

A STUDY ON THE PROCESS OF FORMATION OF INTIMATE SPATIAL RELATIONS BETWEEN THE CITY AND UNIVERSITIES IN HELSINKI

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Abstract

This paper aims to clarify how intimate spatial relations have been formed between the city and universities in Helsinki during their process of growth. This is done through an analysis of the historical process of locating university campuses and comparing it with city growth. We focus on three points: 1) how and why the city center campus was situated and how it was able to stay in the heart of the city; 2) how and why the intimate spatial relations between suburban campuses and their surrounding areas were realized; and 3) how and why some of the campuses were relocated within the inner city or returned to the inner city.

1. Introduction

1.1 Background and purpose of study

Finland, a country with less than six million people, had her competitive power, education level, and cultural activity rated very highly in the some of the latest international surveys.¹⁾ This has attracted international interest. The Master Plan (1992) of Helsinki laid out as its principle strategic factors "to develop its strengths- namely, science and art and the environment- and also to improve where its weaknesses- such as cost effectiveness and a vibrant urban culture and to improve the city's attractiveness and open it up to new opportunities.¹⁾ Fig.1 shows a triangle connecting the city center with two suburbs. This represents interaction between corporate technical expertise(know-how), institutions of higher education and of research, and emphasizes that the competitive power, based on knowledge and information, is strengthened by connecting organically the various activity bases including universities, which are designated by the stars in the figure.

In order to realize such a strategy and to ensure it works effectively, as a fundamental condition, universities and other knowledge and information centers must maintain spatially intimate relations with in the city. It is doubtful whether the same strategy could be realized in Japan, where many university campuses have moved to the suburbs from city centers, so that the spatial relations between the city and the universities have gone cold, and the city center has lost many of its knowledge and information centers. Many

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universities have become isolated from the city. Helsinki, however, has maintained such good conditions.

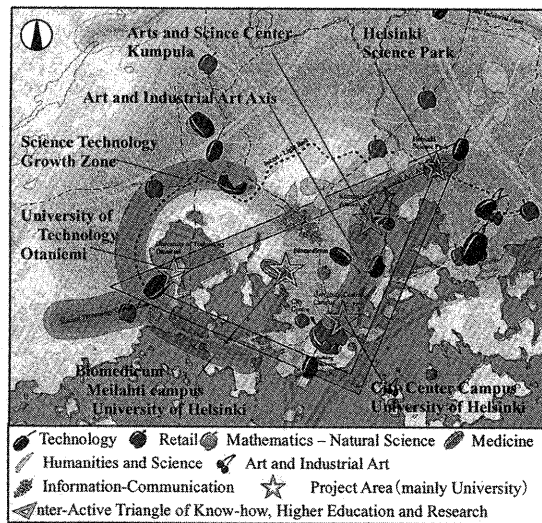


Fig. 1 Know-how provides competitive edge – Strategic Planning Advice 1995²⁾

In this paper, we concentrate on the university in its role as one of the most important knowledge and information bases. The purpose of this paper is to clarify how the intimate spatial relations have been formed between the city and universities in Helsinki by analyzing the historical location process of the universities and its connection with city growth, and thereby to derive some conclusions.

1.2 Subjects and method of study

In this paper, we consider “the spatially intimate relations between a city and a university” from two viewpoints: that is, looking at a geographically closer location in the larger view, and observing the spatial relation between university facilities and its surroundings in close-up. The key criterion for of the former is whether a university locates within or nearby a city. That of the latter is whether a university is sympathetically located with regard to its function and role in the city.

In the Helsinki area, there are eight universities, plus the Helsinki University of Technology,²⁾ which is located in the City of Espoo, next door to the City of Helsinki. Fig.2 shows location changes of these universities and Table 1 summarizes their relocation history. Fig.2 illustrates three typical types of location change. Firstly, the University of Helsinki has preserved a main campus in the city center ever since it was established, but has also created new campuses in the suburbs (① in the figure). Secondly, the Helsinki University of Technology moved as a whole to a suburb from the city center, but has recently returned in part to the inner city (② in the figure). Thirdly, the University of Art

and Design Helsinki, the Theatre Academy of Finland, and the Academy of Fine Arts have all recently moved from the city center to former factory sites (3 4 5 in the figure). Lastly, the Helsinki School of Economics, the Swedish School of Economics and Business Administration, and the Sibelius Academy have stayed in the city center of Helsinki. (6 7 8 in the figure).

