EVALUATING OF NEW TOWN PLANNING IN SOUTH KOREA: NEW URBANISM PERSPECTIVE (1100)

Oh Ji Woon[1*], Mun Hansol[1], Seong Jin[1], Jung Juchul[1]

[1] Pusan National University, Department of Urban Planning & Engineering, Pusan, Republic of Korea; junejwoh@pusan.ac.kr

Abstract. New Urbanism is to create a specific social pattern in the city and improve the quality of urban life through urban physical infrastructure planning. However, New Urbanism was criticized for being regard as a planning technique that could only be applied in new vacant land like a new town, not in the old city place. Nonetheless, New Urbanists have been creating and popularizing many now-common development patterns and strategies. South Korea is one of the countries with many large-scale new town developments, but there was a lack of reflection on the planning principles on New Urbanism. Accordingly, this study is evaluating new town planning through New Urbanism and we derived the trends and implications of new town planning in South Korea.

Keywords: New Urbanism, New Town Planning, Urban Planning.

1. Introduction

1.1. Background Information

Since the 21st century, cities are undergoing rapid urbanisation due to population growth, and various urban problems due to urban overcrowding and reckless expansion. As part of an effort to solve these urban problems, a new concept of urban movement called ‘New Urbanism’ was developed in the United States in the 1980s. New Urbanism started from the belief that planning the city's physical infrastructure can create or influence a specific social pattern within the city, although it cannot directly solve various problems in the city. It is noteworthy in that it is a planning theory created by the collaboration of experts in various fields such as urban, landscaping, and architecture. Although there is no case of directly applying New Urbanism's planning theory and approach to urban planning in South Korea, recent trends in urban planning show that the publicity and pedestrian-friendly strategies of the city that New Urbanism emphasises are mainly used. Therefore, in this study, we reviewed the planning theories and approaches of New Urbanism, and analysed how these planning theories were implemented in the physical dimension of urban planning, focusing on recent cases of new urban planning in South Korea.

1.2. Method of the Study

In order to analyse the trend of South Korea's New town planning in this study, We analysed the winning works of the ‘Third-Generation New towns basic concept and three-dimensional urban space planning competition(3rd New Town Competition)’. The competition, which was conducted in 2020 by the Ministry of Land, Infrastructure and Transport and Korea Land and Housing Corporation (LH), is an urban planning contest led by the central government. It is representative of the domestic urban planning trend in that it reflects the new vision and trend led by the state in the new town planning of South Korea.

First, we reviewed previous studies on the background, concept, and main principles of New Urbanism to explore the essential meaning and practical purpose of the New Urbanism movement. And we reviewed previous studies on urban planning theories that influenced New Urbanism and similar urban planning theories that emerged after New Urbanism. In addition, in order to compare and analyse the main principles of New Urbanism and new town plans in South Korea, this study reviewed previous studies on the main principles of New Urbanism and the composition of guidelines for the new town planning contest, and prepared a comprehensive table for comparative analysis. Utilising this, we tried to explore implications for the future development direction of South Korea's urban planning by conducting an analysis of each winning work and examining the trend of new town planning in South Korea viewed from a New Urbanism.

2. The concept of New Urbanism and the theory of urban planning

2.1. Background and Concept of New Urbanism

New Urbanism was raised in the United States in the 1980s as a counterargument against the indiscriminate expansion of cities, that is, the existing suburban development methods. It supports planning theories similar to neo-traditional planning and transit-oriented development (TOD). As New Urbanists are experts in various fields, they have different values for urban planning. However, through several years of discussion, New Urbanism derived two common goals : "securing public areas" and "creating pedestrian-specific environment". And tried to realise them through physical planning. Discussions were made on the changing family composition, land use that does not consider natural characteristics and physical limitations, government policies that encourage low-density growth, street systems that ignore the human scale, and uniform communities that ignore local climate and traditions. Six architects : Peter Calthorpe, Andres Duany, Elizabeth Moule, Elizabeth Peter-Zyberk, Stefanos Polyzoides, Daniel Solomon (Daniel Solomon) started to work by founding the New Urbanism Association (CNU; Congress for the New Urbanism), a non-profit organization that

advocates general changes in New Urbanism principles and community formation methods(Bae et al., 2014). New Urbanism emerged in this social background, and can be seen as a concept of urban planning to design a city by presenting new plans and guidelines to solve the city's problems.

2.2. Basic Principles of New Urbanism

New Urbanism started from the belief that designing a community, that is, planning a city's 'physical infrastructure', can create or influence a specific social pattern within a city. After numerous discussions, experts in various fields such as urban, landscaping, and architecture announced a statement called The Ahwahnee Principles in 1991 at a meeting of the California Local Government Committee held at the Ahwahnee Hotel in Yosemite National Park, USA. It became the basis for New Urbanism planning principles. There are four ideological themes of New Urbanism outlined in The Ahwahnee Principles : integrated communities, mixed land uses, walkability, and conservation of resources. Afterwards, CNU was officially held in 1993, and theoretical principles were proposed in the form of a charter in 2000. This principle is still used as the main theoretical concept and basic principle of New Urbanism **(Table 1).** The basic principles of New Urbanism focus on building a high-density city centered on traditional communities, and there are differences in interpretation of the theoretical content of New Urbanism depending on the perspectives of researchers.

