Article

Big-Data-Based Text Mining and Social Network Analysis of Landscape Response to Future Environmental Change

Chulmin Choi, Jooho Lee, Jessica Machado [ID] and Gunwoo Kim *[ID]

Graduate School of Urban Studies, Hanyang University, 222 Wangsimni-ro, Seongdong-gu,
Seoul 04763, Republic of Korea
* Correspondence: gwkim1@hanyang.ac.kr; Tel.: +822-2220-0274

Abstract: Climate change impacts the urban environment and landscape changes worldwide. To understand how South Korean citizens perceive these changes and what they expect for the future landscape, this study analyzed urban residents' perceptions through text mining. Data related to the keywords "future landscape", "future environment", "well-being", and "climate change" were collected from July 2020 to July 2021 from the Korean search engines Naver, Daum, and Google using the tool TEXTOM. Keywords, importance, and related words were derived through word frequency, TF-IDF, and N-gram analysis. CONCOR analysis was used to derive the meaning and relevance of the words. In "future landscape", results showed a high frequency of the words "complex", "apartment", "future value", and "sale", and the connection strength was higher between "complex", "landscape", and "future value". In "future environment", "eco-friendly" showed the highest word frequency, and the words "New Deal", "hydrogen" and "mobility" showed a high frequency and correlation. For "well-being", "Green Cross" (a well-being-related company) showed the highest frequency, and the connection strength between satisfaction indexes was high. For "climate change", "response" showed the highest frequency, and the connection strength between "carbon-neutral", "UN-convention", and "plan-establishment" was high. These results showed that South Koreans associate landscaping with the value of apartment complexes, that they expect solutions to mitigate climate change impacts with green and eco-friendly strategies, and lastly that well-being-related companies are receiving a great deal of public attention. Thus, it is expected that the results will help plan effective landscaping approaches to respond to environmental changes.

Keywords: future landscape; future environment; well-being; climate change; landscape response

1. Introduction

Emerging environmental problems due to global climate change are threatening the health and survival of humankind along with changes in the future environment. From climate-related illnesses to risks to food safety and nutrition, mental health and well-being, the occurrence of these threats has increased alarmingly [1]. The interactions among rapid urbanization, the concentration of population in urban areas changing the urban form, and climate change can create various risks for cities, such as urban heat islands, flooding, water scarcity, and other hazards [2]. The reduction of biodiversity is becoming more serious, as climate change is affecting ecological processes and endemic and threatened species are under environmental pressure [3,4]. Asian cities have regionally specific risk profiles, as the rapid land-use change, and global processes increase the risk of extreme events [2,4].

South Korea is a country deeply impacted by climate change, with one of the highest increases in the average temperature compared with other countries, resulting in increasing concern among citizens, who believe that the government should take responsibility to address this issue [5]. Since the COVID-19 outbreak, the restrictions on activities affected human well-being, as participation in recreational activities declined [6]. However, according to the "COVID-19 Community Mobility Report" released by Google, the use of

parks in South Korea has continuously increased since the spread of the pandemic, with the infectious disease being one of the main factors impacting the growth [7,8]. Therefore, the demand for a healthier and safer outdoor space has increased significantly, and as leisure activities in indoor spaces were restricted, parks became a solution with a relatively low risk of infection from COVID-19, where physical activities and social exchanges are possible within a limited range [9]. Moreover, climate change can increase the use rate of urban greenspaces as citizens seek a cooler microclimate in green areas during periods of high temperatures [10].

This urgently requires practical studies in landscape science in terms of responding to climate change, dealing with rapid urbanization, and improving urban ecosystem services. Modern landscaping is a specialized field that practices all three directions, and its social value is being reset [11]. Landscape architecture is attracting attention in this respect, with its role recently expanded, as research related to "landscape urbanism" is being actively conducted [12]. As the awareness of the loss of biodiversity and the importance of ecosystems is increasing, the recognition of the potential of ecological systems to respond to climate change is also increasing. Therefore, using landscape systems as a response to climate change is an emerging topic among scholars [3]. The Ministry of Economy and Finance released the Korean Green New Deal Policy in 2020, with a list of projects aiming for a green transition of infrastructures, comprising plans to turn "public facilities into zero-energy buildings, restore the terrestrial, marine, and urban ecosystems, and build a management system for clean and safe water" [13]. To achieve these goals, landscaping can be used as a strategy to build green infrastructure, parks, and green areas to promote health and well-being after the COVID-19 pandemic. In addition, it is possible to pursue the convergence of all fields of landscape-related industries, such as virtual reality and the smart city concept. Taking into consideration that "collecting, disclosing and utilizing data in areas closely related to people's lives" is one of the projects of the Digital New Deal [13], this approach can contribute to gathering data to plan countermeasures according to future environmental changes by communicating with the "digital generation" in the digital space.

Considering regionally specific risk profiles, it is possible to affirm that landscape and climate change have implications for adaptation at the ground level. Still, subjective sense of place and landscape are still poorly researched in studies of adaptation to climate change, although individual perceptions can lead to different climate adaptation approaches [14]. For this reason, this research was conducted to understand the perception and prospects of residents on the local level, and to give insights into how landscaping could properly respond to urban changes considering citizens' perspectives.

Most of the research related to South Korean citizens' perception of the urban environment and landscape is focused on post-occupation analysis, usage behavior, or preference analysis using surveys and questionnaires [15–18] and even mapping [19] methods to propose improvement plans for green areas. However, some studies, especially after the COVID-19 outbreak, were conducted using text mining and social network analysis [20–23] to analyze behavior characteristics, use changes, and users' perceptions, as personal contact became difficult. Comparing the results of the previous studies, it was possible to see that the studies conducted using text mining allowed the analysis of a much larger amount of data (such as 268.319 SNS posts [20]) and the analysis of data collected from a longer period of time (from June 2017 to May 2020 [21]) than compared to the studies that used questionnaires and field surveys (497 samples collected for 21 days [18]). Jin et al. [24] used several text mining methods such as keyword network analysis, among others, and identified an increasing frequency of specific phenomena terms resulting from climate change in environmental news channels, such as heat waves and cold waves, as well as a trend of policy discussion on climate change issues.

Text mining extracts meaningful structured information from text data, enabling the identification of key concepts and their relationships, patterns, and attributes [25]. As the cost and time of collecting large-scale data are reduced with text mining methods, research

analyzing key issues or trends using big data is increasing. However, more research in the environmental field is needed, as it is still in the early stage [24]. Therefore, it is expected that this methodology combined with visual representation can demonstrate common future landscaping trends.

In this context, this study aims to analyze the keywords "future landscape", "future environment", "well-being", and "climate change" from citizens' perspectives, using text mining and social network analysis. In Section 2, we introduce the TEXTOM tool, and the text mining techniques used: word frequency, TF-IDF, N-gram, and CONCOR analysis. In Section 3 we present the text mining results, following the sequence mentioned above for each keyword. Furthermore, in the discussion section, we attempted to suggest directions that landscaping should take to respond to changes in the future environment based on the local context, as citizens are the main users that experience and give sense to the landscapes. Finally, in the conclusion section, we present the main findings, limitations, and implications of the study.

2. Materials and Methods

Big data analysis allows the collection of raw data for the desired keyword in a short time and at low cost, also providing the possibility to grasp the changing aspects of society quickly. By identifying patterns and prospects through text mining, visualization of the results makes it easy to persuade citizens about policies and logically present solutions. Therefore, to analyze citizens' perceptions of landscape in the scenario of COVID-19 and the digital era, the text mining approach was selected to investigate a large amount of data that will provide insights into important factors that impact the practice of landscaping and planning of green policies. The research structure is presented in the following diagram (Figure 1).
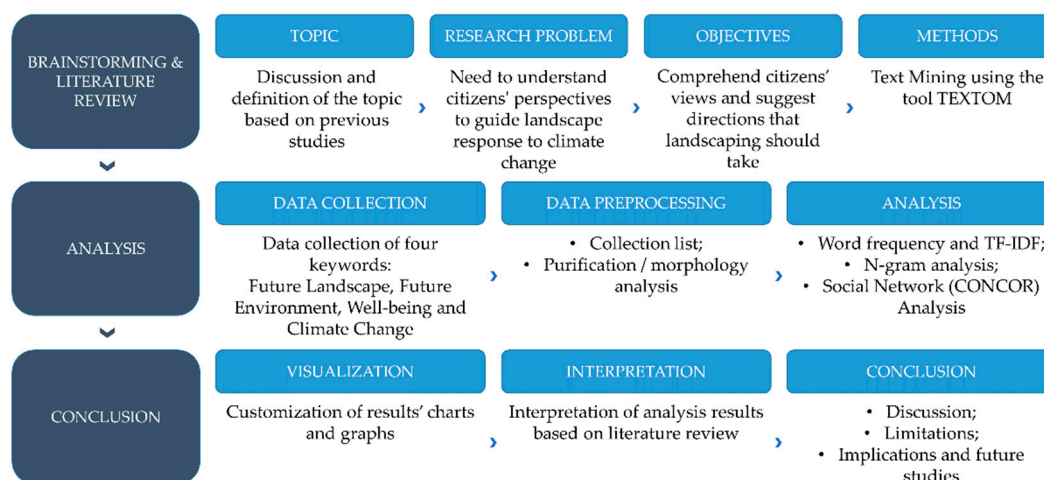

Figure 1. Research structure.

