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The Contextuality of Dongdaemun Design Plaza and Park, an Iconic Building in Seoul—A Study Based on Fuzzy Statistical Analysis

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Abstract: For many cities around the world, the construction of iconic buildings is a major strategy to improve their urban space and enhance recognition. Yet, newly built iconic buildings usually spark controversy owing to their relationship with the urban context of the city. In this study, revolving around Dongdaemun Design Plaza and Park, we analyze and evaluate the functional influences of its reconstruction on the urban context of Seoul. We found that though the DPP has a positive effect on the city image and cultural exchange of Seoul, it is barely satisfactory for maintaining and extending the urban context. Through the combination of a random sampling questionnaire and triangular fuzzy number analysis, we transfer previous subjective comments about the DPP into an objective evaluation, analyze its influence on the dimension of culture, and call for consideration of the continuity of the urban context in future urban planning. The results of this study provide a new perspective on quantifying the urban contextual influence of iconic buildings, reminding city planners of the balance between the development of business and the sustainability of the urban context.

Keywords: regional study; iconic building; fuzzy statistical analysis; urban context



Citation: Cao, Z.; Yoon, J.-E. The Contextuality of Dongdaemun Design Plaza and Park, an Iconic Building in Seoul—A Study Based on Fuzzy Statistical Analysis. *Buildings* **2024**, *14*, 1011. <https://doi.org/10.3390/buildings14041011>

Academic Editor: Derek Clements-Croome

Received: 5 February 2024

Revised: 9 March 2024

Accepted: 25 March 2024

Published: 5 April 2024



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1. Introduction

In the current global construction of cities, as one of the resources of renewable energy for improving city image, iconic buildings have gained significant importance in the construction of cities [1]. Shaping the skylines of cities with their unique characteristics, iconic buildings imbue cities with distinct historical and aesthetic value that indulges locals and tourists [2]. Along with the fast urbanization that has occurred since the beginning of the 21st century, and as a result of city governors' speculative strategies that have prioritized the construction of iconic buildings, a multitude of iconic buildings have sprung up around the world to attract tourists and global investors, affecting themselves, their surroundings, and their communities with their peculiar features [3]. In many cities, iconic buildings have been built regardless of their urban context, in that they have been rejected by their surroundings as an “empty monument” rather than seen as an inclusive place of cultural exchange [4]. Especially in East Asia, new iconic buildings are arousing controversy in a more frequent manner due to their contrast with the environment [5]. A city is an archive center that records the old-time trails of its dwellers and its own environment for different sections of its history. Over time, they constitute the unique culture and identity of their citizens, which may be lost due to arbitrary planning and construction [6]. Seoul is one of the representatives of this dispute.

Entering a new era, Seoul shifted from the pure development of its economy to cultural regeneration, a more nature- and culture-friendly strategy and pattern of city update, to sustain its urban context [7,8]. Under such a policy, a series of programs for relic renovation have been undertaken, such as the restoration of Gyeongbokgung Palace, the reconstruction of

Gwanghwamun Square, and the replanning of Insadong to become a national tourist zone [9]. Meanwhile, new iconic buildings, like Lotte World Tower and Mall, the 63 Building, and others, have been constructed. Yet, an iconic building is different from a monument in that not only is it a symbolization of the scale of its city or country, but it is also of historical and cultural value [10]. The Design Plaza and Park (DPP), a piece by world-renowned designer Zaha Hadid, has caused protests due to its impact on the urban context of Seoul, on the basis of its appearance, the protection of relics, the regionality of South Korea, cultural memory, etc. Although the main construction of the DPP and its historical park has played an important role in revitalizing the economy of the district, attracting tourists through the visual miracle itself [11], during the process of its construction, there were conflicts between the construction party and local citizens, resulting in protests by various groups, including citizens, sports people, and culturalists [12], against the work of a foreign designer that sabotaged the urban context of Seoul. The iconic building of the DPP was completed, for the government met the protestors with concessions that the memories of the site for various groups would be replicated, with considerations of relic protection. However, there are still ongoing discussions about the urban contextual influence of the DPP.

Revolving around the DPP, in this study, we aim to discuss the urban contextual influence of newly constructed iconic buildings, through which we give suggestions for policies and practices for city renewal. Previous studies have centered, by and large, on the urban contextual influence of the DPP, interviews with people related to the project [13,14], and judgements and analyses based on policy papers and earlier studies [15]; in this study, meanwhile, by analyzing previous studies, we summarize the indexes for evaluating the urban contextual influences of iconic buildings and update the models for depicting the relationship between iconic buildings and their urban contexts. For an objective evaluation of the urban contextual influences of iconic buildings, we collected data using random sampling questionnaires. Meanwhile, triangular fuzzy statistics were employed to analyze the data, whose triangular fuzzy values were then obtained using triangular fuzzy statistics [16]. The abstract concept of context was objectively quantified via barycentric value; thus, we reached our conclusions from the final sequence of indexes that we chose. With the combination of the above methods, we could handle indeterminacy in the subjective evaluation, in turn evaluating the urban contextual influence of an iconic building in a more accurate manner. Through an investigation of the complexity and inner contradictions of the integration of iconic buildings into their urban contexts, we evaluated the urban contextual influence of the DPP to attempt to achieve a relatively optimal solution that is compatible with the local situation, which could shed light on other programs of iconic buildings and their cities.