Table 1. Principles of New Urbanism

Principle	**Contents**
Walkability	- Most things within a 10-minute walk of home and work - Pedestrian friendly street design - Pedestrian streets free of cars in special cases
Connectivity	- Interconnected street grid network disperses traffic & eases walking - A hierarchy of narrow streets, boulevards, and alleys - High quality pedestrian network and public realm makes walking pleasurable
Mixed-Use & Diversity	- A mix of shops, offices, apartments, and homes on site. Mixed-use within neighborhoods, within blocks, and within buildings - Diversity of people - of ages, income levels, cultures, and races
Mixed Housing	- A range of types, sizes and prices in closer proximity
Quality Architecture & Urban Design	- Emphasis on beauty, aesthetics, human comfort, and creating a sense of place - Special placement of civic uses and sites within community. Human scale architecture & beautiful surroundings nourish the human

	spirit
Traditional Neighborhood Structure	- Discernable center and edge - Public space at center - Importance of quality public realm; public open space designed as civic art - Contains a range of uses and densities within 10-minute walk - Transect planning: Highest densities at town center; progressively less dense towards the edge
Increased Density	- More buildings, residences, shops, and services closer together for ease of walking, to enable a more efficient use of services and resources, and to create a more convenient, enjoyable place to live - New Urbanism design principles are applied at the full range of densities from small towns, to large cities
Green Transportation	- A network of high-quality trains connecting cities, towns, and neighborhoods together - Pedestrian-friendly design that encourages a greater use of bicycles, rollerblades, scooters, and walking as daily transportation
Sustainability	- Minimal environmental impact of development and its operations - Eco-friendly technologies, respect for ecology and value of natural systems - Energy efficiency / Less use of finite fuels / More local production / More walking, less driving
Quality of Life	- Taken together these add up to a high quality of life well worth living, and create places that enrich, uplift, and inspire the human spirit

Source : http:/www.newurbanism.org

2.3. Similar Urban Planning Theories of New Urbanism

2.3.1. The City Beautiful Movement

The City Beautiful Movement is an urban movement in the late 19th and early 20th centuries. This movement emphasised the arrangement of public buildings, squares and parks in the city. The second half of the 19th century was a time when the growth of cities in the United States reached its peak due to immigrants from South America and Europe. As a result, the racial and cultural heterogeneity of the city amplified, and environmental problems such as housing, sanitation, and pollution, and moral problems such as social division and increased crime occurred. In accordance with these social problems, politicians, intellectuals, and businessmen began to consider the preservation of urban social organizations as a city's immediate task. Two movements have begun, centering on the middle and upper classes of the US: the Progressivism movement, which aimed to reform the existing urban planning regulations, laws and systems, and the City Beautiful movement, which is a practical movement to improve the aesthetics of cities(Park et al., 2012).

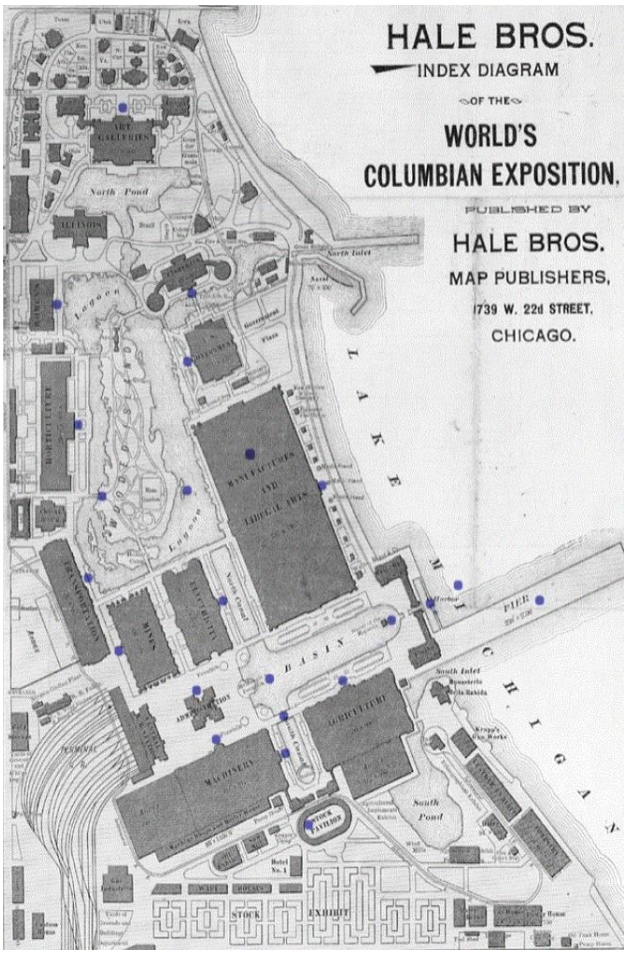

Figure 1. Plans of the 1893 Chicago Exposition
Source: www.chicagohs.org

The City Beautiful Movement planned the World's Columbian Exposition held in Chicago, USA in 1893 to commemorate the 400th anniversary of Columbus' discovery of the New World. At this time, under the direction of architect Daniel Burnham, landscape architect Frederick Law Olmsted planned the project together (Figure 1).

After the World's Columbian Exposition, urban planning reflecting the City Beautiful Movement was actively carried out in major cities in the US, such as Washington, San Francisco, and Cleveland. It was also used in many British colonial city plans, such as India and Southeast Asia, which were created between 1910 and 1935. The ideological background of the City Beautiful Movement starts from environmental determinism, which has similarities with the main ideas of New Urbanism that appeared later. Activists believed that the pursuit of the beauty of the environment was important in

solving urban problems because the urban environment had a great influence on people's thoughts and actions, and pursued the combination of beauty and utility. In addition, they believed that physical changes in the urban environment, such as the collective arrangement of public buildings and the creation of open spaces, would attract the population to the city and increase wealth, thereby increasing the city's assets and improving the quality of life. It was an attempt to alleviate the problem of rapid urban growth through the intervention of the state and capitalists.