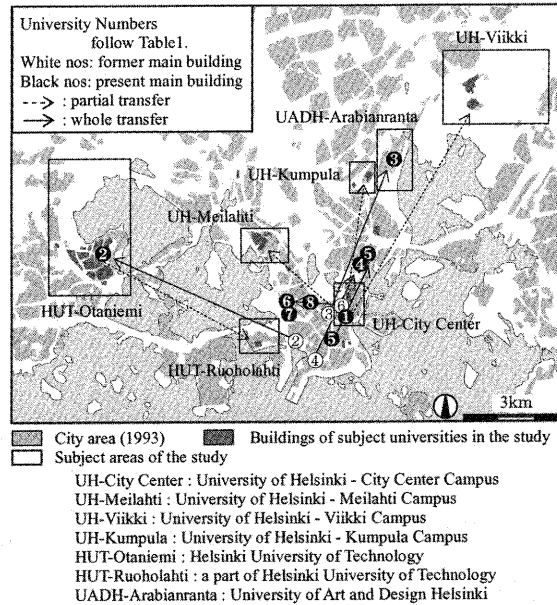


Fig. 2 Location changes of eight universities³⁴⁵

Table 1 Data of eight universities

No	University	Year of Founding	Year of Higher Status	Year of Moving to the present Main Building	Number of Students
1	University of Helsinki	1640		1828	37,685
2	Helsinki University of Technology	1849	1908	1963	14,763
3	University of Art and Design Helsinki	1871	1973	1986	1,717
4	Theatre Academy of Finland	1940	1979	2000	395
5	Academy of Fine Arts	1848	1993	2003	224
6	Helsinki School of Economics	1904	1911	1950	4,170
7	Swedish School of Economics and Business Administration	1909	1927	1952	2,390
8	Sibelius Academy	1882	1966	1931	1,514

Number of Students: 2002 by KOTA,
 Reference: Finnish Universities 2002, Ministry of Education

We will focus on the University of Helsinki, the Helsinki University of Technology and the University of Art and Design Helsinki, all of which are relatively large-scale universities that have made typical moves. We will address:(1) how and why the City Center Campus of the University of Helsinki was located and could stay in the heart of the city;(2) how and why the intimate spatial relations between suburban campuses of the University of Helsinki and the Helsinki University of Technology and their surrounding areas have been realized;

and (3) how and why one campus of the University of Art and Design Helsinki and a part of the Helsinki University of Technology were, respectively, relocated within the inner city and returned to the inner city from a suburb.

This study is mainly based on the material obtained about the city planning of Helsinki, the campus planning of each university, and from architects and city planners writings about such as C.L. Engel, E. Saarinen, and A. Aalto. A part of our information on latest trends was collected from the universities themselves and the Helsinki City Planning Office.

Several studies have been made on campus planning or the relationship between the city and universities. For example, a publication on recent cooperation between the City of Helsinki and the universities in the development of Helsinki³⁾, a record of the campus planning history of the University of Helsinki⁴⁾, and a publication on the revision of the campus planning of the Helsinki University of Technology⁵⁾. In Japan, there are studies on university locations and their changes⁶⁾ and on space organization within campuses,⁷⁾ amongst others, but, these are limited to campus and bear no relationship with cities. We will make reference to some universities in one particular city and analyze the spatial relationship between them historically. As far as we know, no studies in Japan have ever attempted this before.

2. Situation and Growth Process of the City Center Campus

2.1 Situation of the City Center Campus and its background

The fate of Finland had been controlled by Sweden and Russia for several centuries because of her geopolitical location. When control passed from Sweden to Russia, her capital was moved from Turku to Helsinki in 1812. But it was only in 1828, 16 years later, that the Turku Academy, the predecessor of the University of Helsinki, was moved to Helsinki (Table 2). The reason for the time lag was a political one: namely, when the capital was moved, the czar did not have the intention of making use of the university for political unification.⁸⁾ Instead, he preferred to keep the Academy away from the new capital because people, especially academics, in Turku were strongly oriented toward Sweden^{7) 9)}. Later, the Russian government moved the Academy to Helsinki because they needed to keep direct watch on students who had the liberal tendencies⁹⁾, and to make use of the Academy for creation of new culture^{7) 10)}.

