

Article

Maximizing Public and Private Satisfaction for a Better Privately Owned Public Space: The Case of Yeouido Business District

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Abstract: This paper proposes that balancing public and private satisfaction in the creation of privately owned public space (POPS) might be the key to producing more efficient and effective POPSs. Seven qualitative techniques categorized into on-site observations, space syntax, survey, and regulatory review were used to gather data, and triangulation methods were used to derive conclusions. We then discussed methods for improving POPS planning and designs that prioritize both public and private sectors by assessing the indirect and direct benefits of POPS. Indirect benefits are delivered when POPS can elevate the pleasantness of the surrounding environment. In this study, users and tenants of the host buildings were found to obtain the most benefits with their easy access to POPS, while the public saw the existence of POPS as insignificant compared to local parks. Furthermore, the lack of good designs resulted in low public interest and awareness. Although developers gain direct benefits from bonus FAR, a less rigid but more comprehensive system is needed to increase developer motivation to create better POPS. Proposals that combine two or more POPS and regulations that require connection to existing public open space networks should be considered in future.

Keywords: privately owned public space; spatial efficiency; social contribution; incentive zoning; POPS in Korea



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1. Introduction

By current trends, an “open city” has become preferred over a “closed city”, and public space is seen as a catalyst for enhancing a city’s openness [1]. However, in recent years, providing public spaces in continuously growing metropolises has become a great challenge in big cities, including Seoul [2,3]. This is especially true in city centers, commercial areas, and business districts where the density of the buildings is the highest. Expanding the public realm using privately owned public space (POPS) has become one alternative in many metropolitan cities around the world. Some studies believe that POPS can never be fully realized because the public and the private are two different, even contradicting, sectors [4]. Although there have been many attempts to maximize the multifaceted services of POPS, challenges remain. The main goal of this study was, in acknowledgment of these challenges, to seek solutions with a methodology that has not been significantly explored in the past.

The never-ending growth in urban density in business districts stressed the importance of POPS in ensuring the publicness and openness of the area. However, according to a report by the Seoul Institute in 2016, Seoul’s standards for the minimum size of open space provided by private establishments (45 m²) are lower than those of Tokyo (300 m² for residential areas) and New York (190 m² for the plaza type) where the POPS regulation is considered more advanced [5]. To fully realize its purpose, the development of POPS should not only focus on the quantity but also on the quality of the space and its connection with the existing public space network.

A second point of consideration is the physical design of POPS. The Seoul Institute stated that the planning and design of POPS in Seoul were lacking mostly in terms of accessibility and the degree of publicness. A POPS with low accessibility may lead to further issues, such as it being underused due to low recognition by the public. Although some POPS were indeed designed with the public as the core users, others were designed to prioritize the host building [6]. Kim [7] reported that Korea is starting to establish design guidelines for POPS that emphasize publicness. However, with improved accessibility, there will be managerial issues that need to be addressed. As a POPS is privately owned, the construction and management costs are usually borne by the owner of the host buildings. Since the public is the intended user of POPS, owners often feel burdened by this cost.

The third challenge follows the previous point in that land and building owners do not perceive any benefits in the creation of POPS, leading them to think that owning and managing POPS reduces their profit [8]. However, the motivation provided by the bonus floor area ratio (FAR) incentive causes the construction of POPS, by private establishments, without following proper standards. Standards such as welcoming designs for the public and the exclusion of obstacles that prevents maximum access by the public are the ones often found lacking in POPS. These POPSs have a higher chance to be underused due to their uninviting design and excessive restrictions set by the management body [9]. The challenges mentioned above suggest two conflicting entities that play roles in the creation and dynamic of POPS: the private and the public. In agreement with a study in Bücherplatz, Germany, stating that spaces such as POPS need all stakeholders to agree on interests and responsibilities to function properly [10], we believe that good POPS must consider both public and private needs. However, past studies mostly focus only on the public satisfaction of POPS or the management of POPS [5,6,11] as though the value of POPS should be seen from the public point of view alone.

This paper opened with a simple question about how to define a good POPS from a wider perspective, in which the creation of POPS satisfies all stakeholders. In our research, we explored options and strategies to maximize public and private satisfaction towards POPS by analyzing the direct and indirect benefits of having POPS in an area. As one example of a dense urban center, the Yeouido Business District (YBD) was chosen as the study's sample, and we conducted a series of field observations and surveys to discover the current quality of POPS there. Social and economic services of public space were studied to determine the types of data needed in this study. Various research instruments were then used to gather spatial, behavioral, and demographic data. Next, laws and regulations related to the planning and design of POPS in Korea, Seoul specifically, were studied and compared to various cases around the world to find any gaps that may be informative for improving the current planning system of POPS in YBD. The triangulation strategy was then used to analyze and interpret the results.

1.1. POPS vs. General Public Space

The concept of POPS was first invented in New York City in the early 1960s and the term started to be globally used in the 2000s when Jerold Kayden, a Harvard professor, published a book about New York's POPS. The rapid development of city centers packed New York City with tall buildings and, later, skyscrapers. To avoid a loss of public-access space in the city, an incentive-based zoning system was proposed to persuade private buildings to provide a public space for their residents in return for a smaller floor area ratio [12]. The main difference between POPS and regular public spaces is the provider and the manager of the space. Befitting the name, a POPS is usually owned and managed by the private sector in which the POPS is located, while public space is owned by the government and managed by the respective department of the city government. For example, in South Korea, any POPS is regulated by the Building Law while, public space is regulated under the Urban Land Use Act and is included in the masterplan of the city or region.

Although there are several direct translations for POPS in Korean, "*gonggae gongji*/공개공지" is the one mostly used by scholars [11]. *Gonggae gongji* is defined in Ko-

rean as a small rest area that people can freely use on the premises of a private establishment. According to the same law, any building with a floor area of more than 5000 m² is obligated to provide such spaces [13]. There were improvements in the regulation about the installation and utilization of POPS in private buildings from 2009 to 2020. However, creating accessible POPS that leads to high usability remains a significant challenge in Korea, specifically in Seoul's business district. This is because most building owners simply focus on providing POPS without paying much attention to its quality.

Compared to public spaces that are funded by the city for free use, POPS budgets mostly come from the developers in exchange for incentive zoning. Because POPS is the product of incentive zoning, it is almost as if the developers or landowners pay for the so-called bonus FAR by providing POPS [14]. Private sectors then manage the space in ways that restrict the public's movement for security and maintenance purposes. Although many critiques address this issue, the most discussed is probably how the private sector consistently prioritized surveillance and strict use over public freedom in utilizing the space. POPS managers often make decisions that keep their spaces sterile for safety reasons. Although it was first launched as a method to provide more public spaces, eventually, clashes between private and public interests often lead to the underutilization of POPS.

