Spatial Configurations for The Revitalization of a Traditional Market: The Case of Yukgeori Market in Cheongju, South Korea

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Abstract: Changes in consumer purchasing patterns in South Korea in the 1990s led to a gradual decline in traditional markets. However, Yukgeori Market, a representative and unique traditional market in the city of Cheongju, has survived and continued to develop while maintaining the physical and operational characteristics of a traditional market. There is a lack of studies on the revitalization of traditional markets in non-metropolitan areas outside of Seoul in Korea. Thus, this study has identified the characteristics of the spatial configurations that foster the vitality of traditional markets by analyzing the attributes of the spaces based on their accessibility in the street network of Cheongju, and especially in the neighborhood surrounding Yukgeori Market. This was done by calculating the depths of the nodes in the network using a spatial analytical model. The results showed that long streets with a high public level (integration), which attract people and act as a communication bridge between highly modernized commercial areas and traditional markets as well as a boundary to preserve and develop a market’s traditional characteristics, can lead to the sustainable development of both types of area.

Keywords: traditional market; commercial area; street network; spatial configuration; spatial analytical model

1. Introduction

As South Korea (hereafter Korea) became a member of the World Trade Organization in 1995, its domestic market was opened fully to foreign investors, and large multinational distributors flowed into the country. At that time, with the increasing popularity of the Internet, online shopping systems were also introduced into the Korean market. In this new environment, Korean traditional marketplaces declined or disappeared as consumer purchasing patterns changed [1]. Nonetheless, several traditional markets have continued to be commercially successful. There are two key models for the persistence of traditional markets in Korea. The first is in Seoul, where the traditional market continues to exist by embracing a modern spatial layout and retaining traditional methods of operation. For example, two representative traditional markets in Seoul (Namdaemun and Dongdaemun markets), which include many stores accommodated within a single multi-story building, ranked fourth and sixth, respectively, among Seoul’s top ten attractions according to a survey conducted by the national Ministry of Culture, Sports and Tourism from 2013 to 2017 with foreign tourists [2]. The second model for resilient traditional markets receives less attention in the news and existing literature compared to Seoul’s model; we call it “the Cheongju model”. In this model, the traditional market successfully
persists while maintaining the traditional spatial and organizational arrangements. This model is well illustrated by the Yukgeori Market, which is analyzed in this research.

The local context significantly differs between Seoul and Cheongju. We selected Yukgeori Market because it has survived even though Cheongju had a much lower population and infrastructure level than Seoul in the late 1960s when the modernization projects at the Namdaemun and Dongdaemun markets were carried out. Thus, the traditional markets in Cheongju were not subject to modernization or redevelopment until the 2000s, when policy supports for Korean traditional marketplaces were implemented. Cheongju, the capital city of North Chungcheong Province, sits at the geographical center of South Korea and has, therefore, long acted as a key node for transportation and trading in Korea. Over time, a market emerged at the intersection of six major streets in the center of Cheongju. People called it “Yukgeori”, meaning “six streets”. The market was selected as an excellent model for the revitalization of other markets in the Korea Leading Market Expo for three consecutive years, from 2009 to 2012.

It is necessary to determine what measures are required to preserve the intrinsic value of traditional markets against damage from modernization and develop the markets continuously. The vitalization of traditional markets can be achieved by improving physical facilities and their operations, with reliance on policy support. However, the identification of the spatial configurational features that support the vitalization of traditional markets will also be useful to expand the markets’ sustainability in terms of urban planning and design.

The retail revitalization in declining traditional city centers can be dependent on the spatial configuration and, in particular, the proximity, integration and linkage of the components of the centers [3]. There are various methods for analyzing urban space, such as spatial data analysis, spatial optimization, spatial interaction and so on. Spatial data obtained through censuses and surveys are so diverse that it is not easy to classify them [4]. Spatial optimization in urban planning requires massive amounts of spatial data and a variety of mathematical models to test spatial decisions [5]. A spatial interaction model originated from Reilly’s gravity model, which can calculate the degree of migration interaction between two spaces where customers will be drawn to one or another of two competing commercial centers [6]. Unlike the gravity model, which can only handle the interaction between two spaces, space syntax based on graph theory is a spatial interaction model that can calculate the interrelationship between all spaces in a system [7,8]. To understand various features of the urban structure, urban space should be conceptualized as a system of networks and flows, representing the relationships among urban components [9]. Space syntax has more benefits than the methods mentioned above, as it can uncover functional configurations hidden in a simplified street network as a graph of nodes and links [10] and follow easy and simple analytical and interpretational procedures to reveal its configurations [11].

Retail types can be categorized by this spatial configuration and presented as diagrammatic descriptions to illuminate the interrelation of the sociality, spatiality, and economy of retailing [12]. Space syntax methodology offers objective and quantitative descriptions of the spatial configuration in addition to the diagrammatic descriptions [7,8].