2.3.2. The Garden City Movement

The Garden City Movement is an urban planning theory initiated by British urban planner Ebenezer Howard. It was a plan to create a “new town” designed for the poor workers who flocked to the cities because of the Industrial Revolution. Howard did not judge the urban problems of the time simply as the influx of population and the construction of dwellings for the poor. Through the Garden City Movement model, he tried to reform the contradictory results of the industrial modernisation period, such as solving unemployment problems through job creation, improving workers' quality of life, revitalising com-munities, and securing self-sufficiency.

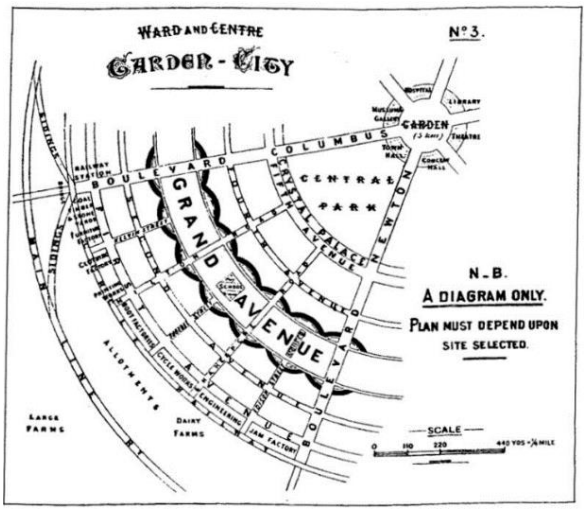

Figure 2. Howard's concept of garden city

The garden city's core concept is the central garden. The center of the city is composed of a garden, as a central park, and public facilities are placed around it. In addition, a safe and beautiful pedestrian center street and commercial area are arranged around it, and a residential area is arranged in the nearby pedestrian zone to realise an open view and pedestrian-friendly space. In the outskirts of the garden city, industrial areas and agricultural areas are arranged, and a green belt called Grand Avenue is arranged together to function as a public park in the suburbs (Figure 2).

The key point of the Garden City Movement was to create a car-friendly city while maintaining the atmosphere of a ‘village’. Therefore, the separation of the pedestrian space and the driving space is one of the key elements of the plan. It also emphasises the neighborhood unit as one of the main planning concepts, which avoids through traffic and is intended to form a large block based on schools and green spaces. What

was emphasised in this movement was to restore 'village life' by avoiding an urban approach to community formation.

2.4. Evaluation of Urban Planning viewed from New Urbanism

In this study, we analysis the trends of new town planning in South Korea viewed from New Urbanism. For this analysis, we matched each elements of New Urbanism's planning principles are reflected in the winning works of '3rd New Town Competition'. Therefore, among the planning principles, elements that can be judged physically or conceptually in the design description and measurement methods are summarised in a table (Table 2). It was based on the design description expressed on each winning artwork panel. Among a total of 25 indicators, 10 items that could not be objectively interpreted or were not expressed in the design description were excluded, and finally 15 items in 8 fields were selected. It is divided into items that can be conceptual evaluation(C) and items that can be physical evaluation(P). We specified the method of determining whether each detailed item was reflected or not, and described the method of reflection for each winning work in the analysis stage.

Table 2. The framework of urban planning evaluation viewed from New Urbanism

Principle	Details	Evaluation Methods	Results
Walkability	· Easy to walking between work and home (EW)	· Adjacent arrangement of residential and business area	P
	· Pedestrian-specialised street (PSS)	· Install pedestrian-friendly streets (pedestrian-friendly alleys, streets, etc.)	P
	· Pedestrian-only street (POS)	· Install a pedestrian-only street with restricted vehicle	P
Connectivity	· Grid-type road network (GRN)	· More than 50% of the road network is planned in the form of a grid	P
	· Setting the Road Hierarchy (RH)	· Road system divided into main, middle, and small	P
	· Quality of public area and pedestrian network(QP/PN)	· Whether public areas (parks, plazas, etc.) and walking networks are connected	C
Mixed-Use & Diversity	· Mixed-use planning (MUP)	· mixed-land use planning	P
	· Population diversity	-	-
Mixed Housing	· Diversity of housing size, shape and price (DH)	· Diversity of household composition type (single/multi-family house) · Diversity of housing scale (~ 60	P

		/ 60~85 / 85 ㎡~)	
Quality Arch. & Urban Design	· Placeness of space and usability of citizens	-	-
Traditional Neighborhood Structure	· Ambiguity between center and boundary	-	-
	· Central arrangement of public spaces(CP)	· Parks, public institutions, transportation stations are centrally located	P
	· Importance of public domain	-	
	· Transect Planning(TP)	· High-density center and low-density outer areas are applied	P
Increased Density	· Easy to walking between residential and commercial area (EWRC)	· Adjacent arrangement of residential and commercial/business facilities	P
	· Application of New Urbanism principles to all urban spaces	-	
Green Transportation	· Connection with other cities (CC)	· Whether public transportation is connected	P
	· Convenience of using bicycles, scooters,etc (CB)	· Bicycle roads are installed	P
Sustainability	· Minimisation of environmental impact during development	-	-
	· Applying eco-friendly tech(EF)	· Eco-friendly tech. is applied in the design manual	P
	· Energy Efficiency/ Minimisation of fossil fuel / Utilisation of local products	-	-
	· Promote walking rather than using a vehicle (PW)	· Walking is promoted rather than vehicle use according into the design manual	C
Quality of Life	· Improving the quality of life of city residents	-	-

C: Conceptual evaluation, P: Physical evaluation

3. Trend of New Town Planning in South Korea and its Analysis from the perspective of New Urbanism

3.1. History of New Town Development in South Korea

New Town development is a policy to bring other spaces(; New Town) into the center of the real estate market to solve the problem, considering that the cause of the serious spatial problem in the central city is due to the demand-supply mismatch regarding limited land resources(Kim, 2014). Development of new towns began in earnest in the 1990s with five major new towns and continued in the form of developments such as multifunctional administrative cities, innovative cities, and corporate cities and second generation new towns. In 2018, five additional cities were designated as the 3rd generation new city.