This study uses the TEXTOM tool to collect data from Korean blogs and social networking service posts. Data collection for this study was conducted by limiting the period to about one year, from July 2020 to July 2021, about the four keywords (originally in Korean) "future landscape", "future environment", "well-being", and "climate change" from representative search engines in South Korea such as Naver, Daum, and Google. The collection channels were chosen due to the following reasons: first, because they are the top three most used channels in South Korea, and second, as the purpose of this study is to find out the overall trend of landscape and environment, news websites and blogs are relatively rich sources of content where users freely share their experiences and opinions.

The four keywords were chosen based on previous studies and mainly based on the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [4]. In the chapter that describes impacts, adaptation, and vulnerability with a focus on Asia, it is

mentioned that Asian countries are the most vulnerable to climate risks, with cities and infrastructure, and terrestrial ecosystems being the main sectors susceptible to multiple hazards. The chapter also emphasizes the effects of climate change on the health and well-being of citizens, as vulnerability to extreme weather events increases water-related illnesses, malnutrition, mental health problems, and allergies. Regarding the measures that have been adopted to adapt to climate change, the report shows that solutions based on ecosystems, such as the planning of urban parks and green spaces aiming to reduce risks such as extreme heat and heat islands, have a medium impact on reducing risks and high impact on human well-being [4]. Therefore, it was identified that the four keywords have an important connection and relevance to this study, since "climate change" directly impacts the "future environment" and the "well-being" of citizens, and the practice of landscaping provides proven effective solutions to mitigate risks and improve the human well-being through the creation of parks and green spaces.

2.1. Data Collection and Preprocessing

TEXTOM, a Korean-based big data program, is a software that is useful for network analysis as it searches for keywords on search engines to provide data and related terms rankings and provides matrix information according to the frequency of the searched keywords [26]. In the first step, the keywords, collection period, and collection channels were defined and inserted in the TEXTOM tool to collect the data. After obtaining the unstructured data, in the preprocessing stage, a refining process was performed to subdivide the collected unstructured data into morphemes [27]. Unnecessary words such as pronouns and synonyms, and duplicated posts were deleted, and to secure the reliability and objectivity of the research results, the final data to be used in the research were obtained after the third refining process. The text mining techniques applied are explained below.

2.2. Text Mining Analysis

Text mining, or text data mining, is a method of extracting meaningful data by modeling and structuring unstructured text data using a mechanical algorithm [28]. In addition, text mining is an exploratory data analysis process that allows for the discovery of useful, previously unknown information [29–31]. In other words, it is a process of structuring an input text from a large amount of data, inducing connections and patterns through various mechanical algorithms in the structured data, and grasping their meaning to generate novel insights.

2.2.1. Word Frequency and TF-IDF Analysis

Word frequency and term frequency–inverse document frequency (TF-IDF), which indicate keywords' frequency occurrence, are statistical numerical data indicating how important a specific word is [32]. TF-IDF mainly uses a method in which the importance of words is determined by calculating the weights between documents containing specific words, and sorting the weights with high values for the purpose of extracting keywords [33]. Frequency of appearance was analyzed through the four keywords "future landscape", "future environment", "well-being", and "climate change", and TF-IDF analysis was conducted to derive related terms for each keyword.

2.2.2. N-Gram Analysis

N-gram analysis is a method that calculates and visualizes a sequence of N words, which can represent the frequency of syllables or words placed after a particular word in a large volume of documents as quantitative figures [34]. By examining the connection between the derived terms and initial keywords, the meaning of the derived keywords was identified, and the connection strength and related words that are important within each keyword were obtained.

2.2.3. Social Network (CONCOR) Analysis

CONCOR analysis is a method of classifying groups with an appropriate level of similarity by repeatedly performing correlation analysis [35]. In the case of semantic network analysis based on real language, the convergence of iterated correlation (CONCOR) analysis method—which divides the clusters based on the correlation of indirect connection patterns—is recommended, because words are an organization without a hierarchy [36]. Detailed research areas were classified through CONCOR analysis by grouping words with high relevance. When visualized by CONCOR analysis, the higher the frequency of words, the larger the node size, and the thicker the connection line between the nodes, the stronger the connection strength between words. It analyzed how words were related by keyword and identified the meaning and relationship between words based on urban residents' opinions.

Analysis results were organized into tables and graphs for visualization, and interpretation was conducted based on the literature review as presented in the next section.

3. Results

This section presents the results of text mining analysis for "future landscape", "future environment", "well-being", and "climate change". First, the summary of the unstructured data collected is shown, followed by the results and explanation of each of the four keywords, conducted in the sequence of word frequency and TF-IDF, N-gram, and CONCOR analysis.

3.1. Data Collection and Preprocessing Results

Table 1 below shows the data collection results obtained from July 2020 to July 2021, through the most frequently used portal sites in South Korea: Naver, Daum, and Google.

Table 1. Data collection results.

Category	Future Landscape	Future Environment	Well-Being	Climate Change
Naver Blog	13,725	164	978	938
Naver News	27	468	464	920
Daum Blog	16,169	4374	876	868
Daum News	3369	3612	697	770
Google News	-	-	-	321
Total	33,290	8618	3015	3817

For "future landscape", 13,725 articles from Naver Blog, 27 articles from Naver News, 16.169 articles from Daum Blog, and 3369 articles from Daum News were selected as final analysis targets. For "future environment", 164 articles from Naver Blog, 468 from Naver News, 4374 from Daum Blog, and 3612 articles from Daum News were collected. For "well-being", 978 articles from Naver Blog, 464 articles from Naver News, 876 articles from Daum Blog, and 697 articles from Daum News were selected as final analysis targets. Finally, for "climate change", 938 articles from Naver Blog, 920 articles from Naver News, 868 articles from Daum Blog, 770 articles from Daum News, and 321 articles from Google News were collected. The large number of posts about "future landscape" shows that the topic is highly discussed among South Koreans, even more than climate change, which was the only term with posts on Google News. This result can confirm the result obtained from the Jin et al. [24] study, which showed that the keyword "climate change" tends to decrease overall, while specific phenomena terms are increasing. This also reinforces the need to understand why and how the landscape subject is gaining attention from non-expert citizens.

3.2. Future Landscape Analysis Results

3.2.1. Text Mining Analysis

1.   Word frequency and TF-IDF analysis

The word frequency and TF-IDF analysis results of "future landscape" revealed that "complex" (the term translated from Korean refers to apartment complex or industrial area) was searched the most, followed by "apartment", "future value", and "sale", as shown in Table 2. This indicates that the current Korean apartment complex and landscaping industries are closely related, and most landscaping work—including construction work—is being carried out on apartments [37], which further indicates that the proportion of apartment landscape spaces is becoming an important factor that influences commercial properties and the real estate value of apartments. In addition, in the light of words such as "future value", "sale", and "premium", the perception of "future landscape" for South Korean citizens is closely related to real estate value. The keywords "community", "park", and "nature" showed a moderate frequency, suggesting that measures to expand territoriality along with a change in perception of landscape should be discussed and studied.

Table 2. "Future Landscape" word frequency (TF) and TF-IDF derivation results (Top 30).

Rank	TF		TF-IDF	
	Word	**Freq.**	**Word**	**Freq.**
1	Complex	8466	Complex	13,485.908
2	Apartment	7317	Apartment	12,523.342
3	Future value	5836	Future value	10,174.186
4	Sale	4875	Sales	9782.369
5	Build	2797	Schedule	7160.031
6	Schedule	2745	Build	7123.508
7	Space	2429	Space	6734.692
8	Expectation	2428	Expectation	6455.062
9	Variety	2349	Variety	6280.140
10	Value	2169	Design	6031.276
11	Design	2168	Value	5969.716
12	Information	1851	Seoul	5549.716
13	Seoul	1725	Information	5358.072
14	Community	1671	Park	5094.553
15	Park	1668	Community	5044.145
16	Nature	1570	Nature	4911.348
17	Premium	1550	Premium	4849.865
18	Facility	1540	Facility	4805.724
19	Nuri (Regional Planning Research Institute)	1512	Nuri (Regional Planning Research Institute)	4722.541
20	Plan	1489	Plan	4707.615
21	Environment	1468	Environment	4646.527
22	Model house	1449	Model house	4556.275
23	Area	1400	Generation	4545.315
24	Generation	1385	Area	4540.905
25	Development	1365	Architecture	4508.184
26	Possibility	1344	Development	4441.349
27	Architecture	1338	Possibility	4373.021
28	Life	1261	City	4321.201
29	Investment	1257	Investment	4174.257
30	City	1247	Life	4165.333

2.   N-gram analysis

As a result of N-gram analysis of "future landscape", "complex→landscape" showed the highest connection strength (intensity number of 995), and the connection strength was found to be high between "future→value" (924), followed by "apartment→sale" (589), and "community→facility" (561) (Table 3, Figure 2). As with the TF-IDF analysis results, it can

be interpreted as a result of the recognition that landscape is closely related to apartments and is an important factor that can increase the value of future real estate. The reason that specific place names such as "Hwaseong Dongtan" and "Paju", both cities in South Korea, are mentioned is because they are areas where large-scale housing site development or new towns are to be built or constructed. As of 2020, apartments accounted for a high proportion of domestic housing—51.1%, according to the Korean Statistical Information Service [38]. Therefore, "future landscape" is emerging as the future value of residential space for city dwellers. It can be said that the influence of apartments on urban space is very high, and if the apartment landscape space can be used more publicly, various changes—such as the improvement of ecosystem services that can respond to anticipated changes in the future environment, improvement of urban green space, and improvement of urban community as a public space—can be expected [39]. Open spaces in apartment complexes, that is, any space beyond the indoor space where residents perform daily activities, should have a stronger public space role. These spaces can be optimized through landscaping solutions, such as the implementation of green infrastructure to improve the microclimate, absorption of rainwater, and the creation of leisure spaces, thus acting as a response to climate change and promoting the well-being of residents and other users. The landscaping space of an apartment complex increases the satisfaction of its residents and is an important factor influencing the improvement of livability and quality of life [40]. Therefore, it should be planned as a space that is closely related to society and can offer diverse functions and facilities. The appearance of the company name Jeil Construction Ltd., which is a company specializing in the construction of apartment complexes, also reinforces this strong association of landscape with apartments. Considering that a pleasant environment can be provided through nature-based solutions, and green spaces can play a major role in the mitigation of climate change impacts and urban environmental problems [41], landscaping can be seen as one of the most important approaches to adapting to future environmental changes; therefore, studies in this area should be actively conducted.