2. Materials and Methods

2.1. The Definition of Iconic Buildings

Iconic buildings are those that raise worldwide attention due to their uniqueness and attractiveness, reinforcing urban regeneration [17,18]. In *The Iconic Building*, the artificial marvels of the modern age are referred to, by Charles Jencks, as “buildings”, playing roles that symbolize power and interest, rather than “architectures”, for “it is an age that everything can be an icon” [19].

One of the fundamental features of an iconic building is to astonish its visitors, and this means being overwhelmed by its height, shape, or unique location, which means that the original intention when designing an iconic building is to raise attention visually by outracing its surroundings [20]. They are of importance in the construction of cities [1], in turn reinforcing their cities with additional economic, political, and cultural effects in the competition among cities [21]. On account of this, more cities have grasped and utilized the uniqueness granted by newly constructed iconic buildings to attract attention and tourists [22]. Various cultural and business campaigns are held in which citizens are routinizing the field of the iconic buildings as the place of their everyday communications [23]. The sections of interconnections between the day-to-day lives of citizens and their ground-

ings into events with the iconic buildings included are compiled by the memory of the community, yielding episodes of consecutive space–time fields [3], which in turn benefit the community and shape the iconic building into a symbol with incentive and moralization function, endowing the city with a unique cultural field.

However, since iconic buildings are mostly funded by establishments, they symbolize not only the scale of the cities or countries but also their cultural or historical value, namely mighty powers in politics, religion, or business that feature the establishments behind them [10]. Unlike the latter, they do not play the cultural function of turning the collective memory of a certain era into shared values of all times; thus, disjunction is seen between iconic buildings and the city they are located in [4].

2.2. The Development of Context

“Context” is a concept that originated in linguistics, underlying the relationship between a part and the whole [24], and was introduced into architecture in the 1960s [5]. Against the background of postmodernism, context has been endowed with different qualities in culture, with it being understood as interdependent communication between different cultural venations and the consequences of change and mergence. Context is a concept including both perceptions of the future and related experiences in the past, while the cultural turn of the concept triggers qualitative integrations of concepts in deeper layers [25]. Venturi blended the concept of “context” and “environment”. In the 20th century, he emphasized the relationship between buildings and the environment and that between buildings [26]. Generally, people define themselves by means of their own past and reference objects from their lives in the past; thus, the self-identities of people are constituted partly by the physical environments of cities [27], which in some situations trigger intense talks as tokens of people’s commemoration, resulting in the formation of a field of memory [28]. Entering the 1960s, Colin Rowe was among the figures initiating public censure against the failure of modernism urban planning and its damage to civic cultural inheritance. He criticized the fact that modern urban planning and building design gave rise to the school of contextualism [29], which emphasizes the inner connection of cities and their cultural backgrounds as an interconnected system. Contextualism advocates consideration of history and social environment in urban planning to maintain the uniqueness and sustainability of history, meeting the needs in function on the one hand and reinforcing the inner connection between cities and their urban context on the other. Contemporary contextualism underlies protections of constructions and their intangible culture [30].

2.3. The Relationship between Iconic Buildings and Urban Context

Iconic buildings serve not only as visual landmarks but also as carriers of urban context and identity. They interact with their surroundings by means of unique design language, attracting attention and triggering the urban effect depicted by the Bilbao effect [31], so that in many cities, iconic buildings are built strategically to raise their international profiles. Iconic buildings interrelate with the urban context in many facets [Table 1], and the latter can be expounded by important pairs of relationships including people and buildings and buildings and cities, as well as people and cities, which profoundly impact the image, recognition, and cultural inheritance of a city. The relationship between iconic buildings and the urban context is featured in the following facets:

- **Identifiability:** The basic property of iconic buildings. Iconic buildings enhance the identifiability of their cities by means of their uniqueness.
- **Publicity:** Being large in scale, iconic buildings provide public space for citizens, which indirectly activates public life in the city.
- **Cultural field:** By blending into their surroundings and the local intangible culture as part of integrations, iconic buildings serve as fields of cultural exchange and social interaction, promoting the cultural vitality of cities, which in turn internalizes as a component of the foundation of urban culture that intertwined with the image and shape of cities, constituting a compact network of urban contexts and cultural fields [5].

