

From linear city to Rosario metropolis: Origin of the 1980's transit oriented metropolis plan in Seoul, Korea

Chang Gyu Choi*, Hyungun Sung**

Abstract

With the recent focus on transit-oriented development (TOD), the discussion is expanding spatially beyond one station. When considering the construction cost of public transport and connectivity in the region, TOD should be discussed at the metropolis level, not in one station or one corridor. The Rosario Plan for Seoul in 1980 is a leading example for metropolitan scale transit oriented approach to combine mass-transit, land use plan and district level design, but not well known. The purpose of this study is to identify the origins of the Rosario Plan in 1980 which proposed a decentralized spatial structure with building subway lines and was included in the official city plan of Seoul in 1990. This study examines the projects, articles, and interviews by Byong-Kee Kahng, who proposed Rosario Plan for the first time, to confirm the origins of the plan. He explained to his disciples in the early 1980s that his Rosario Plan originated in the form of connecting the end of Linea City suggested by Soria y Mata in the late 19th century. Recently, Sung & Choi (2017) confirmed that the Rosario Plan in 1980 has a historical meaning to link the transition before and after it: the plan connected the previous metropolitan scale's mass-tansit and housing plan of Copenhagen, Stockholm and Paris in the mid-20th century, and Caltrape's Pedestrian Pocket, or TOD, in 1993. Nevertheless, Sung & Choi (2017) could not confirm why Kahng invented such a link.

This study tries to confirm why Kahng's Rosario Plan started in Linear City and how it has been transformed and developed. This study finds the origin of Tange Kenzo's Tokyo Bay project in 1960, where Kahng participated in as a member of Tange's laboratory. Since then, his urban planning proposal for the linear city has been made more concrete in the research of the new administration capital plan of the Korean government in the late 1970s and there was an attempt to incorporate the linear city concept into the existing urban structure through the proposal of the decentralized spatial structure of Seoul in 1977, respectively. This study finds that his attempt to combine the new mass transit developments, spatial structure, land use, and urban design into the Rosario metropolis plan. This study's discovery could give valuable information and lessons to recent urban planning and transportation planning discipline which is aimed at the public transportation oriented metropolitan.

Keywords: Rosario Plan, Linear city, Semi-lattice structure, transit-oriented development (TOD), transit-oriented metropolis (TOM)

* Hanyang University, Seoul, Korea, cgchoi@hanyang.ac.kr

** Chungbuk National University, Chungcheongbuk-Do, Korea, hgsung@chungbuk.ac.kr

1. Introduction

The Rosario Plan in 1980 has its significance in the history of urban planning in terms of the connection between the metropolitan level's transit-oriented development and the neighborhood's 'pedestrian pocket'. The academic significance of this plan has recently become known by Sung and Choi (2017), and even before that, the proposal was not well known in Korea as well as in the world. The 1980 plan was a groundbreaking proposal for Seoul, which had serious housing shortage and road traffic problems while the city underwent rapid urbanization. The concept was included in Seoul's 1990 comprehensive plan. The plan was designed to solve the problem of housing shortage in Seoul, the metropolis which had a spatial structure centered on a historical one city center. By conducting the combined development with the high - density housing and mixed-land use development in the subway station areas of Seoul, it tried to solve the housing and transportation problems. It is believed to have important implications for the history of global urban planning in terms of providing important lessons for cities with similar problems

This article tried to find the rationale of the Rosario Plan. Sung and Choi (2017: 518) confirmed that the Rosario Plan was originated from Linear City by Arturo Soria y Mata. However, they could not explain that how the latter developed to the former and whether the latter concept included all of the former, because the Rosario Plan offered a flexible spatial structure and contained urban design concepts in district level.

This study examined the metropolitan plans which Byong-Kee Kang who originally devised the Rosario Plan had participated in before making the plan, and his articles before and after the proposal to see what kind of theoretical backgrounds the proposal has. To accomplish this, this study focused on two perspectives. The first is the development of the concept of Linear Plan. Before the 1980 Plan, he participated in three important metropolitan level plans including Tokyo Plan 1960, in which he participated in urban planning for the first time as a researcher, a spatial structure suggestion for Seoul in 1977, which proposed the urban spatial structure for the first time by returning to Korea from Japan, and a new administrative capital plans in 1979, which Korean government regarded as an national level concern in that time. A review of these showed how Professor Kang pursued linear city and how it transforms into a ring, as he told an assistant that connecting the end of the Linear City make it a ring (Sung and Choi, 2017: 518).

The second part tried to understand how the concept developed in the form of a ring became the Rosario Plan with a more flexible-decentralized structure. Because the continuing scalability is limited when the end of the line is connected, the ring is eventually closed. Prior to the Rosario Plan, Professor Kahng published a variety of articles related to urban planning and urban design, especially in the late 1970s and early 1980s. In addition to the problems of the old city spatial structure, he showed the time was an important turning point for developing the idea of flexible-decentralized urban space. In particular, Christopher Alexander's (1965) "A city is not a tree" proved that Professor Kahng gave important information to conceptualize the spatial structure of the Rosario Plan. The second half of this study explained how he incorporated Alexnader's concept into the 1980 Plan.