In this study, through the spatial analysis of Yukgeori Market as a representative market whose evolution has taken place in a non-metropolitan area operating under different conditions from markets in Seoul—a case not covered in previous studies—we identified the spatial configurations to maintain and promote social and commercial activities in this traditional market and, thereby, supporting its revitalization.

Wrigley and Dolega (2011) found that despite the global economic crisis during the 2000s, adaptively resilient retail centers have thrived due to the complementary relationship between urban components [13]. In this study, the spatial configuration of an urban district market is regarded as a network that causes interactions between the market and the surrounding urban components. Given that space syntax investigates aspects of flow, transport, and potential movement of pedestrians in cities through spatial configuration analysis [8], it can identify the interaction of retail activity with
the spatial configuration of the street network [14]. Therefore, this study has adopted space syntax as a methodology to quantitatively analyze the relationships among the components based on the spatial configuration.

How does spatial configuration support the survival and rehabilitation of a traditional market? To answer this question, this study has identified the measures to achieve the sustainability of traditional markets, based on the identification of the spatial compositional characteristics of the traditional Korean market that diverge from those of large discount stores and the western commercial architectural style, and to find out a spatial configuration applicable to market revitalization in terms of the network analysis. To do so, this study derives the characteristics of the spatial configurations that support the rehabilitation of traditional markets by calculating syntactic measures of nodes in the street network of the traditional market and its vicinity using an analytical model based on space syntax.

2. The Characteristics of Korean Traditional Markets

According to the South Korean “Special Act on The Development of Traditional Markets and Shopping Districts” and the Enforcement Decree of the same Act [15,16], a “traditional market” is a market that was created naturally or by social and economic needs, where trade of goods and services is conducted through traditional methods and is based on mutual trust; it includes more than 50 stores and a gross area of over 1000 square meters, including buildings and convenience facilities, or in the case of a market within a building, sales and business facilities and convenience facilities.

Unlike modernized markets that accommodate foreign cultures and follow global trends, traditional markets follow traditional methods, physically or operationally.

After the Korean War, with vigorous industrialization, a tide of urban modernization occurred in Korea and several traditional markets in Seoul were modernized according to the city redevelopment plan in the late 1960s. In 1967, especially, the “Modernization Plan of Traditional Markets” for major traditional markets in Seoul was established [17]. At that time, the modernization of Namdaemun Market, the largest traditional market in Korea, was accomplished by expanding the existing spaces and constructing new, modern buildings to enhance its commercial function; as a result, this market has become a model for the redevelopment of other traditional markets. This includes the nearby Dongdaemun Market; as it was redeveloped, Dongdaemun Market and Namdaemun Market evolved together [18]. These two markets can be seen as successful examples of the Korean redevelopment policy, in which the commercial functions of the markets were enhanced by accommodating many stores within large modern commercial buildings thanks to the active support of the government.

As pressure grew on Korea in the 1980s to open its markets to international competition, the government established a three-step plan for opening markets in October 1988. As part of the plan, measures for opening the domestic market were taken in 1991 [19]. As the market became fully open in 1996, in an environment of free competition, foreign distributors and large corporations rapidly established and expanded operations in Korea [20]. Given these circumstances, traditional markets were left behind; due to aging facilities, lack of large retail distribution systems and lack of facilities and services, traditional markets became uncompetitive, and their sales dropped sharply [21]. To seek the revitalization of local business districts and the balanced development of the retail industry by facilitating the modernization of the facilities and business management of traditional markets, the Korean government enforced the “Special Act on the Nurturing of Traditional Markets” in 2005 [22]. Thanks to the government’s support, provided through the implementation of the special act, struggling traditional markets gained an opportunity for revitalization.

Retail markets can be categorized according to the degree of planning [23,24], ownership, control and spatial configuration [12,25]. In Korea, traditional markets have formed and evolved in an unplanned way, under fragmented ownership, whereas modern markets have been created in a planned manner, often under single private ownership. Most Korean traditional markets are composed of small stores densely arranged along pedestrian streets, often with a canopy to prevent rain on top. When these streets are repeatedly crossed, they form a network structure. Korean modern markets,
on the other hand, are made up of “big box” stores, such as superstores and mixed-use commercial facilities, with modern shops located along streets wider and more spacious than those in the traditional markets. Another distinction between traditional and modern markets is that in traditional markets, bargaining between sellers and buyers is direct, while in modern markets it is indirect. This makes it possible to negotiate prices in traditional markets. Additionally, in traditional markets, many street vendors do business on the sidewalk at the market boundaries, while in modern markets strong controls and surveillance prevent street vendors from doing business around the market. The foregoing can be summarized as shown in Table 1.