Figure 2. "Future landscape" N-gram analysis results.

Table 3. N-gram connection strength analysis results for "future landscape".

Rank	Word A	Word B	Strength
1	Complex	Landscape	995
2	Future	Value	924
3	Apartment	Sale	589
4	Community	Facility	561
5	Sale	Information	492
6	Future value	Expectation	406
7	Specialized	Landscape facility	373
8	Issue	Inspection	370
9	Jeil Construction Ltd., Jeollanam; South Korea	Specialized	370
10	Landscape facility	Introduction	370

3.2.2. Social Network Analysis (CONCOR Analysis)

As a result of the CONCOR analysis (Figure 3), the keywords related to "future landscape" were divided into five groups. For urban residents, "future landscape" is a major factor in creating a premium complex, influencing the real estate market, and improving the future value of apartments. "Architecture", "design", and "city", were partially related to the territorial nature of "landscape", and more ecology-related words such as "garden" and "nature" were also partially connected. Considering the characteristics of South Korea, where most residential dwellings are apartments, "future landscape" is closely related to apartments and is still recognized as a factor affecting the real estate market, instead of as a means capable of responding to climate change and urban environmental problems.
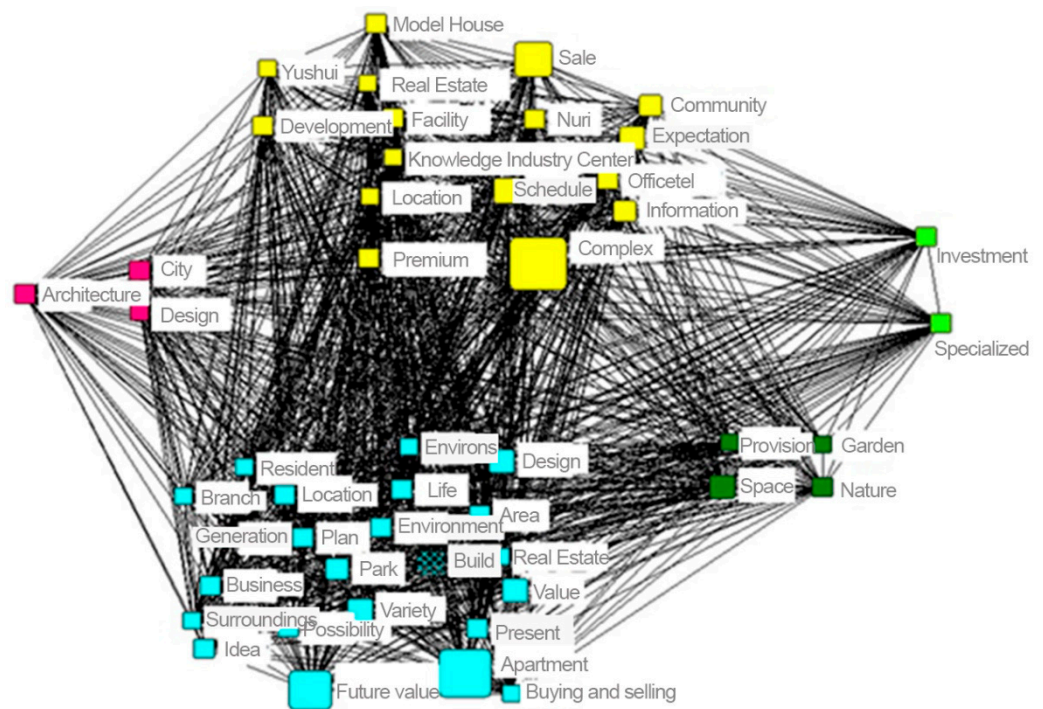

Figure 3. "Future landscape" CONCOR analysis results.

3.3. "Future Environment" Analysis Results

3.3.1. Text Mining Analysis

1. Word frequency and TF-IDF analysis

As for the frequency of words for "future environment", "eco-friendly" was the most searched word, followed by "education", "industry", "business", and "technology". In the TF-IDF analysis, "education" was found to be searched the most, followed by

"eco-friendly", "industry", "business", and "technology" (Table 4). The interest in eco-friendliness has increased among city residents as various policies for eco-friendly cities have been announced to counter environmental problems caused by global climate change. The results showed the words related to government policies on the Green New Deal [13] such as "New Deal", "hydrogen", "smart", and "mobility", and as the plan includes the development of smart cities and hydrogen cars, it can be seen that citizens' perceptions are highly related to government policies. In particular, the frequency of the word "education" was found to be high, indicating that continuous and proper education, understanding, and a change of perception are necessary for innovation in preparation for the future environment and successful policy achievement.

Table 4. "Future Environment" word frequency (TF) and TF-IDF derivation results (Top 30).

Rank	TF		TF-IDF	
	Word	**Freq.**	**Word**	**Freq.**
1	Eco-friendly	3200	Education	5182.407
2	Education	2871	Eco-friendly	3741.414
3	Industry	1828	Industry	3516.993
4	Business	1765	Business	3262.855
5	Technology	1487	Technology	3060.051
6	Change	1433	New Deal	2947.131
7	New Deal	1347	Hydrogen	2910.8
8	Energy	1263	Smart	2882.574
9	Mobility	1224	School	2768.27
10	Smart	1219	Energy	2714.597
11	Hydrogen	1150	Mobility	2585.286
12	Corona	1079	Change	2584.431
13	School	1024	Car	2522.409
14	Car	1017	Corona	2395.025
15	Electricity	962	Electricity	2368.262
16	Society	939	City	2281.099
17	Possibility	937	Society	2280.713
18	Development	934	Digital	2275.993
19	Digital	867	Development	2147.468
20	City	863	Possibility	2133.982
21	Plan	855	Support	2113.958
22	Economy	852	Economy	2071.914
23	Propulsion	835	Plan	2020.641
24	Era	831	Market	1970.483
25	Market	825	Propulsion	1964.212
26	Response	810	Era	1954.802
27	Support	787	Hyundai Motor	1915.16
28	Growth	772	Response	1896.61
29	Policy	725	Growth	1884.24
30	Value	713	Corporation	1860.146

2. N-gram analysis

The N-gram analysis results of "future environment" (Table 5, Figure 4) revealed "future→environment" to have the highest connection strength (964), followed by "eco-friendly→future" (830), "future→education" (793), and "future→mobility" (791). Major factors in the future environment can be analyzed as "eco-friendly", "education", "mobility", and "New Deal", indicating that smart and energy-related words are attracting attention along with eco-friendly cities. From the perspective of the landscape industry, smart technologies related to the fourth industrial revolution technology are continuously being developed and studied. Smart cities, smart homes, smart farms; and precision agriculture, smart tourism, and smart healthcare technologies are highly linked by cooperation with landscaping [42]. Smart park creation [9], if it is linked with the Korean New Deal

policy [13] and pursues smartization of the design, construction, and management process, can respond to future environmental changes as the social value of parks is improved due to the COVID-19 pandemic. Collaboration in the landscape industry that can respond to the future environment, such as greenway and pedestrian-friendly city construction linked to smart mobility, is required.

Table 5. N-gram connection strength analysis results for "future environment".

