and software park. This paper aims to tell the story of this transformation.

## The Sixth Chemical Fertilizer Factory in Taiwan

The production of chemical fertilizer in Taiwan began in the 1920s when the Japanese established a factory at Keelung City to produce calcium phosphate [ $\text{Ca}_3(\text{PO}_4)_2$ ]. After World War II, in May 1946, the Taiwan Provincial Government took over the fertilizer industry and organised a national enterprise, the Taiwan Fertilizer Company (台灣肥料公司), to provide sufficient fertilizer for recovering agricultural production, which had been damaged during wartime. In 1950, the government also established a fertilizer factory to produce ammonium sulphate [ $(\text{NH}_4)_2\text{SO}_4$ ] in Kaohsiung City (高雄), southern Taiwan. The growing fertilizer industry not only assured grain supply but also supported industrial development in Taiwan (Li Jen-chieh 2011: 84-87).

In 1951, the government initiated construction of the Taiwan Fertilizer Company's Factory No. 6 (台灣肥料公司第六廠; hereafter, Factory No. 6). In 1952, the Taiwan Fertilizer Company set up a preparatory office and decided to construct Factory No. 6 at Nangang, with a land area of 37 hectares (370,000 m<sup>2</sup>) located at No. 34, Section 1, Nangang Road. It was a national enterprise with American assistance. In September 1954, a contract was signed with Hydrocarbon Research Inc., an American advisory company from New York. On 4<sup>th</sup> July 1957, Factory No. 6 started commissioning machinery and expected operations to begin at the end of that year. The major machinery in this factory included an ammonia synthesis tower, which weighed 71 tons, and a urea granulation tower which was 140-feet high. The new facilities attracted significant praise from the guests invited to this commissioning. (*The Nangang Gazetteer* 1985:77; Taiwan Cinema Culture Company, <http://catalog.Digitalarchives.tw/item00/31/9a/76.html>, accessed on 24<sup>th</sup> March 2016). It is notable that Shen Zu-xin (沈祖馨, 1916-), a chemical engineer who took up the planning of Factory No. 6 and later became its second director (September 1961 - August 1964), was a fifth-generation grandson of Shen Bao-zhen (沈葆楨, 1820-1879), the eminent Qing official who came to Taiwan in 1874 as Imperial Envoy of the Taiwan Coastal Defence (Shen Lü-ting 2010.10.05). In 1958, Factory No. 6 started operating with four buildings for public utilities, gas, ammonia (NH<sub>3</sub>), and urea (CH<sub>4</sub>N<sub>2</sub>O), respectively. In February 1969, Factory No. 6 was renamed as the Nangang Factory of the Taiwan Fertilizer Company, Ltd. (台灣肥料股份有限公司南港廠; hereafter,

Nangang Factory). In the process of its development, Nangang Factory was renovated several times to meet the market demands of fertilizer. In December 1976, Nangang Factory started to use natural gas in the production of ammonia. In March 1977, the construction of a plant for producing compound fertilizer was completed, with a daily yield of 520 metric tons. In September 1980, Nangang Factory stopped the production of urea owing to an insufficient supply of gas provided by China Petroleum Company. From then on, compound fertilizer and flower and gardening fertilizers became the staple products until the end of 1997, when Nangang Factory stopped all production (The Keelung River Protection Web, <http://klriver.ngo.org.tw/node/603>; *The Nangang Gazetteer* 1985: 77; Lin Bao-xüan 1997: 143). It should be noted that urea was an important element which provided nitrogen (N) in the production of compound fertilizer. From July 1976 until November 1977, the demand for urea was serviced by Nangang Factory itself but, from 1980, it was supplied by the Hsinchu (新竹) and Miaoli (苗栗) factories. A study in 1980 suggested that the most economical and rational way of transporting urea from Hsinchu and Miaoli to Nangang was to adopt a combination of railroad and highway transportation with different ratios (Gan Yin-long 1980: 23-27). Here, some old pictures of Nangang Factory can be shown to illustrate its landscape. Photo 1 shows what was the main gate of Nangang Factory, presented in an essay by Lin Xi-jia (林錫嘉, 1939-), a chemical analyst who went to work at the factory in July 1958. Lin recalled that the site of this main gate was situated at what is now Entrance 6 of Nangang Exhibition Centre Station of Taipei Metro (Lin Xi-jia 2012).

Figure 1. The main gate of Nangang Factory, the Taiwan Fertilizer Company.



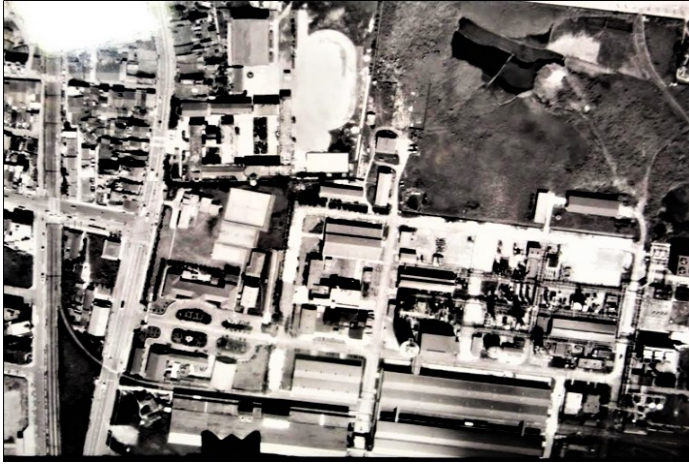
Source: See Lin Xi-jia 2012.

Figure 2. Urea granulation tower, taken by Lin Xi-jia, 25<sup>th</sup> May 1965.