This article tried to identify the similarities and differences between the Rosario Plan and these plans by examining Soria y Mata's concept of Linear City and its subsequent plans, plans related to transit oriented development and their development concepts. Lastly, it would like to confirm the background of the prototype of the station area included in the Rosario plan by examining the plan of the district unit which Kang regarded as an urban designer.

2. Literature Review

2.1 Linear City and its successors

Arturo Soria y Mata in Spain proposed a suburban "Linear City" in 1882 using improved access by the train (originally drawn by horses and by streetcars in 1909). This form of development has not been activated in Madrid since then (Hall, 2002; Figure 1).

The ideal of the linear city was introduced globally by the Association Internationale des Cites Lineaires, founded in 1928 by French planner Georges Benoit-Levy. In 1930 Nikolay A. Milyuntin of Russia proposed a de-urbanistic linear city in Sotsgorod (Socialist City) and Le Corbusier reflected the concept of linear urban planning in La Ville radieuse (the Radiant City) (Hall, 2002; Cho, 2014: 272-273). During the 1950s, the Brazilian government built Brasillia, a new administrative capital that is faithful to Lucio Costa's linear city concept (Hall, 2002). Danke Kenzo followed the concept of linear planning in Tokyo Plan 1960 (Kenzo,1961).

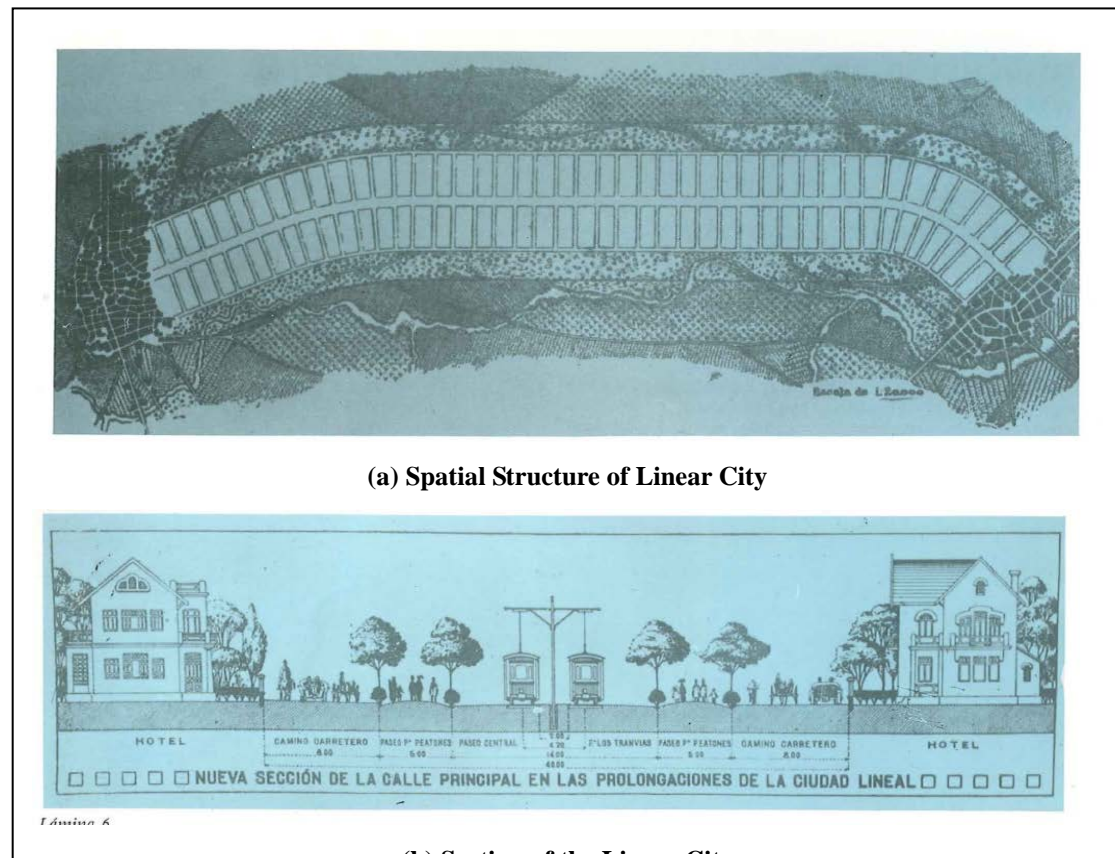


Figure 1. The Linear City by Soria y Mata in 1882*

*Source: Navascués Palacio, Pedro (1969).

In the mid-2000s, the Korean government decided to build a new administrative capital and proceeded to submit an international competition for designing a proposal. Five designs were selected in the design competition in 2005, and the city spatial structure of the new administrative capital was decided based on two plans (see (b) in Figure 2). These two proposals are Andres Perea Ortega (2005), The City of Thousand Cities (see (a) In Figure 2) and Jean Pierre During's The Orbital City. The two proposals are favorable to the provision of mass transit system linking the whole city, and it has the strength of being able to develop a stable city, suggesting a decentralized spatial structure (On, 2016: 164-172). There was a controversy that this plan choice would have included a Marxist view because one of the chiefs was David Harvey (On, 2016: 164-166). Except for the discussion of whether this space plan is Marx or not, the fact that the decentralized structure of the linear plan has evolved into the form of a ring and that this is actually constructed is important in urban planning history.