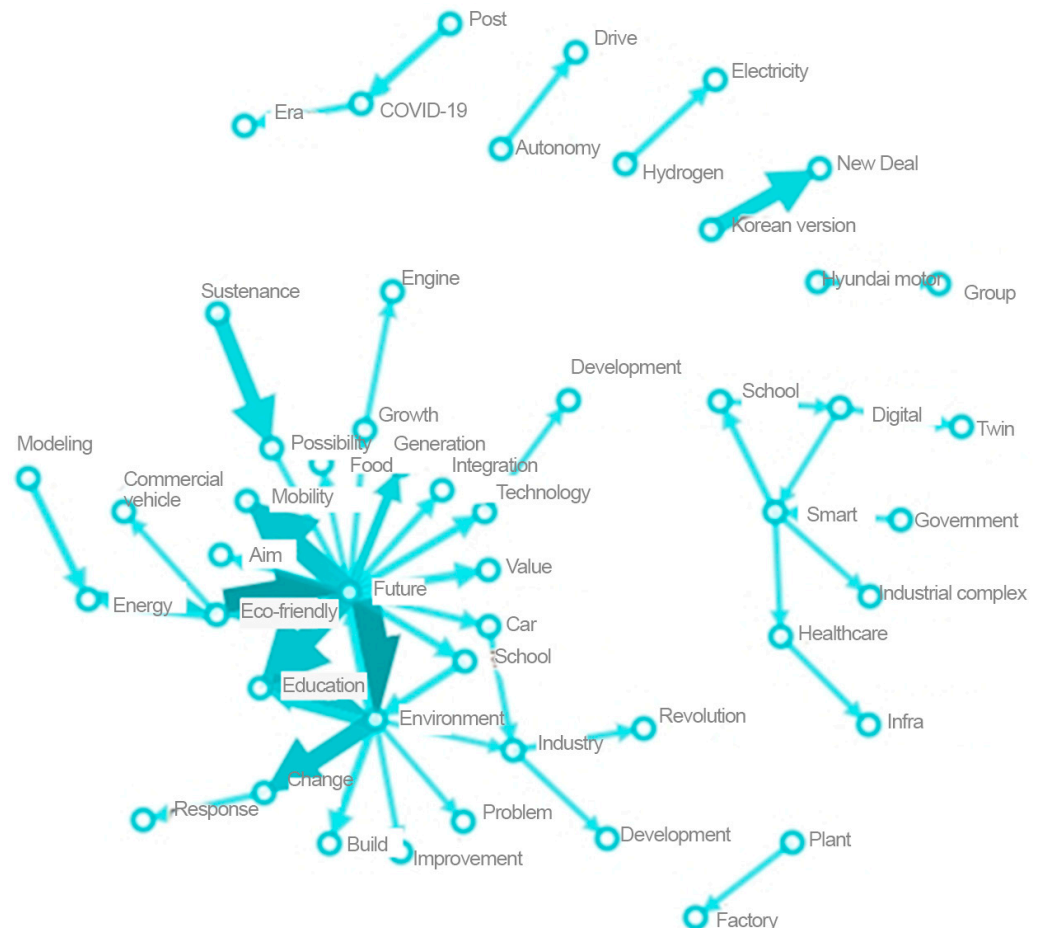| Rank	Word A	Word B	Strength
1	Future	Environment	964
2	Eco-friendly	Future	830
3	Future	Education	793
4	Future	Mobility	791
5	Environment	Change	653
6	Education	Environment	609
7	Korean version	New Deal	538
8	Sustenance	Possibility	532
9	Future	Eco-friendly	470
10	Future	Generation	312

Figure 4. "Future environment" N-gram analysis results.

3.3.2. Social Network Analysis (CONCOR Analysis)

The results of the CONCOR analysis on the "future environment" can be divided into eight related groups, which indicate uncertainty and difficulty in predicting the future environment (Figure 5). As a common factor for each group, words related to "eco-friendly" are included, and it can be concluded that policies, related projects, and technology development for a healthy and sustainable urban environment are important in the future

environment. In particular, electric/hydrogen vehicles, mobility, and related companies that use eco-friendly energy in line with the Korean Green New Deal and Digital New Deal policies [13] actively being promoted by the government, are attracting attention. As interest has increased in future environmental changes due to the COVID-19 pandemic, "safety"-, "response"-, and "COVID-19"-related keywords were also derived, which were analyzed in the same group as keywords such as "education", "change", "innovation", and "policy", indicating the importance of state–citizen cooperation to preparing for future environmental changes.
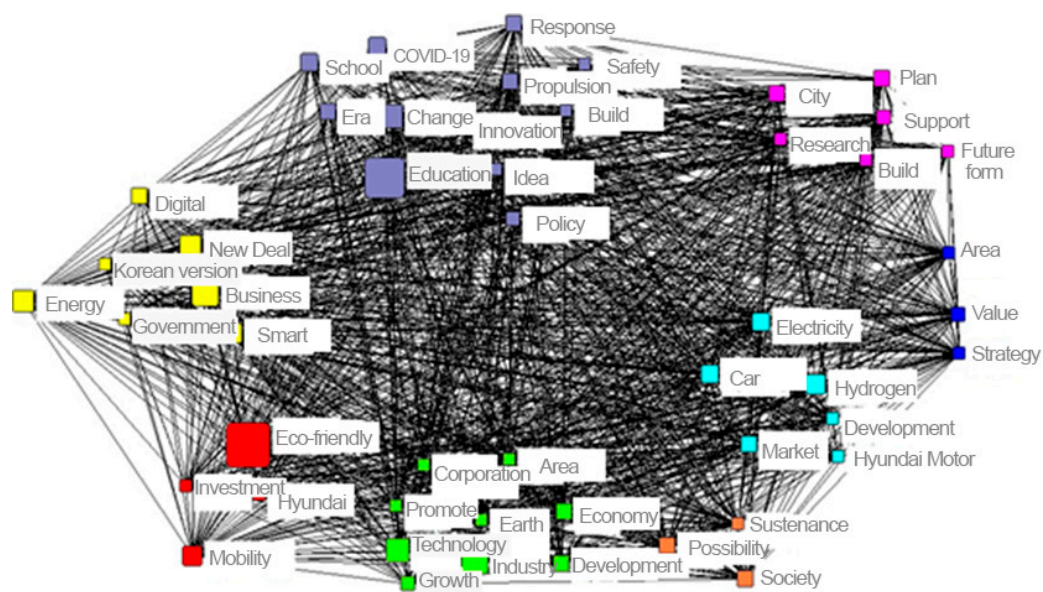

Figure 5. "Future Environment" CONCOR analysis results.

3.4. "Well-Being" Analysis Results

3.4.1. Text Mining Analysis

1.　　Word frequency and TF-IDF analysis

　　"Well-being" is a concept that encompasses the happiness, satisfaction, and health of citizens. Since 2001, it has been widely used in all areas of life, as the mass media has focused on introducing "well-being" and a "well-being lifestyle" [43]. In the dictionary, "well-being" means eating well and living well, in the sense of achieving happiness, but it is a concept that values peace of mind and spiritual abundance for a better life instead of material values. The World Health Organization, which first used the term well-being in this broader context, defines the culture of well-being based on social, economic, and environmental conditions [44]. As a social trend established in the 21st century, well-being is gradually expanding between generations and classes [45], and is becoming a major concern of citizens. In particular, the desire for well-being is growing stronger due to global climate change, rapid urbanization, and urban environmental problems caused by industrialization. In the word frequency analysis, "Green Cross" showed the highest frequency, followed by "health", "consumer", "environment", and "index", as can be seen in Table 6. In the TF-IDF analysis, "Green Cross" showed the highest frequency, similar to the word frequency analysis results, and other derived words were "environment", "consumer", "index", and "health". Linked with diet-related words such as "health", "restaurant", and "food", the "Green Cross" is a company that is active in South Korea providing services such as health diagnosis, health solutions (nutritional treatment), pharmaceuticals, and medical care [46]. A word related to landscaping, "park", was searched as a place to relieve urban residents' desire for well-being; as the utilization rate of parks increased due to the COVID-19 pandemic, they are being considered an important factor in an eco-friendly city. The term "well-being" is already widely known in South Korea, and is becoming a field of great interest. The creation of public spaces and parks under the concept of well-being that

combines urban culture with the satisfaction of the needs of residents, instead of a place seen just as a facility, can greatly contribute to an improvement in quality of life [47].

Table 6. "Well-being" word frequency (TF) and TF-IDF derivation results (Top 30).

Rank	TF		TF-IDF	
	Word	**Freq.**	**Word**	**Freq.**
1	Green Cross	1320	Green Cross	2230.249
2	Health	951	Environment	1540.146
3	Consumer	704	Consumer	1535.746
4	Environment	699	Index	1487.392
5	Index	666	Health	1466.515
6	Satisfaction	635	Satisfaction	1437.774
7	Restaurant	419	Paju	1236.308
8	Business	403	Park	1158.255
9	Paju	397	Restaurant	1020.197
10	Park	388	Jangdan Soybean	1004.962
11	Representative	356	Maru	999.1673
12	Food	333	Business	985.0055
13	Korea	328	Production	888.2246
14	Maru	318	Food	838.2301
15	News	318	Consecutive	819.4821
16	Jangdan Soybean	315	Korea	768.0588
17	Production	314	Pension	763.9595
18	Consecutive	311	Representative	759.0459
19	Association	274	Facility	754.4669
20	Selection	274	Injection	738.9886
21	Standard	250	Yongso	727.9513
22	Injection	238	Release	694.4661
23	Facility	229	Association	689.7149
24	International	221	Selection	688.3345
25	Release	217	News	654.8483
26	Yongso	203	Standard	647.6347
27	Market	196	International	639.3132
28	Product	195	Selenium	632.0871
29	Food	193	Food	623.5374
30	Function	186	Snack	609.5941

2.　　N-gram analysis

In the N-gram analysis, "satisfaction→index" had the highest connection strength (615), followed by "environment→satisfaction" (608), "consumer→environment" (601), and "Jangdan Soybean→Maru" (303) (Table 7, Figure 6). Since "well-being" is used in a way that is related to the lives of urban residents, interest in satisfaction index for daily life is increasing. In terms of well-being, as food-related industries are highly active, "Jangdan Soybean", one of the local specialties produced in Jangdan-gun, Paju city in South Korea, was also ranked relatively high, as well as "Paju". "Jangdan Soybean Wellbeing Maru", is the name of a tourist zone in Paju city, created to promote the city's agriculture. As for keywords related to "landscape", the connection strength between "Yongso" and "park" was high due to the influence of the Yongso Well-being Park, located in Gijang-gun, Busan. Looking at the overall trend of "well-being", it is possible to derive "nature-friendly life", "healthy life by organic products", "personal happiness", and "strong curiosity and active action" [48] as characteristics of well-being. In connection with this, active research is needed not only for "well-being" but also for "healing", "healing-themed spaces", "parks", and "community space".