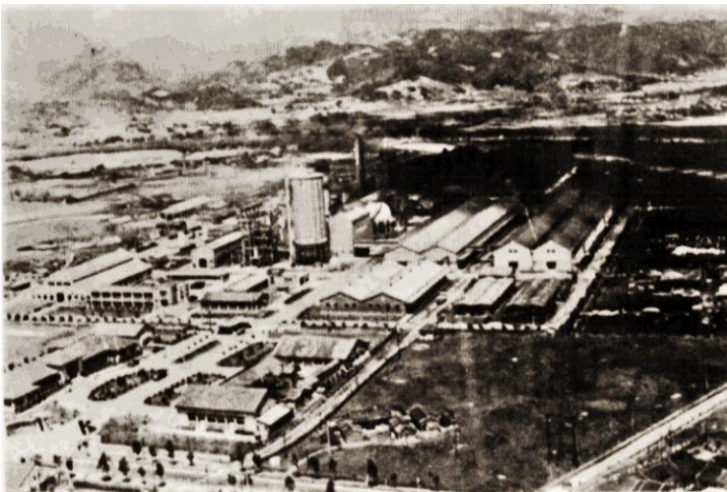
Source: See Lin Xi-jia 2013.

Figure 3. An aerial photograph which shows the layout of Nangang Factory, taken on 17<sup>th</sup> December 1978.



Source: <http://www.panoramio.com/photo/34241815>.

Figure 4. An aerial view before the factory stopped production (1997).



Source: *The Nangang Retrospect*, Photos, 125.

Figure 5. Shining white urea hill (a photograph taken in 1971).



Source: See Lin Xi-jia 2015.

The staple product of Nangang Factory was urea. Photo 5, taken in 1971 by Lin Xi-jia, shows the shining white urea hill. The white urea was piled up like a small hill inside the storehouse located on the eastern side of the factory. It was 100 metres long. The manufactured urea was packed up in parcels and the scattered kernels were delivered through a conveyor to the storehouse and finally piled up into a white urea hill (Lin Xi-jia 2015).

On 1<sup>st</sup> September 1999, the Taiwan Fertilizer Company was transformed from a national enterprise to a private company. In 2002, the Taiwan Fertilizer Company established its Research Centre for Biological Technology and thus entered a new field of biological fertilizer (the Taiwan Fertilizer Company, “Brief Introduction of the Company”). The following highlights some memories of retired employees from Nangang Factory, and may be helpful in understanding life around the factory.

On 6<sup>th</sup> March 2014, Li Fu-xing (李復興, 1946-), Chairman of the Board of the Taiwan Fertilizer Company, visited Ping Xin-tao (平鑫濤, 1927-), who was in charge of the Company’s accountancy sixty years ago. Mr. Ping recalled that, at that time, the price of farmland at Nangang was NT\$ 6.5 for one *ping* (坪, 1 *ping* = 3.3058 m<sup>2</sup>) but is now more than NT\$ 1 million. At that time, he carried boxes of cash for several days to purchase land from farmers so that the fertilizer factory could be built (Lin Xi-jia 2014; Liao Pei-yu 2014.03.07).

In 2014, Li Geng-shen (李庚申), a retired chemical engineer, wrote that compound fertilizer from Nangang Factory was sold to the farming area in southern Taiwan in 1993. Because the compound fertilizer produced by Nangang Factory remained in the shape of kernels for two to three months after being spread on the farmland, the farmers thought it was not effective. However, the nitro-phosphate fertilizer produced by the Kaohsiung Factory melted soon after spreading. Li Geng-shen told the farmers that Nangang Factory's compound fertilizer had a sustained-release nature, and that although the kernels of fertilizer remained in shape, the fertile elements had already been released. The farmers were not convinced by this explanation, however, and the Business Office of the Factory helped to select six townships in Changhua (彰化) and Yunlin (雲林), counties in central Taiwan, to demonstrate the functioning of Nangang's No. 1 compound fertilizer and Kaohsiung's No. 1 nitro-phosphate fertilizer during the first cropping season of paddy rice in 1994. In the early stage of the cropping season, fertilizer from Kaohsiung was better than that from Nangang, but at the later stage, the opposite was true, demonstrated in different numbers of sprouts and ears. Considering the nature of these two varieties of compound fertilizer, it is clear that the nitro-phosphate fertilizer from the Kaohsiung Factory is not suitable for the farmland of Southeast Asia, where rainfalls are abundant (Li Geng-shen 2014).

In 2012, Lin Xi-jia wrote that the Nangang Factory's laboratory was very spacious — bigger than the one at the University. Outside the laboratory there were green lawns with evergreen cypress trees and azaleas blossoming in the spring. He also noted that the most memorable site of the Nangang Factory was the meeting hall. In September 1958, Dr. Hu Shih (胡適, 1891-1962), the President of Academia Sinica, was invited to deliver a speech at the meeting hall, but Lin regretted that he could not attend the lecture because he was too busy with his duties. The meeting hall was also memorable because it was the place where his marriage ceremony was held. For most employees, the meeting hall was memorable because films were shown there every Saturday evening. In 2013, this retired chemical analyst wrote another essay to highlight the unusual cultural activities that took place in the Nangang Factory. The employers organised various clubs for leisure time. Famous writers and artists were invited to deliver speeches and many technicians participated in writing and painting during their leisure time (Lin Xi-jia January 2014).