Fig.3 shows the arrangement of the university and important public buildings, which were completed or planned at that time. As the figure shows, the town structure was a grid plan. The Cathedral, administration buildings and military buildings faced the Senate Square or the main south-north street, forming the heart of the new capital. The university main building was placed at the most important site: namely, opposite the Senate Building, across the Senate Square, in spite of the fact that any ratified town plan before the university was moved did not include any university buildings¹¹⁾. In this way, the university was regarded as an important facility, and consequently it was organically integrated into the grid plan. Taking into account the above reason for the university transfer, it is quite natural that the

university should be placed at the site.



Source of the map : reference 4)
Parentneses indicate construction year / conversion year.
①-⑤ : the university buildings
① University Main Building (1832)
② University Library (1840)
③ Botanical Garden (1829-)
④ Clinical Institute (1833)
⑤ Observatory (1834)
⑥ Cathedral (1852)
⑦ Senate Square
⑧ Senate Building (1822-28)
⑨ Town Hall (1819)
⑩ Imperial Palace (1820 / 1845)
⑪ Russian Military Hospital (1823-27)
⑫ Governor-general's Palace (1822 / 1835)
⑬ Guard Barracks (1822)
⑭ Church (1826)

Fig. 3 Arrangement of public buildings after University of Helsinki was moved ¹⁴⁰

Table 2 Transfer circumstances of the University of Helsinki ^{140/78)}

1808	Helsinki lost about a third of its buildings to great fires and had begun to implement a reconstruction plan.
1809	Finland had been under Swedish rule for nearly six centuries. However, since Russia won the Russia-Sweden War, she became a grand duchy, gaining autonomy under Russian rule.
1812	Helsinki was made capital of Finland by the Czar of Russia, Alexander I. Planning and construction began under J.A.Ehrenström and C.L.Engel, who took part in the reconstruction committee later.
1827	The old capital Turku suffered a great fire and the Turku Academy (now the University of Helsinki) was damaged. Transfer of the Academy to Helsinki was decided by the Czar of Russia, Nicholas I.
1828	The University main building was completed and the University was moved officially. The Czar Alexander University (now the University of Helsinki) was established.

Table 3 Number of sites by extension type of the City Center Campus

Year	Type	vacant lot use	rebuilding	conversion
1850-1899		6	3	0
1900-1969		1 6	3	2
1970-1999		0	2	1 5

C.L. Engel unified the buildings in the city center, including those of the university, with the neo-classical style and connected each block visually with greens⁴⁸⁾. The university thus became an important part of the townscape.

2.2 The growth and the staying process of the City Center Campus

The growth process of the City Center Campus can be classified into the following three main types: "vacant lot use", "rebuilding" and "conversion".⁹ We can represent this as in Fig. 4. Table 3 presents a number of changes in each period. It shows that the main type of expansion between 1850 and 1969 was "vacant lot use", but "conversion" has taken its place since 1970. And "rebuilding", whilst infrequent, has been done throughout.

Fig. 5 shows that large-scale undeveloped plots of land remained next to the university blocks and on the northern shore until the second half of the 19th century. The expansion since 1900 has made of these vacant lots. This provides a contrast to the expansion before that, which had used small-scale vacant lots in existing university blocks.

This figure also shows that there were stone buildings facing each other on the square and along the main street running north to south, Unioninkatu. However, a large number of temporary wooden buildings remained around the university. The redevelopment of

temporary buildings into permanent ones started around the end of the 19th century. The university's expansion through rebuilding followed the city's reconstruction trend.

As Fig. 6 shows, the buildings in the city center were already crammed together by 1960, but a relatively high number of vacant lots remained around the university. The university has expanded mainly through conversion since 1970. This is because the City and the State have been protected many buildings in the area since the 1970s. Furthermore, the City has protected the urban landscape of the old city area (within the thick line in the figure)¹¹.