Table 1. Different features of traditional markets and modern markets in Korea.

| Categories          | Traditional Markets                                                                 | Modern Markets                                                                 |
|---------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|
| Formation method    | Formed in an unplanned manner.                                                     | Formed in a planned manner.                                                   |
| Ownership           | Ownership is fragmented.                                                            | In the case of the big box store, ownership is usually single and private.    |
| Spatial form        | Most are in the form of street markets with many small buildings while the upper part of the street is often covered by a canopy. | Most are built in the form of a street market or big box store.               |
| Shoppers’ passage   | Usually, shoppers’ passages are narrow.                                              | Shoppers’ passages are wider and more spacious than those of the traditional market. |
| Price of products   | Negotiable.                                                                         | Predetermined.                                                                |
| Street vendors      | Many street vendors do business on the sidewalks at the market boundaries.            | Strong controls and surveillance prevent street vendors from doing business around the market. |

3. Methods

3.1. Selection of The Research Area

In 2015, through the careful evaluation of the recommendations received from the local government, the Korea Tourism Organization (hereafter KTO) chose the 16 traditional markets that are most worth visiting for tourists in Korea [26]. Traditional markets can serve as tourism resources to drive regional economic growth; in 2018, the Korean government selected 20 representative traditional markets, including Yukgeori Market [27].

According to the “Enforcement Rules of The Special Act on The Development of Traditional Markets And Shopping Districts”, based on the size, a traditional market is categorized as a large market if it has 1000 stores or more; as a large middle market if it has 500 or more stores but less than 1000 stores; as a middle market if it has 100 or more stores but less than 500 stores; and as a small market if it has less than 100 stores [28].

There are 15 traditional markets in Cheongju, of which 11 are small, three are medium-sized markets and one is a large market, that is, Yukgeori Market.

As the largest and most prosperous among all of the traditional markets in the province, Yukgeori Market, in the unique tradition of Korean markets, operates as a street market with a 5-day and dawn market, held 5 days every month (2nd, 7th, 12th, 17th, 22nd, and 27th of each month). While continuing to uphold the unique traditions of Korean markets, Yukgeori Market has achieved commercial success by promoting merchant organizational activities. From 2007 to 2009, the market received two Presidential Awards and two Ministerial Awards; it was also given the title of “excellent market” for three consecutive years from 2009 to 2011 at the South Korean Leading Market Expo hosted by the Small and Medium Business Administration (now known as the Ministry of Small and Medium Enterprises and Startup). As a result, Yukgeori Market was recognized as an outstanding market with growth potential and was selected in 2015 as the target site for the Project for Promoting Global Premium Markets by the Small and Medium Business Administration (SMBA) and the KTO [29].
As Yukgeori Market represents a traditional Korean market that has had commercial and reputational success, it was selected as the research subject of this study.

In this study, both a city-level analysis of Cheongju and a neighborhood-level analysis of the central business district (CBD), which includes Yukgeori Market and its vicinity within the old center of the city, were conducted. As shown on the map in Figure 1, the district is separated from the surrounding urban area by a wide road for car traffic (thick yellow lines on the map) and a long stream.

![Figure 1. The district selected as the research area, containing Yukgeori Market and its vicinity.](image)

3.2. The Construction of a Street Network for Spatial Analysis

In this study, a city-level analysis was conducted to derive the spatial attributes of all traditional markets throughout Cheongju and to identify both their commonalities and the distinctiveness of Yukgeori Market among them. Then, a neighborhood-level analysis was performed to identify in more detail the spatial configurations in the commercial district—the old center of the city, including the market and its vicinity.

First, to analyze spatial configurations at the city level, we modeled the entire street network throughout the city in the form of a Drawing Exchange File (DXF), a data file format enabling data interoperability among computer-aided design programs. Next, to analyze spatial configurations at the neighborhood level, we extracted a partial street network covering the district where Yukgeori Market is located.

3.3. Analytical Formula

Hillier (1996) defined a spatial system’s “configuration” as the degree of relationships that it allows among and through its elements [7]. Space syntax, a methodology developed by Hillier and Hanson (1984), is a set of analytical techniques used to describe and quantify spatial configurations in cities or buildings, for purposes of urban and architectural planning [8]. Hillier and Iida (2005) measured the correlation between measurements of space syntax and pedestrian traffic to identify, from a geometric and topological perspective, how the spatial configuration of street networks influences the movement flows of cities, thus affecting the evolution of land-use patterns [30]. Additionally, Can and Heath (2016) showed that spatial configuration influences social activities by examining the importance of the configuration related to urban morphology and social relations [31].
According to the basic space syntax theory, the mean depth (MD) for a space in a system can be calculated by dividing the total depth—the sum of the depths via each of the shortest routes between one space and all other spaces—by the number of spaces in the system. The formula is as follows:

$$MD_x = \frac{\sum_{i \in S \setminus x} D(x, i)}{k-1} \quad (1)$$

where $MD_x$ is the mean depth of a space $x$ in system $S$, $D(x, i)$ is the depth of the shortest path between space $x$ and space $i$ in the system and $k$ indicates the number of spaces in the system. $MD$ is a measure of the degree of integration/segregation of space in system $S$; a lower $MD$ for a space means that the space is more integrated into the system. In terms of space syntax, a more integrated space is generally interpreted as a more public space.