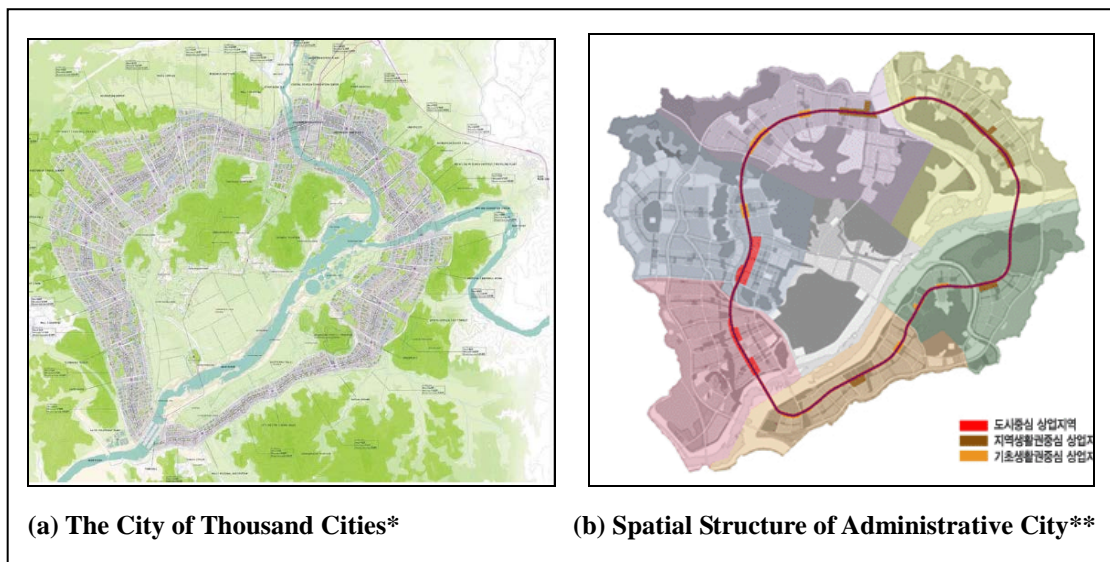


Figure 2. Ring spatial structure of Administrative City in Korea

* Source: Andres Perea Ortega (2005) The City of Thousand Citie. (accessed on 25th April 2017 at <http://andrespereaarquitecto.com/english/proyectos/concursos-internacionales/>)

** Source: National Agency for Administrative City Construction. (accessed on 25th April 2017 at <http://www.naacc.go.kr>)

2.2 A city is not a tree by Christopher Alexander

In 1965 Christopher Alexander published an article in the Architectural Forum entitled "A city is not a tree", claiming that the "artificial cities" created by urban planners lacked the organic structure of the existing "natural cities". Alexander proposed a diagram as shown in Figure 3, naming the structure of the planners rigid and hierarchical as a tree structure, and naming a structure with more hierarchical relationships as a semi-lattice structure. He pointed out that artificial cities are the former, and natural cities are the latter. Semi lattice structure was said to produce more diverse sets than tree structure. Or he criticizes artificial cities, criticizing the rigidity of Brasillia and the 1960 Tokyo Plan, typical of

linear planning (Alexander, 1965: 58-61).

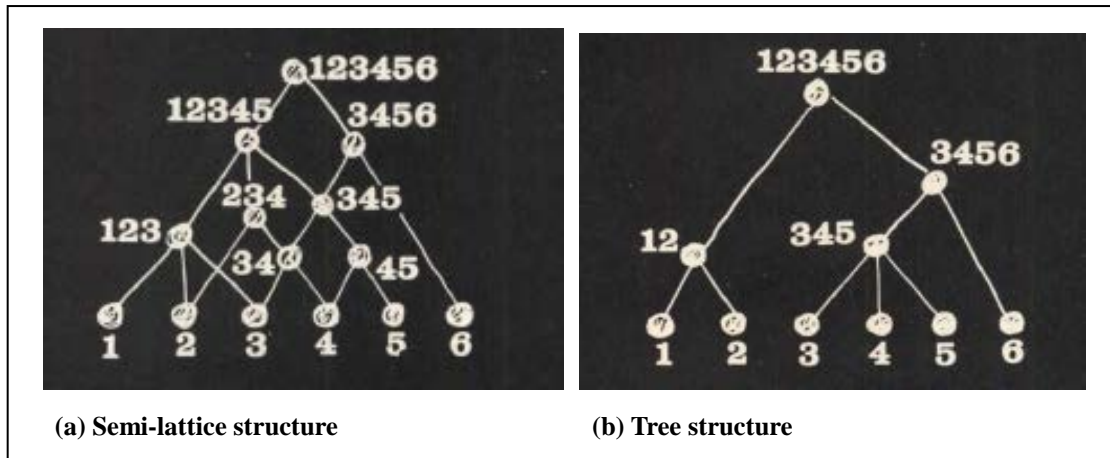


Figure 3. Semi-lattice structure and tree structure by Christopher Alexander*

* Source: Alexander (1965: 59)

