Spatial Transition of Existing Old Settlements in Downtown Cheongju, Korea

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Abstract
The purpose of this study is to clarify the spatial structure and its transitional process by focusing on 22 existing old settlements established before 1913 in downtown Cheongju, Korea. The results are as follows: First, the old settlements are classified into four types relating to their topographic features: the Sanrok and Gogae Types are located on hills and the Daegok and Sogok Types are located in valleys. Second, in traditional Korean villages, a road system is composed of outer roads, approach roads, inner roads, and side roads having different functions. An inner road among them is the most important element in spatial structure as the basic framework of the road system inside villages. Third, the preservation or division of settlements has been influenced by the transformation of inner roads during the urbanization process. When spatial structures of inner roads have been maintained, old settlements have tended to be preserved. In addition, when new roads have been built to pass near communal spaces, old settlements have been preserved in spite of the lack of connection to old inner roads. Fourth, the functions of communal spaces have been influenced by the changing of society over time. Some functions have been changed, lost, or have suffered reduction in importance due to changes in modern lifestyles, but the personality of communal space is lasting. Finally, when the characteristics of the old settlement and functions of old roads have been preserved, housing layout has had a tendency to follow the original orientation, courtyard location, gate location, and access route as can be seen in Topdong Yangdalmal.

Keywords: old settlements; spatial transition; road system; communal space; lot system; Topdong Yangdalmal

1. Introduction
In this study, the term "old settlements" means villages established before 1913 in downtown Cheongju, Korea. In small- and medium-sized inland Korean cities, historically settlements were built along outside walls and public buildings were built inside walls when walls were constructed. When cities expanded during the period of modernization and urbanization, old settlements were influenced in their spatial structure, lot system, housing layout, and housing type. With the development of a grid-patterned road system and other urban infrastructure, urbanization caused many changes to cities. During this process, historical settlements were adjusted to reflect modern life; however, they also show morphological characteristics of the rural villages due to their being settled before the period of modernization and urbanization.

Old settlements that have been settled around the city, in particular, retain traditional characteristics thanks to their spatial structure and the conditions of their location, while, at the same time, they have modern urban characteristics because of their proximity to the city core. Therefore, these old settlements existing in the downtown have both modern and rural characteristics at the present time.

In Cheongju, one of the aforementioned walled cities, 22 old settlements established in the 19th century before the modernization of Korea are still in existence. It is possible to infer the existence of the settlements from the 1913 Original Land Registration Map. In the map, each land category was written with four sub-categories. Among them, residential areas are referred to using the term 'building land' (및). Until now, studies on spatial transition about existing old settlements in downtown Cheongju, Korea have been classified into four categories: morphological characteristics, road systems, community space, and spatial configurations. For morphological characteristics, form, size, and layout of the old settlements are characterized according to the geographical features prior to urbanization. The road system approach is about change and maintenance...
mainly focused on an inner road from the perspective of function, form, and location. Community space is discussed as central space with perspective on the location of villages and the functionality for residents. In 2013 Tai-Young Kim showed that community spaces in Cheongju’s old settlements can be classified into central space, inner road, and cul-de-sac.

Spatial configuration is focused on the change and maintenance of the lot system and the layouts of houses following the urban plan of downtown Cheongju.

This study aims to clarify the spatial structure and transition focusing on the existing 22 old settlements in downtown Cheongju. For that, this study will first look into the morphological characteristics of those settlements. Next, characteristics about the road system and communal space will be studied. Finally, the transitional process of the road system, lot system, and housing layout will be outlined focusing on the village of Topdong Yangdalmal which was selected as a key example among the 22 old settlements.

This study was carried out through literature and field surveys, analysis of aerial photographs, and comparison analysis of land registration maps. The transitions of roads, lots, and housing layout are analyzed using aerial photographs from 1968 and 2012, and land registration maps from 1913 and 2012. The size and boundary of each old settlement can be determined using the total area and border of 'building land' of the land category from the 1913 Original Land Registration Map.

2. The Status of Old Settlements

2.1 Old Settlements in Downtown Cheongju

Cheongju, located in the center of the Korean peninsula, was a walled city used for administrative and military purposes. The natural environment of Cheongju is that the Mushim River runs through the downtown from north to south, a ridge continues to Mt. Uam and Dangsan in the east, and low hills continue in the western part of the settlement.