New town development in South Korea is actively progressing to the extent and there are some negative views about it. In the first and second generation of new town construction, a city with a planned population of 200,000 to 300,000 was built in a only few years by the government's one-way policy decision method. As a result, it achieved the desired goal, such as mass housing supply, but also caused other urban problems, such as the lack of securing self-sufficiency of the city and the cause of environmental problems. On the other hand, there is also a positive view, which is that it could be a good opportunity to accumulate technology related to New Town, export skilled technology, and participate in development nation's projects. Therefore, in the 3rd generation new town plan, problems such as traffic problems and securing self-sufficiency pointed out in the previous new town development process and evaluation after creation are supplemented and promoted, and public housing supply.

The 3rd generation new town is located adjacent to Seoul, has a size of 32.74 million square meters, and a total of 173,000 units are expected to be supplied. The four strategies of the 3rd generation New Town are selecting a geographical location close to Seoul, securing self-sufficiency, improving public welfare, and cooperating with region government. First of all, as a response to the traffic problem that was a problem in the previous new town development, a plan to build public transportation was established before moving in. And as a strategy for securing the self-sufficiency of the city, the main goal was to secure more than twice the amount of land for urban support facilities than before. In addition, in order to improve the public welfare of the city, along with a plan to expand the park site by 1.5 times the existing standard, the goal was to operate 100% national and public kindergartens. Lastly, in order to promote coexistence with the region, local governments participate as implementers, and the company that won the 'New Town Basic Concept Contest' has the right to carry out urban planning projects as a master planner for each development district and participates in the overall planning process. Through this, the consistency of the New Town Plan and development will be managed and comprehensively customised development will be implemented for the region.

3.2. Overview and Results of the 3rd New Town Competition

In 2020, the '3rd New Town Competition' co-hosted by the Ministry of Land, Infrastructure and Transport(MOLIT) and Korea Land and Housing Corporation(LH) was held in a general design contest, and 11 specialised companies in the urban planning and architecture sectors participated. Experts in each field, such as urban planning and architecture, participated in the first document review (technical review) and the second main review (discussion/presentation) to select the best winning work, and the winning company received the right to perform the three-dimensional urban space planning project and the Master Planner status was granted. The purpose of the contest is to create the 3rd Generation New Town to meet the future vision, such as traffic-friendly, job creation, eco-friendliness, and coexistence with the surrounding area. Under the big theme of “A symbiotic city of coexistent and win-win that develops together,” basic concept ideas for the spatial structure of each new town and three-dimensional urban spatial planning were proposed. The core of this competition is to go beyond the existing method of establishing a flat blueprint, to set up a specialised area within New Town, and to establish a three-dimensional(3D) urban space plan for it. The best works by district are Namyangju-Wangsuk District : 'Coexistent City', Hanam-Gyosan District : Co-Living Platform', Incheon-Gyeyang District: 'Hyper Terra City' was selected.

The common spatial guideline for the winning works is to arrange districts so that public transportation such as subway and S-BRT can be used within 10 minutes on foot. In particular, transportation hubs such as GTX-B and S-BRT stations are designated as specialised zones to secure transportation convenience and self-sufficiency, and specialised designs for resting spaces(adjacent arrangement of residential and park sites, etc.), landmark buildings, etc. all shown in 3D. In addition, in order to respond to various future demands such as attracting anchor companies, the land use is not fixed, and a multi-use site (White Zone) is planned that can be flexibly applied to building plans. Various specialised elements reflecting the shape of the future city were also proposed; Future transportation infrastructure such as self-driving vehicles, roads traveled by S-BRTs, roads driven by drones, advanced logistics distribution (unmanned delivery system, etc.), energy saving systems (zero energy town, building-integrated solar power generation system, etc.), city life Smart management system by cycle (moving the entire city into 3D space), etc.

3.3. Analysis of the Winning Projects

3.3.1. Namyangju-Wangsuk District: Coexistent City

The winning project of the Namyangju -Wangsuk District Competition presen-ted four development directions : economy, ecology, hyper-connectivity, and happy city, with the vision of a Coexistent City that has complete urban functions, interacts with neigh-boring cities, complements and grows. A plan was proposed to set up three central living areas, eco-cultural, socio-economic, and business complex, and 9 neighborhood living areas, including public facilities such as parks and schools within 500m of residence, and to connect all living areas to parks and green areas. GTX-B station and S-BRT were built so that public transportation can be used within 10 minutes by foot from home, and minimised travel times in connection with personal mobility.

Figure 3. Namyangju-Wangsuk District Winning project
Source: www.newcity2019.org

In addition, an urban plan was proposed that harmonises transportation, cultural, and commercial functions, such as creating an integrated platform of the GTX and Gyeongchun Line, which is the gateway to New Town, as a landmark, and connecting surrounding buildings and parks with a walking deck (Figure 3).