Angular Segment Analysis (ASA) [32], an analysis model extended from basic space syntax, calculates $MD$ for a space by considering the turning angles from a space to another space as follows:

$$MD_x = \frac{\sum_{i \in S \setminus x} D_\theta(x, i)}{k-1} \quad (2)$$

where $D_\theta(x, i)$ is the depth calculated by considering the angle ($\theta$) for each turn from space $x$ (root) to space $i$ (destination) in system $S$, which ranges from 0 (no turn) to 2 (a 180° turn). In this way, ASA supplements the $MD$ of the basic space syntax mentioned above, which focuses only on topology.

This study employed this equation to analyze the city-level research area. The equation was implemented in a computing environment using “Depthmap X”, an analysis tool developed by Varoudis (2013) [33].

Batty (2013) understood a city as a network and system of flows, not just as a place. From this perspective, Batty developed methods to capture and express the vast complexity of a city, accounting for streets as nodes and streets as links in a street network [9]. Jiang and Claramunt (2002) suggested the concept of point-based space syntax to model large-scale urban spaces as a finite set of small-scale spaces [34]. The point-based method can analyze urban spaces at a micro level (neighborhood level), while the line-based analysis based on Equations (1) and (2) can analyze the spaces at a macroscopic level (city-level).

Jeong and Ban (2016) proposed an extended equation for point-based angular analysis, inspired by the concept of point-based space syntax, to identify the attributes of the nodes as a set of points in spaces connected by the path segments in a street network, which cannot be covered by the line-based analysis [35]. To get the spatial attributes of nodes, $MD$ for a space is calculated by considering the metric distance and turning angles required to go from a point to any point via the shortest angular path, as follows:

$$MD_x = \frac{\sum_{i \in S \setminus x} \sum_{n_1, n_2, n_3 \in (x, i)} D_\theta(n_1, n_2, n_3) L(n_2, n_3)}{L_{total}} \quad (3)$$

where $D_\theta(n_1, n_2, n_3)$ indicates the depth obtained by considering the turning angle ($\theta$) between two path segments defined by the three consecutive nodes ($n_1$, $n_2$ and $n_3$) of all nodes $N(x, i)$ on the shortest path from space $x$ to space $i$ in system $S$; $L(n_2, n_3)$ indicates the length $L(n_2, n_3)$ of a segment consisting of two nodes ($n_2$ and $n_3$); and $L_{total}$ indicates the total length of all segments in the system. The above approach can model a street network finely, as it considers metric and geometrical properties in addition to topological properties. The present study employed this equation to analyze the neighborhood surrounding Yukgeori Market. The equation was implemented in a computing environment using “J-Studio for Spatial Analysis” (J-SSA) as the point-based analysis tool [35].
4. Results of The Analysis

4.1. Basic Survey

Before the main research to analyze the spatial configuration, a basic survey was conducted to identify the overall status of traditional markets in Cheongju—their general and common features and the unique distinctiveness of Yukgeori Market among them. The status of the markets is shown in Table 2.

Compared to other 14 traditional markets with fewer than 150 stores, Yukgeori Market is composed of 1202 stores in the largest land area (45,433 m²) among the markets in the city. Rao (2019) illustrated that different retail types in terms of the spatial structure may create synergies for vibrant urban public life or, conversely, weaken public life due to strong private control [36]. Among the traditional markets in Cheongju, retail types that accommodated many stores in a single building were investigated only in two markets; in all other markets, the facades of most shops face the open streets. Additionally, street vendors or store owners operate temporary street stalls in nine markets. It was observed that the street stalls were placed along open streets and sidewalks of the market boundary. In the case of Yukgeori Market, the street-facing stores and street stalls in the market can be considered to be retail types that increase the publicity attracting customers (Figure 2).

Table 2. The overall status of traditional markets in Cheongju.