2.3 Transit Oriented Development

Transit oriented development (TOD) is the planning principle presented by Calthrope (1993) as an alternative to overcome urban problems due to the excessive road traffic system and urban sprawl in the United States. It is based on the transit center and the network of public transportation, and realizes the urban form of high density land use and walk-friendly urban design by reducing the excessive reliance on the automobile in the traffic. His first approach is based on not only ‘pedestrian pocket’ but also regional scale. Nevertheless, the applications of TOD were mainly small scale and limited to neighborhood development. Fortunately, recent discussions emphasize the need to shift to a regional development strategy through transit-oriented corridor development and spatial restructuring (eg Cervero & Sullivan, 2011; Belzer, 2011).

While Calthrope (1993) proposed the concept of TOD and its main content, the elaboration of planning elements has been mainly done by Cervero and his co-workers. The initial TOD planning elements have been refined as 3Ds (density, diversity, design) proposed by Cervero and Kockelman (1997). It focuses on high-density composite land use and walking-friendly urban design. 2Ds (distance to transit, destination accessibility) have been added (Cervero and Murakami, 2009; Ewing and Cervero, 2010), claiming that it is difficult to implement TOD without considering the accessibility of public transportation. It considers the criticism (Handy, 1993) that it is impossible to see that a city of the 21st century can carry all its daily lives on foot. Then another "D" demand management is added (TransLink, 2011).

2.4 Rosario Plan in 1980

At the time the Rosario Plan was presented, Seoul was longing for a decentralized policy for two reasons. First, it was a city planning problem. In the center of Seoul, which was a mononuclear city, it

concentrated on commercial, office and even schools. Almost all buses' lines have passed through the city center, and the rapid growth of automobiles is expected due to economic development, but the possibility of road expansion in urban areas has been limited (Kim, 1977: 96). The second was the purpose of military defense. Excessive population concentration north of the Han River was considered to have serious military implications (Son, 2005: 129-130). When the Korean War broke out in 1950, North Korea occupied Seoul in three days, and many South Koreans who were unable to evacuate were killed or injured. Because the capital city of Seoul is only 40 km away from the border between South Korea and North Korea, it seemed undesirable in Korea which was the outpost of the right wing camp of the Cold War era. In the 1970s, the Korean government continued its efforts to resolve the decentralization of functions in Seoul.

In addition to suggesting a solution to the demand for spatial distributed structures, it was also necessary to solve the housing shortage problem at the metropolitan level. Sung and Choi (2017: 517-519) evaluated the Rosario Plan as metropolitan plan to achieve a "transit-oriented metropolis (TOM)" based on the "transit and housing" idea which connected subway construction and housing supply in "value-capture" strategy which was critical for developing countries with lack of capital. The Rosario plan also includes the content of TOD, which has recently been actively discussed throughout the world. Sung and Choi (2017: 519-520) assessed the Rosario Plan based on TOD's Ds, claiming that the station area prototype in the Rosario Plan is very similar to Calthorpe's TOD. In order to accommodate the population of Seoul and the increase in housing demand, it is necessary to develop a high 'density' apartment in the station area. In the area, the commercial and residential use should be mixed to achieve the 'diversity' of land use, while sometimes light- industrial facilities would be located. A district-level approach is required, and a comprehensive 'design' is proposed to compose the station area. If the target population density of the plan is achieved, about 8.6 million people will be able to achieve 'distance to transit'. In the subway station area, it was proposed to limit the traffic of vehicles and improve the pedestrian environment to achieve some degree of 'demand management'.

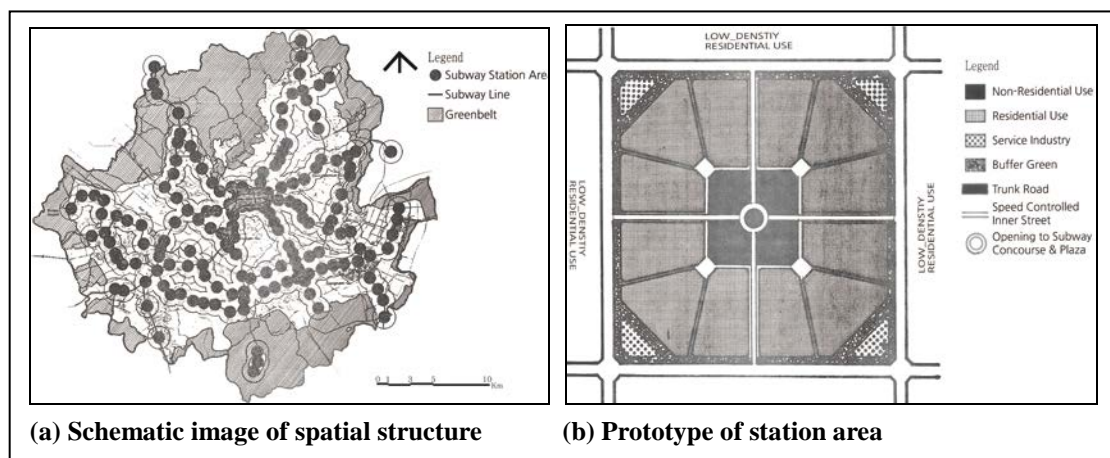


Figure 4. Rosario Metropolis of Tomorrow for Seoul by Byong-Keo Kahng*

* Source: Kahng (1980b: 502, 509)