1.2. Social Services and Qualities of POPS

Several studies focused on identifying the elements that make a good public space. As the pioneers, Kevin Lynch and William H Whyte were the most notable first-generation researchers. While Lynch emphasized that accessibility and equity are the most important qualities of public space, Whyte stated that the key to successful public spaces relies on the micro-scale aspect of the physical design [15,16]. Furthermore, subsequent studies investigated a more contemporary context. The five elements that should exist in a good public space are inclusiveness, meaningful activities, comfort, safety, and pleasure [17]. The broader considerations on the evaluation of public spaces—such as civility, animation, physical configuration, ownership, and control—are believed to make a public space good as an independent urban element and as a part of the urban fabric [18].

Although there are different arguments on what constitutes good quality in a public space, the core of it is the connection of people with their communities. The qualities of public spaces allow people to have social interactions and attachments to their places or communities, as well as opportunities to connect with others [19]. The public perspective of POPS demands that it has similar qualities to general public spaces and is not simply for people to pass through without any meaningful activities or interactions. There are five attributes proposed by Jang and Lee [20] for specifically evaluating the quality of POPS—namely, accessibility, openness, convenience, aesthetics, and maintenance. With the exception of maintenance, which focuses on how the private establishments manage POPS, the other four emphasize the maintenance of a desirable degree of publicness. Jang and Lee [20] also focused on physical elements that can support and provide the social services of POPS. Physical elements play a crucial role in shaping visitors' behavior, specifically in the case of POPS where size is usually more restricted than the general public space. In a detailed manner, elements—such as greenery, shades, and seats—may have the ability to attract people to stay in a public space [21,22].

The several ways to enjoy the social services of POPS include enjoying oneself on a public bench during a break and the thrill of being in the bustle of rush hour. From the public perspective, high usability could be one indicator of a successful POPS. However, low usability is not uncommon in cases where spaces are well-equipped and physically accessible [23]. In an attempt to address this issue, a study conducted in Teheran-ro—another business district in Seoul—concluded that there is a wider scope than just the physical design that can lead to the high usability of POPS. Visual accessibility and awareness are as important as internal designs in attracting more people to visit [24,25]. To provide a larger social impact to the communities by ensuring maximum access, the connection of POPS to

the immediate or surrounding buildings should be secured, along with people's awareness of it and knowledge that it is for public use.

1.3. Direct and Indirect Benefits of POPS: Private Perspective

Although several studies agreed on the social and environmental services of public open spaces in cities, only a few thoroughly examined the cost and benefits of providing these spaces [26]. This is particularly noted in the case of POPS, for which its creation is often seen as a sacrifice of private land that entails further loss from the continued costs of ownership and management. Considering the reluctance of the private sector in providing POPS, it is important to view its services in a way that would satisfy both public and private sectors. Although services rendered to the public are more apparent, it takes more effort to convince developers on the services they can obtain from creating POPS. Therefore, to shape a comprehensive understanding of how the private sectors find POPS to be satisfactory, both direct and indirect benefits that can be gained by the developers or landowners need to be considered.

For indirect benefits, it is necessary to understand the economic services of POPS as an urban public open space. An early study on the economic benefit of urban public open space showed that it has a positive effect on the prices of the surrounding property [27]. Furthermore, several subsequent studies attempted to determine the economic benefits of open spaces that resulted from their social and environmental benefits. Although Orford [28] confirmed the economic benefits of open spaces in the real estate market, the effect significantly decreased with any additional distance between an open space and a property. This indicates the sensitivity of the positive impact of open spaces on property values. Other studies found that accessible open spaces are preferred, that oversupply occurs in some metropolitan areas, and cost–benefit analysis is important in analyzing the supply of open spaces [26,29]. This elevation of land value occurs because public spaces—including POPS—act as economic drivers in cities.

Cities Alliance in 2018 stated that public spaces regenerate the urban economy in two significant ways. First, the urban economy is regenerated by providing inclusive and safe spaces that support the productivity of both formal and informal businesses. Second, they beautify cities, thereby creating a more pleasant environment. This is relevant to the initial purpose of POPS to create a pleasant environment and to contribute to the wellness of the public [30]. Incentive zoning, usually with bonus FAR, has been implemented almost everywhere to promote and persuade buildings and landowners to provide POPS within their lots. Although each city might employ different details on the bonus FAR, this incentive zoning has been the major direct benefit of POPS for developers. However, the bonus FAR needs to be carefully regulated to prevent it from becoming a mere profit tool for developers. Moreover, developers and other private sectors should ensure their investments in these spaces in order for POPS to contribute extensively to society instead of becoming a waste of space [31].

2. Materials and Methods

Figure 1 shows the three main framework stages for this study. The first step defines the issue of quality disparities in POPS in the study area and how to improve its planning and design to prioritize both public and private entities. After conducting a relevant literature review, data gathering and analyses were conducted using field observations, surveys, and a review of the related laws and regulations. Several physical elements affecting the accessibility and efficiency of POPS were recorded during the field observation. Furthermore, the users and potential users were surveyed on their experiences in POPS, their understanding of what it constitutes, and their awareness of the degree of publicness. This step also included a thorough review of the laws and regulations related to creating POPS in Seoul, specifically Yeongdeungpo District where the site is located. Subsequently, the data obtained on laws and regulations were compared to similar cases around the world to determine their implications. The last part includes an analytical interpretation of the

results, a derivation of a good POPS definition based on the analysis, translations into future guidelines and recommendations, and the limitations and suggestions that should be addressed in future studies.