| Market Name          | Number of Stores | Land Area (m²) | Market Size | Store Placement Type                      |
|----------------------|-----------------|---------------|------------|------------------------------------------|
| Gagyeong Terminal    | 85              | 8389          | Small      | Street-facing and street vendor          |
| Naedeeok-jayon       | 52              | 9395          | Small      | Street-facing                            |
| Naesu                | 76              | 6912          | Small      | Street-facing and street vendor          |
| Dukkeobi             | 59              | 6816          | Small      | Street-facing and street vendor          |
| Bokdae               | 55              | 7843          | Small      | Street-facing and street vendor          |
| Bokdae-gagyeong      | 77              | 8000          | Small      | Street-facing and street vendor          |
| Bukbu                | 133             | 10,296        | Medium     | Street-facing and street vendor          |
| Sajik                | 71              | 10,735        | Small      | Street-facing, street vendor and accommodation in a building |
| Seomun               | 73              | 15,269        | Small      | Street-facing                            |
| Ochang               | 71              | 35,784        | Small      | Street-facing                            |
| Wonmaru              | 103             | 7968          | Medium     | Street-facing                            |
| Yukgeori             | 1202            | 45,433        | Large      | Street-facing and street vendor          |
| Joongang             | 62              | 4380          | Small      | Street-facing and accommodation in a building |
| Jikji                | 60              | 5640          | Small      | Street-facing                            |
| Sachang              | 103             | 5109          | Medium     | Street-facing and street vendor          |

Source: Chungcheongbuk-do (2019) [37].

Figure 2. A view of Yukgeori Market.
During the rapid decline of traditional markets during the 1990s, nine merchant associations—one for each type of product in the Yukgeori Market, as seen in Table 3—were incorporated into a single merchant association, which then asked the central and local governments to support the market’s revitalization in 1999. In the 2000s, having gained policy support, the association expanded the amenities for customers and merchants in the market, issued Korea’s first traditional market gift certificates and conducted various other activities [38]. As of 2018, there are 1200 stores and 3278 employees in this market, which has a total area of about 90,000 square meters. The stores in the market sell primarily processed foods, houseware, and agricultural, aquatic and livestock foods.

**Table 3. Number of stores by sale item in Yukgeori Market.**

| Categories          | Sale Item | Contents                                |
|---------------------|-----------|-----------------------------------------|
|                     | Agricultural Foods | Livestock Foods | Aquatic Foods | Processed Foods | Clothing and Shoes | Housewares | Restaurant Foods | Others |
| Number of stores   | 420 (35%)  | 120 (10%)  | 300 (25%)  | 84 (7%)  | 36 (3%)  | 60 (5%)  | 60 (5%)  |         |
| (Percentage)        |           |             |             |           |           |           |           |         |

Survey period: 1–15 May 2018.

Most traditional markets in Cheongju were found to be street-facing, in a characteristic arrangement of being placed alongside the street so that the storefronts are adjacent to the street as the market pathway. In only two cases, several stores are inside one building. The single building type also illustrates the characteristic arrangement with stores placed alongside the pathways in the building, which is similar to the street-facing type. Customer movements in traditional markets are shaped by the arrangement of the stores. In Yukgeori Market, a plurality of customer movement axes intersects to form an intertwined street network.

**4.2. Spatial Configuration Analysis Results**

**4.2.1. City-Level Analysis Results**

At the city level, the analysis results presented visually in Figure 3 refer to the measured values determined by applying the reciprocal of the MD that was obtained from applying a weight to the turning angle of the segments that make up the network (segment angular integration). The measurements are visualized on a spectrum scale: the redder the segments that form a street network in our analysis, the higher the measured value of integration; and the bluer the segments, the lower the measured value of integration.

Most of the traditional markets in Cheongju, including Yukgeori Market, are located along the north–south and east–west main roads. Spatial network analysis of the whole city at the city level showed that the two road axes are composed of segments with low mean depths and thus are highly integrated within the city’s spatial system. Yukgeori Market is located in an area with a particularly high degree of integration, originating from a spatial configuration functioning as a transportation hub where the four main roads leading to all areas of Cheongju intersect. Along the four roads branching out from the entrance to Yukgeori Market to the north, east, southeast, and southwest, intra-city buses run routes crisscrossing the entire city of Cheongju. Around the market entrance, bus stops congregate, also serving as transfer stops.

In particular, the bridge where one of the above four roads passes, connecting spaces of the city separated from each other and divided into eastern and western regions by the long Musimcheon stream over which the bridge passes, plays a major role in creating the spatial configuration in which the market is central and highly integrated.
At the city level, the characteristics of Yukgeori Market were as follows: it functioned as a transportation hub because of its location at the intersection of roads flowing into all parts of Cheongju and its proximity to the bridge over the Musimcheon stream that flows through the city. The market focuses on commerce and works as a connection point between the east and west of Cheongju, separated by the stream.

4.2.2. Neighborhood-Level Analysis Results

Pafka (2017) argued that in space syntax analysis at the neighborhood level, topological models could yield inaccurate analytical results, as they ignore a range of urban morphological attributes [39]. Therefore, at the neighborhood level, to analyze the district including Yukgeori Market and its vicinity, this study extended the basic space syntax model by using a method that considers and analyzes the turning angles and street lengths of paths in the street network. In this way, the extended model can handle topology and metric elements. Using this method [32,35], the characteristics of the spatial configuration were derived from the geometric and topological elements.