Table 7. N-gram connection strength analysis results for "well-being".

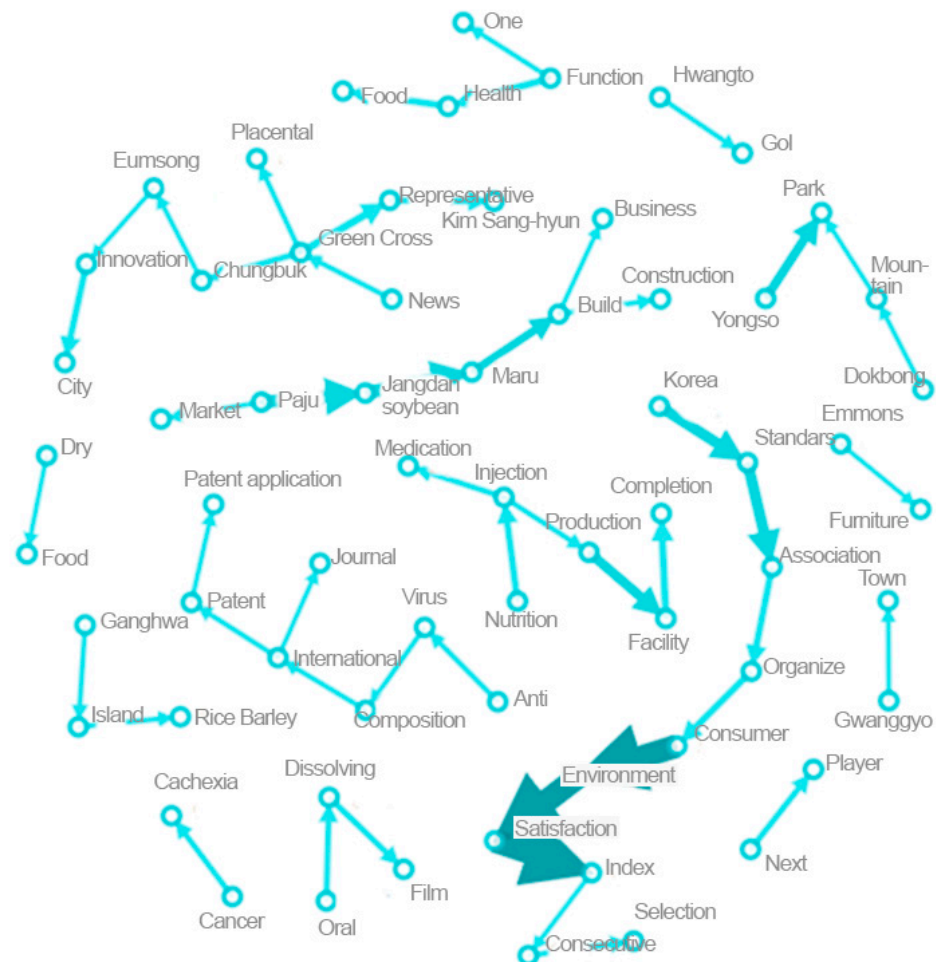| Rank	Word A	Word B	Strength
1	Satisfaction	Index	615
2	Environment	Satisfaction	608
3	Consumer	Environment	601
4	Jangdan Soybean	Maru	303
5	Paju	Jangdan Soybean	292
6	Standard	Association	249
7	Korea	Standard	246
8	Production	Facility	212
9	Yongso	Park	193
10	Maru	Creation	162

Figure 6. "Well-being" N-gram analysis results.

3.4.2. Social Network Analysis (CONCOR Analysis)

In the CONCOR analysis of "well-being", the results were divided into five related groups (Figure 7), and a relatively clearer association could be derived compared with other keywords. The connection strength and correlation of the "environment–consumer-satisfaction-index" were the highest. As with the previous word frequency and N-gram analysis, this result was found because of the active nature of the food-related industry, and the perception of well-being being stronger in the health-related food industry than in outside spaces such as parks. We can also recognize the high interest in diet-related terms.
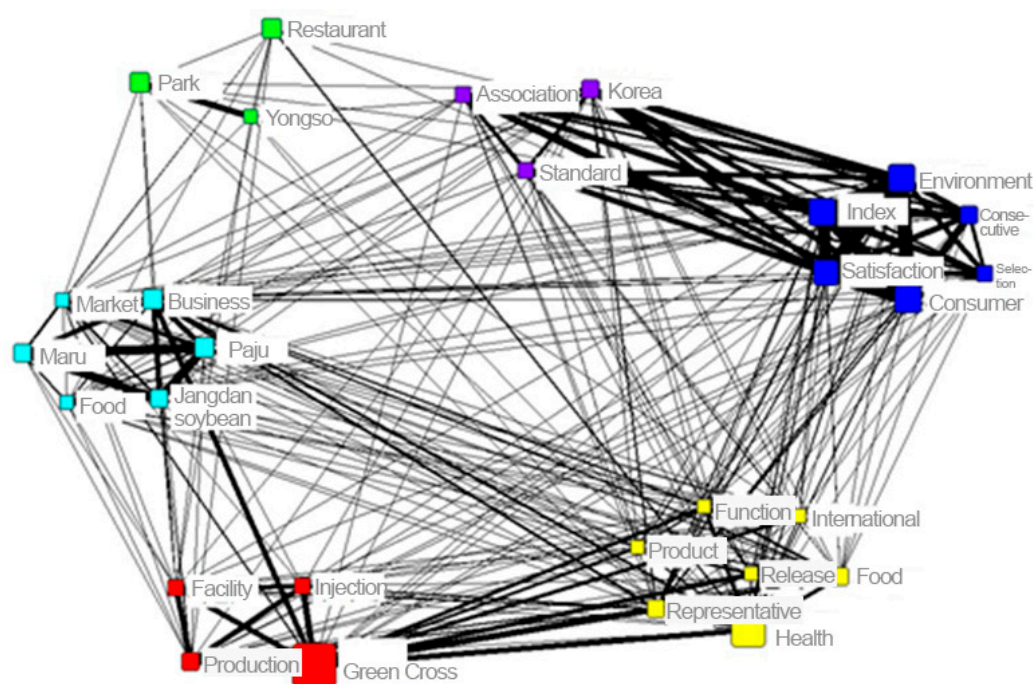
Figure 7. "Well-being" CONCOR analysis results.

3.5. "Climate Change" Analysis Results

3.5.1. Text Mining Analysis

1.   Word frequency and TF-IDF analysis

"Climate change" is the most controversial keyword around the world, and since the Paris Agreement in 2016 [49], it has emerged as the most important issue at the national and international level, along with air pollution caused by fine dust and ozone in urbanized areas. Climate change is a very complex phenomenon that occurs not only in one sector, but also in physics/environment, industry/economy, population/society, and energy (Table 8). Following these international trends, and South Korea's response to climate change as expressed in the Climate Change Convention and the Kyoto Protocol (which were ratified in 1993 and 2002 and came into effect in 1994 and 2005, respectively) [50,51], research on climate change response in various fields is being conducted in earnest [52]. Urban floods, heat island effects, heatwaves, fine dust, ozone, etc., caused by global climate change are causing enormous damage worldwide, and various policies are being introduced and active research conducted to mitigate these events. There is a growing perception that climate change is one of the most important issues in life for urban residents, and a task to be solved nationwide.

The word frequency analysis results for "climate change" revealed that "response" showed the highest frequency and was followed by "carbon", "crisis", "environment", and "earth". In the TF-IDF analysis, "response" had the highest frequency, followed by "carbon", "environment", "crisis", and "earth." The perception of climate change as a task to be addressed is high, and carbon reduction and environmental improvement are important. In line with the COVID-19 pandemic, it is urgent to prepare countermeasures that can respond to the future environment, such as preparing policies and discovering related businesses.

1.   N-gram analysis

In the N-gram analysis of "climate change", "carbon→neutral" was derived with the highest connection strength (482), followed by "UN→convention" (164), "plan→establishment" (155), and "party→general assembly" (148) (Table 9, Figure 8). This is related to the establishment of new and diverse urban concepts such as green cities, low-carbon cities,

zero-emission cities, and carbon-neutral cities to respond to climate change. In particular, the 17th Conference of the Parties to the Convention on Climate Change (COP17) in 2011 [53], along with the "Kyoto Protocol Extension" after 2020 [51], provided the compulsion to respond to global climate change, in which developing countries such as China, India, and South Korea joined the greenhouse gas reduction system through the Durban Platform [54]. Greenhouse gas reduction and carbon reduction to respond to climate change have become global norms; moreover, South Korea has been designated as a country obligated to reduce emissions, and the government is actively responding through related policies and business development [55]. In this context, the connection strength of "carbon-neutral", "UN convention", and "party-general assembly" was high.

Table 8. "Climate change" word frequency (TF) and TF-IDF derivation results (Top 30).