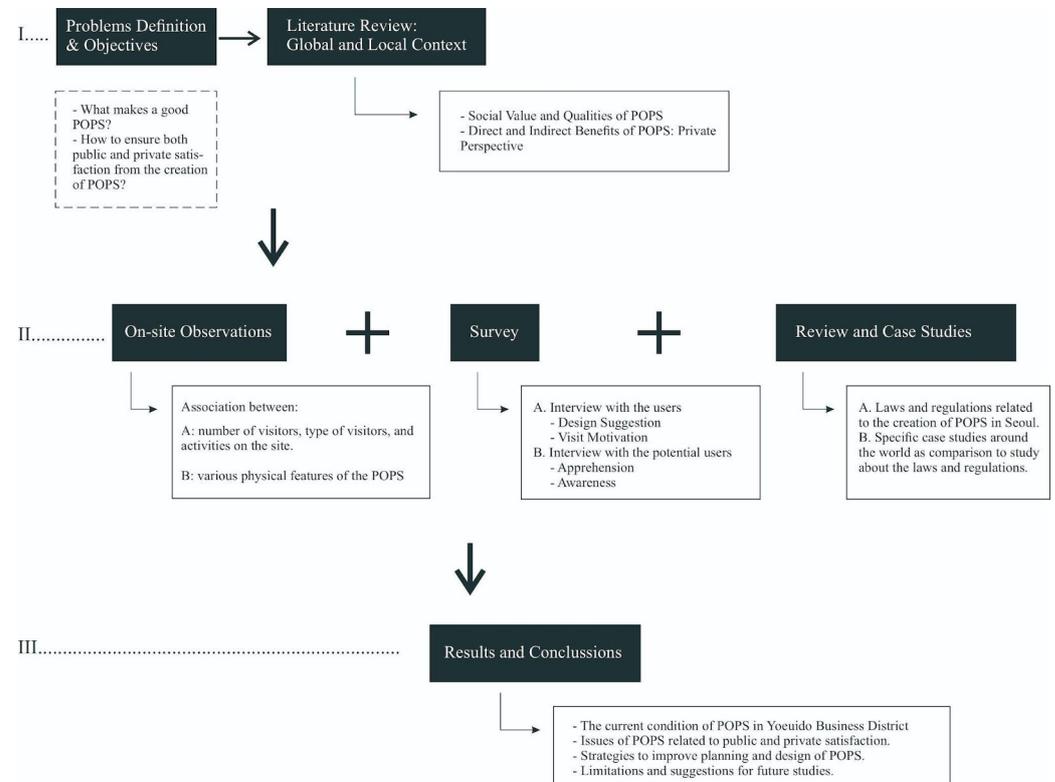


Figure 1. The research framework.

2.1. Sample and Site Location

A database from Korea's Building Life Cycle Management (BLCM) was used to identify the POPS in YBD and to choose relevant samples for the study. BLCM is an integrated online system by the Ministry of Land, Infrastructure and Transport for monitoring the status of buildings in Korea. It is a one stop-service where anyone can easily and conveniently manage or check a building from the time it has been approved for use to its demolition. All architectural information regarding the building site can be viewed using the system. The owners can easily manage and report their building inspections, while the public can check any building's status by using its integrated map service. As a subject that is also regulated by the Building Act, information about POPS can be accessed by using the following website: blcm.go.kr (accessed on 8 June 2022). In addition, only POPSs that were registered on the BLCM database were considered in this study.

Although Seoul has several urban cores, YBD was selected as the study's site since previous investigations already covered other areas [11,20,25]. As presented in Figure 2, YBD has a total of 34 POPS, which is relatively high in number compared to other areas. Out of this total number, only 20 were found registered within 5 official POPS categories based on BLCM. Furthermore, 12 POPS were categorized as paths, 4 were categorized as gardens, and the other 4 were categorized as plazas. Four path-type POPSs, two gardens, and two plazas were selected to have samples that represent all the POPSs on the site. A total of eight samples were selected because they have a minimum total area of 150 m², which is considered to be the proper size for a thorough observation. After further filtering, four samples were found to have a very limited option of urban furniture and other design elements that hinder the observation from obtaining the optimized results. Therefore, only four samples were eventually considered fit for this study. Table 1 below shows the summary of all selected samples:



Figure 2. The location of Yeouido Business District within Seoul city and the distribution of POPS on site (source: author analysis with a base from blcm.go.kr, accessed on 8 June 2022).

Table 1. Four samples of this study.

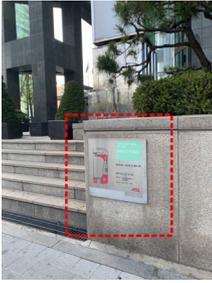
Sample	Picture	POPS Sign	Area Size	Urban Furniture	Location	Building Type	Address
Sample 01			179 m ²	<ul style="list-style-type: none"> - Seating area - Pergola - Smoking area 	On the side of the building	Corporate Office	Seoul, Yeongdeungpo District, Yeouido 13-1
Sample 02			935 m ²	<ul style="list-style-type: none"> - Seating area - Pergola - Bicycle Parking - Trees - Fountain 	In front of the building entrance	Business Center Offices	Seoul, Yeongdeungpo District, Yeouido 45-21
Sample 03			195 m ²	<ul style="list-style-type: none"> - Seating area - Pergola - Smoking area - Beverage vending machine 	In front of the building entrance	Business Center	Seoul, Yeongdeungpo District, Yeouido 15-24

Table 1. Cont.

Sample	Picture	POPS Sign	Area Size	Urban Furniture	Location	Building Type	Address
Sample 04			632 m ²	- Seating area - Trees	In front of the building entrance	Business Center Offices	Seoul, Yeongdeungpo District, Yeouido 28-1

2.2. Research Instruments

A qualitative approach with multi-methods was implemented for this study to develop a comprehensive understanding of the topic. The first method is a direct field observation that addressed the physical elements of POPS, the second method is a survey that focused on the users and potential users, while the third is a comparative review of the current laws, regulations, and related cases outside Korea. Field observations were conducted to investigate the extent to which physical elements can contribute to the services offered by POPS. The three main research instruments used for the direct field observation included behavior mapping, content mapping, and space syntax analysis. The behavior map was proven to be powerful for studying the quality of public space because it did not only show the layout of a place but also the users' activities and behavior within a certain period in a specific location [32]. The relation between the physical features of a space and the users' behavior was investigated using the map. The mapping was conducted in four different periods, twice during the weekday and twice during the weekend, to obtain the most robust data. A minimum of 15 min was required to observe an outdoor behavior setting [33].

To examine the accessibility of the POPS as one important design element, a descriptive analysis was conducted with content mapping of the space on how it is connected to its surrounding. The important elements of the surrounding area include the host building(s), main arterial road, the train station or bus stop, and the nearby general public spaces. This study aims to emphasize that proximity to those elements will increase POPS's degree of accessibility, thereby contributing to the overall value of the district [34,35]. The third method comprises an axial map analysis, which uses the space syntax technique to delineate the connectivity and integration of the entire urban environment of YBD. First developed by Bill Hillier in the 1970s, space syntax is a powerful technique that studies the relationship between tangible factors of urban morphology and society, as well as intangible aspects [36]. The depth map software—developed by UCL's Space Syntax—was used to perform the axial analysis, as it is the industry standard for studying the relation between pedestrian behavior and the urban fabric [37]. The locations of the POPS were subsequently overlaid on top of the axial map to know how well the space is connected and integrated with the surrounding area.

The purpose of this study is to measure the public's awareness and also to know whether the POPS fulfilled its role as a public space. The questions for the users include the following contents: (i) the purpose of the visit, (ii) the frequency of the visit, (iii) the length of stay, and (iv) the opinion of the POPS design. For potential users, the visitors of Yeouido Park located in the middle of YBD were asked questions related to the existence of POPS, and it is important to know the external factor(s) that prevented people from visiting the space. The last method of examining the laws, regulations, and case study were conducted to understand the management of POPS and how it may or may not benefit the developers. This information was analyzed using the triangulation strategy, where multiple data from different methods were used to answer the research questions, develop an understanding of the topic, and finally derive conclusions [38,39].