- Event: By staging various campaigns covering business, culture, and entertainment, iconic buildings connect citizens [23].
- Collective memory: While iconic buildings witness the history of the region that they bear, they deepen the connection as well between the history of cities and their citizens who are meanwhile strengthened in both their confidence in and the loyalty to the culture of their cities [25,30]. Citizens tend to preserve such connections, for long-term memories of surrounding urban regions make up the overall image of their cities [32].
- Locality: Contextualists advocate coalescing iconic buildings into their surrounding intangible culture and the aggregation of history and tradition, which constitute the integrity to underlie the uniqueness of the region [33].
- Heritage and sustainability: Iconic buildings carry the responsibility of relic protection and promote the sustainability of cultures and communities because not a single race, group, or individual survives and breeds in a new environment without historical continuity [34].

Table 1. Evaluation indexes of the relationship between iconic buildings and the urban context.

Property	Factor	The Relationship between Iconic Buildings and the Urban Context	Bibliography
Property of Constructions	Identifiability	Uniqueness and attractiveness are the fundamental properties of iconic buildings	Jencks C, (2006) [17] Raevskikh E, (2018) [18] Charles J, (2005) [19]
	Publicity	The indoor part of iconic buildings serves its users, while the outdoor part serves as the background of public lives	Gospodini A, (2004) [1] Klaus R, (1999) [31]
Property of Urban Context	Cultural field	A place to breed, spread, and inherit culture	Marcus and Francis, (1997) [23] Liu yun, (2010) [5]
	Event	Large-scale activities such as festivals, parades, exhibitions, etc.	Marcus, C.C. and C. Francis, (1997) [23]
	Public memory	Bearing public memories and bringing out resonance	Krzyżanowska N, (2016) [28]
	Regionality	Heterogenization	Robert V, (2002) [26] Stern; R.A.M, (1983) [32] Rong. Z, (2015) [27]
	Inheritance and sustainability	Protection of cultural relics and the sustainability of communities	Hubbard, P., (1996) [33] Pepper, S.C, (1942) [25] Zhuyuan, (2012) [34] Liu, X, (2008) [30]

Not only do iconic buildings decorate the city space or act as tools for economic growth, but they are also vital carriers of history and cultural heritage. By visual means, they work and are experienced as other architectures do/are in basic and cultural resources. As motivations of change to the city, iconic buildings endow the city with unique identifiability, while the identifiability of the city is constituted by people's memories and recognition of different places, according to Kevin Lynch. Thus, the evaluation of iconic buildings in urban renewal should be expanded from a mere discussion of the direct effects of iconic buildings to that of their long-term contribution to the urban context.

According to the summary above, our concept is based on a hypothesis to deconstruct the model in which an iconic building improves the image of a city through various urban contextual variables and the properties of the building itself [Figure 1]. In the framework of the model, an iconic building is considered a multi-dimensional socio-cultural phenomenon and influences five aspects of urban context (marked as H4-1, H4-2, H4-3, H4-4, and H4-5) through five variables (marked as H3-1, H3-2, H3-3, H3-4, and H3-5). H4-1 represents the combination of an iconic building with its surroundings, forming a platform of communication and interaction in culture, which enhances the impetus of urban culture, tightening the urban context and cultural field. H4-2 refers to an iconic

building's functioning as a stage of various activities, promoting urban cultural vitality and stimulating the city and its social communication. H4-3 symbolizes an iconic building's function, as a witness of the past, in binding the connection between citizens and the history of the city, boosting the sense of belonging for its citizens. H4-4 signifies the integration of an iconic building into geography, culture, history, and tradition, emphasizing its regionality and the uniqueness of the city. H4-5 indicates the role of an iconic building in the promotion of the inheritance of culture, the protection of relics, and support for the sustainable development of the community.

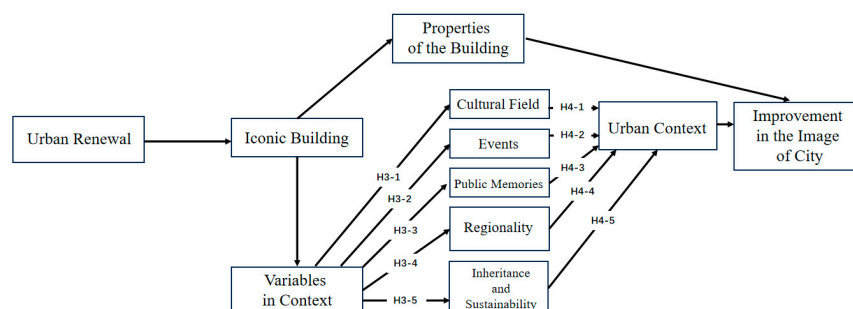


Figure 1. Research hypothesis model (source: one of the author's drawings).

With what we have shown above, the influence of the relationship between iconic buildings and the urban context is multidimensional, ranging from the visual identifiability of the city to improvements in cultural activeness, the creation of public space, the fortification of public memory, and emphasis on local culture. All of the factors above constitute the overall image of a city, promoting the continuity of culture and sustaining the community. After thorough discussion, we gained further awareness that when illustrating the role of an iconic building in urban renewal, attention should not be paid to merely its immediate effects, such as the attraction of tourists and financial profits. Rather, we should note its long-term contribution to the urban context. For this, we built a model of evaluation, aimed at the quantification of such influences. In the following sections, a specific case was chosen in order to verify the model and examine how to integrate the newly constructed iconic buildings into the historical and cultural context of the city they are located in.