Rank	TF		TF-IDF	
	Word	**Freq.**	**Word**	**Freq.**
1	Response	1656	Response	1955.141
2	Carbon	797	Carbon	1452.528
3	Crisis	790	Environment	1408.521
4	Environment	769	Crisis	1372.349
5	Earth	711	Earth	1345.309
6	Word	633	Education	1300.753
7	Neutral	488	Word	1210.184
8	Education	463	Neutral	1116.968
9	Heatwave	419	Heatwave	1031.801
10	Convention	375	Convention	1005.515
11	Adaptation	358	Adaptation	1002.29
12	Problem	356	Index	993.3302
13	Korea	352	Experience	917.631
14	United States	342	Korea	891.9647
15	News	334	Energy	888.6312
16	Energy	325	Problem	869.3709
17	Greenhouse gas	299	United States	866.6248
18	Ideal	294	Minister	858.663
19	Experience	285	News	798.0628
20	Plan	282	Plan	792.2516
21	Minister	263	Greenhouse gas	791.6371
22	Conference	261	Conference	774.5506
23	Impact	260	Ideal	772.3619
24	Policy	258	Business	759.6759
25	News	256	Policy	733.7896
26	Business	255	Expert	725.2571
27	Expert	255	News	722.9811
28	Economy	254	Corona	718.8093
29	Index	249	Impact	716.8549
30	International	245	Cooperation	707.4256

In particular, "carbon-neutral" showed a significantly higher connection strength than other words, and it can be deduced that it is the most important factor in responding to climate change. According to the fourth report of the Intergovernmental Panel on Climate Change [56], the main contribution of greenhouse gas emissions comes from cities, and they account for 70% of total emissions. In South Korea, green architecture, eco-friendly architecture, zero energy, and related certification systems for greenhouse gas and carbon reduction are mandatory, but except for at the city level, the effect does not appear to be high, due to the limitations of individual building units. This suggests that it is urgent to prepare legal and institutional devices to make eco-friendly cities and green cities a reality, and that it is necessary to prepare continuous improvement measures such as topical research and related projects.

Table 9. N-gram connection strength analysis results for "climate change".

Rank	Word A	Word B	Strength
1	Carbon	Neutral	482
2	UN	Convention	164
3	Plan	Establishment	155
4	Party	General assembly	148
5	Local	Time	142
6	Adaptation	Countermeasure	128
7	Greenhouse gas	Reduction	123
8	Crisis	Response	115
9	Convention	Party	107
10	Experience	Education	96
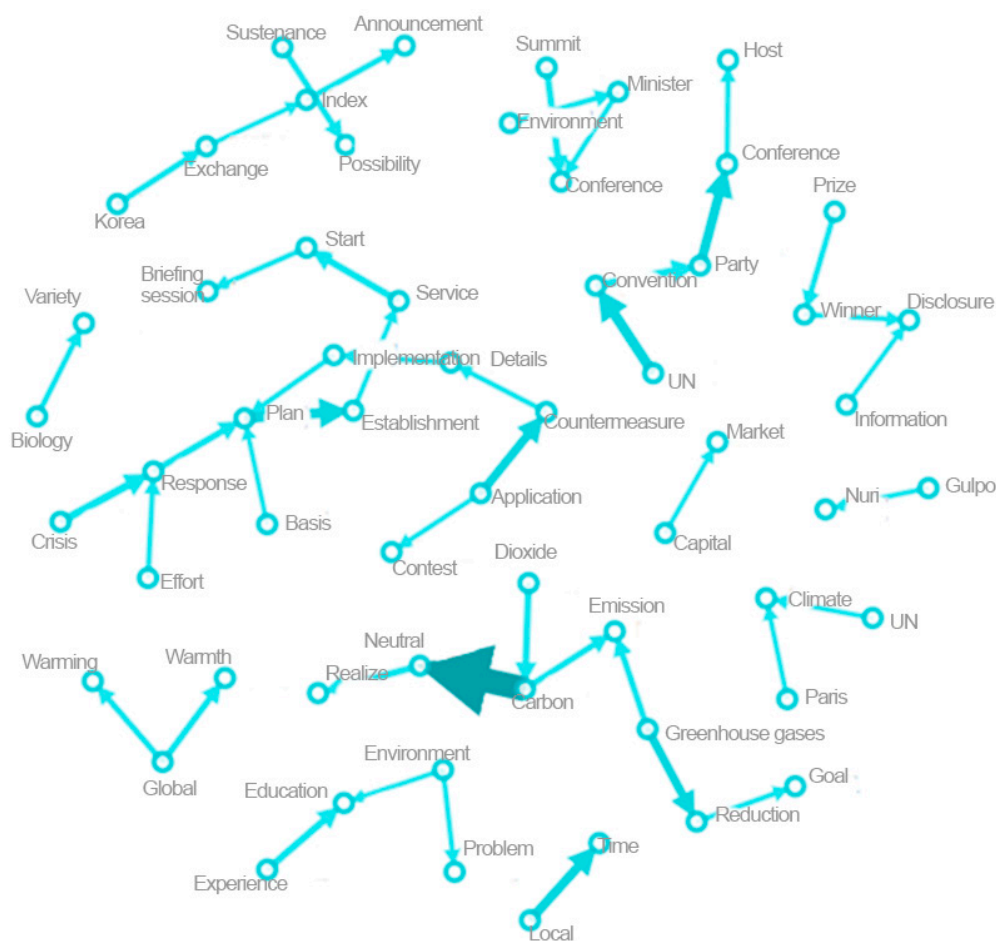
Figure 8. "Climate change" N-gram analysis results.

3.5.2. Social Network Analysis (CONCOR Analysis)

The CONCOR analysis of "climate change", can be divided into eight related groups (Figure 9). Compared to the other keywords "future landscape", "future environment", and "well-being", the general connection strength was not high, being higher only between a few specific words.

"Response", "carbon", "earth", "environment", and "crisis" are the most important factors in climate change. For urban residents, climate change is the most important task for coping with changes in the future environment, and in particular, factors such as greenhouse gas reduction, energy reduction, and carbon neutrality are recognized as important.
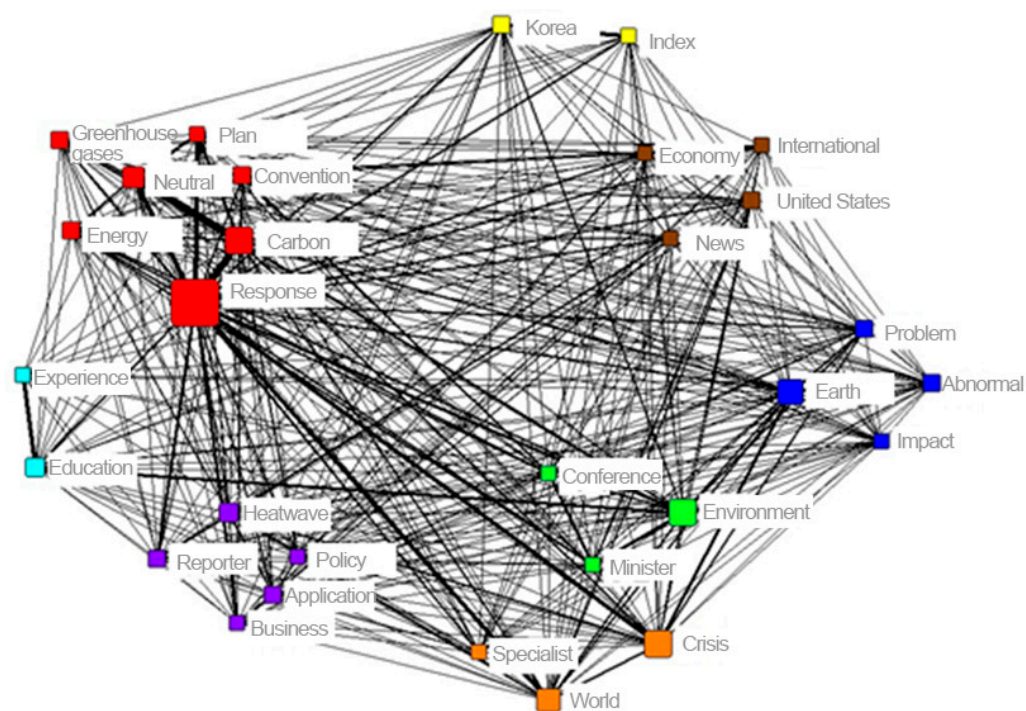
Figure 9. "Climate change" CONCOR analysis results.

4. Discussion

This study examined the perceptions of South Korean citizens in regard to landscape and environmental changes through text mining and social network analysis methods. The analysis of related terms, meanings, and connection strengths derived from the four keywords "future landscape", "future environment", "well-being", and "climate change", helped to elucidate directions and implications for landscaping at the local scale. Based on this study's results, the relevance of words related to the perception of urban residents for each of the four keywords is as follows.

1. The results showed that "future landscape" is strongly associated with real estate value, which can be explained by the fact that more than half of the South Korean population currently live in apartment complexes [38], where landscaping becomes a component that increases marketing value. Words such as "complex", "apartment", "future value", and "sale" showed high frequency and close relationship. In the N-gram analysis, the strength of the connection between "complex-landscape" and "future-value" was higher than for the other keywords. This emphasizes that landscape is recognized as a factor that influences the quality of life of residents adding real estate value to apartment complexes, thus being a relevant point to be considered in future landscaping. This influence on residents' quality of life was also identified in the study conducted by Tae et al. [57], which demonstrated that apartment complex landscaping spaces (ACLS) have a positive impact on improving residents' life satisfaction and psychological well-being, suggesting that these spaces should be attractively planned and balanced in design, promoting a feeling of being "out of the ordinary". This directs to the need to study diverse approaches, such as adding walking trails or vegetable gardens, so that residents and other users can enjoy landscaping spaces in a dynamic and active way.