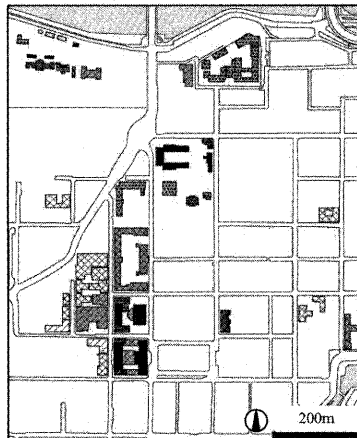


fig. 4 Growth Process of the City Center Campus^{8,10}

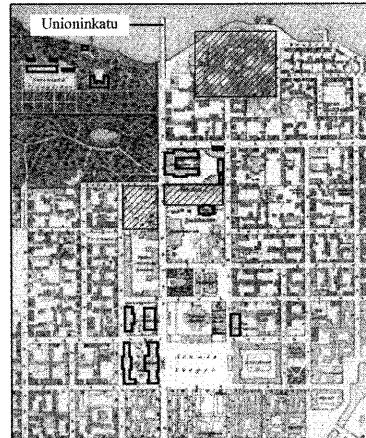


fig. 5 Town Plan, 1878

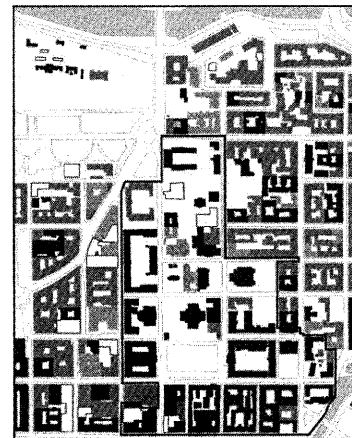


fig. 6 Construction period of buildings around the university¹²

3. Formation Processes of an Intimate Relationship between Suburban Campuses and their Surrounding Areas

3.1 Securing a close location to the city at suburban campuses

3.1.1 Time lag between the period of land acquirement and transfer

While the City Center Campus of the University of Helsinki had been growing gradually, the issue of transferring the university to a suburb had already come up in the 1910s. The first transfer issue arose from the proposal of 1918, which was to move the whole university to Meilahti. However, as the university preferred to move only the Faculty of Medicine there, it was not realized at that time. The issue of transfer came up again at the end of the 1960s. By that time, an increase in the number of students had caused an obvious lack of space. It was proposed to move the whole university to Viikki, where the Faculty of Agriculture was at that time. However this too was not realized because of heavy opposition by students.

The site of Meilahti Campus, in which the Hospital and Faculty of Medicine are located at present, was acquired in 1939¹². The site of Viikki Campus, in which the faculties related

to agriculture are located, was acquired in 1931¹³. However the campuses did not immediately move to either site. It was not until postwar times that a major transfer finally started (Tables. 4, 5).

Table. 4 Planning process for the Meilahti campus of the University of Helsinki ⁴¹³⁾

1910	E. Saarinen drew the site plan of Meilahti for the university hospital, clients was the hospital concerned.
1917-18	Bertel Jung who was a town-planning architect of the City of Helsinki at the time, and some professors of the University Senate proposed to move the whole university to Meilahti. A committee of the university was in favor of expanding the university in the city center and building new facilities in Meilahti only for the Faculty of Medicine. J.S. Sirén drew a site plan for the Meilahti area and the city center.
1918	E.Saarinen made the Greater Helsinki plan, which included the transfer to Meilahti of the whole university.
1923	The plan for the Faculty of Medicine at Meilahati ended in failure. After that, the construction (1931) and land acquisition (1937) for the Faculty of Medicine in the city center was carried out.
1939	The Finnish parliament granted funds for reserving a site at Meilahti for a future hospital and a Department of Medicine. In this connection, the university was given the use of a block adjacent to the hospital area.
Postwar	The planning for construction of a suburban campus had begun.
1966	The main building for the Faculty of Medicine at Meilahti was completed.

Table. 5 Planning process for the Viikki campus of the University of Helsinki ⁴⁾

1920s	The committee supposed a construction of a building for the agriculture and forestry education in the City Center campus.
1931	The estate at Viikki was handed over to the university by the state to replace the land which the university had lost in connection with the reorganization of experimental work and research in 1932. A part of the Viikki campus was used as an experimental farm.
1939	The building for agricultural education was constructed in the City Center Campus.
Postwar	It was decided that the Faculty of Agriculture should be moved to Viilli campus experimental farm.
1950-	Student housings were constructed at Viilli in 1950s, and the university institutions in the 1960s.

This time lag was influential in the campuses securing a close location to the city. Fig. 7 shows that in 1940 Meilahti Campus partly adjoined the city area while Viikki Campus was isolated from it. However, in 1960 the former was surrounded by the city area while the latter now adjoined it. In other words, the campuses moved to the suburbs while, at the same time, the city area expanded to surround the campuses.