3. Results

3.1. Proximity to Relevant Facilities

People have the tendency to select a specific place based on their travel abilities, needs, and preferences [40]. Although it is hard to determine these aspects when traveling to a POPS, it is certain that the closer the POPS is to the users, the easier it can be accessed. The four major points that were considered for proximity observation are as follows: subway stations, bus stops, residential areas, and the main street. A radius of 350 m was used for the proximity to a bus stop and 500 m was used for a subway station [41]. All samples were within walking distance to at least two bus stops and one subway station. However, Samples 3 and 4 were closer to more public transportation nodes as shown by the thick coverage of the service area of each bus stop and station (Figure 3). Proximity to public transportation not only makes visitation easier but also means that it will be noticed by more people.

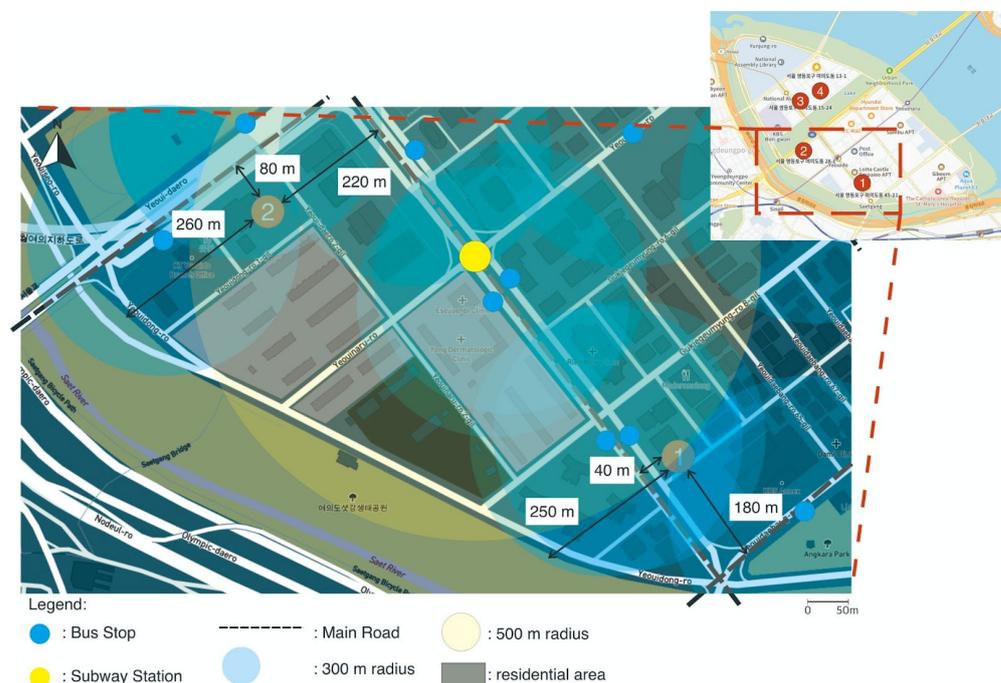


Figure 3. The proximity of Sample 1 and 2 from the bus stops, subway station, and nearby parks. Compared to the other samples, Sample 2 has the closest proximity to most facilities.

The field observation results illustrated that proximity to different facilities or functions has different impacts on the visibility of POPS to the public. The proximity to main streets seems to have a rather opposite effect from that of public transport. Due to the nature of the main streets in a business district where pedestrians only focus on their destinations without noticing the surroundings [42], POPSs located near the main street of YBD do not obtain as much exposure and attention from the pedestrian as the ones located near public transport stops. Although POPS needs to act as an expansion of the city's public open space network [43,44], there were no relations between the visitation rate and proximity to neighboring parks for all samples. On the contrary, proximity to residential areas boosted the visitation rate, as shown in Sample 2. Due to the POPS' small scale, visitors often come from the host building or from the surrounding areas only. Proximity to residential areas is observed to be more inviting in YBD.

3.2. Relation with the Buildings and Pedestrian Street

Since POPS is usually a part of a building complex, it is important to investigate the spatial connection between the space and its building host. Besides the easy access between the two, a prior study found a correlation between ground-floor features and face-to-face

interactions in a public open space adjacent to the building [45]. Relatively visible indoor places, interconnected entrances, and the availability of food vendors are the important ground floor features considered in this study. The flow of movement is measured by the entrances of the buildings that have direct access to the space, while ground floor features were measured by the availability of public facilities in the ground floor of host buildings. The field observation results showed that a good spatial connection between POPS and the host buildings invites both internal and external visitors to stay in the space. An internal visitor refers to the people who work at the host building or are simply related to the host building(s), and external visitor refers to the general public.

In addition to the spatial connection with the host building, the observation also considers accessibility from the adjacent pedestrian street. Moreover, the access should be barrier-free in order to be inclusive for the general public. Table 2 presents all physical elements related to the POPS and its relation with the buildings and pedestrian streets. Among the others, only Sample 4 has a barrier-free entrance. With the exception of Sample 2, most host buildings have one entrance facing the POPS. Sample 2 has multiple entrances, all of which face the POPS. Moreover, most of this sample's ground floor facade is covered by a glass material that maximizes the visibility of the indoor space. The public facilities in Sample 2 played a larger role in the occupation rate of the POPS, because they not only consist of a library and café but also have direct access to and from the space. In other samples, the public facilities are limited to a cafe or a restaurant with minimal access to and from the POPS. The spatial relationship between POPSs and the pedestrian streets showed that the variety of public facilities located on the first floor and barrier-free design plays a role in inviting the public to use the space.

3.3. POPS Design and User Behavior

One important service and vital goal of any public open space is to enrich a community's social life and to attract visitors for social activities [46].

When such spaces are privately owned, there are limitations on the kind of behavior and activities it can host. However, some basic social outdoor activities—such as sitting, having a conversation, meeting friends, and relaxing—should be accommodated by POPSs. A total of four observations were conducted for each sample to investigate how supportive each POPS's design was in promoting social interactions. Samples 2 and 4 had relatively higher numbers of visitors than Samples 1 and 3, as shown in Figure 4. Since the host of Samples 1, 2, and 4 are office buildings, there were more visitors during the weekday than the weekend. Sample 3 has a drink vending machine that invited more people during the weekend to buy drinks in between their walks. Although there is a difference in number, Samples 2 and 4 always have visitors, while on some days, Samples 1 and 3 do not.