The district selected for the analysis, which includes Yukgeori Market and its vicinity, has mainly pedestrian-centered areas, and the car-based main road outside the boundary, where public and private vehicles operate, forms a major spatial barrier. In particular, it can be inferred that the spatial barrier formed by the main road located on the east and the Musimcheon stream in the west created the spatial barrier.

Table 4 presents a comprehensive summary of the spatial network configuration and land-use pattern supported by this configuration for the entire city of Cheongju.

Table 4. Spatial configurations and land-use patterns of the market at the city level.

| Spatial Configuration | Land-Use Pattern |
|-----------------------|------------------|
| The intersection of the roads leading to all areas of the city | Use as a traffic junction |
| Adjacent to a bridge connecting eastern and western areas of the city, which are separated by a long stream | The concentration of commercial functions |
| The concentration of commercial functions | Connection of two separated areas |
| The concentration of commercial functions | The concentration of commercial functions |

Figure 3. The result of the spatial analysis of the whole city.
configuration of the district and has a long axis in the north–south direction. The main road on the east boundary of the district has retail stores along both of its sidewalks; thus, this study included the sidewalk with some retail stores outside of the boundary and the street segments connected to it in the subject for analysis.

Figure 4 shows the results of the spatial analysis of the district where Yukgeori Market is located and its vicinity at the neighborhood level.
Based on Figure 4a showing the locations of retail stores and other buildings, we identified that the district consists of three zones (comprising the modern, traditional and buffer areas). The modern area, located in the northern area of the district, mainly consists of chain stores that correspond to big box stores such as superstores, department stores, and multiplexes (Figure 4a-1), and specialty stores intensively arranged along the north–south axis of the street (Figure 4a-2). There are two traditional areas (Yukgeori Market and Seomun Market) in the district. Yukgeori Market, located in the southern area of the district, contains many small independent retail stores arranged along a canopy-covered walkway (Figure 4a-6). Seomun Market is famous for its street lined with many traditional restaurants that serve grilled pork chops, but this marketplace was excluded from the analysis given that this study focused mainly on the spatial analysis of retail stores. Between the modern and traditional areas, there is a special area where independent specialty stores are mainly arranged along the east–west axes and houses and accommodations, such as hotels and motels, are intensively distributed; in this study, we called this a "buffer area" (Figure 4a-3–a-5).

To analyze the research area at the neighborhood level, we calculated the attributes of spaces at nodes of the street network in the urban district surrounding the Yukgeori Market. The configuration of a street network as an urban grid can influence the proportion of pedestrians at the neighborhood scale [40]. Using Equation (3), mentioned in Section 3.3, the spatial depths of the nodes comprising the district’s street network were calculated by considering metric distances and turning angles required to go from a point to any point via the shortest path.
As shown in Figure 4b,c, the analysis found that nodes on two north–south axes (axes 1 and 2) passing through all of the modern, traditional, and buffer areas in the district containing the market and its vicinity, had shallow spatial depth values, which indicates high integration.

Axis 3, with a high degree of integration, was what was once inside the fortress wall, which had north, south, west and east gates; this was once a major road that passed between the north and south gates. Another north–south axis (axis 4) consisting of nodes with high integration at the district’s boundary was parallel to axes 1, 2 and 3, and formed along the main road on which public transit operated. There are bus stops along the axis, and the bus stop in front of Yukgeori Market diverges into many bus routes that allow access to all of the areas of the city. Therefore, the public could easily access the axis. Of the four north–south axes, two (axes 1 and 3) intersected with the four east–west axes (axes 5 through 8) consisting of highly integrated nodes.

The results indicated that of the four east–west axes, two (axes 5 and 6) form a strong centrality around Cheongju Central Park and a large outdoor parking lot. Axis 7, consisting of highly integrated nodes in the buffer area, included Hanbok Culture Street, where stores sell hanbok, the traditional clothing of Korea, and related products (Figure 4a-4). Furthermore, axis 8, also consisting of highly integrated nodes near Yukgeori Market, included the Cheongju Furniture Street, where many furniture stores were agglomerated (Figure 4a-5).

These eight axes have a web-shaped spatial configuration, which, according to the space syntax analysis, has a high degree of integration and illustrates a high public level. Therefore, the configuration was interpreted as a spatial structure that can attract many visitors to the traditional market and the highly modernized commercial area.

The four north–south axes (axes 1 to 4) were visualized as a spatial configuration that connects the highly modernized sector and the traditional market sector, while the three east–west axes (axes 6 to 8) in the buffer area were visualized as the configuration that separates the two areas. Table 5 presents a comprehensive summary of the spatial network configuration and land-use pattern supported by such configuration at the neighborhood level within the district that includes Yukgeori Market and its vicinity. The land-use pattern was mainly investigated in terms of the eight axes of the district’s street network, with relatively high integration. Thereby, it was possible to identify the factors influencing the revitalization of the traditional market by analyzing the characteristics of the land-use patterns and their relationships within the network.