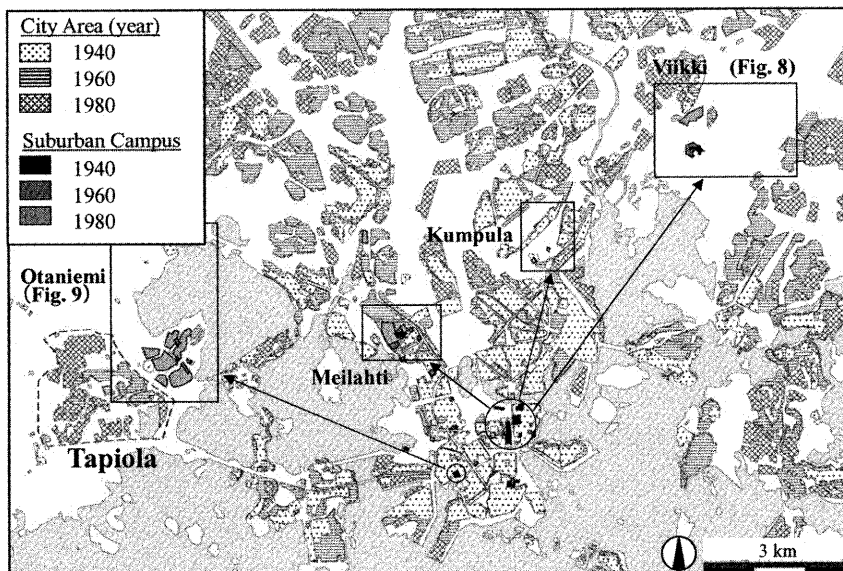


Fig. 7 Expansion of a city and changes in suburban campuses¹⁴⁾

3.1.2 Securing a close location to the city by construction of a surrounding suburban residential area

The Helsinki University of Technology had also examined the issue of transfer of a whole or part of the university to a suburb before the War. However the land of Otaniemi campus was only acquired in 1949 (Table. 6). Planning and construction started immediately. In this case, there was almost no time lag between the land acquisition and campus transfer, in contrast to that of the University of Helsinki.

Table. 6. Planning process of the Otaniemi campus of the Helsinki University of Technology ¹³⁾¹⁴⁾¹⁵⁾¹⁶⁾¹⁷⁾

1918	E.Saarinen made the Greater Helsinki plan, which included also the transfer to Meilahti of the technology university.
1920	The investigative committee of the government about the university transfer problem in the report mentioned that it was not necessary to move the university.
1923	Saarinen took part in the committee which considered that it was necessary to move the university. He drew up a plan for another place.
1923	The Finnish parliament rejected the transfer proposal.
1938	The Committee of Student Sports, appointed by the government, proposed the idea of building a student campus.
1945	A committee studied alternative sites for the rebuilding and extension of the university main building, which got damaged during the War.
1949	Transfer of the whole university to a suburb was decided, and then the government bought the land of Otaniemi for the University. A competition for land use planning was held the same year, and A.Aalto won.
1950s	Student housing was built at Otaniemi.
1960s	The university institutions were built at Otaniemi. All departments had been moved into new premises by 1972.

We should note that Tapiola¹⁵, a suburban residential area next to Otaniemi, was constructed at the same period as the campus. As Fig. 7 shows, the campus was isolated from the city area in 1960. However, Tapiola grew as well as the campus, and both areas came closer to each other. Generally speaking, a university lacks the power to attract by itself a new city to its surrounding area. However, in this case, the suburban campus and the surrounding residential area were constructed during the same period. Therefore, the isolated situation of the university lasted for only a short period.

3.1.3 Securing a close location to the city by a transfer to a vacant site in the city area

The University of Helsinki acquired land in the late 1970s for the Kumpula Campus, then partly relocated there. As Fig. 7 shows, the city area already surrounded the new site, on which temporary housing had been built because of a housing shortage after the War.

3.2 Structural integration with a city of suburban campuses

3.2.1 Relationship between the suburban campuses of the University of Helsinki and their surroundings

The Meilahti Campus, one of the suburban campuses of the University of Helsinki, houses the Faculty of Medicine and the Helsinki University Central Hospital. The hospital is an important public facility that structurally integrates into the community. This facilitates the campus to have an intimate relationship with the surroundings.