3. Object of the Study

3.1. Introduction of the Design Plaza and Park

Located in the Dongdaemun district of Seoul (Figure 2), the Design Plaza and Park was a training ground for the army of the Yi dynasty and a facility for the training and accommodation of troops to protect the capital [6]. In the 18th century, with the booming of business, the DPP became one of the three main market squares in Seoul. With the signing of the Japan–Korea Treaty in 1905, the Gwangjang Limited company was founded by the Koreans, as a countermeasure against businessmen from Japan. This is the first permanent market to protect the native capitals of the Koreans and their interests and is a typical Korean marketplace. When the Japanese occupied the Korean peninsula in 1924, the first modern stadium, Gyeongseong Stadium, was built to celebrate a wedding held by the imperial house of Japan. Since the stadium witnessed several victories by Korean athletes in confrontation with the Japanese, it is thus regarded as “a place for Korea to fight Japan” [35].

In 1945, following the defeat of Japan, Gyeongseong Stadium was thereafter renamed as Seoul Stadium, along with a series of changes within society in Korea. With several new modern stadiums constructed, Seoul Stadium was used less frequently, and then once again renamed as Dongdaemun Stadium. Being named after a district rather than a city marked the decline of its influence [36]. As for Gwangjang Market, the neighbor of the stadium, the Korean War made it the biggest clothing wholesale market in Korea.



Figure 2. (a) Dongdaemun Stadium aerial view (source: online); (b) map of the Design Plaza and Park. The red part is the main building of the DDP (source: one of the author's drawings).

Entering the 1980s, Seoul upgraded gradually from a city of heavy industry to a city with information technology-intensive industry [12]. The development of the economy boosted the self-confidence of the Korean nation. During Mayor Oh Se-hoon's term of office, Dongdaemun district was chosen as the core region of Seoul to improve "the brand value of the culture, art, design and environment of Seoul" [37], featuring the city with its design-oriented path of urban renewal. In the 1990s, a batch of shopping malls and duty-free shops belonging to fashion brands were built around the stadium. In 2008, the stadium was demolished, and, following the designs of Zaha Hadid, a famous designer from Britain, it was rebuilt into a versatile iconic building of Seoul, in which a series of cultural and art activities have been hosted.

3.2. Reason for Studying the DPP

In this study, we chose the Design Plaza and Park as a test case and analyzed its urban contextual influence. As an iconic building in Seoul, the DPP is an integration of historical relics, cultural memories, wounds of the nation, and modern design. From the accommodation of the army to one of Seoul's three main marketplaces [6], the role of the DPP was shifted by the emerging modern culture in Korea, which is a "local" change, driven by internal power. In the following historical period, the land received mandatory upgrades by the Japanese, which is an external factor that came into play. Up to now, the district contains the famous iconic building that represents Seoul. Observing the course of the development of the land, we see the transition from historical relics and a stadium bearing public memories to a project of urban renewal centered on design and culture [14]. Yet, the project aroused various disputes [Table 2]. Citizen groups headed by "Cultural Solidarity" protested against the tearing down of the old stadium, with an alternative solution given to reconstruct it into public sports facilities and amusement parks [12]. Historians and archeologists proposed to protect and excavate the site since it had been part of the Hangyangdoseong Capital City Wall [38], and along with its excavation, the Seoul Metropolitan Government (SMG) built Dongdaemun Museum to exhibit cultural relics found in the archeological site. In the sports circle, the Korean baseball league spoke against the proposal on behalf of sports people, in that there is no proper baseball field in Seoul. The SMG met with the baseball league over 150 times, reaching an agreement that the new construction was to be identified as a field of sport by keeping the lighting tower and the flame-holder as symbols of a stadium. The baseball league let the matter drop after a sports museum and seven other baseball fields were put forward in the plans. After coordination with different groups of interests, Dongdaemun Stadium was deconstructed in 2008, including criticism from historians, the worries of sports people, and protests from local businessmen [Table 2].

Table 2. General outline and design element characteristics of the study site.

Discommender of the DPP	Reason	Appeal
Historians	Protection of cultural relics	Protection of archaeological remains
Sports people	Continue cultural memories	Rebuild the stadium into a sports museum
Citizens	Maintain the place bearing emotions and memories	Register it as a heritage site
Businessmen	Survival pressure	Retain the marketplace

Source: Seoul Metropolitan Government [37].

Our results show, however, some of the citizens' awareness of the positive effect of the DPP in raising the reputation of Seoul and staging cultural and art activities. This controversy illustrates the dual role identity of the DPP that it is both the motivation that drives the modernization of the city and a potential threat to the sustainability of the urban culture (Table 2). Below is a general outline and the design element characteristics of the study sites.

Above all, we chose the DPP as the case of the study for it displays the diversity and complexity of the relationship between iconic buildings and the urban context. By exemplifying the DPP, we may investigate its urban contextual influence on Seoul, in turn shedding light on the urban contextual development of iconic buildings [Table 3].