2. For "future environment", "eco-friendly" had the highest frequency followed by "education", while in the TF-IDF analysis "education" had the highest frequency followed by "eco-friendly". This result can be interpreted as an increasing interest in environmental issues, while the frequency of the terms "New Deal", "hydrogen", and "mobility" indicates growing attention to government measures to cope with climate change. In most cases, the words are connected with the keyword "future", also indicating concern and uncertainty regarding the future environment. This suggests that means to expand the population's

knowledge of eco-friendly measures and encourage active participation should be provided, as well as that approaches in line with the Green New Deal should be developed, such as the inclusion of green infrastructure in public buildings and schools.

3. For "well-being", "Green Cross"—a well-being-related company—showed the highest frequency, while the term correlation of "satisfaction-index" showed the highest connection strength. Well-being is a topic that is becoming a social trend, especially in the face of environmental problems and the occurrence of pandemics such as COVID-19. Considering the frequency of words related to food, and also words such as "environment" and "park", "health", "consumer", "satisfaction", and "index", it is possible to identify that the population associates well-being mainly with healthy food and environments, which justifies the relevance of companies focused on health supplements, and also highlights the importance of creating open green spaces for leisure and physical activities, as it is reported to provide positive outcomes to physical and psychological well-being [58]. With the increase in the use rate of parks after the pandemic, it is possible to affirm the need to improve the function of these spaces with a focus on healing and well-being experiences.

4. For "climate change", the keyword "response" showed the highest frequency, followed by "carbon" and "environment". This shows that residents associate carbon emissions as one of the causes of climate change, while also elucidating the perception of the effects of climate change on the environment. As shown in the N-gram analysis, the connection of the terms "carbon-neutral", "UN-convention", "plan-establishment" and "party-general assembly", demonstrates the interest of citizens in policies that discuss measures to mitigate the effects of climate change. Therefore, as South Korea has already been suffering the negative impacts of climate change, such as extreme events, flooding and reduction of biodiversity [59], and residents expect effective government measures, it is important to think about the landscaping role as a means of accomplishing the goals defined in green policies to cope with climate change.

The strategy of analyzing the perception of South Koreans through text mining made it possible to access a large amount of information that contributed to a general understanding of trends in the environment and landscape. The TEXTOM tool demonstrated great effectiveness in the process, as it helps non-experts from the very first step of obtaining unstructured data and pre-processing, to creating the final graphics for visualization. The results, however, were interpreted based on the background of landscaping professionals and students, with a focus on climate change and well-being. In addition to the use of other keywords that can lead to different results, there are also other text mining techniques, such as sentiment analysis, that could provide more in-depth information on the subject, and that can be considered for complementary studies.

Through green infrastructure, parks, gardens, and freshwater management, the interdisciplinary practice of landscaping can expand ecosystem services that are cultural (recreation, aesthetic value, etc.), regulating (climate, air quality, water purification, etc.), supporting (nutrient cycling, etc.), and provisioning (food, fresh water etc.) [60]. In this way, the practice of landscaping has great potential for responding to environmental changes, and landscape professionals should consider that, according to the results obtained in this study, South Korean citizens are aware, at least partially, of this potential and therefore expect eco-friendly measures aligned with policies to respond to climate change, and that landscaping spaces in apartment complexes are gaining greater relevance and value.

5. Conclusions

Through big data analysis, this study aimed to provide insights into the patterns and trends related to the practice of landscaping as a response to climate change. It helped identify the need to optimize the beneficial outcomes of green spaces in general—but mostly in apartment complexes—and to increase benefits for health and well-being, since climate change brings concern to residents who are increasingly aware of green policies and the need of them. Hence, these results cannot be interpreted as a general picture as they correspond to the point of view of a portion of South Korean residents with a particular

background. In addition, although data were collected for one year, it is difficult to see the data as absolute because the interest of residents varies according to the circumstances and issues of the period. However, the study is significant because it helps understand citizens' perspectives, and it is expected that the results will provide information on relevant factors that landscaping professionals and urban planners could use for future approaches and plans, mainly to promote a healthy environment, as the term environment was derived from all keywords. We also expect that this study helped to elucidate how local contexts can lead to different landscape strategies, therefore justifying the need to consider users' opinions. In the future, it is expected that further discussion and study on practical methods to respond to environmental changes will be conducted—as well as studies on landscape-correlated disciplines such as ecology and urban planning—to analyze urban residents' perceptions of the future landscape from different backgrounds, therefore contributing to an increase in the effectiveness of this field of research.

Author Contributions: Conceptualization, C.C., J.L. and G.K.; methodology, J.L. and G.K.; data curation, J.L. and J.M.; writing—original draft preparation, C.C., J.L. and G.K.; writing—review and editing, C.C., J.M. and G.K.; visualization, C.C., J.L. and J.M.; supervision, G.K.; project administration, G.K. All authors have read and agreed to the published version of the manuscript.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: The data presented in this study are available on request from the corresponding authors.

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

References

1. Cissé, G.; McLeman, R.; Adams, H.; Aldunce, P.; Bowen, K.; Campbell-Lendrum, D.; Clayton, S.; Ebi, K.L.; Hess, J.; Huang, C.; et al. Health, wellbeing, and the changing structure of communities. In *Climate Change 2022: Impacts, Adaptation and Vulnerability: Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*; Pörtner, H.O., Roberts, D.C., Tignor, D., Poloczanska, E.S., Mintenbeck, K., Alegría, A., Craig, M., Langsdorf, S., Löschke, S., Möller, V., et al., Eds.; Cambridge University Press: Cambridge, UK, 2022; pp. 1041–1170. [CrossRef]
2. Dodman, D.; Hayward, M.B.; Pelling, V.; Castan Broto, W.; Chow, E.; Chu, R.; Dawson, L.; Khirfan, T.; McPhearson, A.; Prakash, Y.; et al. Cities, Settlements and Key Infrastructure. In *Climate Change 2022: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*; Pörtner, H.O., Roberts, D.C., Tignor, D., Poloczanska, E.S., Mintenbeck, K., Alegría, A., Craig, M., Langsdorf, S., Löschke, S., Möller, V., Okem, A., Rama, B., Eds.; Cambridge University Press: Cambridge, UK, 2022; pp. 907–1040. [CrossRef]
3. Opdam, P.; Luque, S.; Jones, K.B. Changing landscapes to accommodate for climate change impacts: A call for landscape ecology. *Landsc. Ecol.* **2009**, *24*, 715–721. [CrossRef]
4. Shaw, R.Y.; Luo, T.S.; Cheong, S.; Abdul Halim, S.; Chaturvedi, M.; Hashizume, G.E.; Insarov, Y.; Ishikawa, M.; Jafari, A.; Kitoh, J.; et al. Asia. In *Climate Change 2022: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*; Pörtner, H.O., Roberts, D.C., Tignor, D., Poloczanska, E.S., Mintenbeck, K., Alegría, A., Craig, M., Langsdorf, S., Löschke, S., Möller, V., et al., Eds.; Cambridge University Press: Cambridge, UK, 2022; pp. 1457–1579. [CrossRef]
5. Chang, J.J.; Kim, S.H.; Shim, J.C.; Ma, D.H. Who Is Responsible for Climate Change? Attribution of Responsibility, News Media, and South Koreans' Perceived Risk of Climate Change. *Mass Commun. Soc.* **2016**, *19*, 566–584. [CrossRef]
6. Park, S.-H.; Chang, C. Impact of Changes in Forest Use Caused by the COVID-19 Pandemic on the Perception of Forest Ecosystem Services in the Republic of Korea. *Sustainability* **2022**, *14*, 10914. [CrossRef]
7. Google. COVID-19 Community Mobility Report. Available online: https://www.google.com/covid19/mobility?hl=en (accessed on 12 September 2021).
8. Sulyok, M.; Walker, M. Community movement and COVID-19: A global study using Google's Community Mobility Reports. *Epidemiol. Infect.* **2020**, *148*, e284. [CrossRef]
9. Kim, Y.; Song, Y.; Jo, S. Smart park design and management direction for smart green city. *Korean Soc. Landsc. Archit.* **2020**, *48*, 1–15. [CrossRef]
10. Alizadeh, B.; Hitchmough, J. A review of urban landscape adaptation to the challenge of climate change. *Int. J. Clim. Change Strateg. Manag.* **2019**, *11*, 178–194. [CrossRef]

11.   Cho, S. The path to low-carbon green growth in Chungcheongnam-do: Urban regeneration strategies in the era of low-carbon green growth. *Open Chungnam* **2009**, *47*, 56–69.

12.   Wang, J. Landscape Design Strategy as a Plan to Build Urban Green Infrastructure. Master's Thesis, Sungkyunkwan University, Seoul, Republic of Korea, 2018.

13.   Green Climate Policy Division. *Korean New Deal: National Strategy for a Great Transformation*; The Ministry of Economy and Finance (MOEF): Seoul, Republic of Korea, 2020. Available online: https://english.moef.go.kr/pc/selectTbPressCenterDtl.do?boardCd= N0001&seq=4948 (accessed on 7 October 2022).

14.   Köpsel, V.; Walsh, C.; Leyshon, C. Landscape narratives in practice: Implications for climate change adaptation. *Geogr. J.* **2016**, *183*, 175–186. [CrossRef]

15.   Lim, R. The Analysis of Factors that effect the Satisfaction Degree and Forms of Usage by the City Park Users: Conducting Man-suk Park in Suwon. Master's Thesis, Myongji University, Seoul, Republic of Korea, 2001.

16.   Lee, S. A Post Occupancy Evaluation of the Yeouido Tributary Ecological Park. Master's Thesis, Hanyang University, Seoul, Republic of Korea, 2005.