The Rosario plan is included in the first comprehensive plan for Seoul, based on official law. In the plan, Professor Kahng participated in the planning of land use and spatial structure. The Seoul city plan included his proposal aimed at the development of the station center (Seoul City Government, 1990: 227-233).

3. Metropolitan Plans by Kahng before 1980 Rosario Plan

3.1 Tokyo Plan 1960

Byong-Keek Kahng participated in the Danke Kenzo's Tokyo Plan 1960 from the late 1958, and began intensive research on cities (Lee, 2009: 155). While this plan was joined by the Danke laboratory staff, in this plan, he is presumed to be responsible for the transportation planning part.

Tokyo Plan 1960 shows the typical Modernistic design of Soria y Mata's Linear City (see Figure 5). This plan points out the problems of the existing centripetal spatial structure of Tokyo and the new city should be developed to follow the linear structure (Kenzo, 1960). In order to overcome the closed structure of the radial city in the past, it should be an open linear urban structure. The plan suggested that such an open structure can be achieved through the organic unification of city, transportation, and architecture (Kenzo, 1960).

For Kahng, Tokyo Plan 1960 was not only a turning point for researching the city, but also for instilling the concept of Linear City, which has been the basis of the spatial structure of many urban plans that he participated in after 1960s.

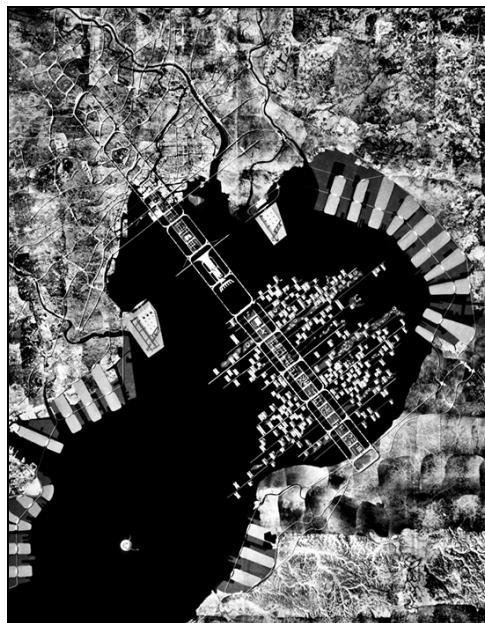


Figure 5. Tokyo Plan 1960

Source: http://special.nikkeibp.co.jp/atclh/NBO/mirakoto/mirai/h_vol11 (accessed on 25th April 2017)

3.2 1977 Seoul Spatial Structure proposal

In the mid-1970s, the new Seoul Mayor Ja-chun Koo embraced the idea of a three-nuclear city proposed by Kim Hyung-man Kim to disperse centralized Seoul's central business district (CBD). To realize the concept, in the administration he received the approval of President Park Chung-hee, who had strong power at the time, and in the public developed it to be more specific in the form of idea competition. Seoul City hold a formal competition, at which time Kahng also was invited to give a proposal (Son, 2003.3: 269-279, Lee, 2009: 167). In this idea competition, Kahng suggested a polynuclear structure, which it is characteristic of a formation called "reception and distribution shape (集散形)" (see figure 6).

He suggested that the periphery of the city has a radial system and the vicinity of the city center combined a circle-shaped structure. He predicted that the subway network would be an important driving force in the restructuring of the urban structure and argued that it should be able to sustain the shape of the ring, which he called "action corridor or action ring" (Kahng, 1977: 227). In this plan, Kahng first proposed a 'ring - shaped' transport network structure connecting both sides of a linear network. This spatial structure coincided with the plan of present administrative city (Sejong City). The 1977 proposal showed that the Linear City which was oriented to distributed spatial structure is converted into Ring form.