Further, Lin Xi-jia wrote an essay in memory of Liu Sheng-tzu (劉繩祖), who served as the fourth Director of Nangang Factory from April 1972 until June 1977. Lin said that, in the 1960s, Nangang Factory already had



an integrated institution for the welfare of employees. Director Liu, who was well versed in Western classical music, asked Lin to organise an activity for the appreciation of Western classical music in the middle of the day, and to prepare an introduction of pieces to be played. The employees were encouraged to join this activity every day after lunch, to take a rest and enjoy the music. With advanced audio equipment and imported quality records, the beautiful melodies helped to relax minds that had been harassed by hard work. The contribution of Director Liu in providing this opportunity for employees to purify their minds was memorable (Lin Xi-jia January 2014).

Lin Xi-jia also noted that, in the early years, a group of young technicians who had graduated from vocational high schools came to work at the laboratory in Nangang Factory. A photograph taken in January 1959 shows some 50 young colleagues gathered together before two of them left for military service. Some of them would leave after they passed the entrance examinations for universities, but some returned to the factory after obtaining their university degrees (Lin Xi-jia July 2013). Luo Jian-san (羅建三), who worked at the Taiwan Fertilizer Company for more than 37 years at factories located at Kaohsiung, Nangang, and Keelung, recalled that, in 1976, he was dispatched from Kaohsiung to Nangang, to serve as an engineer in charge of the construction of a compound fertilizer plant. He supervised the entire process of construction, training employees, commissioning machinery, and formalising production. After the Nangang Factory stopped production, Luo moved to Keelung in 1998 and continued to work in the production of compound fertilizer (Luo Jian-san January 2015).

The employees of Nangang Factory were accommodated at residential houses located at Lane 22, Section 2 of Nangang Road, known as the Second Village of the Taiwan Fertilizer Company (台肥二村). This village was surrounded by a wall, inside of which was a big pond, open green spaces, and a park. There was also a kindergarten, a small market, a sundries shop, and a hair salon. The houses for employees were typically arranged with four households connected together in a row. Only the houses for the Director and Vice-Director were single buildings. Each house had a small yard in front of it. Altogether, the houses accommodated 100 households. Nangang Factory also arranged shuttle buses to bring employees to work and their children to the schools and home again. During leisure time it was possible to go and see films at Nangang Factory's meeting hall on Wednesday and Saturday evenings. This residential site has now been converted into public housing, a shopping mall, a post office, and an oil station (marathons 2012/09/11).

## **The Establishment of Nangang Business and Software Park**

According to the Land Development Team at the Land Bureau of Taipei City (臺北市政府地政局土地開發總隊), the time period for obtaining land to construct the Nangang Business Park was set between January 1991 and May 2005. This land area stretched from the dike along the Keelung River in the east and north, to the borderline between the city and the province in the southeast, and from Nangang Pumping Station in the west to Section 1 of Nangang Road in the south. The total land area was 25.2906 hectares (252,906 m<sup>2</sup>), of which 16.9780 hectares (169,780 m<sup>2</sup>, 67%) was allotted for public utilities infrastructure, and 8.3126 hectares (83,126 m<sup>2</sup>, 33%) for business buildings. The environmental situation of this area was that the Keelung River flowed through it in an “S” shape and the river flow was not very smooth. Around this area, there were a lot of factories, storehouses and illegal buildings. Obtaining pieces of land in this area for new development could help to upgrade industry, improve transportation, and provide real benefits for local residents. The major public works and construction included roads, machinery plants for rapid transportation, dikes, river-regulation facilities, parks, and an electricity substation (Land Development Team of Land Bureau of Taipei City “New Town of Science and Technology–Nangang Business Park”).

On 26<sup>th</sup> September 1996, the Taipei City Government announced a plan to re-zone urban land. The first stage of land re-zoning covered an area of 52.96 hectares (529,600 m<sup>2</sup>) with a scope from Jingmao First Road (經貿一路) in the east, to Huiming Street (惠民街) and Nangang Vocational High School (南港高工) in the west, and from Chongyang Road (重陽路) in the north, to Section 1 of Nangang Road (南港路 1 段) in the south. Photo 6 is an aerial photograph of the location for the first stage of land re-zoning at Nangang District (南港區第一期市地重劃區航照位置圖; Land Development Team of Land Bureau of Taipei City “The first stage of land re-planning at Nangang District”).

Figure 6. Aerial photograph of the first stage of land re-zoning at Nangang District.



Source: Land Development Team of Land Bureau of Taipei City.

According to a report given by the Taiwan Fertilizer Company on 30<sup>th</sup> July 2008, though the Company was transformed from a national enterprise into a private company on 1<sup>st</sup> September 1999, the government still kept 24% of its total stock shares. The total capital of the Taiwan Fertilizer Company was NT\$ 98 billion. The Company's headquarters were located in Taipei City, and there were five factories respectively in Keelung, Hsinchu, Miaoli, Kaohsiung, and Hualien. The Company's development strategies included the following: to consolidate fertilizer production; to innovate in new industries; land development; to increase financial efficiency; to strengthen international cooperation; and to assure sustainable development (Taiwan Fertilizer Company 2008/07/30).