The activities mostly recorded on the samples were people having conversations and using/staring at their phones. Furthermore, there are apparent differences in the distribution of users on the site. In Sample 1, most visitors were seen standing while performing activities, such as operating phones, and were sitting on benches in Sample 3. Figure 5 clearly shows that in Samples 2 and 4, visitors are more scattered all over the site and there is a mix of those sitting and standing while performing their activities. Proper landscaping with various vegetation, specifically in Sample 2, might be the reason for the distribution of visitors. Meanwhile, in Samples 1 and 3, vegetation was purely aesthetic and also functioned as sun shades in Samples 2 and 4. During weekday afternoons, when people usually take short breaks from work, visitors were seen standing near the entrances of Samples 2 and 4 because these spots are covered by either installed roofs or shadings from the vegetation. Male visitors outnumbered females, and no children were seen in all samples, which indicate low diversity in POPS visitors on sites. Moreover, the careful planning of vegetation and urban furniture, and the provision of supporting facilities—which can boost people's tendency to stay in POPS—are the main results found on the site.

Table 2. The physical relationship between the POPS and the buildings on the site, shown by the entrance designs and the availability of public facilities such as restaurants and cafes on the first floor.

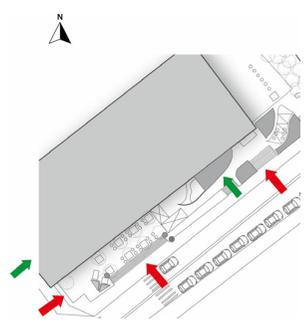
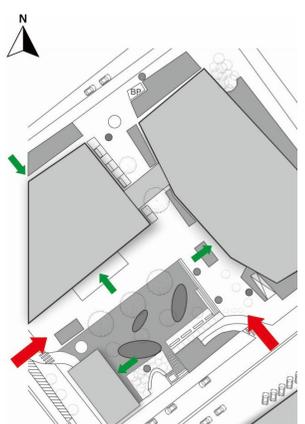
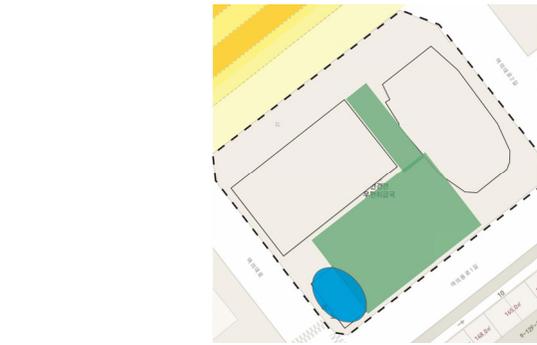
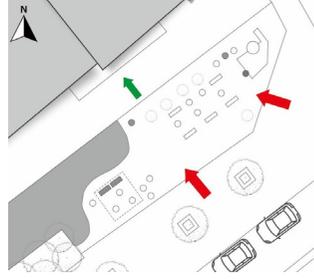
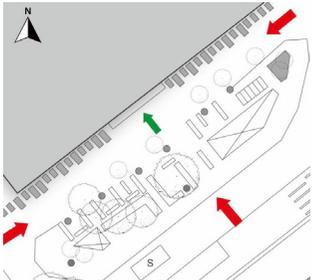
Picture	Entrances	First Floor Facilities
<p>01</p> 	 <p>  : entrance to POPS  : entrance to buildings </p>	 <ul style="list-style-type: none">  : site boundary  : 1st floor's restaurant / café / public lounge  : building  : POPS
<p>02</p> 	 <p>  : entrance to POPS  : entrance to buildings </p>	 <ul style="list-style-type: none">  : site boundary  : 1st floor's restaurant / café / public lounge  : building  : POPS

Table 2. Cont.

Picture	Entrances	First Floor Facilities
<p>03</p> 	 <p> ➔ : entrance to POPS ➔ : entrance to buildings </p>	 <p> ----- : site boundary ■ : 1st floor's restaurant / café / public lounge ■ : building ■ : POPS </p>
<p>04</p> 	 <p> ➔ : entrance to POPS ➔ : entrance to buildings </p>	 <p> ----- : site boundary ■ : 1st floor's restaurant / café / public lounge ■ : building ■ : POPS </p>

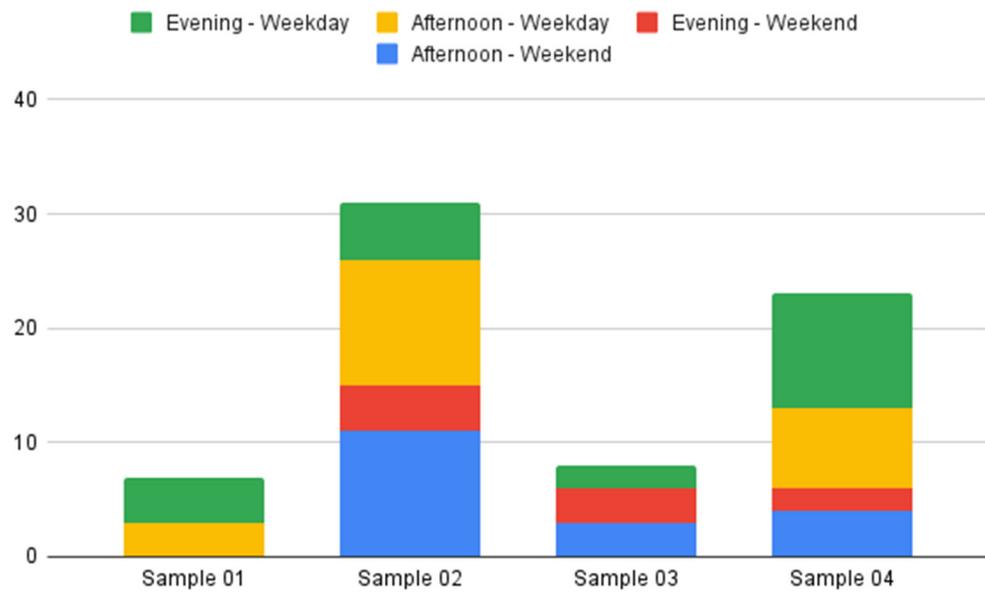


Figure 4. The total number of visitors during the behavior map observation.

