Research Article

Affect, Architecture and Water: Bibliometric Analysis of the Literature

Damla Katuk¹ iD **, Emine Köseoğlu²** iD

¹ Architect, Department of Architecture, Institute of Graduate Studies, Fatih Sultan Mehmet Vakif University, İstanbul, Türkiye.
²Assoc. Prof., Department of Architecture, Fatih Sultan Mehmet Vakif University, İstanbul, Türkiye.

Abstract

Effects of water in the space is the subject of study in many scientific fields. The research question is that whether the water features are included in the studies carried out the intersection of affect and architecture. Therefore, the purpose of this study is to explore the literature regarding the concepts of affect-architecture-water and to determine the concepts in current research areas and the primary authors. The scope of this study consists of documents in Scopus database. The keywords "Affect, Affective, Architecture, Water" were selected for the systematically analysed scan made in Scopus database. Scanning was done by creating three different combinations with the selected keywords. First combination is "Affect" and "Architecture; Second combination is "Affective" and "Architecture"; Third combination is "Affect", "Architecture" and "Water". After collecting the bibliometric data of a total of 1557 documents according to three different combinations from the database on November 21, 2022, the downloaded data files were transferred to the VOSviewer (1.6.18.0) software. Bibliometric analysis with science mapping techniques was applied to the dataset by the VOSviewer. Firstly, Scopus analysis search results were examined. Secondly, Visuals were created by science mapping techniques. As a result, nine concepts and 26 authors were determined. The concepts for the gaps are "Architecture, Affect, Atmosphere, Perception, Space, Sensory Experience, Architectural Design, Built Environment, Emotion". The authors are "Deleuze, Guattari, Davidson, Anderson, Barrett, Damasio, Kraftl, Lyubomirsky, Manzo, Massumi, P. L. Russell, Wigley, Scherer, J. A. Russell, Böhme, Abusaada, Matteis, Bachelard, Merleau-Ponty, Pallasmaa, Plutchik, Watson, Zumthor, Lefebvre, Sørensen, Ebbensgaard".

Keywords: Affect, Architecture, Water, Bibliometrics, VOSviewer.

Araştırma Makalesi

Duygulanım, Mimarlık ve Su: Literatürün Bibliyometrik Analizi

Damla Katuk¹ (ID) **, Emine Köseoğlu²** (ID)

¹ Mimar, Mimarlık A.B.D., Lisansüstü Eğitim Enstitüsü, Fatih Sultan Mehmet Vakif Üniversitesi, İstanbul, Türkiye.
² Doç.Dr., Mimarlık Bölümü, Fatih Sultan Mehmet Vakif Üniversitesi, İstanbul, Türkiye.

Özet

Suyun mekândaki etkileri birçok bilimsel alanda çalışma konusudur. Araştırma sorusu, duygulanım ve mimarlık arakesitinde yapılan çalışmalarda, su özelliklerine yer verilip verilmediğidir. Dolayısıyla bu çalışmanın amacı, duygulanım (affect)-mimarlık (architecture)-su (water) kavramlarına ilişkin literatürü araştırmak ve güncel araştırma alanlarındaki kavramları ve birincil yazarları belirlemektir. Bu çalışmanın kapsamını Scopus veri tabanındaki dokümanlar oluşturmaktadır. Scopus veri tabanında yapılan sistematik analiz taraması için "duygulanım, duygulanımsal (affective), mimarlık, su" anahtar kelimeleri seçilmiştir. Seçilen anahtar kelimelerle üç farklı kombinasyon oluşturularak tarama yapılmıştır. Birinci kombinasyon "duygulanım ve mimarlık"; ikinci kombinasyon "duygulanımsal ve mimarlık"; üçüncü kombinasyon ise "duygulanım, mimarlık ve su" dur. Üç farklı kombinasyona göre toplam 1557 doküman ait bibliyometrik veri, 21 Kasım 2022 tarihinde Scopus veri tabanından indirilmiştir ve veri dosyaları VOSviewer (1.6.18.0) yazılımına aktarılmıştır. VOSviewer tarafından, bilim haritalama teknikleri ile bibliyometrik analiz yöntemi uygulanmıştır. İlk olarak Scopus'taki arama sonuçlarından elde edilen analizler incelenmiştir. İkinci olarak, VOSviewer yazılımında bilim haritalama teknikleri ile görseller oluşturulmuştur. Sonuç olarak dokuz kavram ve 26 yazar belirlenmiştir. Araştırma boşluklarına yönelik belirlenen kavramlar: Mimarlık, duygulanım, atmosfer, algı, mekân, duyusal deneyim, mimari tasarım, yapılı çevre ve duygudur. Belirlenen yazarlar: Deleuze, Guattari, Davidson, Anderson, Barrett, Damasio, Kraftl, Lyubomirsky, Manzo, Massumi, P. L. Russell, Wigley, Scherer, J. A. Russell, Böhme, Abusaada, Matteis, Bachelard, Merleau-Ponty, Pallasmaa, Plutchik, Watson, Zumthor, Lefebvre, Sørensen ve Ebbensgaard'dır.