In terms of the land development of the Taiwan Fertilizer Company at Nangang, the focus was on the construction of Nangang Business Park (南港經貿園區). In December 2001, the Company's Chief Manager, Huang Qing-yen (黃清晏), reported that Nangang Business Park was planned to combine a biological technology park, a light industry zone, and a software industrial park, forming a centre of technology, economy, trade, and industry. This case of land development included C1, C2, and C3 zones with a large-scale exhibition hall, international tourist hotels, business buildings, shopping and entertainment centres, and office buildings. The aim was to

construct a new core in Taipei's municipality. (Huang Qing-yen December 2001)

On 23<sup>rd</sup> April 2003, the Taiwan Fertilizer Company invited officials, entrepreneurs, and scholars to a conference to discuss the land development plan at Nangang. Yu Guang-hua (余光華, 1940-), the Company's Chairman of the Board, said in the opening address that the Company was aiming to utilise core technologies and resources to develop fertilizer production, electronic chemicals, biological technology, and land development. The intention in terms of land development was the building of Nangang Business Park, in an area of 11.3 hectares (113,000 m<sup>2</sup>) and at Hualien (花蓮) with an area of 56 hectares (Sun Yu-shou May 2003). According to staff at the Land Development Office (土地開發處) of the Taiwan Fertilizer Company, the projects to be carried out at Nangang included constructing international tourist hotels, large-scale shopping and entertainment centres, high-level business zones, office buildings, and houses.

The land allotted for an international tourist hotel (C2), business entertainment facilities (C3), and business cultural facilities (C4) would be planned from an urban-planning perspective, taking into account the combined functions of exhibitions, meetings, hotel, leisure, shopping, business, entertainment and cultural activities, to achieve the maximum overall benefit.

The land areas allotted for C6/C8 and C7/C9 were facing a 50-metre-wide avenue and the Intelligent Transportation System (ITS) Park. They were also separated from C3 and C4 by a 50-metre-wide road, and it was necessary to provide a square with a radius of 40 metres to connect to the Neihu Line of Taipei's Metro with a bridge. As for R4-1 and R5-2-2/R5-3-2, they were business residential zones and could be used for building houses, while the ground floor could be used for shops.

Moreover, because Typhoon Nari had caused hazardous damage to the area allotted for Nangang Business Park in 2001, it was necessary to consider upgrading the standard of flood control and prevention, such as adopting the 200-year flood prevention standard (EL13.06m), which stated that the underground area should be equipped with pumping machinery and electrical machinery, and the roof should be equipped with an emergency electrical system (Lin Zhi May 2003). On 30<sup>th</sup> July 2008, a report by the Taiwan Fertilizer Company provided a map showing the geographical position of Nangang Business and Software Park (see Map 1).

Figure 7. The geographical position of the Nangang Business and Software Park.



Source: Taiwan Fertilizer Company.

**Table 1. The 2008 Land-Development Plan related to Nangang Business Park.**

| Zones | Land area (m <sup>2</sup> ) | Land value (NT\$ million) | Current condition of management                     |
|-------|-----------------------------|---------------------------|---|
| C2    | 23,310                      | 3,007                     | Commission to architecture design                   |
| C3    | 41,537                      | 5,358                     | Commission to architecture design                   |
| C4    | 6,911                       | 633                       | Commission to architecture design                   |
| R13   | 2,444                       | 192                       | Call for business units and buildings               |
| R17   | 1,873                       | 140                       | Call for rent and Commission to architecture design |
| R5    | 6,743                       | 526                       | Call for business units and buildings               |
| R4-1  | 4,520                       | 353                       | Commission to architecture design                   |

Source: Taiwan Fertilizer Company 2008.07.30.

In 2008, the total acreage of Nangang Business and Software Park was 88 hectares (880,000 m<sup>2</sup>). The plan was to construct a residential zone, a business zone, a software park (軟體園區), Nangang Exhibition Centre (南港展覽館), tourist hotels, and office buildings. The construction of Nangang Exhibition Centre was completed in July 2007 and it was expected to open on 13<sup>th</sup> March 2008. There were 2,650 standard booths and it was

supposed to hold ten exhibitions in that year. Plans for the second exhibition centre were expected to be completed in 2012. In addition, the software park would be developed in three stages with a total land area of 8.7 hectares (87,000 m<sup>2</sup>). The first and second stages were completed, and the station rate of firms reached 100% with a total number of employers around 15,000. The third stage was also completed and is currently calling for firms to move in. The transportation system around this area includes the National Highway No. 1, the Second Northern Highway, the rapid route encircled around the eastern side of Taipei City, the East-West Rapid Route, and the Taipei Metro Service (Taiwan Fertilizer Company, 2008.07.30).

In regard to business land-development, zones C2, C3 and C4 were planned for business purposes, including offices, hotels, business and entertainment functions, and so on. The total land area was 10.86 hectares (108,600 m<sup>2</sup>) and it was to be developed in two stages, with the first stage including international tourist hotels, A-level office buildings and entertainment facilities. It was expected this would be completed in 2012. In addition, zones C6-C9 (business buildings) were rented to the CTBC Bank (中國信託商業銀行) for 50 years, who planned to make the site its business headquarters (Taiwan Fertilizer Company, 2008.07.30). Residential buildings included five subzones. Zone (1) R13 (2,444 m<sup>2</sup>) houses the residential building of Jiaziyuan (甲子園) and contains 111 units of homes with the size of each unit being 11.5-15.8 m<sup>2</sup>. Zone (2) R4-1 (4,520 m<sup>2</sup>) was to include the houses to be built in cooperation with the Huaku Development Company (華固建設公司), and construction was expected to begin in 2009. Zone (3) R5 (6,743 m<sup>2</sup>) was for the building of houses that were going to be 24.2-36.4 m<sup>2</sup> each, and construction was expected to begin in 2009. Plans for Zone (4) R17 (1,871 m<sup>2</sup>) included business-styled houses and business facilities. Zone (5) R13-1 (1,086 m<sup>2</sup>) was going to be business-styled houses (the Taiwan Fertilizer Company, 2008.07.30).