Cheongju has had roughly five periods of development and the territory of the city has been expanding throughout (Fig. 1.). The Cheongju Eupseong (淸州邑城; an old castle in Cheongju), was consecrated in approximately 689 AD, but was destroyed between 1911 and 1915 when Cheongju began to develop as a modern city. Most of the road system at the present time was built at that time of modernization in a grid pattern of long, linear south-north roads aligned with the Mushim River. The areas around the castle located in the old downtown are representative of historical places in Cheongju with historical and cultural structures such as the traditional government offices, Yongdusaji Cheoldanggan (an iron flagpole of the Yongdu Temple Site established in 962 AD), and Namsukkyo (a bridge made with stone located in the south) still remaining.

The area of the downtown was delineated by an urban development plan named ‘1939 Chosen Urban Planning Ordinance’, and that designation was retained until 1968. The territory of downtown Cheongju until 1968 was 18.29km² in total area and is the subjected of this study. There are 22 existing old settlements in downtown Cheongju that were established at the end of the 19th century, mainly near Mt. Uam in the east and in the low hills to the west (Fig. 2.).

2.2 Morphological Characteristics

These 22 old settlements are classified into the Hill Type on the ridge and the Valley Type in the low-lying areas. There are 15 Hill Type and seven Valley Type settlements (Table 1.).

The Hill Types are further categorized into the Sanrok Type located on mountain ridges and the Gogae Type located on hillsides. Ten of the 15 Hill Type settlements are Sanrok Type and five are Gogae Type. The Valley Type is further categorized into the Daegok and Sogok Types. The Daegok Type is located in deep and wide valleys and the Sogok Type is located in narrow and shallow valleys. From the seven Valley Type settlements, three are Daegok and four are Sogok Types (Fig. 3.).
The sizes of the old settlements vary; the Hill Types between 1.2ha and 1.5ha and the Valley Types around 0.6ha. The Gogae Type on hillsides is the smallest at 0.35ha and the Sogok Type in valleys is around 0.6ha.

2.3 Road System

In traditional Korean villages, road systems are composed of outer roads, approach roads, inner roads, and side roads. An outer road connects villages. Its function is similar to a present day highway as the main road of the city. An approach road is a connector between the outer road and the village, so it is located at entrance points to a village; thus, there are few houses around an approach road. An inner road is the biggest road inside a village and the most basic element for spatial structure. The shapes or sizes of settlements are generally decided by the length and direction of the flow of inner roads. Most inner roads start to connect from an approach road but a few inner roads connect directly from an outer road without an approach road due to differences in topographic features or village layouts. Finally, a side road like a small path extends from an inner road and plays a role in the entry to each house.

Traditionally, access to the inside of settlements was generally via the outer road—approach road—inner road route. However those roles of roads and access to villages have been changed due to the grid-pattern road system implemented during urbanization.

In Sanrok Type settlements one can enter directly via an outer road without using an approach road. Waterways are placed in parallel to inner roads but waterways are kept separate from the inner roads in order to minimize damage from floods. Within the Sanrok Type, four settlements—Topdong Yangdalman, Andeokbbul, Araeyoungwoori, and Baggatdeokbbul—are located on flatland of less than a 5° gradient. Their inner roads run along the ridge, passing through the villages, and the houses are laid out around the inner roads. Within the Sanrok Type, three settlements—Goong, Hodunamgeori, and Goengmal—are located on mountainsides with roughly a 9° gradient. Because they are located on a highly inclined plane, inner roads are formed to fit topographic features around the boundary of the settlements on the flat side, with small paths (side roads) extending from inner roads toward the mountain.

Gogae Type settlements are located on land with a gradient greater than 7°. Inner roads are formed on the hillsides of the settlements. There is a road unique to Gogae Type settlements—Gogae road—which derives its name from the Gogae Type. The road penetrating the settlements serves as a passage connecting other villages and as an important element for traffic.

The Valley Type settlements are encircled by mountains and the entry to the village is open. Approach roads and waterways are formed together.
and houses are crowded along inner roads. Although similar to Sanrok Type settlements in light of the relationship between roads and settlements, they are different in that the settlements have a valley topography. Located in a deep and wide valley and at a right angle to the main axis direction of said valley, they have approach roads formed from the outer road connecting settlements toward the direction of the valley and meet deep inside the valley. Compared to settlements of other types, the functions of village roads are clear and the hierarchy is strong.