Anahtar Kelimeler: Bibliyometrik, Duygulanım, Mimarlık, Su, VOSviewer.

INTRODUCTION

This study remarked that the water in the space can create an affect with an impression. So, this study was considered that water can have a significant role as an affective aspect in architectural design. For this reason, this study was focused to examine the research on water at the intersection of affect and architecture. The concept networks of "Affect", "Affective", "Architecture" and "Water" and whether there are findings supporting this regarding in the literature were investigated.

In a rare article example indexed on Scopus, concepts of came together. Ebbensgaard (2017, p. 441) examined that "how landscape design orchestrates the sensation of nature" by following discussions within cultural geography on landscape design, affect and emotion in this article. Water was one of the elements that landscapes orchestrate sound, smell, tactility, and view by focusing on the sensation of nature in this article (Ebbensgaard, 2017). Furthermore, the terms that may be related to relationship among affect, architecture and water based on this article could be summarized as "sensory experience, sensation of nature, landscape architecture, landscape design, green lungs, nature, natural environment, urban nature, urbanism, wild nature, transformed nature, natural landscape, sustainability fix, well-being, atmospheres, feel of place, see-feel-act and aesthetic" (Ebbensgaard, 2017).

During this research, some studies in related to concepts of affect and architecture apart from concept of water have been noticed about expressions such as "atmosphere", "affective power", "affective atmospheres", "distinction between affect and emotion", "affective spaces", "non-representational effect", "affective urban atmospheres", "affectivity" and "affective bonds".

One of the studies about concept of atmospheres expressed that experienced in bodily presence in relation to people and things or in spaces, "affective powers of feeling, spatial bearers of moods and related with the aesthetics" (Böhme, 1993, p. 119). Moreover, the expression "atmospheric" was applied to people, spaces, and nature (Böhme, 1993, p. 113). Another study about that examined emotion, space, and society concept of affective atmospheres considered context of distinction between affect and emotion (Anderson, 2009). In this article, distinction between affect and emotion was examined in the subjective (emotion)/objective (affect) problematic via two oppositions: narrative (emotion)/non-narrative (affect) and semiotic (emotion)/a signifying (affect) (Anderson, 2009, p. 80). Additionally, landscapes were one of the terms that include atmospheres according to this article (Anderson, 2009, p. 78). A recent study was about atmospheres and concept of "affective space" in relation to architecture which "helps to clarify the first-person, direct experience of the environment and how it impacts a person's emotional states, influencing their perception of the world around them" (Matteis, 2020, p. 6-7). According to these three studies, water can be included in studies in affect-architecture-water as an element of both nature and landscape by presence of an experiencing subject.

In contrast, Sørensen (2015) referred condition as "clause of subjectivity" for the atmosphere dependent on the presence of an experiencing subject. This article attempted to challenge this condition, exploring the potential for analysing atmospheres in the prehistoric past by adopting Böhme's notion "ecstasies of things" and using "emergent forms" (Sørensen, 2015, p. 67). In addition, this article explored a ground that "even in the absence of an experiencing subject, there could be affective and sensuous engagements between human beings

and architecture for the archaeological condition" (Sørensen, 2015, p. 71).

A study which was drawing a new concept and connected the relation of architectural space and affect from a different point was about "non-representational effect" (Kraftl & Adey, 2008). Kraftl and Adey (2008, p. 215-216) explored how buildings represent the attempts to encourage forms of affect that should educate, calm, and promote a reverential and spiritual experience according to "authentic" ecological architecture and "placeless" modern architecture. A recent study presented toolkits that based on the communications between people and place for creating "affective urban atmospheres" (Abusaada, 2020). In this article, the concept of "affectivity" was one of the terms that were the processes of interpretation related to daily experience (sociocultural) and the perceptual mechanisms that affected people's feelings and changed their behaviours towards the city (Abusaada, 2020, p. 381).

Another research in this field was on exploring the other dimensions of emotional relationships with places and focused on positive "affective bonds" to "embrace an array of places, feelings, and experiences" (Manzo, 2005, p. 67). A review article which was published the same year focused on "pursuing happiness" by positive feelings, positive experiences, and positive affect (Lyubomirsky et al., 2005).

Thus, the purpose of this study is to explore the literature regarding the concepts of affect, architecture, and water. Thanks to this exploration, update terms and concepts, current research gaps, authors and theorists can be identified by reaching the research done in the selected scientific disciplines which are Arts and Humanities or Psychology or Environmental Science. The bibliometric analysis with science mapping techniques was found to be the most suitable and fast method for the exploration to be made within the scope of this study. Therefore, documents in Scopus database that supply bibliometric data are included in this study.

METHODOLOGY

It is aimed to investigate what kind of findings there are in the literature on the approach to water in the relation of affect and architecture. In this context, it is thought that the bibliometric analysis method is quick to find these approaches. Applying the bibliometric analysis method to the collected data can determine which fields are more up to date, which keywords are used, and which authors can be primary. For this reason, Scopus database was scanned with the bibliometric analysis with science mapping techniques. Scopus is one of the world's leading academic databases containing a large number of scientific documents (Xiao et al., 2022).