According to staff at the Property Management Office (資產管理處) of the Taiwan Fertilizer Company, after the transformation of the company from a national enterprise to a private one, the strategy of managing land-development was also changed from static to dynamic. In 2008, the Taiwan Fertilizer Company, in cooperation with the Continental Engineering Corporation (大陸工程股份有限公司), started to construct the first residential building, Jiaziyuan (甲子園), which was completed in 2011. This case provided the basis for development transformation. In 2010, the construction of a second residential building, Tianhui (天匯), was in cooperation with Huaku Development Company, and this case raised the

price of housing in Nangang District. In addition, the case of Wushuang (無雙, Zenith City) which started construction in 2011, even broke the record for estate sales at Nangang (Liu Yu-fen, July 2014).

In addition to residential buildings, the land of Zone C2 was designated for the building of the largest-scale hotel buildings in Taiwan. International hotels, such as Hi-Lai (漢來) and Caesar (凱撒), had been planned to contain 1,121 rooms. These two hotels won the bid in early 2013 and were expected to generate an annual amount of rent close to NT\$ 4 billion from 2018 onward. The office buildings located on the same street would have a total floor acreage of more than 17,000 *ping* (5610.6 m<sup>2</sup>) (Liu Yu-fen July 2014; ETtoday Taipei Report).

The year 2014 was a key turning point in the history of the Taiwan Fertilizer Company. Li Fu-xing, Chairman of the Board, said that the new challenge for the Company was to design a second core industry in addition to fertilizer production. This second core was to vitalise the land. In this respect, the tourist hotels at Zone C2 were expected to start construction in 2015, and it was also hoped a conclusive solution would be reached regarding Zone C3 (Fang Ming, 2014.06.30).

The land-development achievements by the Taiwan Fertilizer Company did not go unnoticed by the public. On 15<sup>th</sup> December 2015, an opening ceremony was held for the beginning of the construction of office buildings and tourist hotels at Zone C2; this signalled a step towards entering the field of large-scale business-estate development. It is expected that two buildings of international tourist hotels and one office building will be constructed. After completion in 2020, these buildings will be rented out for business use. It was estimated that more than NT\$100 billion would be spent in constructing these buildings and they would generate an annual benefit of NT\$ 8 billion from rents (“Nangang C2 Tourist Hotel and Office Building projects formally start the construction!”).

As for Zone C3, it has a total land area of 41,536.66 m<sup>2</sup>, located between the Jingmao 1st Road and 2nd Road (經貿一路、二路), and between Lane 105 and Lane 157 of the Jingmao 2nd Road. This is an excellent and very valuable area within the Nangang Business Park. For this site, the Taiwan Fertilizer Company decided to adopt a method of bidding for the surface rights (地上權招標方式) in order to reduce the risk of investment. Two life insurance companies — CTBC Life (中國信託) and Taiwan Life (台灣人壽) — were successful with their bids, amounting to NT\$ 150.324 billion (tax included) for 45 years (which can be extended for a further 40 years). The contract was signed on 15<sup>th</sup> September 2015 (“The ceremony of signing the contract for C3”).

In addition to the Taiwan Fertilizer Company's land development, on 21<sup>st</sup> October 2010 the Ministry of Economic Affairs reported that the planning for the second building of Nangang Exhibition Centre was complete. It was planned that the Taipei City Government would provide the land and the Ministry of Economic Affairs would provide the funding. The new exhibition hall was designated the "National Convention and Exhibition Centre" (國家會展中心), also known as "Nangang Exhibition Centre, Hall 2", housing 2,350 exhibition booths. It brings the total number of booths (including those that already exist in Nangang Exhibition Centre) to 5,000, helping to promoting Nangang Exhibition Centre as a large international convention and exhibition centre. Nangang Exhibition Centre (Hall 2) was built on the site of Nangang Elementary School, which moved to a new site in early 2010. The land area is 3.36 hectares (33,600 m<sup>2</sup>) and is owned by the Taipei City Government. The building plan included three floors underground and six floors aboveground, connected to the original hall. The total expenditure was estimated to be NT\$ 64 billion. It was expected that design would begin in 2011, with construction starting in 2013 and completion estimated for August 2018. Private business firms would participate. On 27<sup>th</sup> October, 2010, the agreement was signed by the Ministry of Economic Affairs and the Taipei City Government (Yu Guo-chin 2010/10/22; Chen Huai-yu 2010/10/21).

Here, the history of Nangang Elementary School should be outlined. The School was originally established in 1914 as Xi-Kao Public School (錫口), on Nan-Gang Campus. In 1968, it was renamed Taipei Municipal Nan-Gang Elementary School. The campus has beautiful trees, a playground, a spacious yard, and a swimming pool. In 2008, there were 50 classes. It was designated by the Ministry of Education as a "Green School." When it was moved to its new location, the old trees were also all moved. On 10<sup>th</sup> January 2010, the school was reopened at a new campus located on Huiming Street (惠民街) (Taipei Municipal Nan-Gang Elementary School).

In addition to the business park discussed above, in the early 21<sup>st</sup> century, in order to develop the software industry, the Ministry of Economic Affairs proposed several plans, including the "Five-Year Plan of the Software Industry" (軟體工業五年發展計畫) and the "Development of the Software Industrial Park" (開發軟體工業園區). It was planned to establish three software parks in Taiwan, located in the north, central, and south, to provide an environment for the growth and development of the software industry. The government initiated cooperation with the Century Development Corporation (世正開發公司), a private enterprise, to build Nangang Software Park (南港軟體園區) in the hope of establishing an international



image of software and knowledge-intensity industry in Taiwan. The Nangang Software Park was the first software park developed in Taiwan and the first international park for special research and development. The design of Nangang Software Park was carried out with the goal of building efficient and comfortable business spaces. There are automatic control systems for electrical machinery, public health, communication, safety, and air conditioning, as well as stable and uninterrupted electricity. For the people working in the park, there are banks, restaurants, shops, and other supporting services. There are also green parks located between the first-stage and second-stage buildings (Century Development Corporation “Nangang Software Park: the first stage”).