The Valley Type settlements are closed because they are nestled inside the valley. Also, roads and waterways are adjacent and are parallel, with waterways passing the territory of the settlements. In regard to the orientation of the topography surrounding Valley Type settlements, most of them are situated toward the west, with some toward the southwest.

3. Inner Road and Communal Space
3.1 Transformation of Inner Road

Old settlements differ in spatial structure because of topographic features. In traditional Korean villages, an inner road is the most important element in spatial structure as the basic spine of the road system inside a village. Inner roads are mostly formed in the center area of a village but some inner roads were established along the boundary of villages due to topographical features or village layouts. Since most inner roads are located in the center area of a village and houses are crowded along them, communal spaces have been made around inner roads. Therefore, the conservation or disconnection of inner roads due to new road construction during urbanization has had a significant effect on the preservation or division of settlements.

Considering the viewpoint of inner roads in the spatial structure, nine settlements have been preserved as one community because few changes in the structures and width of inner roads have been made to the present day (Fig.5.). During the urbanization process, new roads were constructed but they have been built on the outskirts of the village's territory and do not penetrate the center area of villages in those settlements. As a result, new roads constructed during

![Diagram of Types of Old Settlements by Topography](image)
urban development have little influence on inner roads themselves in the nine settlements. In addition, even though widths of inner roads have been expanded, the width is not enough for a vehicle to pass, so resident's activities on the inner roads are kept and the function of the inner road is preserved. The road systems of those nine settlements are adapted to natural, environmental, and geographical features. This is the main reason why the settlements have been preserved to the present time. A typical case is Topdong Yangdalmal, which was selected as a key example among the 22 old settlements.

Many inner roads passing the center areas of villages were cut off by new roads in the 1960s and 1970s. There are two characteristics influencing settlements due to the disconnection of inner roads. The first is that settlements are preserved in spite of the disconnection of inner roads. The reasons are related to communal space. Even though new roads penetrated the center areas of villages, more residents have been able to participate in community activities because new roads are constructed surrounding the communal spaces. As a result, the new road is more helpful to the community and tends to act as a substitute for the function of old inner roads.

The second is that settlements are divided by the severing of inner roads. These cases are demonstrated in seven settlements (Fig.5.), which were divided due to new road construction with inner roads also being disconnecting. In those settlements, the new road did not play the role of the old inner road and old inner roads became side roads. The communities of those settlements were divided into smaller ones, so there has been a reduction in community activity.

### 3.2 Transformation of Communal Space

Because inner roads are located in the central area of a village and houses are crowded along inner roads, communal spaces have been formed around inner roads as well. Most communal spaces in location and function have been influenced by the transformation of inner roads.

The locations of communal spaces and inner roads are especially closely connected. When inner roads have been maintained settlements have tended to be preserved, and the locations of communal spaces have also been kept. However, the locations of communal spaces were moved to other places along new inner roads when inner roads were disconnected.

In addition, when settlements were divided due to the disconnection of an old inner road, new communal spaces were established in divided communities at new locations. There are three kinds of communal space inside villages: natural facilities, artificial facilities, and vacant lots.

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**Fig.5. Transformation of 22 Existing Old Settlements by the Maintenance and Disconnection of Inner Roads**
Vacant lots have been and still are used for activities such as festivals or village events.

Artificial or natural facilities are related to everyday life or religion. Examples of facilities for everyday life are common wash places around a streamlet, old trees for relaxation, a big rock, which is a village symbol for meeting, public wells, and buildings like senior centers or community centers. Facilities for religion are big, old trees near shrines for the village deity or temples. Buildings with modern conveniences and various programs for residents like a community center or a senior center are newly constructed, so those artificial facilities are a larger part of the residents’ lives than natural facilities like old trees or a symbolic rock.

The functions of communal spaces have changed, been lost, or been reduced in importance over time. For example, big, old trees for village rituals or religious functions in the past are still standing in the same place, but currently provide places to relax. Old public wells and common washing places were destroyed or are not used anymore due to modern lifestyles.

However, when development of new communal spaces has been needed, it has tended to be made around existing communal spaces even though the function was changed, lost, or reduced in importance. For instance, when a new community center is needed, it tends to be built in the same location as existing communal spaces like big, old trees used for village rituals or old public wells. The personality of communal space is lasting even though some functions were lost due to changing times as new community facilities are built in the same location.