Table 3. General outline and design element characteristics of study site.

Division	Attributes Included in the DPP	
Cultural Characteristics	Historical cultural facilities	Remains of the capital in history and commercial plot in history
	Cultural field	Art gallery and Dongdaemun History Park
	Event	Large-scale activities including festivals, parades, art exhibitions, etc.
	Regionality	Newly developed constructions and foreign designers
	Public memories	Memory of the stadium
	Sustainability in culture	Iconic building in Seoul
Cultural Characteristics	Shopping	DPP Design Store
	Business activities	Business campaigns and exhibitions
	Dining	Restaurants
	Entertainment	Exhibitions and light shows
	Hotels	/

4. Results

4.1. Investigation Method

4.1.1. Examination of the Object under Investigation

In total, 220 copies of the questionnaire were distributed and 220 of them were recollected. For diversity in the data, we distributed the questionnaire in various places, with large-scale activities avoided over time. Respondents were stratified into groups of different ages, avoiding members of large tourist groups and visitors taking part in large-scale activities. Although the samples are mediocre in quantity, the effectiveness of them was ensured.

Before the questionnaire survey, an extensive search of the literature was carried out using both Web of Science and Google Scholar to ensure the feasibility and reliability of the study. The retrieval range includes SCI, SSCI, AHCI journals, and other highly cited papers. By providing a summary of the properties of the urban context, we specified several dimensions of the urban context in which iconic buildings have an influence and drew progressive conclusions. The questionnaire had in total of 23 options, in which part 1 records the basic information of the respondent, such as age and education, and part 2 records the type of respondent and the purpose of their visit. Among all of the sections, part 3 is the core part of the questionnaire, with it listing all of the relative properties of iconic buildings, including properties in business and urban contexts, based on the literature review in the previous part of the study. This was carried out to verify the model

we proposed. In the evaluation of all the properties, a five-point Likert scale (Table 4) was employed. To exclude invalid questionnaires, question 4 about local identity and question 10 about the property of cultural memories were limited to respondents with a local identity relating to Seoul to establish mutually exclusive conditions. Since the questions were not appropriate for explicit analysis, accurate points in the evaluation were replaced by five fuzzy options, such as asking the respondent if he/she is satisfied with the new construction's reproduction of the urban contextual elements. In the final analysis, options are assigned with different values, which are then fuzzified and defuzzified with a triangular fuzzy formula, among which part three touches on the evaluations analyzed using a five-point Likert scale [Table 4]. Since the questions were not appropriate for explicit analysis, accurate points were replaced by fuzzy options.

Table 4. Survey items.

Division	Subsection
Demographic information	Age and education
Type	Citizen or tourist and type of tourist
Purpose of the visit	Visiting a historical relic, visiting an exhibition, shopping, or dining
Context elements	Identifiability, publicity, cultural field, event, public memory, regionality, inheritance and sustainability, and protection of the cultural relic
Commerce characteristics	Commercial exhibition, entertainment, art exhibition, attraction for international tourists, and improvement in national profile
User satisfaction	I am very satisfied with the element of the building (1.0) I am satisfied with the element of the building (0.75) I am just okay with the element of the building (0.5) I am not quite satisfied with the element of the building (0.25) I am not satisfied with the element of the building (0.0)

4.1.2. The Transformation of the Qualitative Data during Fuzzy Statistical Analysis

Regarding the urban contextual influence of iconic buildings, researchers are prone to studying cases using qualitative methods. Conclusions are usually drawn from interviews with relative people, previous studies, and policy documents. In disposing of evaluation of respondents and capturing the fuzziness of the concept, researchers are often limited by subjective factors, while the abstractness of the concept of urban context is usually intangible. Thus, in this study, we employed fuzzy statistical analysis, quantifying the qualitative evaluations we collected by means of triangular fuzzy numbers to reach more accurate and reliable conclusions.

Fuzzy theory is a theory that quantifies fuzzy, implicit quantitative information and qualitative data by means of mathematical concepts [39]. Since people's evaluation of complex emotions and abstract concepts is usually blurry and implicit, to counter this, we must reduce errors that are caused by language and recognition [40]. Since traditional evaluations of elements related to the urban context, such as the cultural field, public memories, and locality, hinder the respondents from accurate scoring; in this study, we employed triangular fuzzy statistical analysis.

Moreover, the results of the study can be calculated and analyzed by means of a combination of fuzzy variables and triangular fuzzy indexes, for qualitative evaluations can be effectively quantified by triangular fuzzy numbers, a mathematical tool that is also capable of the coding and analysis of indeterminacy and subjectivity in the data of the survey. The method employed in this study based on an integration of the three data points in the triangular fuzzy index and quinquartite method was feasible, according to another study using the same method [16]. After assigning value to the options in Table 4, fuzzy sets and fuzzy logic are built and then projected to concrete fuzzy numbers, in which each selected result A can be categorized into a triple (l, m, u) , in which l_A is the lower limiting value, m_A is the possible value, and u_A is the upper limiting value (Formula (1)).