17.   Choi, S. An Analysis of Satisfaction on User Programs of Urban Park: The Case of Seoul Urban Parks. Master's Thesis, Kyung Hee University, Seoul, Republic of Korea, 2008.

18.   Kim, Y. Impacts of Urban Residents' Park Use Behavior on the Satisfaction with Park and Leisure Satisfaction. Ph.D. Thesis, Sejong University, Seoul, Republic of Korea, 2011.

19.   Yang, S.; Yoo, S. Behavior Patterns in an Urban Linear Park, Reusing the Abandoned Railroad—Focused on Gyeongui-Line Forest Park in Seoul. *Urban Des.* **2016**, *17*, 101–115.

20.   Kim, J.; Park, C.; Kim, A.; Kim, H. Analysis of Behavioral Characteristics by Park Types Displayed in 3rd Generation SNS. *J. Korean Inst. Landsc. Archit.* **2019**, *47*, 49–58. [CrossRef]

21.   Woo, K.; Suh, J. Analysis of Behavior of Seoullo 7017 Visitors—With a Focus on Text Mining and Social Network Analysis. *J. Korean Inst. Landsc. Archit* **2020**, *48*, 16–24. [CrossRef]

22.   Lim, H.; Lim, H. A Study on the Perception and Value Evaluation of Regional Tourism Brands Using Big Data. *Commod. Stud.* **2021**, *39*, 1–13.

23.   Woo, K.; Seo, J. A Time Series Analysis of Urban Park Behavior Using Big Data. *J. Landsc. Archit.* **2020**, *48*, 35–45.

24.   Jin, D.; Kang, S.; Choi, H.; Han, K.; Kim, D. A Study on the Utilization of Text Mining for Climate Environmental Issues Analysis. In Korea Environment Institute. 2018. Available online: https://www.kei.re.kr/elibList.es?mid=a20403000000&elibName= researchreport&class_id=&act=view&c_id=721596&rn=300&nPage=30&keyField=&keyWord= (accessed on 3 October 2022).

25.   Castellanos, L.A.; Versini, P.A.; Bonin, O.; Tchiguirinskaia, I. A Text-Mining Approach to Compare Impacts and Benefits of Nature-Based Solutions in Europe. *Sustainability* **2020**, *12*, 7799. [CrossRef]

26.   Textom. About TEXTOM. Available online: https://www.textom.co.kr/home/sub/overview.php?pnm=1 (accessed on 15 September 2022).

27.   Jeong, G. *Future Prediction Method Using Text Mining and Network Analysis*; Korea Institute of Science and Technology Planning and Evaluation: Eumseong-gun, Republic of Korea, 2010.

28.   Feldman, R.; Sanger, J. *The Text Mining Handbook: Advanced Approaches in Analyzing Unstructured Data*; Cambridge University Press: New York, NY, USA, 2007.

29.   Tukey, J.W. *Exploratory Data Analysis*; Addison-Wesley: Boston, MA, USA, 1977; pp. 131–160.

30.   Hoaglin, D.C.; Mosteller, F.; Tukey, J.W. *Understanding Robust and Exploratory Data Analysis*; Wiley InterScience: Hoboken, NJ, UKA, 2000.

31.   Hearst, M.A. Untangling Text Data Mining. In Proceedings of the 37th Annual Meeting of the Association for Computational Linguistics on Computational Linguistics, College Park, MD, USA, 20–26 June 1999; pp. 3–10. [CrossRef]

32.   Lee, S.; Kim, H. Keyword extraction techniques in electronic news using TF-IDF variation. *J. Korean Electron. Trans. Assoc.* **2009**, *14*, 59–73.

33.   Ahn, H. Fashion Design Sentiment Analysis Using Big Data: Focusing on Text Mining and Semantic Network Analysis. Ph.D. Thesis, Ewha Womans University, Seoul, Republic of Korea, 2017.

34.   Woo, K.; Seo, J. Analysis of usage behavior of visitors to Seoullo 7017: Focusing on text mining and social network analysis. *Korean Landsc. Archit. Soc.* **2020**, *48*, 16–24. [CrossRef]

35.   Lee, S. Analysis of the correlation between the centrality of the researcher network and research performance—Focusing on academic papers in the field of records management in Korea. *Korean Libr. Inf. Soc.* **2013**, *44*, 405–428.

36.   White, H.C.; Boorman, S.A.; Breiger, R.L. Social structure from multiple networks. Blockmodels of roles and positions. *Am. J. Sociol.* **1976**, *84*, 730–780. [CrossRef]

37.   Shin, K. Changes in Outdoor Space in Apartments in Korea and Characteristics of Landscape by Era. Ph.D. Thesis, Dankook University Graduate School, Yongin, Republic of Korea, 2010.

38.   KOSIS. Housing Type by Administrative District. 2020. Available online: https://kosis.kr/statHtml/statHtml.do?orgId=116& tblId=DT_MLTM_5403&conn_path=I2&language=en (accessed on 23 September 2022).

39.   Kang, S.A. Study on the Establishment of Green Infrastructure System Using Landscape Space in an Urban Apartment Complex: For Housing Redevelopment Project in Seongbuk-gu, Seoul. Ph.D. Thesis, Hanyang University, Seoul, Republic of Korea, 2018.

40.   Nasar, J.L. *The Evaluative Image of the City*; Sage Publications: Thousand Oaks, CA, USA, 1998.

41. Kang, S. Analysis of Residents' Consciousness on the Use of Urban Parks and Green Spaces in Apartment Landscape Spaces: A Case Study in Seoul. Master's Thesis, Graduate School of Urban Studies, Hanyang University, Seoul, Republic of Korea, 2014.

42. Choi, J.; Suh, J. Exploring the 4th Industrial Revolution Technology from the Landscape Industry Perspective. *Korean Inst. Landsc. Archit.* **2019**, *47*, 59–75. [CrossRef]

43. Jeon, Y. The Emergence of Well-Being Culture and Future Prospects. Samsung Economic Research Institute, Issue Paper. 2005. Available online: https://archives.v1365.or.kr/items/show/2888 (accessed on 2 October 2022).

44. World Health Organization. Health Promotion Glossary of Terms. 2021. Available online: https://www.who.int/publications/i/item/9789240038349 (accessed on 3 October 2022).

45. Kang, P. A Design of Well-Being Park—A Case Study of Oryong Stadium in Cheonan City. Master's Thesis, Hanyang University, Seoul, Republic of Korea, 2008.

46. GC Biopharma. Available online: http://www.globalgreencross.com/eng/index.do (accessed on 3 October 2022).

47. Cho, K. A Study on Mapping as an Environmental Design Method. *Korean Soc. Public Des.* **2006**, *1*, 71–84.

48. Park, G. *New Frontier of Urban and Local Tourism*; Baeksan Publishing Company: Seoul, Republic of Korea, 2005.

49. United Nations Climate Change. The Paris Agreement. Available online: https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement (accessed on 6 October 2022).

50. United Nations Climate Change. What Is the United Nations Framework Convention on Climate Change? Available online: https://unfccc.int/process-and-meetings/what-is-the-united-nations-framework-convention-on-climate-change (accessed on 6 October 2022).

51. United Nations Climate Change. What Is the Kyoto Protocol? Available online: https://unfccc.int/kyoto_protocol (accessed on 6 October 2022).

52. Jang, Y. The Development of Model for Integrated Urban Regeneration against the Decline and Climate Change. Master's Thesis, Hyeopseong University Graduate School, Hwaseong, Republic of Korea, 2019.

53. United Nations Climate Change. COP 17. Available online: https://unfccc.int/event/cop-17 (accessed on 6 October 2022).

54. United Nations Climate Change. Essential Background—Durban Outcomes. Available online: https://unfccc.int/process/conferences/the-big-picture/milestones/outcomes-of-the-durban-conference?gclid=Cj0KCQjw48OaBhDWARIsAMd966AGcpvoLFBWZd7ZN0y9f1FHzlvu7WIffNvFqD3k786RtrmgwwybGjgaAoZZEALw_wcB (accessed on 6 October 2022).

55. Kim, Y. A Study on the Planning Indicators and Evaluation Criteria for Carbon Neutral Green City. Master's Thesis, Hanyang University, Seoul, Republic of Korea, 2013.

56. IPCC. *Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*; Pachauri, R.K., Reisinger, A., Eds.; IPCC: Geneva, Switzerland; 104p.

57. Tae, J.; Jeong, D.; Chon, J. How Can Apartment-Complex Landscaping Space Improve Residents' Psychological Well-Being?: The Case of the Capital Region in South Korea. *Int. J. Environ. Res. Public Health* **2022**, *19*, 10231. [CrossRef] [PubMed]

58. Rezaei, M.; Kim, D.; Alizadeh, A.; Rokni, L. Evaluating the Mental-Health Positive Impacts of Agritourism; A Case Study from South Korea. *Sustainability* **2021**, *13*, 8712. [CrossRef]

59. Biodiversity Division, Nature Conservation Bureau Ministry of Environment. The Fifth National Report to the Convention on Biological Diversity. 2014. Available online: https://www.cbd.int/doc/world/kr/kr-nr-05-en.pdf (accessed on 2 October 2022).

60. Millennium Ecosystem Assessment. *Ecosystems and Human Well-Being: A Framework for Assessment*; Island Press: Washington, DC, USA, 2003. Available online: https://www.millenniumassessment.org/en/index.html (accessed on 2 October 2022).