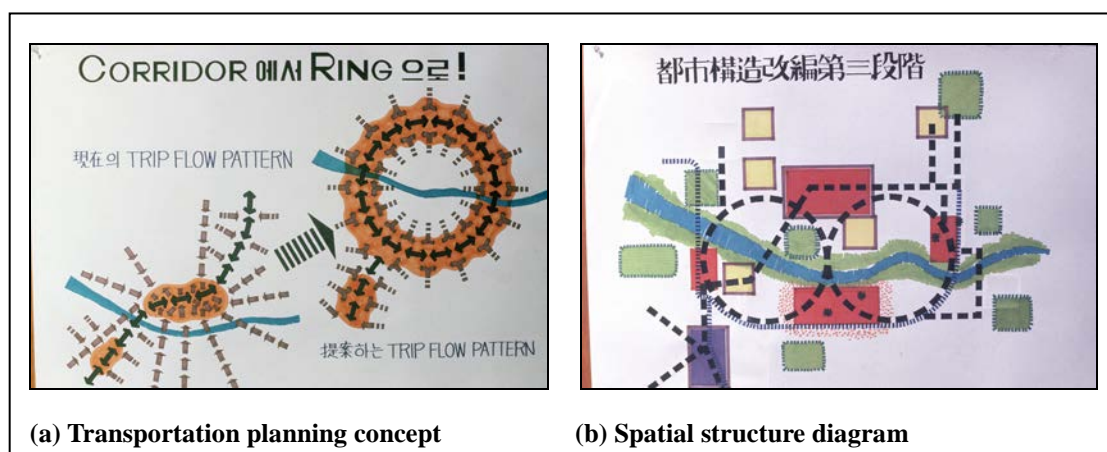


Figure 6. Spatial structure proposal for Seoul by Kahng in 1977

Source: Kahng's original slide (1977)

3.3 1979 New Capital Plan

Concerned with the concentration of population in Seoul in the 1970s, the South Korean government not only directed the decentralized spatial structure of Seoul itself, but also tried to move administrative functions to the provinces. The government made this new administrative capital plan for different teams, including Professor Kahng. His project was 'A study for urban problem and urban pattern' and it was about what kind of problems there are in the city and what countermeasures are there (Lee, 2009: 166). In this study, a team led by Kahng extracted the basic types of land use and road network (see (a) in Figure 7) and attempt to analyze the relationship between urban problems and urban patterns. As a

result, he concluded that linear patterns have the highest potential to solve urban problems (Kahng et al. 1979: 248-270). The result of this analysis was believed to have strengthened his faith in Linear City, and at the end of this report, he proposed a proposal with a linear commercial area with the proposed new administrative capital (see (b) in Figure 7)

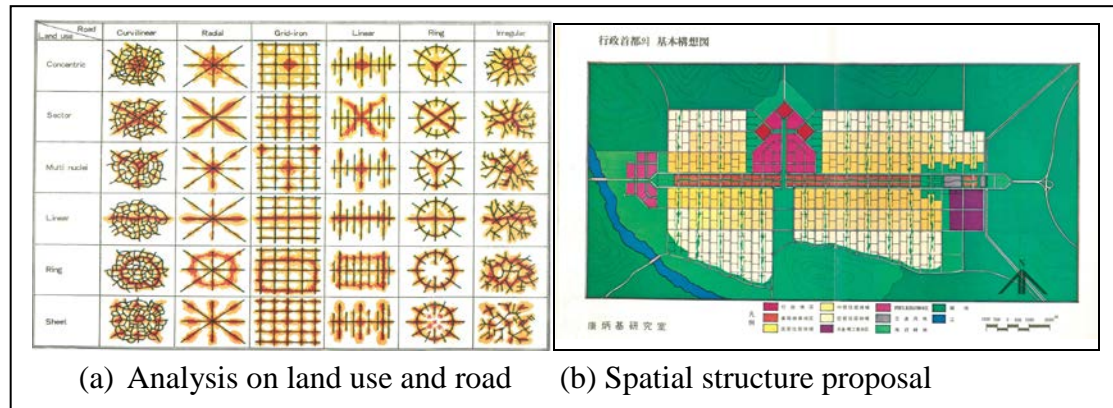


Figure 7. Study and proposal for new administrative city by Kahng in 1979

Source: Kahng et al (1979)

4. Theoretical Origins in Rosario Plan

4.1 Linear City in Rosario Plan

A review of the plans involved before Prof. Kahng proposed the Rosario Plan showed that he had a strong conviction for the Linear City. This belief was transformed according to the given conditions. In the 1977 proposal, it is made on the premise of the growth of about ten million metropolitan cities with the CBD already, and this form appears in the form of a ring connecting both sides of the line. On the other hand, the new administrative capital plan for 1 million population in 1979 was following the traditional Linear City which is developed linearly along the axis of urban growth.

Since Soria y Mata, many planners have accepted and realized the concept of linear cities, but the proposal of a circular space structure has been rarely found. As far as we know, apart from the 1977 plan and the Rosario concept, there are coincidentally two plans outlined in the 2005 international competitions for the new administrative capital of Korea.

Professor Kahng described the basic concept of rosario as "string" and suggested that it could make a necklace by connecting it like like beads (Kahng, 1980b: 501). This paper proposed a structure of a ring that links Soria y Mata's proposal to a subway network more actively. However, as shown in Figure 4 (a), it is difficult to explain all of the distributed structures centering on the many transitions of the Rosario plan.