This study was a quantitative research design, and quantitative data were collected from Scopus Database. Bibliometric analysis is quantitative study that evaluates and examines data from any discipline on bibliometric data as a research method (Pritchard, 1969; Broadus, 1987; Santos et al., 2017; Şen, 2020; Donthu et al., 2021; Karagöz & Savaş, 2021; Özkaraca & Halaç, 2022; Ding & Yang, 2022). In this context, a quantitative research design was designed for this study as bibliometric analysis with science mapping techniques (Table 1). In addition, the bibliometric analysis technique is considered as exploratory or descriptive study (Kokol & Blažun Vošner, 2019; Kurutkan & Orhan, 2018).

Bibliometric Analysis with Science Mapping Techniques
Purpose: Exploring the research related to affect-architecture-water by three types of scanning techniques and determining the concepts in the current research gaps and the primary authors. **Material and Methods:** Bibliometric analysis with science mapping techniques **Sample:** Documents **Data Source:** Scopus Database **Scanning Techniques:** First scanning technique (scanned keywords "affect-architecture") Second scanning technique (scanned keywords "affective-architecture") Third scanning technique (scanned keywords "affect-architecture-water") **Quantitative Info:** Scopus Web Page **Data Visualization and Analysis Tool:** VOSviewer Software **Selected Scientific Mapping Techniques:** Mapping based on "Co-occurrences" data according to the "Author Keywords" Mapping based on "Co-citation" data by the "Cited Authors"
Findings
Findings According to Scopus Web Page Findings According to Scientific Mapping Technique by VOSviewer Software
Conclusion

Primarily, scanning was carried out using Scopus web page using the bibliometric analysis method (Table 1). Three types of scanning techniques were used with selected keyword combinations. The keywords "Affect, Affective, Architecture, Water" are the words determined for the scan made in Scopus database (Table 2). According to first scanning technique in the documents section of the Scopus database, documents in "Title-Abstract-Keywords" were scanned with the code TITLE-ABS-KEY("Affect" AND "Architecture") AND (LIMIT-TO (SUBJAREA,"ARTS") OR LIMIT-TO (SUBJAREA,"PSYC")) in advanced search (Table 2). According to second scanning technique in the documents section of the Scopus database, documents title-abstract-keywords were scanned with the code TITLE-ABS-KEY("Affective" AND "Architecture") AND (LIMIT-TO (SUBJAREA,"ARTS") OR LIMIT-TO (SUBJAREA,"PSYC")) in advanced search (Table 2). According to third scanning technique in the documents section of the Scopus database, documents title-abstract-keywords were scanned with the code TITLE-ABS-KEY ("Affect" AND "Architecture" AND "Water") AND (LIMIT-TO (SUBJAREA , "ENVI") OR LIMIT-TO (SUBJAREA , "ARTS") OR LIMIT-TO (SUBJAREA , "PSYC")) in advanced search (Table 2). There is no date restriction on Scopus database. Scanning was performed over the entire period included in the database. The number of documents in Table 2 was obtained. A total of 1557 documents were identified (Table 2). The scans and data download date are November 21, 2022.

After three types of scanning techniques (Table 2), the bibliometric data of Scopus database on November 21, 2022, csv and txt data files were downloaded one by one. Data files were transferred to the VOSviewer program, respectively. In this program, firstly, Mapping based on "Co-occurrences" data according to the "Author Keywords" was done (Table 1). Secondly, "Mapping Based on Co-citation Data by Cited Authors" was done (Table 1).

Firstly, including the quantitative info such as document types, years, countries, subject areas, sources, authors, affiliations, sponsors in selected disciplines was determined by bibliometric analysis according to Scopus Analyse Search Results on web page in this study. Secondly, including visuals such as authors keywords and occurrences and cited authors in selected disciplines was determined by bibliometric analysis with science mapping techniques method in this study.

Finally, concepts, gaps and primary authors was determined according to all findings.

Scanning Technique in Scopus Database (until November 21, 2022)		
First Scanning Technique	Second Scanning Technique	Third Scanning Technique
Keywords Combination: **"Affect" and "Architecture"**	Keywords Combination: **"Affective" and "Architecture"**	Keywords Combination: **"Affect" and "Architecture" and "Water"**
Limited Subject Areas: **"Arts and Humanities" or "Psychology"**	Limited Subject Areas: **"Arts and Humanities" or "Psychology"**	Limited Subject Areas: **"Environmental Science " or "Arts and Humanities" or "Psychology"**
Code: **TITLE-ABS-KEY("Affect" AND "Architecture") AND (LIMIT-TO (SUBJAREA,"ARTS") OR LIMIT-TO (SUBJAREA,"PSYC"))**	Code: **TITLE-ABS-KEY("Affective" AND "Architecture") AND (LIMIT-TO (SUBJAREA,"ARTS") OR LIMIT-TO (SUBJAREA,"PSYC"))**	Code: **TITLE-ABS-KEY ("Affect" AND "Architecture" AND "Water") AND (LIMIT-TO (SUBJAREA , "ENVI") OR LIMIT-TO (SUBJAREA , "ARTS") OR LIMIT-TO (SUBJAREA , "PSYC"))**
Scan Findings: 942 Documents (1946-2022)	Scan Findings: 341 Documents (1921-2022)	Scan Findings: 274 Documents (1960-2022)
Total Scan Findings		
1557 Documents (1921-2023)		