Comparing the basic principles of New Urbanism with the plans of the Namyangju-Wangsuk district's winning project, the Namyangju - Wangsuk district uses TOD (Transit Oriented Development) as its main focus, so it includes planning elements related to pedestrian-friendly improvement along with the traditional neighborhood structure. In particular, by constructing a walking network of 100m×100m units throughout the site, pedestrian spaces of various sizes formed through various block sizes are connected to the park and green network. In addition, five types of mixed-use land (residential-commercial complex, low-rise complex, self-sufficient complex, modular complex, and public space complex) were designated and multi-use buildings were placed near the station to realise the value of work-residential proximity. By arranging public housing and small housing together in the area adjacent to the transportation station, the diversity of housing size and form was met. In addition, as a plan for three-dimensional urban planning, which was the main guideline of the competition, a three-dimensional symbolic tower was planned in the complex transportation hub section, a drone airport

in the building, a three-dimensional pedestrian space, and a community space were planned, and spaces and functions were vertically connected. This plan can be seen as an alternative that can simultaneously satisfy the mixed use plan and the expansion of pedestrian-friendly spaces pursued in the basic principles of New Urbanism.

On the other hand, the main road network was planned as a curved road network that is different from the orthogonal grid type road network pursued by New Urbanism, but a network that circulates throughout the site is built, and three separate living zones are built around the two main streets. It was intended to respond to the city's step-by-step expansion by forming a circulation loop (Table 3).

Table 3. Analysis of the Namyangju-Wangsuk District winning project

N.U.Principle	Details	Plan
Walkability	EW	- Formation of a walking network in units of 100m × 100m throughout the site
	PSS	- Vertical Movement and Three-dimensional Community, Pedestrian Space Planning
	POS	- Curved grid patterns associated with cluster units rather than typical grid shapes
Connectivity	GRN	- Establishment of 5 levels of road hierarchy and flexible use of road space
	RH	- Three-dimensional walking space
	QP/PN	- Designation of five mixed use sites (residential commercial complex, low-rise complex, self-sufficient complex, modular complex, and public space complex)
Mixed-Use & Diversity	MUP	- Plans for single houses, multi-family houses, general rental and public rental housing
Mixed Housing	DH	- Public rental housing rate 66.7%
Traditional Neighborhood Structure	CP	- TOD
	TP	- Mixed use areas and commercial areas are placed to concentrate the floating population in the center, and residential facilities are placed in the outer area,Nature Edge Planning
Increased Density	EWRC	- Arrange commercial and business facilities centered on public transportation, and arrange residential facilities adjacent to them
Green Transportation	CC	- Designate key transportation hubs such as GTX-B and S-BRT stops as special zones
	CB	- Installation of bicycle and personal mobility network
Sustainability	EF	- Installation of zero energy special zones
	PW	- Induce activation of street space by arranging small block

		units toward the center

3.3.2. Hanam-Gyosan District: Co-Living Platform

The winning project of the Hanam-Gyosan District Competition is based on the vision of " Co-Living Platform" and proposed urban development directions such as "eco-friendly," "traffic-friendly," "nursing-friendly environment," "job and self-sufficiency," and "diversity of living environments." Gyosan New Town is largely divided into self-sufficiency-centered living areas and residential-centered living areas, and is subdivided into 12 small living areas centered on pedestrians.

Figure 4. Hanam-Gyosan District Winning project
Source: www.newcity2019.org

The self-sufficiency-centered living area was divided into 4 areas along the road network, and the residential-centered living area was subdivided into 8 areas centered on transportation nodes such as schools and public transportation stations. Centering around the new subway station, three stations were planned as station area complex sites where commercial, cultural, and living SOCs were integrated. In order to connect the north and south of the self-sufficient centered living area disconnected by the Jungbu Expressway, the area was designated as a specialised area and an artificial urban plateau was installed to connect the disconnected living area. Based on this, it planned a future-type Urban Hybrid Land that combines commerce, business, housing, and culture. Advanced transportation logistics functions such as BRT, underground roads, and shared parking lots were included in the specialised under-ground area, and natural networks such as Deokpungcheon Stream and parks were formed on the ground floor. Finally, on the upper floor, various urban landscapes such as landmark buildings were proposed while over-coming road breaks through artificial deck parks. A city that coexists with nature and history was proposed, such as the creation of a Deokpungcheon waterside park and a plan to preserve historical and cultural resources (Figure 4).

The basic principles of New Urbanism and the plans of the Hanam-Gyosan district winning project were compared. It can be seen that it was planned in a context very similar to the main planning principle of New Urbanism by actively arranging mixed use

land in the center of the city and connecting residential, commercial, and business areas with a three-dimensional pedestrian-only space. In particular, in the Hanam-Gyosan district winning project, an underground corridor was built to link the existing old downtown area and the wide-area transportation system, and an urban plateau was created on top of the space that was disconnected by the Jungbu Expressway to link the pedestrian network and create a space for floating population focused on. Accordingly, the area adjacent to the old city center was developed as a high-density commercial area, and residential areas were placed in the outskirts adjacent to nature. It is contrary to the basic principle of New Urbanism that a park using the existing green area was created in the central part of the new town planning site and residential areas such as apartment houses were placed in the boundary part. However, this was intentionally planned so that more residents can feel nature in their dwellings. In addition, it seems that the hierarchy of roads was not greatly considered in the overall urban division by planning mainly arterial roads (Table 4).