These fuzzy numbers are expressed by means of triangular fuzzy numbers, with which we construct a triangular fuzzy matrix for each urban contextual element so that we can delimit the range of indeterminacy for each option (Table 5). Next, we defuzzify each result of the option via the center of mass method (Formula (2)) for further analysis and relatively appropriate and scientific results. After we verified the rationality of the end results with SPSS, we obtained our final fuzzy rate of the citizens' and visitors' satisfaction with the DPP's urban contextual influence on Seoul.

$$\mu_A(x) = \begin{cases} \frac{x-l_A}{m_A-l_A}, & \text{for } l_A \leq x < m_A \\ 1, & \text{for } x = m_A \\ \frac{u_A-x}{u_A-m_A}, & \text{for } m_A < x \leq u_A \\ 0, & \text{otherwise} \end{cases} \quad (1)$$

Table 5. Analysis of the visit purpose of visitors.

Options	Triangular Fuzzy Number
A. Very satisfied	(0.75, 1, 1)
B. Satisfied	(0.5, 0.75, 1)
C. Okay	(0.25, 0.5, 0.75)
D. Not quite satisfied	(0, 0.25, 0.5)
E. Not satisfied	(0, 0, 0.25)

According to the results of the questionnaire and a verification of rationality using SPSS, we obtained the results of the degree of satisfaction of citizens and tourists regarding the urban contextual influence of the iconic building. A relatively objective result was reached after defuzzification of the data (Formula (2)) and further comparative analysis.

$$x^* = \frac{\int_{l_A}^{u_A} x \cdot \mu_A(x) dx}{\int_{l_A}^{u_A} \mu_A(x) dx} \quad (2)$$

4.2. Result of the Survey

Among the 220 questionnaires retrieved, we excluded 3 that were invalid due to answers in the mutually exclusive questions. In the 217 valid questionnaires, the respondents were distributed the most in the age range of 30–39 ($n = 93.4\%$) and the least in the under 18 age range ($n = 0.9\%$). We saw a large number of respondents who received college education ($n = 66.7\%$), while there were only a few with a doctor degree ($n = 2.7\%$) (Figure 3).

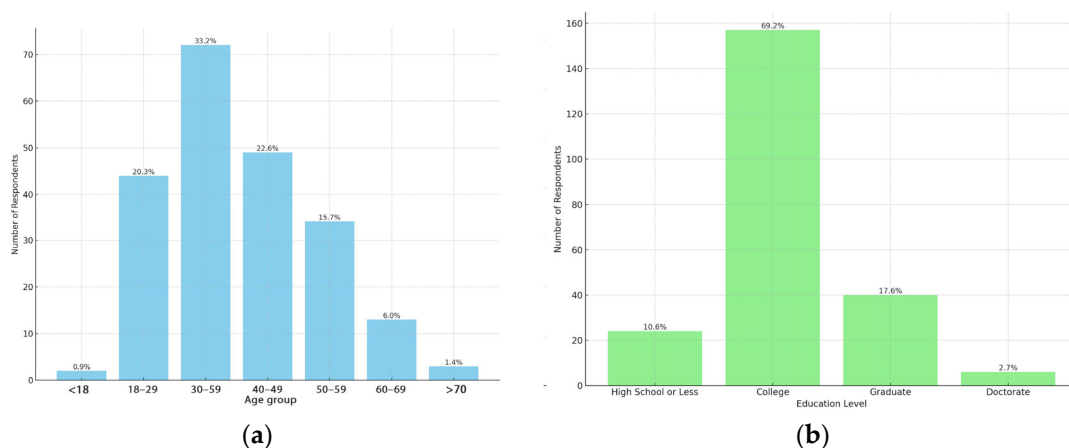


Figure 3. (a) Age distribution of respondents (source: one of the author's drawings); (b) education level of respondents (source: one of the author's drawing).

Of the visitors to the DPP involved in the survey, 85% ($n = 186$) are Seoul locals, while foreign tourists made up a percentage of 14.3% ($n = 31$). Among all tourists, only 3.68% of tourists ($n = 8$) were history enthusiasts, and 1.5% ($n = 7$) of tourists visited the DPP for historical relics, while most of them visited the site for exhibitions (34%, $n = 164$) and cultural activities (29%, $n = 140$) (Table 6). This result demonstrates to some extent both the DPP's attractiveness as an exhibition and cultural activity hall and its deficiency in the protection and sustainability of history and context (Table 7).

Table 6. Analysis of types of tourists.

Types	Options					
	History Enthusiasts	Tourists in Family	Tourists for Leisure	Tourists in Couple	Visitors for Business	Visitors for Academic Purpose
Date	8 (3.68%)	32 (14.7%)	78 (35.94%)	32 (14.7%)	45 (20.7%)	22 (10.1%)
Seoul locals	186 (85.7%)				Foreign tourists	31 (14.3%)

Table 7. Analysis of the purpose of visits.