4. Case Study: Topdong Yangdalmal

Topdong Yangdalmal, established before 1913 in the Chosen era is an old settlement. In front of Topdong Yangdalmal the Mushim River flows and a mountain rises behind the village. This is a good location from a traditional Korean viewpoint. This settlement is one of the Sanrok Types located on the ridge of a mountain. The characteristics of an old settlement have been maintained in the road system, lot system, and housing layout.

4.1 Transformation of the Road System

The road system of this settlement was structured no differently from other settlements. Houses are laid out along inner roads and side roads extending from inner roads. The directions of the main inner road and waterway are parallel but they are not near each other. The four side roads were increased to eight after the destruction of the Cheongju Eupseong between 1911 and 1915. Due to the increase in side roads, the lot system was changed and some side roads became dead ends. On the levee of the waterway flowing to the southeast one road was constructed.

A road system was developed in earnest using the Cheongju Urban Development Plan of 1968. New roads were constructed in a new pattern that was unlike how side roads extended from inner roads previously. According to the Cheongju Urban Development Plan, the width and length of inner roads and side roads were increased. However, the approach road was increased in width only. Even though the width or length of the approach road, inner roads, and side roads were expanded or extended, the characteristics
of the old settlement and functions of old roads have been maintained because the shape and direction of old inner roads have not been interrupted and the width is not enough for a vehicle to pass.

In 2010, a new road penetrating through the center of the village and another new road for vehicles on the outskirts of the village were constructed. Due to those two new roads, the characteristics of the old settlement are on the brink of disappearing.

4.2 Transformation of the Lot System

Transformation of the lot system in Topdong Yangdalmal is shown in Fig.6. and Table 2. Around 1913 during the destruction of the Cheongju Eupseong, 15 lots (I-XV) existed surrounding inner roads. Until the Cheongju Urban Development Plan in 1968, the size and form of 10 lots (III, IV, VI, VIII, IX, X, XI, XII, XIII, XIV) were maintained and five lots (I, II, V, VII, XV) were divided into 28 lots. The division of the five lots came from constructing new side roads leading from inner roads. Some new side roads became dead ends. Therefore, there were a total of 38 lots in Topdong Yangdalmal in 1968.

Among the 38 lots, 19 lots have been maintained in size and form from 1968 (Cheongju Urban Development Plan) to 2010. The other 19 lots have been subdivided into 56 small lots. The subdivision of the 19 lots came from the construction of new roads, expansion of the width, and extension of the length of those roads. Therefore, there were a total of 75 lots in 2010.

4.3 Layout of New Housing

Seventy-two buildings have been constructed or re-constructed on 75 lots. Sixty-two of them are houses for residence and they were still remaining in 2012. Nine of the 62 houses were built before 1968 and the remaining 53 houses were built after 1968. Nine houses (original lot I-3, VII-24, XV-35, 36 / divided lot I: 5-1, 10-1 / II: 14-2, 16-1, 16-2) are facing the south or the southeast. Most houses have been built in keeping with the old directions and forms of the layout. In houses built on lots adjacent to the side roads, the orientation of housing, location of courtyard, and location of gate have tended to be maintained even in the cases of renovation. Particularly, the direction of the gates has been maintained toward the south even though the location of the gate changed due to new road construction or lot division in houses connected to side roads. Most of the courtyards have been kept although the sizes have been reduced due to the alteration of buildings.

Fifty-three houses were built after the 1970s. Twelve of the houses have followed the orientation of the original housing, location of courtyards, and location of gates of the original lots (I-2, 4, 7, 8, 9, II-13, IV-18, VII-27, X-29, XI-30, XV-34, 37). New types of houses began to be built from this time such as two-storey houses or multiplex housing. Housing of the new types has tended to follow the original orientation, the gate location, the layout of old houses, and the size of the old courtyard. The orientation of housing or the direction facing the road has tended to be maintained to match the original ones (orientation or direction) in 41 new houses built on divided lots even though the sizes of the lots were smaller.

The access route from the road to a house has usually been maintained, so the location of the gate has tended to not change. Residents have tended to keep front yards rather than a back yard even though the courtyard size is smaller. The reason for that is that one must pass through the front yard from the road in order to enter an indoor space.