Table 4. Analysis of the Hanam-Gyosan District winning project

N.U.Principle	Details	Plan
Walkability	EW	- Arrange residential, commercial, and business sites by concentrating white zones in the center of the city
	PSS	- Creating a Green Approach Walking Space around the Waterfront and Residential Complex - Planning a walking arcade on the street and building interface space
	POS	- Install an urban plateau, a three-dimensional circulation, and connect commercial and business facilities
Connectivity	GRN	- a grid-type road system
	RH	- Planned on 24m and 22m main roads
	QP/PN	- Connected to each residential area around the green axis near the river
Mixed-Use & Diversity	MUP	- Arrangement of mixed use lands for residential, commercial, cultural, and living SOC spaces around main roads and central living areas
Mixed Housing	DH	- Site development for single houses, block detached houses, and multi-family houses
Traditional Neighborhood Structure	CP	- The entire site is arranged around the park, and public business areas are placed at the center of each living area
	TP	- Create high-density commercial areas in areas adjacent to the old city center and place residential areas in outlying areas adjacent to nature
Increased Density	EWRC	- Arrange residential, commercial, and business sites by concentrating white zones in the center of the city

Green Transportation	CC	- Creation of an urban plateau connected to the old city center - Strengthen wide area transportation BRT accessibility by creating an underground corridor under the main road
	CB	- Establishment of bicycle and personal mobility network
Sustainability	EF	- Establishment of a future green transportation system through the creation of an underground corridor
	PW	- Establishment of a pedestrian-oriented network that connects schools and living SOCs in the center of small living areas and connects them to residential areas

3.3.3. Incheon-Gyeyang District : Hyper Terra City

The winning project of the Incheon-Gyeyang District Competition pre-sented the direction of urban develop-ment to realise Hyper Terra City through 'inclusion', 'connection', and 'convergence and sharing' under the vision of 'New town in the super era that connects hearts'. A three dimen-sional route was proposed so that the S-BRT, which connects Gimpo Airport Station (Lines 9 and 5) and Bucheon Sports Complex Station (GTX-B, Line 7, and Daegok-Sosa Line) in Gyeyang New City, runs smoothly at inter-sections. A station plan was prepared so that S-BRT can be used within 8 minutes (600m) on foot from residential complexes. In addition, it was proposed to build a pedestrian-oriented trans-portation network through under-grounding of automobile roads. A green axis connecting Incheon Gye-yang from east to west (Mt. Gyeyang on the west axis and Gulpocheon on the east axis) is set in a diagonal line, and the complex is arranged so that parks and green areas can be used within 200m from all living areas. Ecological wetlands and waterside trails were also presented, centering on Gulpocheon. The intersection of the north-south S-BRT route and the east-west green axis (connecting Gyeyangsan Mountain and Gulpocheon) is set as a specialised area, and it is planned to create a high-tech industrial cluster where a complex transfer center, corporate/commercial land, and a startup campus harmonise (Figure 5).

Figure 5**.** Hanam-Gyosan District Winning project
Source: www.newcity2019.org

Many elements of the planning principle pursued by New Urbanism were used in that Walkability, Mixed Use Planning, the public space was placed at the center, and the

quality of the pedestrian environment was improved by linking the seven landscape axes with the creation of specialised pedestrian-only streets in connection with it. In particular, the ‘car-free city’ was set as one of the planning goals, and a long-term step-by-step pedestrian priority city was planned by separating the S-BRT line and connecting green belts after undergrounding roads and publicizing pedestrian paths.

On the other hand, in the grid-type road network part pursued by New Urbanism, a diagonal grid was used instead of a rectangular grid. According to the planning description, as the intermediate space (P-Path) of Route 2 takes the form of a diagonal line in the same space, it has the advantage of increasing accessibility by linking with more areas. When the azimuth of the sun approaches the angle of the road as it is planned to be 261 degrees due north, the location of the sunset is located at the end of the street, so you can experience 'Gyeyang-henge'. It will be possible to build a city festival and city brand using this. The oblique landscape axis penetrating the main axis of the city forms a unique visual landscape unique to the Incheon-Gyeyang district, and has the advantage of planning a creative road axis beyond the traditional grid form. However, as the walking and access space due to roads increases, the overall road occupancy rate increases, and there is a concern that idle sites generated due to the formation of acute-angled roads may increase (Table 5).

Table 5. Analysis of the Incheon-Gyeyang District winning project

Principle	Details	Plan
Walkability	EW	· Planning a specialised area (district 2) where business and residential facilities coexist, and creating a pleasant walking environment by bringing the surrounding nature into the building
	PSS	· Urban Square and Central Greenway near the complex transfer center
	POS	· Plan a thousand parks(p-paths) to induce various activities
Connectivity	GRN	· The North-South road axis is formed along the natural terrain, and the plan is to use a diagonal grid called "Route 2 Mediation Space" to access more areas with roads
	RH	· Establishment of three stages of road hierarchy, creation of ground and underground road spaces, and linkage
	QP/PN	· By creating seven scenic axes (vista) in the right-angled direction of Gulpocheon Stream, which is formed in the north-south direction of the city, securing a sense of visual openness and strengthening the walking network
Mixed-Use & Diversity	MUP	· Comprehensive planning of commercial, residential, and business areas as urban residential areas near work area

Mixed Housing	DH	· Planning 8 Housing Types according to Lifestyle; Medium type, road noise response type, community street response type, living street response type, waterfront park specialised type, social cooperative house, Soho type/workroom type house, BRT type
Traditional Neighborhood Structure	CP	· A complex transfer center was placed in the center of the city and an urban plaza and a street park axis were built nearby
	TP	· Place high-density areas in the center and lower-density areas toward the outskirts
Increased Density	EWRC	· Planning a specialised area (district 1) where general commercial areas and residential areas coexist, and forming a neighborhood commercial area
Green Transportation	CC	· Establishing a road system that connects Gimpo Airport and the old city center nearby · Building a complex transfer center in the center of the city
	CB	· Establishing a Bicycle and Personal Mobility Network
Sustainability	EF	· Eco-friendly tech. is applied in the design manual
	PW	· Pedestrian priority plan through road undergrounding and publicization of pedestrian paths, etc

4. Discussion and conclusions

New Urbanism is an urban movement that began in the United States in the 1980s, and is a planning concept developed with the aim of improving the quality of urban life and solving the problems of existing cities by creating and influencing specific social patterns in cities. The starting point of New town planning in the United States can be seen as the start of Howard's Garden City. The plan was to create a new town designed for poor workers who flocked to the city due to the industrial revolution, and to reform the contradictory results of the capitalist social structure of modern industrialization, such as solving unemployment through job creation, improving workers' quality of life, revitalizing communities, and securing self-sufficiency. The concept of the garden city has been developed in the same context as the urban beautification movement and New Urbanism, and has been used as a major principle for creating new cities such as new towns. South Korea's new town plan is also a concept of developing a new city by selecting an appropriate area to solve the physical limitations of the existing city. It pursues the form of an ideal city that is different from the existing city, and in many elements of the new town plan, the publicity of the city and the pedestrian-friendly strategy emphasised in the concept of New Urbanism are mainly used.