Types	Visiting Historical Relics	Visiting Exhibitions	Visiting the Building	Shopping	Participating Activities of Culture	Casual Tour
Date	7 (1.5%)	164 (34.0%)	80 (16.5%)	31 (11.2%)	140 (29.0%)	37 (7.7%)

4.3. Regression Analysis

Regression analysis was employed in this study for a thorough comprehension of the quantitative relation of the DPP's urban contextual influence on Seoul. We categorized the dimensions of evaluation in the questionnaire as a series of independent variables, including public memories, events, cultural fields, regionality, and sustainability and the protection of cultural relics; meanwhile, we categorized the DPP's urban contextual influences on Seoul as the dependent variable. In the regression analysis using SPSS [Table 8], we saw that the modified R^2 of each variable of the DPP's urban contextual influence on Seoul is greater than 0.3 ($n = 0.515$), which means that the effectiveness of the explanation of the model reached a percentage of 51.5%, while the value of P was less than 0.05, representing profound influences of each value on the urban context. The result of the regression analysis generally verified the objectivity and effectiveness of the evaluation of the urban contextual influence of an iconic building on the city.

Table 8. Regression analysis results for Context of Design Plaza and Park.

Mode	Standardized Coefficients (β)	T	Sig.	Collinearity Statistics	
				Tolerance	VIF
Public memories	0.155	2.266	0.013	0.685	1.303
Events	0.086	3.776	0.035	0.630	1.587
Cultural field	0.187	3.840	0.029	0.473	1.677
Regionality	0.241	3.184	0.019	0.684	1.463
Cultural sustainability	0.22	2.847	0.049	0.749	1.553
Protection of cultural relics	0.204	3.153	0.010	0.853	1.172

$R^2 = 0.539$, Adjusted $R^2 = 0.515$, $F = 22.750$, and $p < 0.05$

The result of the regression analysis showed that the most significant variable is the regionality of the building, whose standardized coefficient value is 0.246, the value of t

is 3.184, and the value of the significance level is 0.019. This is the variable that makes the greatest contribution to the DPP's urban contextual influence on Seoul. Moreover, publicity, public memories, and the property of the cultural field represented by the building as variables affect the evaluation of the urban context as well. In the results of the multicollinearity statistics of the regression analysis, the value of tolerance of each of the independent variables was above 0.1, with each of the VIF values lower than 5, so that there was no multicollinearity between variables. The model in this study is therefore feasible and can be expanded to the evaluation of other iconic buildings.

According to the regression analysis, cultural status, publicity, and cultural coordination are the most important three factors that influence the experience of people visiting the DPP and their recognition of the function of it. Its value in terms of cultural status and cultural coordination highlights the importance of the DPP's influence on developing urban culture and shaping the image of the city. Yet these results expose the tension between cultural relics and modernization, which are to be properly balanced in future projects of urban renewal. These results provide specific guidance for future projects for urban planning and the construction of iconic buildings, emphasizing the importance of the protection and development of a continuing urban culture.

4.4. Analysis of the Result of Triangular Fuzzy Statistics

In this section, we carry out further analysis of the result of the questionnaire with triangular fuzzy statistics to establish results for each analyzed index on the DPP given by the respondents. The index "event" is subdivided into the protection of cultural relics, business activities, and art exhibitions, making our analysis more accurate. In the diagram below (Table 9), indexes ranked in first and second place are art exhibitions ($n = 0.6706$) and business activities ($n = 0.6555$), respectively, illustrating the positive effect of the DPP in these aspects. The two indexes at the bottom of the rank are attraction of international tourists ($n = 0.2377$) and representation of the public memories ($n = 0.2970$), respectively, which means that the DPP leaves much to be desired in these aspects. It thus appears that the DPP was not considered as an urban contextual token of public memories that connects the citizens with its history.

Table 9. Analysis of types of tourists and the purpose of their visit.

Factors	Division	Subsection	Triangular Fuzzy Number	Center of Gravity	Rank
Iconic building		Identifiability	(0.3324, 0.53135, 0.7233)	0.529	5
		Publicity	(0.43175, 0.677, 0.85085)	0.6532	3
Cultural characteristics		Cultural field	(0.266, 0.4964, 0.4964)	0.4948	6
		Public memories	(0.0981, 0.2728, 0.5202)	0.2970	11
		Regionality	(0.13675, 0.314, 0.55575)	0.3355	10
		Protection of cultural relics	(0.15385, 0.33555, 0.5815)	0.3569	9
		Inheritance and sustainability	(0.1607, 0.35492, 0.59417)	0.3699	8
		Business activities	(0.42925, 0.67425, 0.6742)	0.6555	2
		Art exhibitions	(0.449, 0.694, 0.86875)	0.6706	1
		Improvement of international image	(0.3295, 0.54325, 0.75125)	0.5413	4
		Attraction of international tourists	(0.1325, 0.2344, 0.3463)	0.2377	12
		Entertainment	(0.32402, 0.51167, 0.6393)	0.4916	7
The urban contextual influence of the DPP on Seoul			(0.1659, 0.3871, 0.6325)	0.3952	

When we focused on the DPP's property as a building, we saw that most respondents scored highly on the identifiability ($n = 0.529$) and publicity ($n = 0.6532$) of the site, meaning that most respondents approve of the design of the DPP in terms of its function in the

urban landscape and public space. The DPP affects the public by means of its visual impact and symbolization.