4.2 Lattice Structure in Rosario Plan

Before suggesting the Rosario plan, Kahng left the belief in his Cartesian perspective that he had been in his youth, shifted to the understanding that diversity should be more concerned with people's daily

life, (Kahng, 1993: 409). His papers contained articles such as "Loose system" (Kahng, 1979.12) and "Mono to Multi" (Kahng, 1981.12): the former introduced the semi-lattice structure proposed by Alexander, and the latter provided a view that accepted diverse and pluralistic values. The change of his mind was transformed into the idea of using the subway as a means of public transportation and its potential for change. He criticizes Seoul's decentralization strategy, which had been in existence since then, as a form of radial network based on existing road network and road transportation. Instead, he proposed constructing a distributed structure in Seoul using the multi-directional magnetic field of each station (Kahng, 1980b: 503). Kahng (1980b: 502) explained "the rosary system with several series of crystallized beads they are; however, they do not converge into any single center. They are different from underlying road patterns which converge into the center focus. They may seem converging into a point where "strings" will meet, but there is not only one, but might be numerous."

This idea is included in the first comprehensive plan in Seoul, including the Rosario plan, in which we can see the semi lattice structure of Alexander (see Figure 7). This plan in 1990 proposed to distribute the center of large and small city activities by using public transportation, while emphasizing the structure of the subway network and road network as a means of structuring the developed living space (Seoul City Government, 1990: 59).

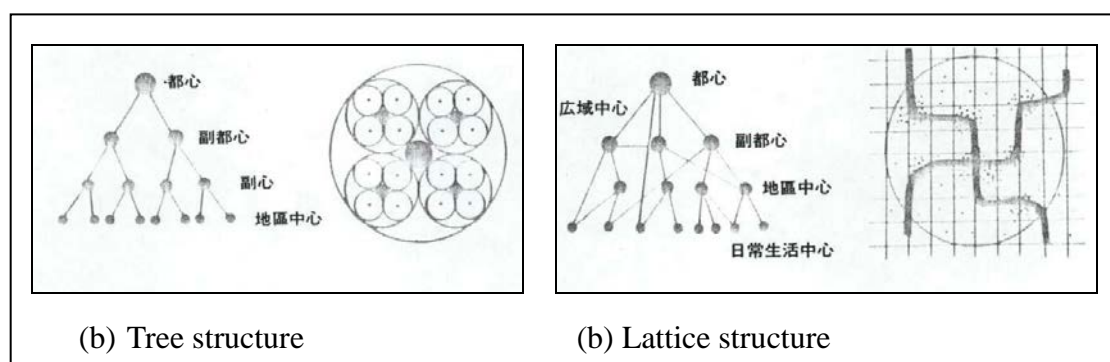


Figure 7. Proposal for spatial structure for Seoul in 1990

Source: Seoul City Government (1990: 59)

4.3 Station area design

The Rosario Plan contained diagrams with detailed design of the station area (see (b) in Figure 4). The prototypes included in this plan had recently discussed TOD's Ds, which contained a more detailed urban design at the district level as well as metropolitan-level spatial structure in this article's previous part. In the background of this design, Kahng himself related to what he calls himself an urban designer (Kahng, 1980b: 492). In 1979, he translated Jonathan Barnett's "Urban Design as Public Policy" into Korean, after reading the book with great interests (Lee, 2009: 170). Just before proposing the Rosario Plan, he published "Definition and range of urban design" (Kahng, 1980a). This article introduced what is urban design in Korea and what should be done with detailed explanations. When he came to Korea in 1970, he wanted to do urban design (Lee, 2009: 158, 169), and his approach to urban design scale

was basic to him. He was one of urban design pioneers in Korea and became the first president of Urban Design Institute of Korea in 2000, the first academic association for urban design in Korea.

5. Conclusion

This study examined in detail how the Rosario Plan was designed under the theoretical background. In addition to his belief in Soria y Mata's 'Linear City', Kahng wanted to pursue Alexander's 'Semi-lattice structure' and hoped that the subway and its stations would make the flexible structure constructed. Adding this metropolitan-level spatial structure, he has mobilized his urban design knowledge to create a pedestrian-friendly and vital station area that also satisfies the supply of housing in high density. It cannot be denied that his Rosario Plan originated from the Linear City concept of Tokyo Plan 1960, but at the end of the 1970s his planning philosophy sought to escape Modernism, and as a result the Rosario Plan was created. Kenzo's influence on Kahng in the Rosario Plan is not a hierarchical spatial structure of Tokyo Plan 1960, but a comprehensive idea that penetrates the whole problems (Kahng, 2009: 440-441; Lee, 2009: 168). The influence of Kenzo is also alive in the Rosario Plan in terms of integrating them into a single system without looking at traffic, housing, and land use separately. There are many urban planners and urban designers who sympathize with Alexander's 'Semi-lattice structure', but realizing this in a plan is difficult. Planners tend to have a hierarchical structure. This is probably because it is easy to design, easy to explain to others, and likely to be accepted. Kahng evaluated the possibility of the subway and its subway station rather than the conventional road transportation system. The possibility of the decentralized spatial structure could be increased if the two are effectively used. He suggested a more flexible structure than others, the Rosario System. Proposals for a metropolitan level spatial structure are unlikely to be realized without a district level approach. The former suggests a structure but does not have specificity, and the district-level proposal can enhance the feasibility of the plan. Therefore, the urban design approach should be discussed and developed in conjunction with the realization aspect even in metropolitan level plan.