Table 2. Three types of scanning techniques in "Title-Abstract-Keywords"

FINDINGS

Findings According to Scopus Web Page

Scopus database could show some analyses on their web pages. When the analyses were examined comparatively for three types of scanning techniques, the following findings were obtained. Eight analysis types common to database was collected according to scan findings in "Title-Abstract-Keywords". These analysis types contained information about the document types, publication years, top 15 countries or territories, top 15 subject areas, top 10 sources, top 10 authors, top 10 affiliations, and top 10 funding sponsors. Moreover, the oldest document date in Scopus is 1946 according to first scanning technique; is 1921 according to second scanning technique; is 1960 according to third scanning technique.

Number of Document in Scopus Database (until November 21, 2022)		
First Scanning Technique	**Second Scanning Technique**	**Third Scanning Technique**
Document Analysis (1946-2023)	Document Analysis (1921-2022)	Document Analysis (1960-2022)
Article, "614" Conference Paper, "92" Book Chapter, "86" Review, "74" Book, "63" Editorial, "3" Note, "3" Erratum, "2" Letter, "2" Short Survey, "2" Conference Review, "1"	Article, "232" Conference Paper, "31" Review, "30" Book Chapter, "28" Book, "12" Conference Review, "6" Note, "2"	Article, "230" Conference Paper, "21" Review, "15" Book Chapter, "8"

Table 3. Document types according to three types of scanning techniques.

According to first scanning technique, it was determined that the number of "Articles (614)" as document type was the highest when scanned with the keywords "affect-architecture" (Table 3). According to second scanning technique, it was determined that the number of "Articles (232)" as document type was the highest when scanned with the keywords "affective-architecture" (Table 3). According to third scanning technique, it was determined that the number of "Articles (230)" as document type was the highest when scanned with the keywords "affect-architecture-water" (Table 3). When the three types of scanning techniques were compared among themselves until November 21, 2022, it was observed that there were more document types in the first scanning technique (Table 3).

Table 4. Document publication years according to three types of scanning techniques

Number of Document in Scopus Database (until November 21, 2022)					
First Scanning Technique		**Second Scanning Technique**		**Third Scanning Technique**	
Document Analysis (1946-2023)		Document Analysis (1921-2022)		Document Analysis (1960-2022)	
2022, "61"	2001, "8"	2022, "24"	2005, "3"	2022, "20"	2005, "6"
2021, "103"	2000, "9"	2021, "33"	2004, "2"	2021, "20"	2004, "4"
2020, "72"	1999, "6"	2020, "32"	2003, "1"	2020, "31"	2003, "5"
2019, "72"	1998, "5"	2019, "31"	2002, "1"	2019, "20"	2002, "3"
2018, "78"	1997, "3"	2018, "31"	2001, "3"	2018, "18"	2000, "1"
2017, "77"	1996, "2"	2017, "22"	2000, "3"	2017, "17"	1998, "1"
2016, "61"	1995, "2"	2016, "30"	1999, "1"	2016, "22"	1997, "1"
2015, "52"	1994, "2"	2015, "21"	1998, "2"	2015, "11"	1996, "1"
2014, "37"	1991, "1"	2014, "12"	1995, "2"	2014, "12"	1995, "2"
2013, "39"	1990, "1"	2013, "16"	1994, "1"	2013, "15"	1992, "1"
2012, "45"	1989, "2"	2012, "15"	1993, "1"	2012, "11"	1991, "1"
2011, "30"	1986, "1"	2011, "10"	1990, "4"	2011, "9"	1990, "1"
2010, "27"	1984, "5"	2010, "13"	1989, "1"	2010, "7"	1985, "1"
2009, "25"	1981, "1"	2009, "3"	1982, "1"	2009, "8"	1981, "1"
2008, "26"	1978, "1"	2008, "8"	1978, "1"	2008, "5"	1969, "1"
2007, "21"	1976, "1"	2007, "7"	1921, "1"	2007, "12"	1960, "1"
2006, "25"	1973, "1"	2006, "5"		2006, "5"	
2005, "10"	1972, "1"				
2004, "11"	1968, "1"				
2003, "7"	1964, "2"				
2002, "5"	1960, "1"				
	1946, "1"				

According to first scanning technique, it was determined that the number of documents was the highest in "2021 (103)" when scanned with the keywords "affect-architecture" (Table 4). According to second scanning technique, it was determined that the number of documents was the highest in "2021 (33)" when scanned with the keywords "affective-architecture" (Table 4). According to third scanning technique, it was determined that the number of documents was the highest in "2020 (31)" when scanned with the keywords "affect-architecture-water" (Table 4). When the three types of scanning techniques were compared among themselves until November 21, 2022, it was observed that there were more new documents in the first scanning technique (Table 4).