However, when it comes to the contribution of the DPP to urban history and cultural inheritance, the score is relatively low, with no values over 0.5 and lower positions in rank. The indexes of context are obviously lower than that of commerce characteristics and iconic buildings, which shows that although the DPP is of great significance in commerce and modern art, there is no overt public realization of the DPP's function in strengthening urban cultural memories ($n = 0.2970$), regionality ($n = 0.3355$), the protection of cultural relics ($n = 0.3569$), and connection with and inheritance of urban culture ($n = 0.3699$). Among all of the functions of the DPP, people are not satisfied with it in sustaining the urban context. The DPP's urban contextual influences on Seoul trend from negative medium to negative maximum ($n = 0.3952$), according to the diagram. Although the DPP is a great site for commercial and artistic use, playing a positive role in improving the international image of Seoul, It does not resonate with the public in terms of connecting the past and the present and reinforcing urban cultural memories. For city planners, this result calls for their consideration, in future projects for iconic buildings, of the influence of different demands from visitors and local citizens, as they are two different groups asking for different functions for the iconic building. The strategy of constructing iconic buildings should be made from the business frame for both economic development and cultural heritage.

The project of the DPP is the embodiment of Seoul's global strategic city planning. It was built to erase the mark of the colonization of the Korean people, emphasizing their new identity as an independent society [41]. Through a deep analysis of the project of the DPP, local citizens' dissatisfaction regarding the ignorance shown toward the sustainability of the urban context through the project is exposed. The project serves well as a reflection of how to sustain the unique identity of a nation and the continuity of its culture in rapid development and globalization and as a good reference for future projects for iconic buildings.

4.5. Summary

Through data collection and literature summarization, we know that the DPP has a close relationship with the planning of the image of Seoul. Within the strategy of building Seoul into a global city, it is necessary to reproduce the locality and identity of Seoul, whilst also creating new cultural spaces and fields. The traditional design art of Korea was supposed to be displayed with its modern variant by means of the integration of history, the park, and the design plaza, but looking at whether the evaluation by researchers and the local citizens or the result of the analysis of data, the finished construction seems counterproductive in those aspects. Indeed, the building and history park of the DPP has played an important role in revitalizing the Dongdaemun district and creating visual wonder, promoting the image of the city, and communicating cultures. Yet it is more of a building out of nowhere that separates itself from its surroundings and history, covering the historical aspects of the land. This discovery is of great importance in city planning at present, shedding light on future design projects for urban districts.

One of the prime targets of urban renewal is to sustain local history and culture and restore and protect districts with historical sites, which plays a central role in utilizing resources and maintaining existing socio-cultural structures. Through the case of the DPP, we know that the function of an iconic building is not merely to fill in the space in the district that it is assigned to. The purpose of an iconic building is to be a narrator, a representative, of the revolution of the local society around and the relics beneath it, especially when built in an Asian city featuring multi-layer cultures. This is conducive in reinterpreting "Asian-ness" by some people [42]. Otherwise, these cities, along with their newly constructed iconic buildings, are to be consumed by the tide of globalization, which is not only challenge in Seoul but also in East Asia.

5. Conclusions

In this study, by employing fuzzy statistical analysis, we provide a method to transfer the qualitative evaluation of the urban contextual influence of iconic buildings, which improves the accuracy and objectivity of the evaluation data collected. According to the study, fuzzy statistical analysis has a significant advantage in the quantification of the evaluation of abstract notions, such as urban context. By using a method such as this, we provide a concrete evaluation of the influence of the DPP from the dimensions of the economy and the urban context, providing new quantitative perspectives of the influence of a new iconic building in city planning and supporting overall research on the urban contextual influence of new iconic buildings. This study also has limitations for specific regions and a relatively smaller number of samples, without considering a broader international environment. In future research, the number of studies can be expanded to different countries and cities, so as to exploit the application of fuzzy statistical analysis in evaluating iconic buildings and their urban context with more samples and to improve the feasibility of the method.

Author Contributions: Conceptualization, Z.C. and J.-E.Y.; methodology, Z.C. and J.-E.Y.; formal analysis, Z.C. and J.-E.Y.; investigation, Z.C.; resources, Z.C.; data curation, Z.C. and J.-E.Y.; writing—original draft preparation, Z.C.; writing—review and editing, Z.C.; visualization, Z.C.; supervision, J.-E.Y. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Data Availability Statement: Data is contained within the article.

Conflicts of Interest: The authors declare no conflicts of interest.

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