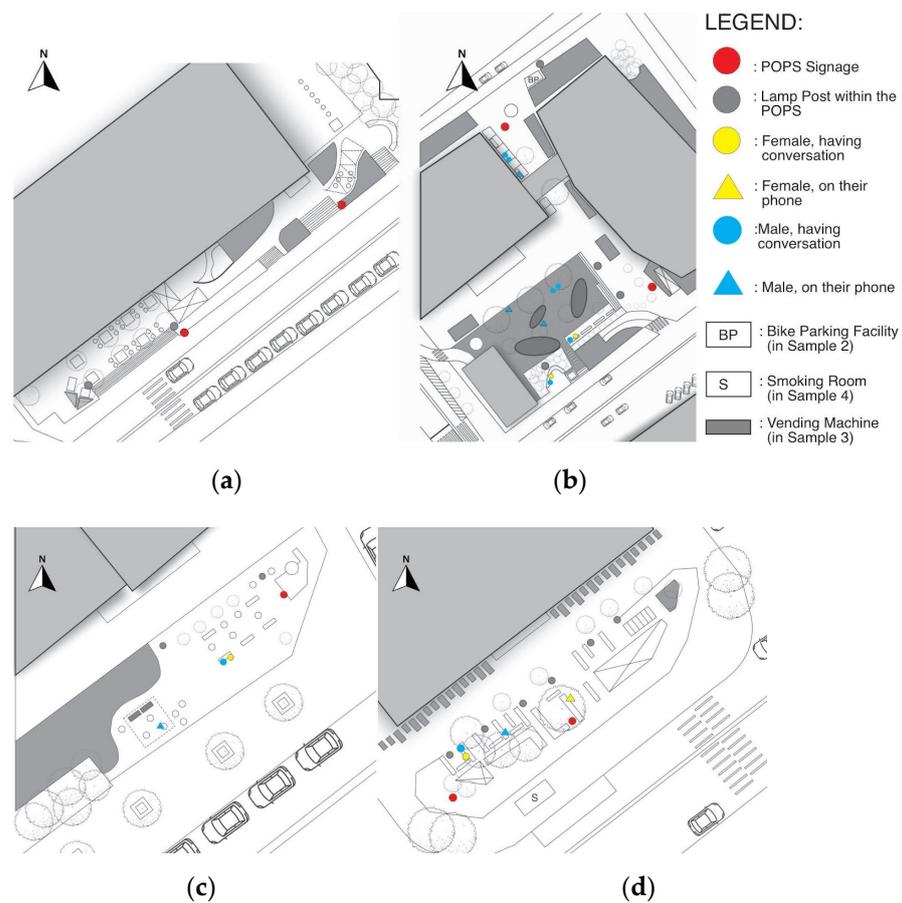


Figure 5. The behavior map of Sample 1 (a), Sample 2 (b), Sample 3 (c), and Sample 4 (d) on a Saturday afternoon. Sample 2 and 4 comparably attracts more visitors than Sample 1 and 3. The design of Sample 2 and 4 also shows a more comprehensive layout.

3.4. Axial Map: Connectivity and Integration

In the space syntax method, the connectivity value refers to the number of connections a street or path has to other direct streets/paths, and it is highly related to the degree

of integration between a street and all other streets in the urban environment [47]. These measurements are important in this study because they are related to the distribution of movement, which means that streets with higher integrations are more likely to attract movement [48]. The result of this analysis is important in knowing the quality of POPS location. Figure 6 presents the result of axial map analysis of the YDB site that indicated all four samples had different connectivity and integration values. It was also found that most of the POPSs on the site were not located near the street with the highest connectivity. Sample 2 was the closest to the highly connected street, and Sample 1 was located near a moderately connected street. Moreover, Samples 3 and 4 were located in a street with low connectivity. Integration, which is also related to connectivity, shows how many streets can access a particular street. Similarly to the connectivity measurement result, most POPSs in the area were not located near the street with the highest integration value. Among the others, only Sample 2 was located near the highly integrated street. However, Samples 3 and 4 were located on streets with medium integration, and Sample 1 was located on a street with low integration.

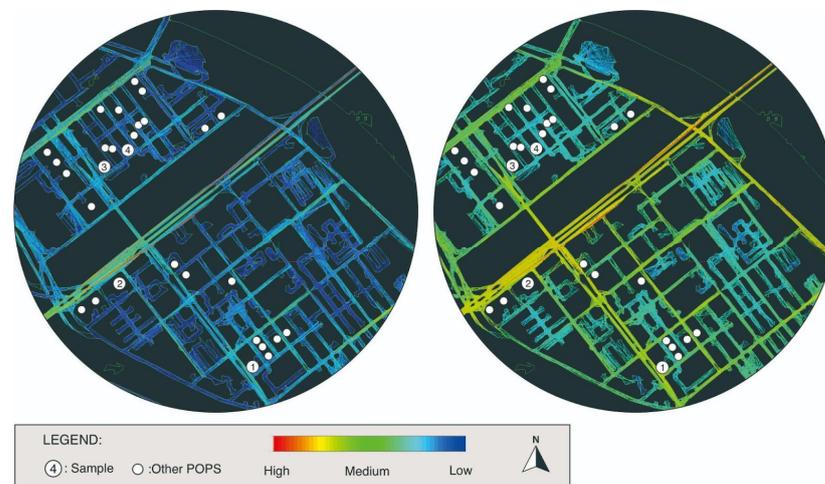


Figure 6. The axial map analysis showing the connectivity (left) and integration (right) of the urban fabric of YDB.

3.5. User Characteristics and Preferences

The users' survey of the samples was intended to ascertain the degree of the site's inclusivity, motivations in visiting the POPS, length and frequency of the visit, and suggestions for design improvements. Public spaces in general should promote social wellbeing with inclusiveness and also make everyone feel welcomed and included [49]. Although there is a certain limitation in the degree of inclusiveness in POPSs compared to regular public open spaces, this study posited that the more diverse backgrounds visitors have, the more the POPS contributes to the community. The survey results showed that the sample sites were more visited by men than women with a predominant age range of 30–50 years, and there were no child visitors. Most respondents were people working in shops near the POPS or in the host buildings where the space is located.

Out of 32 respondents, only 6 were residents of the area. Furthermore, 21 people expressed that their reason for visiting the POPS was to take a short break from their activities and that the visit was rather incidental than purposeful. The other 11 used the POPS as a place where they meet their friends. Although most of respondents stated that they visit the POPS often, they only spend a short period (15–30 min). Regarding POPS's design, 60% of respondents stated that size and vegetation were features that could be improved. Specifically, for Samples 1 and 3, respondents judged that the spaces were too small to be considered public open spaces. For vegetation, they desired more trees for shade and grass instead of pavement. Meanwhile, female respondents stated that the POPS should be brighter at night for safety reasons. These results indicated there were low user diversi-

ties on all samples and a lack of meaningful activities, specifically in Samples 1 and 3. The users' opinions support the previous results in Section 3.3, where the vegetation and size of POPS are the main aspects that should be upgraded.