According to first scanning technique, it was determined that the number of documents by the top 15 countries or territories was the highest in the "United States (275)" when scanned with the keywords "affect-architecture" (Table 5). According to second scanning technique, it was determined that the number of documents by the top 15 countries or territories was the highest in the "United States (102)" when scanned with the keywords "affective-architecture" (Table 5). According to third scanning technique, it was determined that the number

of documents by the top 15 countries or territories was the highest in the "United States (78)" when scanned with the keywords "affect-architecture-water" (Table 5). When the three types of scanning techniques were compared among themselves until November 21, 2022, it was observed that countries "United States, United Kingdom, Germany, Italy, Australia, Netherlands, Spain, Canada and France" were common intersection (Table 5).

Number of Document in Scopus Database (until November 21, 2022)		
First Scanning Technique	Second Scanning Technique	Third Scanning Technique
Document Analysis (1946-2023)	Document Analysis (1921-2022)	Document Analysis (1960-2022)
United States, "275" United Kingdom, "125" Germany, "53" Italy, "51" Australia, "47" Netherlands, "45" Spain, "40" Canada, "38" France, "30" China, "27" Turkey, "24" Sweden, "18" Greece, "17" Russian Federation, "15" Switzerland, "15"	United States, "102" United Kingdom, "60" Germany, "32" Australia, "21" Spain, "21" Canada, "20" Italy, "17" Netherlands, "12" Russian Federation, "12" Mexico, "10" France, "9" Japan, "9" Switzerland, "8" Belgium, "7" Sweden, "7"	United States, "78" China, "49" Spain, "20" Australia, "17" France, "17" Germany, "15" Italy, "15" United Kingdom, "15" Canada, "14" Iran, "9" Brazil, "7" India, "7" Netherlands, "7" Argentina, "6" Japan, "6"

Number of Document in Scopus Database (until November 21, 2022)		
First Scanning Technique	Second Scanning Technique	Third Scanning Technique
Document Analysis (1946-2023)	Document Analysis (1921-2022)	Document Analysis (1960-2022)
Arts and Humanities, "667" Social Sciences, "390" Psychology, "338" Engineering, "211" Computer Science, "143" Neuroscience, "132" Medicine, "86" Business, Management and Accounting, "35" Mathematics, "30" Economics, Econometrics and Finance, "24" Environmental Science, "22" Biochemistry, Genetics and Molecular Biology, "12" Agricultural and Biological Sciences, "10" Materials Science, "8" Decision Sciences, "7"	Arts and Humanities, "195" Psychology, "171" Social Sciences, "106" Neuroscience, "68" Computer Science, "66" Medicine, "47" Engineering, "35" Mathematics, "11" Business, Management and Accounting, "6" Economics, Econometrics and Finance, "4" Agricultural and Biological Sciences, "3" Biochemistry, Genetics and Molecular Biology, "3" Health Professions, "2" Pharmacology, Toxicology and Pharmaceutics, "2" Earth and Planetary Sciences, "1"	Environmental Science, "264" Agricultural and Biological Sciences, "122" Earth and Planetary Sciences, "63" Engineering, "21" Social Sciences, "17" Biochemistry, Genetics and Molecular Biology, "14" Chemistry, "12" Arts and Humanities, "10" Energy, "10" Chemical Engineering, "9" Computer Science, "8" Immunology and Microbiology, "7" Medicine, "7" Materials Science, "5" Mathematics, "4"

According to first scanning technique, it was determined that "Arts and Humanities (667)" had the highest number of documents by the top 15 subject areas when scanned with the keywords "affect-architecture" (Table 6). According to second scanning technique, it was determined that "Arts and Humanities (195)" had the highest number of documents by the top 15 subject

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areas when scanned with the keywords "affective-architecture" (Table 6). According to third scanning technique, it was determined that "Environmental Science (264)" had the highest number of documents by the top 15 subject areas when scanned with the keywords "affect-architecture-water" (Table 6). When the three types of scanning techniques were compared among themselves until November 21, 2022, it was observed that subject areas "Arts and Humanities, Social Sciences, Engineering, Computer Science, Medicine, Mathematics, Biochemistry, Genetics and Molecular Biology and Agricultural and Biological Sciences" were common intersection (Table 6).

Table 7. Documents by top 10 sources according to three types of scanning techniques

Number of Document in Scopus Database (until November 21, 2022)		
First Scanning Technique	**Second Scanning Technique**	**Third Scanning Technique**
Document Analysis (1946-2023)	Document Analysis (1921-2022)	Document Analysis (1960-2022)
Wit Transactions on The Built Environment, "17" Frontiers In Psychology, "14" International Journal of Architectonic Spatial and Environmental Design, "12" A Z ITU Journal of The Faculty of Architecture, "9" Frontiers In Human Neuroscience, "9" Journal of Architecture, "9" Physiology And Behavior, "9" Annals of The New York Academy of Sciences, "8" Cognitive Systems Research, "8" Cognitive Science, "6"	Biologically Inspired Cognitive Architectures, "12" Cognitive Systems Research, "9" Frontiers In Psychology, "8" Emotion Space and Society, "6" Psychological Medicine, "6" Journal of Architecture, "5" Adaptive Behavior, "4" Architectural Theory Review, "4" Interiors Design Architecture Culture, "4" Journal of Affective Disorders, "4"	Forest Ecology and Management, "13" Agricultural And Forest Meteorology, "10" Journal of Hydrology, "8" Agricultural Water Management, "7" Journal of Ecology, "7" Shengtai Xuebao, "6" Journal of Contaminant Hydrology, "5" Ground Water, "4" Iop Conference Series Earth and Environmental Science, "4" Journal of Coastal Research, "4"