The first-stage of the development of Nangang Software Park was on land with an area of 4.0335 hectares (40,335 m<sup>2</sup>), and construction was completed in August 1999. The major items proposed for this software park included computer-software design, technological research and system integration, non-polluted products, IC designing, automatic designing, and supporting offices for the development of the park (Century Development Corporation “Nangang Software Park: the second stage”).

The second-stage of the development was on a land area of 4.1764 hectares (41,764 m<sup>2</sup>). The plan started in 1997, construction began in March 2000, and completion was realised at the end of 2003. Nearly 60 business firms are currently operating in the Nangang Software Park, including IBM, Sony, Broadcom, the China Steel Corporation (中鋼集團), China Development (中華開發), the Shin Kong Group (新光集團), Internet (ISP, ASP, and SSP) Trade-Van (關貿網路), TECO (東元集團), Eastern Broadcasting Co., Ltd. (東森寬頻), the Taiwan Depository & Clearing Corporation (台灣證券集保), and Myson Century, Inc. (民生科技). Total personnel sits at around 13,000 people. The construction of the second-stage included three buildings: Building F (20F); Building G (17F); and Building H (13F), respectively located from north to south. The underground areas of these buildings provide parking distributed on four floors, with 1,348 spaces for cars, 2,288 spaces for motorcycles, 10 spaces for small cargo cars, and two spaces for large cargo cars (Century Development Corporation “Nangang Software Park: the second stage”).

The reasons for developing the software park are: (1) to develop Taiwan to become an Asia-Pacific Operation Centre (亞太營運中心); (2) to create a new, international urban centre in cooperation with the Nangang Business Park; (3) to promote the upgrading of the software industry; (4) to innovate world-leading software research and create a development environment; (5) to upgrade the level of domestic software firms; (6) to push forward the

software industry's development.

As for future development, three goals were set in 1996 for the year 2005: (1) the production value of Taiwan's software industry should reach NT\$ 3,600 billion; (2) the number of software firms should increase from 450 to 600; (3) the total number of employees should increase from 25,000 to 70,000 (Century Development Corporation "Nangang Software Park: the second stage").

It is notable that, in August 2004, the Small and Medium Enterprise Administration (Ministry of Economic Affairs) established Nankang Biotech Incubation Centre (南港生技育成中心), located on the 17<sup>th</sup> floor of Building F of Nangang Software Park. The operation of Nankang Biotech Incubation Centre was entrusted to the Development Centre for Biotechnology (財團法人生物技術開發中心). Efforts were made to integrate biological and medical enterprises, academic research units, and governmental resources, to provide assistance for technological incubation and to enhance the growth of biological enterprises. Services included space, equipment, administrative support, information services, human capital development, technical training, financial support, legal consultancy, and technological introduction and cooperation (Small and Medium Enterprise Administration, Ministry of Economic Affairs, "Nankang Biotech Incubation Centre, SMEA").

The third stage of the construction of Nangang Software Park was expected to begin in January 2008 and was also operated by the Century Development Corporation. There is a difference between the third stage and the previous two stages. In the first and second stages, the Ministry of Economic Affairs purchased the land from the Taiwan Fertilizer Company and entrusted the operation to Century Development Corporation, but in the third stage the land was owned by the Taipei City government, and the strategy was that the land was not for sale but only for rent. Thus, the Century Development Corporation rented the land for 50 years and was in charge of the operation. The land area of the third stage was 1.52 hectares (15,200 m<sup>2</sup>) and the total development cost was NT\$ 85 billion. By September 2008, the station rate had reached 50%. The main intention with development was to support IC design and wireless communications, with the aim of becoming an international industrial and technological centre (Guo Ji-tian 2007.11.17; Chen Hsin-sheng 2008.09.17).

According to the Pan Ji Architects & Planners (潘冀聯合建築師), who were in charge of architectural planning for the buildings at zones C2, C3, and C4, this planning case used an image of a "gate" as a guiding idea to make an integrated plan. In addition, it used the "Sky Plaza and green

corridor” to connect C2, C3, and C4, to avoid conflict with the high bridges surrounding Taipei’s Metro Service and to provide an outdoor square for the citizens (Pan Ji Architects & Planners “The Case of Planning Taiwan Fertilizer Company’s Nangang Business Park”).

## **The effect of land development at Nangang Business and Software Park**

Statistical data will be presented below to provide a preliminary overview of the socio-economic effects of land development at Nangang Business and Software Park. In order to understand the relative position of Nangang District in Taipei City, data regarding land area, population, factories, and business firms will be discussed below.

The total land area of Taipei City in 1990-1991 was 271.7741 km<sup>2</sup>; from 1992 onwards, it was 271.7997 km<sup>2</sup>. The distribution of land area at 12 Districts showed that, in 2015, the land area of Nangang District ranked fifth (21.8424 km<sup>2</sup>, 8.04%), next to Wenshan District (文山, 31.5090 km<sup>2</sup>, 11.59%), Neihu District (31.5787 km<sup>2</sup>, 11.62%), Beitou District (北投, 56.8216 km<sup>2</sup>, 20.91%), and Shilin District (士林, 62.3682 km<sup>2</sup>, 22.95%). It is notable that the top five districts share 65.11% of the total land area in Taipei City.