3.6. Public Knowledge and Awareness

The last survey focused on the extent of POPS contributions in providing open spaces for the public and was intended for potential users. The visitors of the local public parks were interviewed to gauge their interest and awareness of POPS. The survey was conducted at Yeouido Park on a Saturday and Sunday afternoon with a total of 51 respondents. Female respondents were higher in numbers, constituting 64.3% of the sample compared to male of 35.7%. The residents of Yeouido made up 66.7% of the total, while the rest lived in other districts in Seoul. a summary of respondents' answers is shown in Figure 7. The survey's result showed that only 22% were familiar with the term POPS (공개공지) and most of them worked in construction, architecture, or urban planning. However, when photos were presented to all respondents, 87% confirmed to be familiar with such spaces, while only 26% stated that they use POPSs regularly.

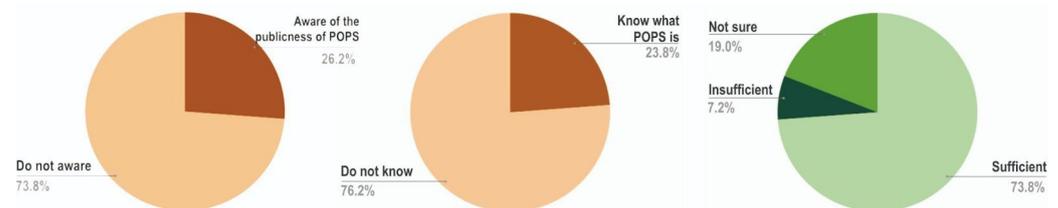


Figure 7. Key results of the survey. Yellow chart: respondent's awareness of POPS, green chart: respondents' opinion on open space in YBD.

The respondents expressed two main reasons when asked why they do not use POPS. First, the respondents had the perception that it is mainly created for the staff of the host buildings. Despite the awareness that the public is permitted to access the space, there was no attraction to visit due to this particular perception. Moreover, they were not aware of the POPS signage installed on the premises. The second reason is the relation between the general public space and visitation. Respondents stated that they would prefer to visit regular public open spaces, such as Yeouido Park. Although most respondents did not acknowledge POPS, almost 74% thought that the YBD had enough public open spaces thanks to the existence of Yeouido Park, Yeouido Saetgang Forest, and Yeouido Hangang Park.

3.7. Current Regulations and Case Studies

According to Table 3, six regulations were examined to understand how POPS management can be less burdensome relative to developers. Various related cases were simultaneously presented as a comparison. Overall, the results can be categorized into four aspects—namely purpose, design, incentive, and operation. In Korea, the purpose of the creation of POPS emphasizes creating a pleasant environment that the public can enjoy [30]. Meanwhile, an example from New York City showed that it is important to create POPS as a social setting for the public. In relation to the incentive given to owners, Korea has a clear guide on what the landowner will gain in return for providing the space [30,50,51]. Since Edward T. Whyte and Jane Jacobs pointed out design flaws that led to the underutilization of POPS; various cities have constructed design guidelines to ensure that it has the necessary elements to support social interactions. However, it is important to consider a design that can also benefit landowners. An example from Japan considers merging two or more POPS to provide more amenities to the public while at the same time lessening the maintenance burden of the management [52].

Table 3. Summary of the current POPS regulations in Seoul and relevant case studies as comparisons.

Aspect	Focus	Source	Case Study	City/Country
Purpose	Pleasant environment	A	Social setting	New York City, USA (NCY Zoning Resolution, 2019)
Design	Providing facilities for the public's convenient use.	B	Providing detailed design guidelines.	New York City, USA (NCY Zoning Resolution, 2019)
	Minimum size based on the size of the site.	C	Minimum size based on the building footprint.	Singapore (URA, 2017)
			Minimum size based on the type of POPS	Hongkong (Luk, 2009)
	Should be accessible from the main street.	C	Should be visible from adjacent sidewalks or open spaces.	Yokohama, Japan (Dimmer, 2013)
	At least one sign board must be installed.	C	At least one signboard must be installed containing all information about the POPS.	New York City, USA (Dimmer, 2013)
	Linkage between POPS and the adjacent land should be considered.	D	Combination of two or more POPS is allowed to achieve more efficiency.	Osaka and Sapporo, Japan (Kurose, 2013)
Incentive	Relaxed BCR (Building Coverage Ratio), FAR (Floor Area Ratio), and Building Height in exchange of POPS provision.	A	Enactment of various policies to avoid private developers from using incentive schemes as a means to gain profits.	Taipei, Taiwan (Hsu, 2013; Lien & Shih, 2013)
	Provision of subsidies for the maintenance and creation of POPS	C	Utilization of public-private partnership to support the maintenance and creation of POPS.	Melbourne, Australia (Beza, 2013)
	Bonus calculation method: Relaxed FAR/BCR by Building Ordinance + relaxed FAR/BCR by Land Act	E	Enactment of the Comprehensive Design System where the incentive depends on POPS' design quality	Japan (Dimmer, 2013)
Operation	No event or activity shall ever impair the utilization and access of the POPS.	A	There should be a balance between private and public rights of the space.	Hong Kong (The Development Bureau, -)
	No private or public activities should be conducted for more than 60 days	B	POPS should always encourage recreational activities	Hong Kong (The Development Bureau, -)
	Step-by step maintenance plan shall be provided by the district government, followed by necessary subsidies.	F	Private management is responsible for the maintenance works	Hong Kong (Luk, 2009)

A: Building Code, Article 43 「건축법」 제43 조. B: Building Law Enforcement Decree, Article 27-2 건축법 시행령. C: Seoul Building Ordinance, Article 26 서울특별시 건축 조례. D: District Unit Planning Guidelines, Article 3-13 지구단위계획수립지침. E: Enforcement Degree of National Land Planning Act, Article 46 국토계획법 시행령. F: Yeongdeungpo District Ordinance of Support and Maintenance of POPS 서울특별시 영등포구 공개공지 등의 정비 및 관리 지원에 관한 조례.

The cases in Santiago and Taipei showed that incentive zoning is often exploited by private sectors for profit while they neglect the quality of POPS [53,54]. Several measures have been implemented to counter this tendency. Melbourne uses an incentive system based on a public-private partnership that views the creation of POPS as an investment to increase the land value [55]. Meanwhile in Japan, the Comprehensive Design System is implemented to calculate incentives based on the quality of the POPS. In the case of operation and management, YBD has a regulation in which the local government helps with the maintenance of POPSs in the form of manpower and financial subsidies [56]. Without government assistance, there are several cases where landowners use maintenance rea-

sons to limit public access, because with fewer visitors, it is easier to keep POPSs clean, well-managed, and safe.

4. Discussion

POPS has continued to face various challenges even though it was first created to provide more public open spaces in dense urban areas. Most of these challenges occur because these spaces are privately owned but are intended for public enjoyment. Moreover, it is often found to be underutilised and overly restricted due to poor designs or management [6,9]. To address these issues, this study differs from previously published works in two ways. First, most studies focused on the public sector of POPS only, while this study studied the private aspect and also aimed to find solutions that comply with both. Second, by focusing on a business district, this study addressed the importance of POPS, specifically in high-density areas. Moreover, different types and various regulations were examined to obtain thorough results on how POPS can cater to the public's needs and to provide developers with equivalent incentives.