According to first scanning technique, it was determined that "Wit Transactions on The Built Environment (17)" had the highest number of documents by the top 10 source when scanned with the keywords "affect-architecture" (Table 7). According to second scanning technique, it was determined that "Biologically Inspired Cognitive Architectures (12)" had the highest number of documents by the top 10 source when scanned with the keywords "affective-architecture" (Table 7). According to third scanning technique, it was determined that "Forest Ecology and Management (13)" had the highest number of documents by the top 10 source when scanned with the keywords "affect-architecture-water" (Table 7). When the three types of scanning techniques were compared among themselves until November 21, 2022, it was observed that no sources were common intersection (Table 7).

According to first scanning technique, it was determined that the highest number of documents by the top 10 authors were four for "Annesi" and "Tzortzi" when scanned with the keywords "affect-architecture" (Table 8). According to second scanning technique, it was determined that the highest number of documents by the top 10 authors were four for "Barnard", "Rodríguez" and "Samsonovich" when scanned with the keywords "affective-architecture" (Table 8). According to third scanning technique, it was determined that the highest number of documents by the top 10 authors were two for "listed 10 authors" when scanned with the keywords "affect-architecture-water" (Table 8). When the three types of scanning techniques were compared among themselves until November 21, 2022, it was observed that no authors were common intersection (Table 8).

Number of Document in Scopus Database (until November 21, 2022)		
First Scanning Technique	**Second Scanning Technique**	**Third Scanning Technique**
Document Analysis (1946-2023)	Document Analysis (1921-2022)	Document Analysis (1960-2022)
Annesi, J.J., "4"	Barnard, P.J., "4"	Annable, M.D., "2"
Tzortzi, K., "4"	Rodríguez, L.F., "4"	Brye, K.R., "2"
Demetriou, A., "3"	Samsonovich, A.V., "4"	Dai, Z., "2"
Smitheram, J., "3"	Narayanan, S., "3"	Dal Ferro, N., "2"
Abel, J.S., "2"	Ramos, F., "3"	Dunn, S., "2"
Abonce, R., "2"	Abusaada, H., "2"	Edington, D., "2"
Arvizu, C., "2"	Arda, Z., "2"	Fang, L.D., "2"
Ballard, K.J., "2"	Augello, A., "2"	Hao, G.Y., "2"
Barnard, P.J., "2"	Baird, A., "2"	Leuschner, C., "2"
Battilossi, S., "2"	Bernad Monferrer, E., "2"	Levia, D.F., "2"

Table 8. Documents by top 10 authors according to three types of scanning techniques

Number of Document in Scopus Database (until November 21, 2022)		
First Scanning Technique	**Second Scanning Technique**	**Third Scanning Technique**
Document Analysis (1946-2023)	Document Analysis (1921-2022)	Document Analysis (1960-2022)
Delft University of Technology, "11"	University College London, "7"	Chinese Academy of Sciences, "9"
University College London, "11"	Universiteit van Amsterdam, "5"	Ministry of Education China, "8"
University of Cambridge, "11"	University of Pennsylvania, "5"	University of Florida, "8"
University of Michigan, Ann Arbor, "10"	University of Melbourne, "5"	University of Tehran, "6"
Universiteit van Amsterdam, "9"	University of Wisconsin-Madison, "5"	University of Chinese Academy of Sciences, "6"
University of Oxford, "9"	Victoria University of Wellington, "4"	Consejo Superior de Investigaciones Científicas, "5"
Massachusetts Institute of Technology, "8"	Goldsmiths, University of London, "4"	University of California, Berkeley, "5"
University of Pennsylvania, "7"	King's College London, "4"	Georg-August-Universität Göttingen, "5"
King's College London, "7"	Stanford University, "4"	Nanjing University, "5"
Stanford University, "7"	VA Medical Center, "4"	Pennsylvania State University, "4"

Table 9. Documents by top 10 affiliations according to three types of scanning techniques

According to first scanning technique, it was determined that "Delft University of Technology (11), University College London (11), University of Cambridge (11)" had the highest number of documents by the top 10 affiliations when scanned with the keywords "affect-architecture" (Table 9). According to second scanning technique, it was determined that "University College London (9)" had the highest number of documents by the top 10 affiliations when scanned with the keywords "affective-architecture" (Table 9). According to third scanning technique, it was determined that "Chinese Academy of Sciences (9)" had the highest number of documents by the top 10 affiliations when scanned with the keywords "affect-architecture-water" (Table 9). When the three types of scanning techniques were compared among themselves until November 21, 2022, it was observed that no affiliations were common intersection (Table 9).