The construction of the Kumpula Campus only started in recent years. The campus has not yet developed an intimate relationship with the surrounding area.

The Viikki Campus was isolated from the northern residential area on the opposite site of a motorway until the 1980s. However, the campus has been redeveloped with a new residential area to the northeast. Hence both areas are rapidly becoming integrated.

Fig. 8 shows new university facilities, and a Science Park set up by the City, the government, companies and the University. It also shows that a residential area, including environmentally-sensitive housing was integrally planned around the existing university buildings and student housings¹⁸⁾¹⁹⁾. The Viikki area has been a productive agricultural area since the medieval period and has retained many natural assets. Thus in this area, bio-science-related university facilities and their surroundings are building a close relationship with each other by means of making effective use of the land in keeping with its character.

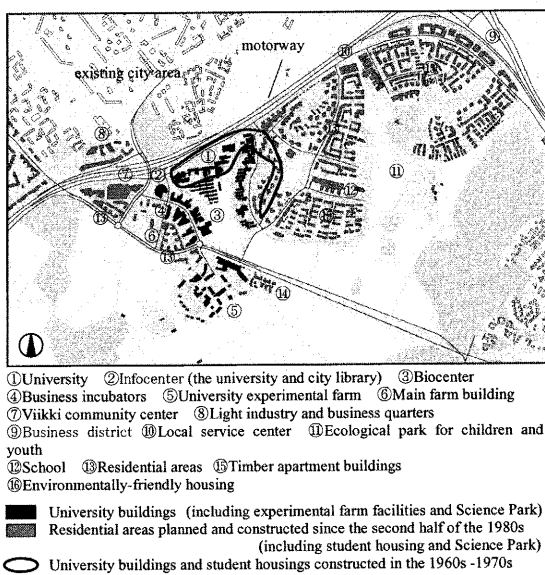


Fig. 8 The development plan of Viikki area and the Viikki Campus¹⁷⁾

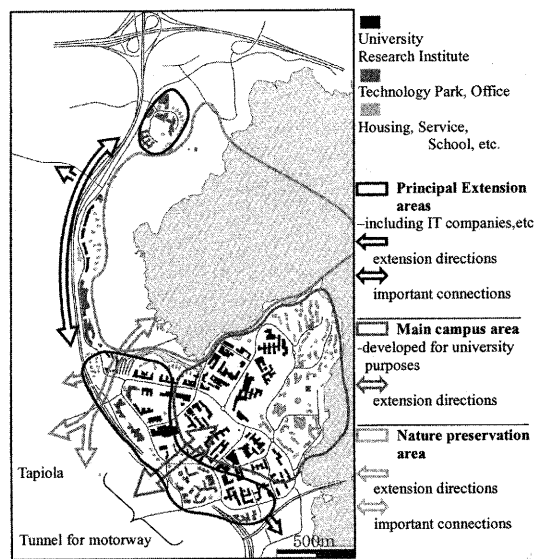


Fig. 9 Land use grouping and development principals in the Otaniemi area⁵⁾

3.2.2 Relationship between the Helsinki University of Technology and its surrounding area

Many IT-related companies and research institutes are currently gathering around the core of the Helsinki University of Technology in Otaniemi and its surroundings. Fig. 9 shows the land use and main developing principles in the revised land use plan of Otaniemi in 1992. In the expanded area, where there is to be technology accumulation area, they have planned not only university facilities and student housings, but also a Technology Park and offices. This reveals their intention to build up a functional connection between the university and its surroundings.

Moreover, in order to secure landscape continuity between Otaniemi and Tapiola, the motorway is to be given a tunnel¹⁶⁾, and buildings and forest in both areas are to mesh

together"¹⁷. Both areas, which were planned and constructed in the same period, share a common idea, called "Forest Town", in which artificial landscape and surrounding forest are integrated.

4. University Relocations to Brownfield Sites and Intimate Relationships with the Surroundings

A post-industrial society came to Helsinki and the City of Helsinki changed the city structure. The redevelopment projects have gradually come to fruition in recent years.