As shown in Figure 8, both the direct and indirect benefits of POPS were examined by utilizing various qualitative methods comprising seven data-gathering techniques. Behavior mapping, axial map, and content map analysis focus on POPS's contributions to the built environment as its indirect benefits [26–28]. Although the connection with its surroundings is preferred in public open spaces [57], the observation of the samples showed that only proximity to residential areas and public transport nodes resulted in a higher number of visits. In terms of the physical relation between the POPS, the pedestrian streets, and the host building, almost all samples did not exhibit barrier-free entrances, which could lead to limited public access. Maximum connectivity to the host buildings means that the people who work in the host buildings will have easy access to the spaces. This can be considered an indirect benefit for the developers since proximity between workplace and public open space positively affects workers' wellbeing [58].

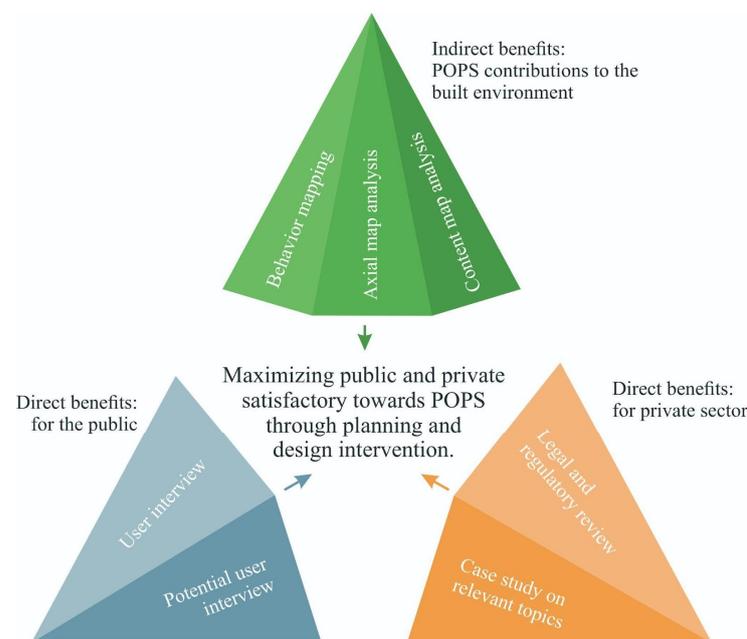


Figure 8. Methods triangulation used in this study to extract data and draw conclusions.

The survey results demonstrated that a proper guideline regarding the distribution of vegetation, seating areas, and lighting is needed to optimize users' experience. In accordance with Buchan and Simmons [31], empty POPS is a waste of space that is not beneficial for both public and private developers. The survey's results also showed that although most visitors found POPS to be convenient, it was not significant for them. According to

Carmona and Wunderlich, although inconsequential spaces may be good enough in comparison to empty POPS, they cannot be considered good public spaces [59]. This condition is further exacerbated by the general public's low interest in POPSs and its minimal awareness. Therefore, it is difficult for the benefits to be delivered when the public does not see the importance and contribution of the spaces. The abundance of other public open spaces in YBD is another driving force that devalues POPS.

The direct benefits of creating POPS for private developers are distinctively shown using the applicable laws. In the case of Seoul, South Korea, the incentive received by private developers for providing POPS is straightforwardly stated and mostly based on the size and location of the space. Cases from Santiago, Taipei, and Hong Kong [53,54,60] showed that underregulated incentive systems often lead to the poor design of POPSs, and they are used by private developers to boost profits. Meanwhile, cases in Japan and Melbourne revealed that besides rigid systems being a disadvantage for the developers, it also limits them in providing functional and usable POPSs. In relation with the axial map analysis, it is important to pay attention to the location of POPS within the site to increase its visibility. The bonus FAR and production and maintenance fees often burden the developers more and hinder the management of high-quality POPSs. To address this issue, the local government of YBD offers financial and labor assistance.

5. Conclusions

Unlike most previous survey that focused on only one entity, this study defined a good POPS as a space that places both the public and private sectors in equal positions and considers the satisfaction of both in its planning and design processes. Moreover, this paper placed the private sector in a wider perspective, indicating it did not only focus on the landowners and developers but also focused the users and tenants of the host buildings. This is in accordance with previous studies that often treated the general public and the tenants of the host buildings as two different entities. The direct and indirect benefits of POPS that can contribute to the public and private's satisfaction were identified from the literature review. Subsequently, the actual condition of POPS on the site was reviewed, and the data were used to construct solutions and strategies to maximize public and private satisfaction. For indirect benefits, the POPS's positive contribution to the built environment should improve public and private satisfaction. In the case of YBD, a well-designed POPS enhances the environment of workers in the host buildings. The physical and non-physical connections between POPS and host buildings need to be maintained and further strengthened in future studies. Moreover, to improve POPS's service to the public, solutions need to focus on redirecting POPS as meaningful social settings and to ensure that the public knows they are welcome within the space. This includes adding infrastructure that encourages sociability, such as community benches and art installations.

The direct benefits of POPS for the public come mostly from its architecture and landscape design. In the case of YBD, only POPSs bearing the characteristics of good public space deliver the most direct benefits to the public. Poor designs and high competition from local parks resulted in the public's low interest in the space. Although the direct benefit of creating POPS comes in the form of bonus FAR for the developers, a more comprehensive system should be proposed to increase their motivation to create better POPS. In this situation, two points need to be reviewed, namely location and size. The current law only focuses on POPS being accessible from the main street and that the size is only determined by the total floor area of the host building. YBD shows that these limitations cause POPSs to be too small and unattractive, and it also encounters other design shortcomings. Therefore, solutions—such as a combination of two or more POPS and regulations about connection with the existing public open space networks—should be considered in future. By emphasizing connections and integrated spaces, the creation of POPSs will be less burdensome for the developers and provide better services for the public.

Finally, this study would like to emphasize the importance of planning and design processes that consider the three benefits above to provide the maximum satisfaction to all

stakeholders. POPS provide indirect benefits by improving the overall quality of the built environment and increasing the land's value. Meanwhile, direct benefits are delivered by providing good space for the public and various incentives for the private. The two main limitations of this study are as follows. First, only general services that were provided by POPS were considered; hence, future studies should attempt to assess specific benefits—such as financial, health, and environmental benefits. Second, the results reflected the urban morphology and diversity of a business district. Therefore, future studies should not only consider other urban types but also the possibility of POPSs being more ubiquitous as a means to provide more open public spaces.

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