### Table 5. Spatial configurations and land-use patterns at the neighborhood level.

| Location                          | Axis   | MD (Average) | Spatial Configuration                                                                 | Land-use Pattern                                                                 |
|----------------------------------|--------|--------------|---------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| The market and its vicinity      | Axis 1 | 6.22–7.87 (7.13) | Long street passing through a highly modernized commercial area, buffer area, and the traditional market | Activation of commercial business functions along the street                        |
|                                  | Axis 2 | 6.30–7.92 (6.99) | Inside the modernized area, the east–west road that meets three long north–south streets (axes 1, 3 and 4) | Operation of public transport on the axis                                          |
|                                  | Axis 3 | 6.29–7.77 (6.78) | On the boundary between the modernized area and the buffer area, the long east–west street intersecting three north–south axes mentioned above (axes 1, 3 and 4) | Used as an access road to the large parking lot located at the center of the district |
| The boundary of the district     | Axis 4 | 6.32–7.99 (6.92) | Inside the buffer area, the long east–west street intersecting four north–south axes mentioned above (axes 1 to 4) | Used as a specialized street filled with many stores selling mainly wedding gifts    |
| The modernized area              | Axis 5 | 6.70–7.77 (7.02) | Inside the modernized area, the east–west road that meets three long north–south streets (axes 1, 3 and 4) | Used as a specialized street filled with many stores selling mainly wedding gifts    |
| The boundary between the modernized area and the buffer area | Axis 6 | 6.19–7.61 (6.59) | Inside the buffer area, the long east–west street intersecting four north–south axes mentioned above (axes 1 to 4) | Used as a specialized street filled with many stores selling mainly wedding gifts    |
| The buffer area                  | Axis 7 | 6.30–7.58 (6.78) | Inside the buffer area, the long east–west street intersecting four north–south axes mentioned above (axes 1 to 4) | Used as a specialized street filled with many stores selling various types of furniture |
Commerce was active along the long north–south street axes (axes 1 to 3) connecting the modern commercial area, the buffer area with old independent stores (usually one or two stories) and accommodations and the traditional market. There were bus stations along the major road at the area’s eastern boundary axis near the market (axis 4) that provided public transit along the axis. Yukgeori Market’s street network had three north–south street axes (axes 1 to 3) that extended beyond the market and were intersected by four highly integrated east–west street axes (axes 5 to 8).

5. Discussion

The space syntax method describes spatial patterns through a clear view of the spatial structure and illustrates in detail how they relate to social processes. Therefore, this method can identify the physical and relational properties of space. However, it analyzes an organically growing city not as a transforming entity, but with static, deterministic, and linear perspectives that are unable to address the impact of locations with temporialized and dynamic activities [41]. Thus, in this study, the space syntax method was utilized only for a patchwork to analyze social phenomena in the city. Instead, we carried out the analysis using an extended model that considered the lengths of path segments and the turning angles between the segments in the street network of the study area.

The vitalization of Korean traditional markets has usually been achieved by modernizing and applying innovations to structures and operating methods based on the government’s political support; instead, this study identified vitalization factors based on the assumption that the specific structure and configuration of the urban space contribute to its vitalization.

During Korea’s urban development and renewal processes, it was possible for traditional markets to survive and revitalize because of policies that focused on preserving and supporting them. As retail market environments and purchase patterns changed due to the emergence of large western-style discount hypermarkets and the increasing popularity of home shopping in the 1990s, the government legislated a special act in 2005 to support the modernization of facilities and business operations by renovating traditional markets. It has since continued to reinvigorate and improve the markets physically and operationally. Large traditional markets, such as Yukgeori Market, which had grown continuously, were developed into tourism resources representing the local area, laying the stepping stones to advance as a high-quality market to promote Korean traditions across the globe.

During the process of modernization through urban development, Dongdaemun Market, the representative traditional market of Korea, maintained its traditional operating systems but lost its traditional spatial configuration, namely its physical environment [42]. On the other hand, Yukgeori Market retained its traditional operational and physical features. For example, regarding operations, a five-day market occurs, held every five days, which is a cultural characteristic of Korea’s traditional markets. Regarding its physical features, the market comprises street vendors selling their wares in an open street environment, which is another characteristic of Korea’s market culture. Street retail is beneficial in promoting street activity, economic development, diversity and social connection in addition to consumption [43]. Open streets provide space for active physical and social interactions [44] and increase commerce along walkways [45]. Street markets can potentially become tourist spots that attract visitors by offering opportunities to experience the local culture [46], and open street markets might facilitate inflows of tourists throughout the open area and revitalize the markets by exposing visitors to a variety of products and cultural activities.