The master plan of 1992 proposed moving existing industrial and harbor functions in the inner city to a suburb and to make good use of obsolete or under-used industrial sites near the city center. Former 'brownfields' have been redeveloped as a new city residential area, which includes modern offices, parks and recreation facilities. In these redeveloped areas, the former factory buildings were converted into cultural facilities and a university, which are now the core of the area. In this manner, such buildings can provide a place to which universities can be relocated in the inner city.

The phenomenon of university relocation and return probably arises from the fact that the city promotes art and cultural activities and any education related to such activities needs a place where people can crowd together.

4.1 Relocation of the University of Art and Design Helsinki

In 1986 the University of Art and Design Helsinki was moved from the city center to the former pottery and ceramics factory building at Arabianranta in the inner city. This area, which traditionally had been an industrial area, has retained its original character.

Fig.10 shows the land use and planned facilities in the development plan of the Arabianranta area. Some of the factory buildings were converted into the University of Art and Design Helsinki, the Pop and Jazz Conservatory of Music, and an industrial design center. Together, they are to form a new industrial art design center for Helsinki^{19,20}.

The zone extending from the university district in the city center through this Arabianranta area to the Science Park in Viikki has been planned as a Science, Industry and Art axis in the city structure⁹. The university is not only placed at the core of the cultural facilities of this area, but also plays a key part connecting campuses in the city center with those in the suburbs.

4.2 Return of a part of the Helsinki University of Technology from a suburb to the city center

The Ruoholahti area, bordering the west part of the city center, used to be an industrial area until the 1980s. Nowadays, however, it has been redeveloped into a new residential area near the city center. In the redevelopment as a core for the area, a former factory building was converted into a cultural facility, which house an art school, a dance school, and a radio station¹⁹. It is also to this building that a part of the Helsinki University of

Technology has returned from the suburbs. This project provides a base for cultural activity at the waterfront adjoining the city center, and the university serves as a part of this base.

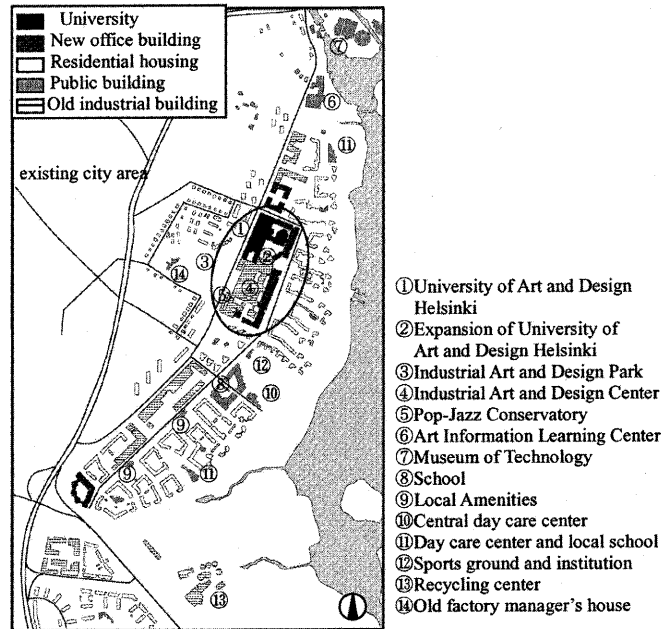


Fig. 10. Plan of Arabianranta area²⁰⁾

5. Conclusions

The formation process of the intimate relations between the city and universities in Helsinki can be summarized as follows.

- (1) The University of Helsinki was placed at the most important site in the new capital for the twin purposes of monitoring the university and making cultural use of it. The University came to be part of the townscape by means of using an architectural style in harmony with the surrounding buildings and by promoting visual continuity with greens between surrounding blocks. Therefore, it has been successfully integrated into the city structure.
- (2) With regard to the growth process of the City Center Campus, "vacant lot use" was the main expansion type from the 19th century until the 1960s, and there was also constant "rebuilding". During this time many temporary and wooden buildings were changed to permanent structures. The expansion since the 1970s took place through "conversion" of permanent buildings into university facilities. In this manner, the university has been able to both grow and continue to exist at the original place.
- (3) There were apparently two ways to secure a university's location in the suburbs, close to the city. Firstly, a university would acquire suburban sites at early stage as a result of proposals for a suburban campus in the early 20th century. Relocation to such sites was

effected after the city had expanded into the surrounding area. Secondly, a campus would be constructed at the same time as the surrounding suburban residential area was being built. In this case, there would be no time lag between the land acquisition and the transfer.