In terms of population, between 1990 and 2015, the population in Taipei City showed a slightly decreasing trend with some fluctuations, being 2,719,659 in 1990, and 2,704,810 in 2015. It is notable that among 12 Districts, Nangang had the smallest number (share) of population during this period. The population of Nangang District was 117,134 (4.31%) in 1990, which decreased to 110,982 (4.27%) in 1997, and then increased with slight fluctuations to 122,245 (4.52%) in 2015.<sup>2</sup>

In terms of factories registered in Taipei City, the total number decreased from 2,699 in 1990 to 1,175 in 2015. Among 12 Districts, Nangang had the largest number (share) of factories between 1990 and 1995, increasing from 751 (27.83%) to 876 (35.03%) but, in 1996, the number decreased to 842 (34.85%) and then increased again to 857 (34.99%) in 1997. However, by 2015 the number had decreased to 323 (27.49%). It is notable that Nangang District lost its top ranking in 2002 when its figure of 650 (31.34%) was lower than the 653 (31.45%) recorded at Neihu District.

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<sup>2</sup> For original statistics, see the Department of Budget, Accounting and Statistics, Taipei City Government, Taipei City Government Statistics Database Query System.

Since then, even though the number of factories in Neihu District has been decreasing, it remains on top with the figure of 449 (38.21%) (Department of Economic Development, Taipei City Government).

In terms of business firms, statistical data for districts is only available for 2006-2015, during which period Nangang District had the smallest number (share). In 2006, the total number of business firms registered in Taipei City was 56,532, of which 1,880 (3.33%) were in Nangang District; in 2015, the total number in Taipei City was 56,134, of which 1,934 (3.45%) were in Nangang District (Taipei City Office of Commerce).

Within Nangang District, administrative divisions have changed several times. In 1968, when Nangang became a district in Taipei City, there were 11 Li (里, villages); this number increased to 23 in 1985, was reorganised to 18 in 1990, increased to 19 in 2002, and then again to 20 in 2010. Seven of these 20 are located within the 500-metre periphery of Nangang Business and Software Park (hereafter identified as NBSP). These seven Li are: Sanchong Li (三重里), Nangang Li (南港里), Zhongnan Li (中南里), Xinfu Li (新富里), Dongming Li (東明里), Dongxin Li (東新里), and Chongyang Li (重陽里), which was divided from Dongxin Li in 2010.<sup>52</sup> The locations of 20 Li in Nangang District and seven Li around NBSP are shown in Map 2.

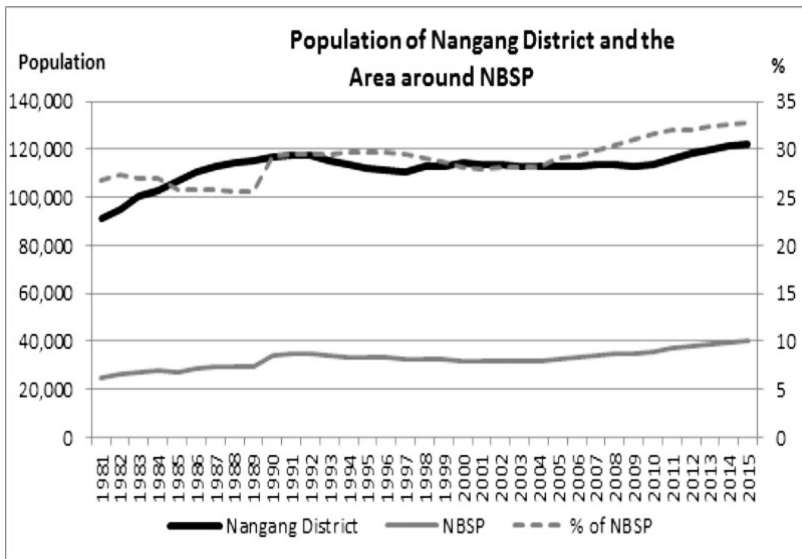
Figure 8. Location of 20 Li in Nangang District and seven Li around NBSP.



Source: Nangang District Office, Taipei City.

The available data concerning the population of Nangang District and the seven Li around NBSP are illustrated in Figure 1. This shows that, in 1981, the total population of Nangang District was 91,553, reaching a first peak of 117,764 in 1991. It then decreased with slight fluctuations and reached a second peak of 122,245 in 2015. Similarly, the population of the area around NBSP reached its first peak of 34,787 in 1992 and its second peak of 40,107 in 2015. The percentage of population in NBSP was around 26% in the period 1981-1989, and was around 29% between 1990 and 2000. It increased again from 28.03% in 2001 to 32.81% in 2015. In short, the land development of Nangang Business and Software Park incurred a population increase around its periphery.

Figure 9. Population changes in Nangang District and the area around NBSP, 1981-2015.

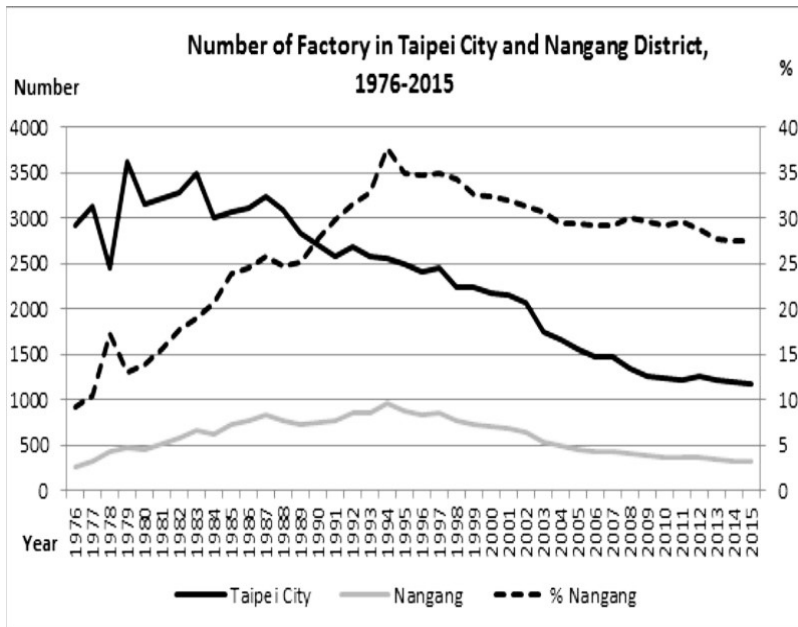


Source: Household Registration Office, Nangang District, Taipei City.