The resilience of declining traditional city centers can be enhanced by the proximity and linkage of the parts of the center [3] and the diversity that emerges from complementary relations between them [13]. The spatial configuration created by the long axis of visually consecutive walkways in the study area was formed by the connections between Yukgeori Market and the large number of modern commercial buildings constructed after Korea’s period of rapid industrialization spanning the middle to the end of the twentieth century. We presumed that the spatial configuration of the outstretched north–south streets (axes 1 to 4) that connect Yukgeori Market to the modern commercial area is the significant reason that the traditional Yukgeori Market developed continuously while the modern
commercial areas grew. This spatial configuration suggests that meeting the needs of residents and customers, who want modern commerce and culture, as well as traditional cultural elements, might be an important factor to consider for the revitalization of traditional markets located near modern commercial areas.

In terms of accessibility, the pedestrian traffic patterns were determined by the characteristics of the street network created by the urban grids [47,48]. The street network configuration is closely related to the amount of pedestrian traffic [49]. Because shopping is one of the most important tourist activities [50], spatial configurations that create easy access to desirable products support the vitalization of traditional markets by increasing the inflow of customers. It is extremely easy to access Yukgeori Market because it is located at the intersection of roads that provide access to every part of Cheongju, and public transit operates along the district’s boundary near the market.

The highly integrated axes of Hanbok Culture Street and Cheongju Furniture Street (axes 7 and 8) functioned as a buffer zone between the traditional and modern areas, which allowed Yukgeori Market to develop and retain its idiosyncratic and traditional features without being absorbed into the modern commercial area. It was found that the east–west axes of protective separation (axes 6 to 8), which contributed to the preservation of the traditional features, and the north–south axes of communication (axes 1 to 3), connecting the modern commercial area to the traditional market, had created a spatial structure that encouraged local collaborative development between the two areas.

As mentioned above, this study illustrates that spatial configurations work to improve access to the traditional market, connectivity between traditional and modern markets and protection of the market, but the spatial configuration analysis subjects at the neighborhood level were limited to the traditional market and its vicinity in the CBD in the old city center. Therefore, future research will require the identification of more diverse and specific relationships between other urban areas and market rehabilitation.

6. Conclusions

This study identified the spatial configuration that promoted social and commercial activities in a traditional market, thereby supporting the market’s revitalization. It analyzed the case of Yukgeori Market in Cheongju, which survived the decline of traditional Korean markets that accompanied the construction of large western-style commercial buildings and the introduction of new shopping practices, such as online shopping.

The attributes of each space in the district that includes the market and its vicinity were inferred calculating the depths of the nodes in the street network, using analysis models based on space syntax. By examining and comparing spatial attributes of nodes in the network, this study identified which spatial configurations supported market revitalization.

We found that the locational characteristics and spatial configuration of Yukgeori Market’s street network were easily accessible because of the concentration of and intersections among various street axes. We also found that the open street environment with street-facing stores and street stalls in Yukgeori Market offered opportunities for visitors to be exposed to various products and experience cultural activities. Additionally, the long north–south axes from highly integrated nodes arranged in a sequence within the district’s street network attracted people and contributed to the vitalization of the market, functioning as a communication bridge between the modern commercial area and the traditional market. Moreover, it was found that other highly integrated east–west street axes functioned as a protective separation boundary that divided the area and formed a buffer zone preserving and developing the market’s traditional characteristics and protecting it from being absorbed by or merged into the modern commercial area. These findings suggest that the vitalization of traditional markets might be actuated by a spatial configuration in which the communication and separation functions between a modern commercial area and a traditional market can be performed properly. This indicates that the co-existence of traditional and modern marketplaces in the Korean context requires a buffer area. This buffer area tends to embody walkable and permeable streets (a morphological feature) with
retail clusters that fill the market gap while being linked to the local culture (a socio-economic feature). The buffer seems to simultaneously connect and separate the traditional and modern marketplaces, showing that the whole shopping center is a complex adaptive system. Therefore, based on the findings, we deduced that establishing streets that connect old to new commercial areas but appropriately separate the areas might lead to sustainable collaborative development in both types of areas.

This study has some limitations. The street network including axes with a high public level could have been identified using a survey on pedestrian movements on the streets; however, we did not include such a survey. Additionally, we conducted only a single case study. Finally, this study was unable to quantitatively capture transforming entities, such as space usage frequency, retail sales, traffic volume, and pedestrian movement in urban spaces with temporalized and dynamic activities.

Therefore, future research should focus on identifying the systematically changing configuration of the urban network and demonstrating its effect on market vitalization. Additionally, to optimally apply planning factors, such as walkability control and buffer area utilization, it is necessary to develop a participatory planning decision model that involves multiple stakeholders in retail revitalization.

Traditional markets have the potential to become a driving force in the sound and sustainable development of Korean cities by inheriting and preserving the traditions of Korean culture and attracting customers and tourists. We hope that the results of this study will contribute to achieving sound and sustainable development in modern cities that are losing their traditional features.

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