Table 6. Comprehensive analysis of new town planning viewed from New Urbanism

In order to examine recent urban planning trends in South Korea from the perspective of New Urbanism, three winning works of the '3rd New Town Basic Concept and Three-dimensional Urban Space Plan Contest' were analysed from the New Urbanism perspective. Common guidelines for the competition were workplace-housing proximity, public transportation-centered planning, three-dimensional urban space planning, and complex site planning. It was a planned feature common to the three districts in terms of pedestrian friendliness, multi-use, housing mix, high density, smart transportation system, and sustainability. On the other hand, in terms of connectivity, New Urbanism insists on building a grid-type road network as a planning principle, but the Namyangju-Wangsuk district and Incheon-Gyeyang district proposed a modified plan in the form of a curved circulation system and a diagonal grid. In the case of the Namyangju-Wangsuk district, it was intended to respond to the city's step-by-step expansion by forming a circulation loop for each of the three living zones centered on the two main streets. And in the Incheon-Gyeyang district, it is explained that accessibility is improved by linking with more regions through a diagonal grid, and city branding using this is possible. However, it remains open to debate whether it will be able to meet other values beyond that. This is because the transformed road network gives up the economic advantages of the existing grid system, such as shortening of travel distance, minimising road space, and increasing efficiency in land use. Regarding the planning principle of transaction planning in terms of traditional neighborhood structure (that is, whether a high-density area is placed in the center and a low-density plan is taken toward the periphery), In the Namyangju-Wangsuk district and Incheon-Gyeyang district, it was observed that the development density decreases as the distance from the center of the city, such as the station, to the outskirts using the TOD development method. However, in the case of the Hanam-Gyosan district, the area around the river in the center was created as a specialised waterside space, parks and plazas were placed, and the new town border area adjacent to the outer nature was created as a residential area, so some areas are far away from the outskirts. It was observed that the development density increased with the increase. Through this, the quality of life in residential areas can be improved by placing residential areas, natural areas, and parks adjacent to each other, and sales can be made well, but there is a risk of a new urban sprawl in the new city. If residential areas are dispersed to the outskirts, a road system that circulates only within the complex is formed for each residential complex, increasing the road occupation rate in the city, while there is a concern that the road sharing rate may decrease (Table 6).

Principle	Details	Reflected Plan or not		
		Namyangju-Wangsuk	Hanam-Gyosan	Incheon-Gyeyang
Walkability	· Easy to walking between work and home	●	●	●
	· Pedestrian-specialised street	●	●	●
	· Pedestrian-only street	●	●	●
Connectivity	· Grid-type road network	◯	●	◯
	· Setting the road hierarchy	●	◯	●
	· Quality of public area and pedestrian network	●	●	●
Mixed-Use & Diversity	· Mixed-use planning	●	●	●
Mixed Housing	· Diversity of housing size, shape and price	●	●	●
Traditional Neighborhood Structure	· Central arrangement of public spaces	●	●	●
	· Transect Planning	●	◯	●
Increased Density	· Easy to walking between resi-dential and commercial area	●	●	●
Green Transportation	· Connection with other cities	●	●	●
	· Convenience of using bicycles, scooters, etc.	●	●	●
Sustainability	· Applying eco-friendly tech.	●	●	●
	· Promote walking rather than using a vehicle	●	●	●

(● : plan, ◯ : transform and reflect)

In this study, a literature study was conducted on the planning principles of New Urbanism and the urban movement before and after it in order to examine the trends of domestic New Town planning from the New Urbanism perspective. New Urbanism has been developed as a physical planning principle to solve the problems of existing cities,

and in the context of garden cities, urban beautification movements, and compact cities, it pursues the improvement of the quality of life of citizens through urban environment and structural changes. In this respect, it was found that it is an urban planning concept that has the same context. Focusing on the winning works of the 3rd new town planning contest co-hosted by the Ministry of Land, Infrastructure and Transport and the Land and Housing Corporation, this study tried to analyse the trend of new town planning in South Korea from the perspective of New Urbanism by comparing them with the planning principles of New Urbanism. This study has a limitation in that it was limited to the target of analysis only for the 3rd new town plan. After the actual implementation of the 3rd new town in the future, it is judged that it is necessary to analyse and monitor the correspondence between the plan and the actual implementation of the city, and whether the physical implementation is being used to meet the goal of the plan. In this way, by activating the evaluation and analysis of the South Korean new town plan, it will be a good opportunity to accumulate the know-how of the South Korean new town development project, which is actively under way, and to export related technologies and participate in the development project.

Acknowledgement. This work was supported by the National Research Foundation(NRF), Korea, under project BK21 FOUR.

References

Ajay M. Garde (2004) New Urbanism as Sustainable Growth? *Journal of Planning Education and research*, 24, pp.154-170.

Bae, J., S. Baek and Y. Kim (2014) An Analysis of Urban Structure of New Urbanism in Calgary of Canada: Focused on analysis of the case of early American. *Journal of the architectural institute of Korea : Planning & design*, 30 (7), pp.11-20.