According to first scanning technique, it was determined that "National Institutes of Health (23)" had the highest number of documents by the top 10 funding sponsors when scanned with the keywords "affect-architecture" (Table 10). According to second scanning technique, it was determined that "National Institute of Mental Health (14)" had the highest number of documents by the top

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10 funding sponsors when scanned with the keywords "affective-architecture" (Table 10). According to third scanning technique, it was determined that "National Natural Science Foundation of China (18)" had the highest number of documents by the top 10 funding sponsors when scanned with the keywords "affect-architecture-water" (Table 10). When the three types of scanning techniques were compared among themselves until November 21, 2022, it was observed that funding sponsors "National Science Foundation" was common intersection (Table 10).

Number of Document in Scopus Database (until November 21, 2022)		
First Scanning Technique	**Second Scanning Technique**	**Third Scanning Technique**
Document Analysis (1946-2023)	Document Analysis (1921-2022)	Document Analysis (1960-2022)
National Institutes of Health, "23"	National Institute of Mental Health, "14"	National Natural Science Foundation of China, "18"
National Institute of Mental Health, "18"	Medical Research Council, "7"	National Science Foundation, "12"
National Science Foundation, "18"	National Institutes of Health, "6"	National Key Research and Development Program of China, "7"
Economic and Social Research Council, "9"	European Commission, "5"	U.S. Department of Energy, "7"
Deutsche Forschungsgemeinschaft, "8"	Horizon 2020 Framework Programme, "5"	Chinese Academy of Sciences, "5"
Medical Research Council, "8"	Russian Science Foundation, "5"	Office of Science, "5"
European Research Council, "7"	Economic and Social Research Council, "4"	Seventh Framework Programme, "5"
National Natural Science Foundation of China, "7"	European Research Council, "4"	European Commission, "4"
Eunice Kennedy Shriver National Institute of Child Health and Human Development, "5"	National Science Foundation, "4"	Ministerio de Ciencia e Innovación, "4"
National Institute of Neurological Disorders and Stroke, "5"	Natural Sciences and Engineering Research Council of Canada, "4"	National Aeronautics and Space Administration, "4"

Findings According to Scientific Mapping Technique by VOSviewer Software

In this section, the findings obtained according to the scientific mapping technique with the VOSviewer software are mentioned. The data which three different scanning techniques created with different word combinations were downloaded from the Scopus database. Then, the data was transferred to the VOSviewer software one by one. Visuals were created by progressing step by step according to the options presented in the software's interface. Co-occurrences and Co-citation relations were examined according to various criteria.

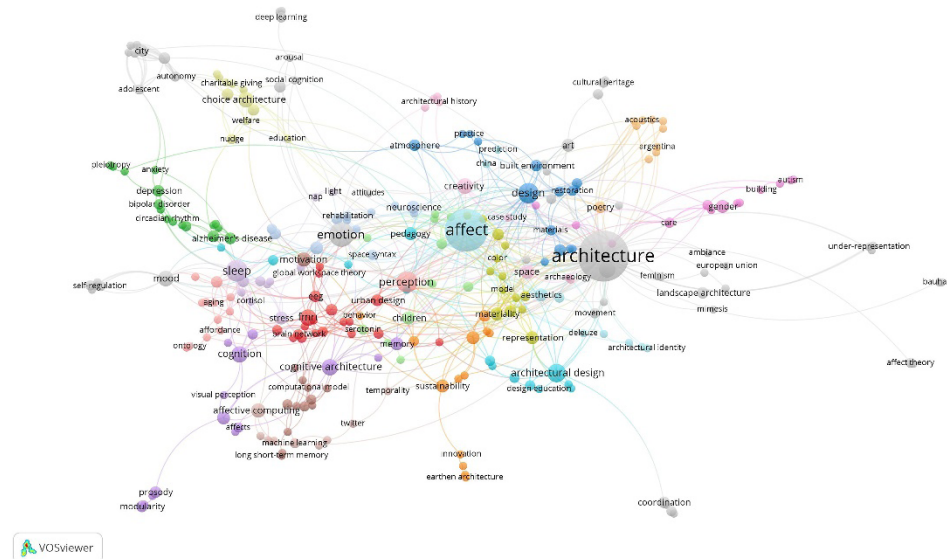## Mapping based on "Co-occurrences" data according to the "Author keywords"

Co-occurrences analysis by author keywords is an exploration method to understand the concepts of scientific collaborations between author keywords in the specified field and the networks of conceptual space to identify themes and to reveal new study areas (Ding & Yang, 2022; Güney & Somuncu, 2020; Karagöz & Savaş, 2021). In addition, with this analysis method, growth of the study areas, new keyword networks, new gaps in some specific disciplines and highlighted changes over time can be understood (Peritz, 1988). In this analysis, the clusters and the sizes of the clusters represent the keywords. The links between the clusters express the cooperation between the keywords. The thickness of the line of networks increases according to the total link strength between the keywords.

First scanning technique (scanned keywords "affect-architecture"): Criteria were decided so that the minimum number of occurrences of a keyword is 2. After these selections, of the 2869 keywords, 302 that met the thresholds were selected by the software. For each of the 302 keywords, the total strength of co-occurrence links with other keywords was calculated by the software. The keywords with the greatest total link strength were selected by the software. The number of keywords to be selected was 302.