As for the number of factories, the statistics concerning administrative division are not available. Figure 2 shows the number of factories registered in Taipei City and Nangang District in the period 1976-2015. Figure 2 shows that the number of factories registered in Nangang District increased from 751 in 1990 to 924 in 1994, and then decreased to 323 in 2015.

Furthermore, a calculation with simple linear regression for data from 1994 to 2015 obtains  $R^2 = 0.9346$ , meaning that the number of factories in Nangang District decreased significantly.

Figure 10. The Number of factories registered in Taipei City and Nangang District, 1976-2015.



Source: Bureau of Industrial Development, Taipei City.

As for the manufacturing industry in Nangang District, available statistics show that between 2002 and 2015, the total number of factories engaged in manufacturing decreased from 650 to 323. Taking the number in 2015 as an example, the top ten manufacturing industries were in the following order: metal products (63); computers, electronic and optical products (40); machinery and equipment (36); electronic parts and components (28); food and beverages (28); electrical equipment (21); plastic products (16); the printing and reproduction of recorded media (14); chemical products (12); apparel and clothing accessories (10).

The top ten items together had 268 factories, or 82.9% of the total manufacturing factories at Nangang.<sup>3</sup>

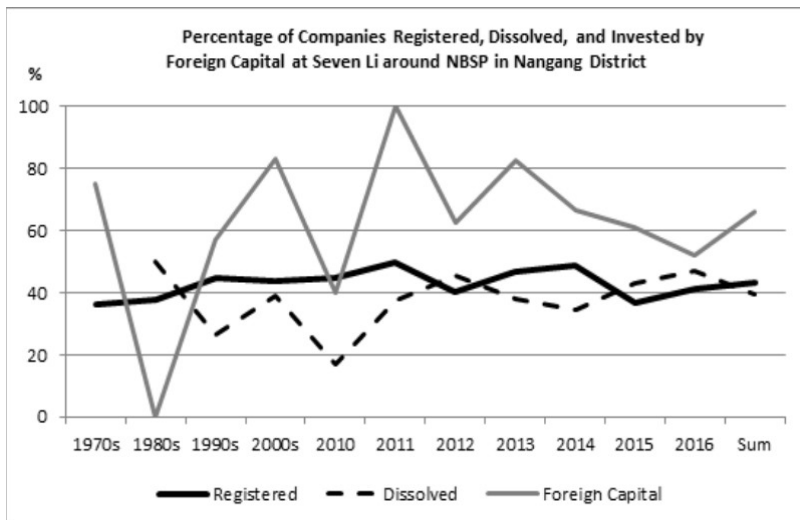
Furthermore, using the data for each registered factory, provided by the Ministry of Economic Affairs, it is possible to work out the number of manufacturing factories still in operation in Nangang District and at the seven Li around NBSP. By the end of 2016, there were 303 factories still in operation. Among them, 103 (33.99%) were located at six Li around NBSP. Among the six Li, Dongxin Li ranked top, with 37 (12.21%); followed by Zhongnan Li, with 24 (7.92%); Sanchong Li, with 19 (6.27%); Dongming Li, with 11 (3.63%); Chongyang Li, with 8 (2.64%); and Nangang Li, with 4 (1.32%). It should be noted that there is no factory located at Xinfu Li, which is also around NBSP. It is notable that the earliest year in which factory registration was approved in Nangang District was 1956, while in the area around NBSP, the earliest year was 1970. Two factories started production in early 2016 (one produces food and the other non-alcoholic drinks), both located at Chongyang Li.

As for companies doing business, either wholesale or retailing, in Nangang District it is notable that Sanchong Li, the locus of NBSK, has the largest number of companies among all divisions. On average, the seven Li share 43.4% of the companies registered, 39.5% of the companies dissolved, and 66.2% of the companies invested in by foreign capital in Nangang District. In short, the establishment of Nangang Business and Software Park played an important role in commercial activities in Nangang District, particularly in the last decade.

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<sup>3</sup> For statistics concerning the years 2002-2006, see *Taipei City Statistical Yearbook* of each year; for the years 2007-2015, see Taipei City Statistical Database Query System (台北市統計資料庫查詢系統), <http://210.69.61.217/pxweb2007-tp/dialog/statfile9.asp>, accessed on 5<sup>th</sup> October 2016.

Figure 11. Percentage of companies registered, dissolved, and invested in by foreign capital at seven Li around NBSP in Nangang District.



Source: Compiled by the author based on data available at [gcis.nat.gov.tw](http://gcis.nat.gov.tw)

## Conclusion

This story of transforming a fertilizer factory into a business and software park began in the late 1990s in Nangang District, Taipei City. It provides an example of the landscape changes in Taiwan during its process of becoming a developing, modern economy. Of course, to obtain a more comprehensive picture of industrial archaeology in Taiwan, other cases studies are needed in the near future.

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