- (4) The suburban campuses were redeveloped and improved by making use of the original character of the land, such as good farm land or forest, and the character of the regional bio-science-related, IT-related industries. Moreover, they were integrated with their surrounding area in the overall city structure.
- (5) Former industrial and port areas, because of the change in times, now provide a place where universities can be relocated. The universities take on new roles as cultural activity bases and have been integrated with a part of the overall city structure. The phenomenon of university relocation and return has its source in the fact that the city is trying to promote and refine art and culture, and that the universities are one of the chief vehicles for doing so.

The trend in Helsinki has been for that the universities to keep their main campuses in the city center, and create suburban campuses as the need arises, all the while, they maintains an intimate relationship with their surroundings. Echoing the trends of post-industrialization, they now serve as centers of art and culture in an inner city. In Japan, there have been discussions about how universities should be located and utilized in city structure. Such a flexible process as that evidenced in Helsinki provides valuable hints for Japan.

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Notes

- *1 According to the report (October, 2002) of the World Economic Forum, which made a comparative investigation of economic competitive power based on knowledge and information about 75 countries and regions in the world, Finland's international competitive power ranked first. Japan ranked twenty-first.
- *2 The Helsinki University of Technology is located in the City of Espoo. However, we include it in "the universities in Helsinki" because it has close relations with the city structure of the City of Helsinki. In this connection, "the City of Helsinki" means the city as an administrative district.
- *3 This figure lacks the former main building location of the Swedish School of Economics and Business Administration, because we have no clear information about it. We show in the figure only the location of the present main building, to where the university was moved in 1952.

- *4 For the University of Helsinki, we show in the figure the building locations of the City Center Campus, the Meilahti Campus, the Viikki Campus and the Kumpula Campus, which are mentioned in Reference 11). The Meilahti Campus includes the university hospital. The Viikki Campus includes the experimental farm. This is a map of 1999 and some buildings which were used by the university in the past are not shown.
- *5 The Helsinki University of Technology and the University of Art and Design Helsinki are shown in the figure only as the main buildings locations in the city center. Elsewhere, there are also buildings used by two universities in the past.
- *6 e.g. Hiroyuki MARUMO, "A Study on Changes in the Campus Distribution Patterns of Japanese National Universities and Colleges". *Journal of Archit. Plann. Environ. Eng., Architectural Institute of Japan*. No.381, pp.122-131, 1987
- *7 e.g. Ki SEO, "A Study in Space Organization and Modification of University Campuses in Japan", *Journal of Archit. Plann. Environ. Eng., Architectural Institute of Japan*. No.430, pp.65-76, 1991
- *8 See Note no. *4
- *9 "Vacant lot use" - extension by means of making use of vacant land in an existing block or of un-developed land, and enlarging a building or constructing a new one. "Rebuilding" - extension by means of rebuilding an existing building. "Conversion" - extension by means of conversion of another building to university use.
- *10 The University facilities in this figure include a former university hospital, because it had close relations with the university's growth. For example, the building adjacent to the north side of the university library (see Fig.3) was originally a military hospital and become the university hospital in 1918. Reference 11) mentions it was handed over to the University in 1998.
- *11 Most buildings in Helsinki are protected by the Local Detailed Plan of the City. The regulation of this plan is not only for building but also for the environment. Some special buildings are protected by National Building Protection. For example, both the university's main building and its library on the City Center Campus of University of Helsinki come under it.
- *12 Some hospital facilities had already been built in Meilahti before the land for the university facility was acquired in 1939.
- *13 As Table 5 indicates, although the university acquired the suburban land in Viikki in 1931, it was proposed in the 1920s to establish an agricultural university separately in the city center. On the other hand, the Forestry building for agricultural education was built in the City Center Campus in 1939. Therefore we exaggerate slightly when we say that the university acquired the land in Viikki for a future suburban campus.
- *14 See Notes *4 and *5
- *15 Tapiola is a garden city constructed with the aim of maintaining an ideal urban environment and creating a comfortable living environment as well as a means toward solving the housing shortage.
- *16 Ring Road 1 has the heaviest traffic in the Helsinki area, and is an important road. The tunnel project of the motorway is a government plan.
- *17 We got this information by interviewing the planner in charge of Otaniemi development planning.

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