References

- Alexander, C. (1965) A city is not a tree. *Architectural Forum*, Vol 122, No 1, April 1965, 58-62.
- Belzer D (2011) *Corridor-Level Approaches to Creating Transit-Oriented Districts*, Strategic Economics and Center for Transit-Oriented Development.
- Calthorpe P (1993) *The Next American Metropolis: Ecology, Community, and the American Dream*. Princeton Architectural Press.
- Cervero R (1995a) Sustainable New Towns: Stockholm's Rail Served Satellites, *Cities*, 12(1), 41-51.
- Cervero R (1995b) Planned Communities, Self-containment and Commuting: A Cross-national Perspective, *Urban Studies*, 32(7), 1135-1161.
- Cervero R and Murakami J (2009) Rail and Property Development in Hong Kong: Experiences and Extensions, *Urban Studies*, 46(10), 2019-2043.

- Cervero R, Sullivan C (2011) Green TODs: marrying transit-oriented development and green urbanism, *International Journal of Sustainable Development and World Energy*, 6, 17-34.
- Cho HJ (2014) A Plan for Tokyo, 1960: Dange Kenzo's Technocratic Utopia, *Journal of Association of Western Art History*, 41, 259-284. (In Korean)
- Ewing R and Cervero R (2010) Travel and the Built Environment: A Meta-Analysis, *Journal of the American Planning Association*, 76(3), 265-294.
- Kenzo D (1961) Tokyo Plan-1960: Proposal for its structural reform. *Shinken-chiku*, March 1961, 79-120.
- Hall P (1988, 2002) *Cities of Tomorrow*. Oxford, UK: Basil Blackwell 3rd edition.
- Handy S (1993) Regional Versus Local Accessibility: Implications for Non-Work Travel, *Transportation Research Record* 1400, 58-66.
- Howard E (1902) *Garden Cities of Tomorrow*, London: S. Sonnenschein & Co., Ltd. Second Edition. Republished 2008 by Forgotten Books, Lexington, KY. US.
- Kahng BK (1977) A Study of Seoul Urban Structure. In- Seoul City Government (Eds.) *A Study of Seoul Urban Structure*, (pp. 213-232). Seoul, Korea (in Korean)
- Kahng BK (1979.12) Loose system. In- Korea Planning Association (Eds.) *Journal of Korea Planners Association*, 15:2, 2-3. Seoul, Korea (in Korean)
- Kahng BK, Lee KS, Lee JW, Shin JS, Lee HD, Jin J, Sohn CG (1979) *A study for urban problem and urban pattern*, Heavy and Chemicals Industry Promoting Committee. Seoul, Korea. (in Korean)
- Kahng BK (1980a) "Definition and range of urban design. In- Korea Local Administration Officials' Mutual Fund (Eds.) *Urban Problem*, (pp. 84-101). Seoul, Korea. (in Korean)
- Kahng BK (1980b) "ROSARIO" Metropolis for Seoul 2001: A Strategic Frame for Joint Development along Subway System. In- Korea Planners Association (Eds.) *The Year 2000: Urban Growth and Perspectives for Seoul*, (pp. 492-511). Seoul, Korea. (in Korean)
- Kahng BK (1979.12) Mono to Multi. In- Korea Planning Association (Eds.) *Journal of Korea Planners Association*, 16:2, 2-3. Seoul, Korea (in Korean)
- Kim HM (1977) A Study of Seoul Urban Structure. In- Seoul City Government (Eds.) *A Study of Seoul Urban Structure*, (pp. 1-211). Seoul, Korea (in Korean)
- Lee KH (2009) Interview with Kahng, B K on his urban planning and life. In- Korea Planning Association (Eds.) *Oral history of Urban Planning of a Half Century of Korea*, (pp. 147-207). Seoul, Korea: Bo-sung-gak. (in Korean)
- On YT (2016) Urban planning and urban design. In- Sang-sang-hoe (Eds.) *Sejong City was made like this*, (pp. 165-173). Boseong-gak: Seoul, Korea (in Korean)
- Palacio PN (1969). *La Ciudad Lineal de Arturo Soria*. "Villa de Madrid" (n. 28); pp. 49-58. (accessed on 25th April 2017 at <http://oa.upm.es/7682/>)
- Pan D (2013) Key Transport Statistics of World Cities, *Journeys, September 2013*, 105-112.
- Seoul City Government (1990) *Comprehensive Plan for Seoul toward the 2000s*, Seoul City Government. (in Korean)
- Son JM (2003) *The Story of Seoul's Urban Planning 3*. Paju, Korea: Hanul. (in Korean)

Son JM (2005) *The Story of City in Korea for 60 years 2*. Paju, Korea: Hanul. (in Korean)

Sung H, Choi CG (2017) The link between metropolitan planning and transit-oriented development: An examination of the Rosario Plan in 1980 for Seoul, South Korea, *Land Use Policy* 63, 514-522

TransLink (2010, updated in 2011) *Transit-oriented communities: A Primer on key concepts*