Bryson, John (2007) Arts, dance, cultural infrastructure, and city regeneration: Knowledge, audience development, networks, and conventions, and the relocation of a Royal Ballet company from London to Birmingham. *Norsk Geografisk Tidsskrift - Norwegian Journal of Geography*, 61 (3), pp.98-110.

Chicago History Museum www.chicagohs.org Accessed [19/05/2023]

Choi, H., E. Seo and H. Jun (2020) Social Diversity and Quality of Life among People Living in Seoul: An Application of Multilevel Model. *Journal of the Korean Regional Science Association*, 36 (1), pp.69-88.

Chung, J., and M. Oh (2011) A Study on Sustainable Development of Urban Area in Green Belt: Focused on City Development of Sustainable Compact City Method. *Journal of the Korea Academia-Industrial Cooperation Society*, 12 (12), pp.5917-5930.

Congress for the New Urbanism www.cnu.org Accessed [19/05/2023]

Florida, R (2002) *The Rise of the Creative Class: And How It's Transforming Work, Leisure, Community, and Everyday Life*. New York: Basic Books.

Fulton William (1996) *The New Urbanism: Hope or Hype for American Communities?* Cambridge: Lincoln Institute of Land Policy.

Han, S., K. Park, E. Park, Y. Seo, D. Kang and S. Park (2009) *The Policy Directions to relieve the Inter-regional Cultural Disparities on Gyeongsangnam-do: Focusing on the expansion of cultural infrastructure*. GyeongNam Institute.

Hwang, S., and K. Kim (2007) A Design Proposal of Four Season Resort Based on the Urban Spatial Structure of the New Urbanism as a Sustainable Urban Theory. *Conference Journal of the architectural institute of Korea*, 2007 (10), pp.489-494.

Jabareen Rafeq Yosef (2006) Sustainable Urban Form: Their Typologies, Models and Concepts. *Journal of Planning Education and research*, 26 (1), pp.38-52.

Jeon, G., M. Choi and M. Jeong (2015) A Study on the Relationship between Community Activities, Culture and Regional Development: Focused on the Cases of Coin street, Nagahama, and Samdeok-dong. *Korean Public Administration Quarterly*, 27 (1), pp.87-113.

Jung, C., and O. Kwon (2010) Study on Supply Standards of Cultural Infrastructure. *Journal of the architectural institute of Korea : Planning & design*, 26 (2), pp.61-68.

Kim, K., and S. Hong (2021) Analysis on Regional Disparities in Culture & Arts Infrastructure: Focused on Gyeonggi Province. *The Journal of Korean Policy Studies*, 21 (2), pp.27-50.

Kim, Y (2004) *A Study on the Characteristics of Spatial Structure of the New Urbanism City*. Daegu, Korea: Graduate School, Kyungpook National University.

Ko, D., and S. Park (2019) A Study on the Influences of the Built Environment around Parks on Pedestrian Traffic Accidents. *Journal of Korea Planning Association*, 54 (5), pp.65-75.

Lee, B (2021) Standardization and Policy Modeling to Support Vulnerable areas in the Cultural Environment. *Journal of the Korean Geographical Society*, 56 (6), pp.623-638.

Lee, H., and J. Sim (2011) *GIS Geomatics*. Seoul: Bobmunsa.

Lee, J., and S. Choi (2018) Spatial Distribution Characteristics Analysis of Cultural Infrastructure in Seoul: A Focus on Distribution of Population and Density of Use. *Journal of Tourism Studies*, 30 (4), pp.61-80.

Lee, S (2014) Understanding Spatial Dependence and Using Spatial Regression Analysis. *Korean policy sciences review*, 18 (3), pp.39-79.

Ministry of Culture, Sports and Tourism (2018) *2030 Cultural Vision.*

Ministry of Culture, Sports and Tourism (2017) *2017 National Cultural Infrastructure comprehensive bibliography.*

Ministry of Culture, Sports and Tourism (2020) *2020 National Cultural Infrastructure comprehensive bibliography.*

Moon, H., and N. Song (2020) Influence of Living Infrastructures on the Distribution of

Single-person Households and Quality of Life. *Seoul Studies*, 21 (4), pp.157-175.
New Urbanism www.newurbanism.org Accessed [19/05/2023]
Oh, D., and K. Kwon (2007) A Case Study on the Regions Where Urban Regenerations were Tried by City Marketing through Culture. *Journal of Korea Planning Association,* 42 (5), pp.109-128.
Oh, M., and J. Chung (2011) A Study on the Urban Development Direction of Overseas and Domestic Sustainable Compact City. *Journal of the architectural institute of Korea : Planning & design*, 27 (12), pp.291-306.
Park, J., J. Sung and H. Cho (2017) A Study on the Progress and Implication of Garden Cities for the Sustainable Development. *Journal of The Urban Design Insitute of Korea,* 18 (2), pp.21-36.
Park, K., and J. Pae (2012) Implication of the City Beautiful Movement on Landscape Architectural History and Contemporary Urban Regeneration. *Journal of the Korea Landscape Council*, 2012 (6), pp.41-60.
Park, Y., and J. Ryu (2000) Prospects and Limitations of Urban Design Prototypes in New Urbanism. *Journal of the architectural institute of Korea : Planning & design,* 16 (5), pp.77-86.
Revko, A., M. Butko and O. Popelo (2020) Methodology for Assessing the Influence of Cultural Infrastructure on Regional Development in Poland and Ukraine, Comparative Economic Research. *Central and Eastern Europe*, 23 (2), pp.21-39.
Yang, J., and J. Park (2019) The Effect of Regional Culture Level on the Quality of Life of Residents. *Journal of Arts and Cultural Management*, 12 (1), pp.77-104.