5. Conclusion

This study aims to clarify spatial structure and its transitional process focusing on 22 existing old settlements established before 1913 in downtown Cheongju, Korea. The method of this study is through literature and field surveys, analysis of aerial photographs from 1968 and 2012, and comparison analysis of land registration maps in 1913 and 2012.

The results are as follows.

Twenty-two existing old settlements in downtown Cheongju are classified into four types using topographic features: Sanrok Type, Gogae Type, Daegok Type, and Sogok Type. The Sanrok and Gogae Types are located on hills and the Daegok and Sogok Types are located in valleys in the low-lying areas.
The Sanrok and Gogae Types are classified by village location such as on foothills or ridges. The Daegok and Sogok Types are classified by the size of the valley. Daegok Type settlements are located in deep and wide valleys, and Sogok Type settlements are located in narrow and shallow valleys.

In traditional Korean villages, the road system is composed of outer roads, approach roads, inner roads, and side roads having different functions. An inner road is the most important element among them in spatial structure as the basic spine of the road system inside villages. Communal spaces have been established around inner roads because most inner roads are located in the central area of a village and houses are crowded along the inner road. Therefore, preservation or division of settlements has been influenced by the transformation of inner roads during the urbanization process.

When spatial structures of inner roads have been maintained, old settlements and communal spaces have tended to be preserved. Even when old inner roads have been disconnected by new roads, settlements have been preserved when the new roads play the role of old inner roads or when new roads are constructed around the communal spaces. However when new roads were constructed in a location far from communal spaces, the communities of those settlements were divided into smaller ones, so there has been a reduction in community activity.

The functions of communal spaces are influenced by changing times, and some functions have been changed, lost, or have had their importance reduced due to adjustments to modern lifestyles. However, when a new community facility is needed, it tends to be built on the special spot around previous communal spaces. The personality of communal space is lasting even though some functions have changed over time.

The lot and road systems have been changed as a result of urban development. Original lots were divided and the width or length of roads were expanded or extended. Nevertheless, when the characteristics of the old settlement and functions of old roads have been preserved, housing layout has a tendency to follow the original orientation, courtyard location, gate location, and access route as can be seen in Topdong Yangdalmal which was selected as a key example among the 22 old settlements.

Notes
1 1913 Original Land Registration Map (地積原圖) was made during the Japanese colonial era. The Japanese government carried out land surveys on a regional scale in Chosen (now Korea). This map is important material about the land status at the end of Chosen times using modern land surveying techniques. In the Map, the land category is written with sub-categories such as 'dry paddy', 'building land', 'forest land', 'castle', 'road', and so on.
2 Ref. 6.
3 The Cheongju Eupseong (청주 읍성) was the administrative center during the Chosen dynasty. It was completed in February of 1487 and the size was 1,783m in circumference and 4m high according to the Annals of the Chosen Dynasty. However, it was destroyed and the materials of the fortress were used in sewer construction during 1911–1914, during the Japanese colonial era. Today, the Fortress has been left with traces of road only.
4 An iron flagpole (鐵幢竿) made in AD 962, was for hoisting a flag standing in front of a temple named Yonggusa (龍斗寺) when events were held in the temple. It is a valuable cultural property because of its purpose, foundation year, and founder of the pole are cast.
5 Namsookkyo (南石橋) means south (南; Nam), stone (石; Suk), and bridge (橋; Kyo) and means a bridge made with stone located in the south of Cheongju.
6 Ref. 9) In the 1930s, urbanization of Chosen society proceeded apace and urban development was needed to prepare designedly and institutionally. Therefore, the Chosen Urban Planning Ordinance (朝鮮市街地計劃令) was established by law in 1934 and was enforced beginning in 1936 during the Japanese colonial era. This ordinance is the first urban planning law in Korean urban history.
7 Ref. 4) The original title, [Cheongju] 부주 [Doshii]도시 [Gaeinbauk] 계획 [Byuneheonsa] 번찬시, was translated as "Changing history of Cheongju Urban Development Plan" by the authors.
8 The name of Sanrok (山窪) means mountain (山; San) and foot of mountain (窪; rok) and Gogae (고개) means "ridge of mountain". In short, the name of the type comes from village topographic features.
9 The name of Daegok (大谷) means big (大; Dae) and valley (谷; gok) and Sogok (小谷) means small (小; So) and valley (谷; gok). In short, the name of the type comes from village topographic features.

References