The Ranking According to The Most Occurrences			
Ranking	Selected keywords	Occurrences	Total Link Strength
1	Architecture	74	126
2	Affect	52	94
3	Emotion	17	31
4	Sleep	14	28
5	Perception	13	29
6	Design	12	34
7	Architectural Design	10	18
8	Embodiment	8	17
9	Cognitive Architecture	8	15
10	Fmri	8	13

Before proceeding to the concept of network mapping, the ranking according to the most occurrences of the keywords can be sorted in the interface created by the software (Table 11). The keyword that came first in this ranking was "architecture"; the second keyword was "affect"; the third keyword was "emotion"; the fourth keyword was "sleep"; the fifth keyword was "perception"; sixth keyword was "design"; the seventh keyword was "architectural design"; the eighth keyword was "embodiment"; the ninth keyword was "cognitive architecture"; the tenth keyword was "fmri" (Table 11).

When proceeding with mapping in Scopus data, the VOSviewer software warned that some of the 302 items in your network are not connected to each other and the larger set of connected items consists of 281 items. Asked by the software, "Do you want to show this set of items instead of all items?", the mapping in Figure 1. was created by answering the question "yes". There were 29

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clusters in the "Co-occurrences" mapping shown in Figure 1. These clusters were represented by circles of varied sizes and colours. According to this mapping, affect and architecture have more co-occurrences than the other keywords (Figure 1).

The VOSviewer software can also show developments over time (current trends) by overlay visualization of the keywords network mapping created in Figure 1. In this way, the relationship of new keywords that have been used in publications recently can be seen in Figure 2. New study areas are expressed with yellow and light green toned small clusters in the time mapping. The keywords "Affect" and "Architecture" were compared according to developments over time. It was observed that the keyword "Affect" was expressed in light tone green colour. It was observed that the keyword "Architecture" was expressed in mid tone green (Figure 2).
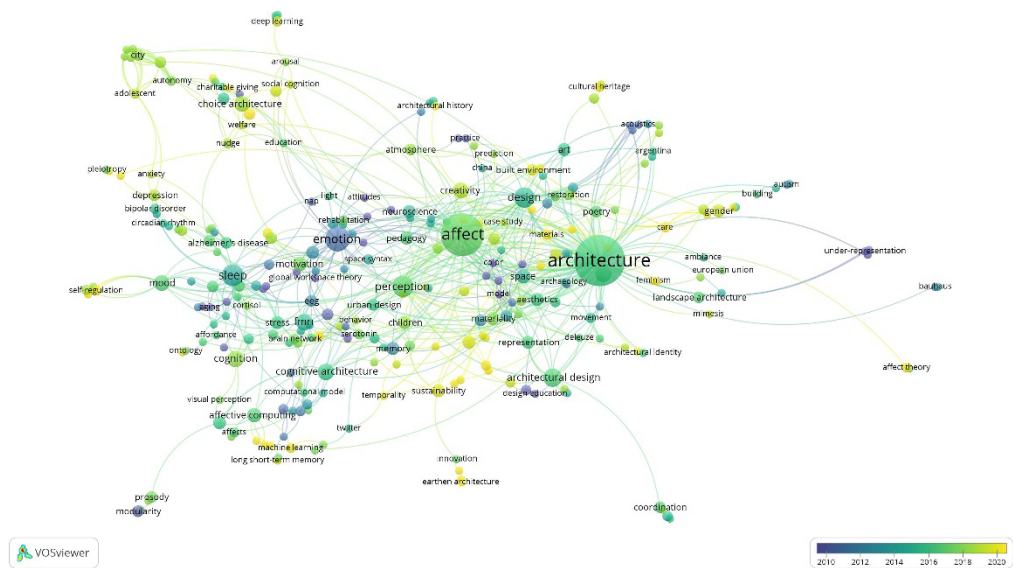
Figure 2. Mapping based on developments over time by overlay visualization of "Co-occurrences" data according to first scanning technique in Scopus (VOSviewer) techniques.

In the developments over time (current trends) by overlay visualization network map made in the VOSviewer analysis program, yellow and light green tones represent new study areas. According to Scopus data, it was determined that the field of "Affect" and "Architecture" are current fields of study. Therefore, the concept related to the fields of "Affect" and "Architecture" have been accepted as current research gaps according to the strength of the lines around it.

Firstly, in this context, to select new concepts that can be associated with the "Architecture" keyword, small clusters networked with in yellow and light green tones close to the cluster they belong to were considered (Figure 3). According to Figure 3, the new areas associated with the "Architecture" cluster can be listed as follows, from yellow to mid tone green colour: "Atmospheres, Built Environment, Environmental Psychology, Creativity, Affect, Perception, Body, Materiality, Infrastructure, Urban Design, Embodiment, Aesthetics, Design, Space, Art".

Secondly, in this context, to select new concepts that can be associated with the "Affect" keyword, small clusters networked with in yellow and light green tones close to the cluster they belong to were considered (Figure 4). According to Figure 4, the new areas associated with the "Affect" cluster can be listed

as follows, from yellow to mid tone green colour: "Safe Spaces, Temporality, Working Memory, Atmospheres, Motivation, Emotion Regulation, Materiality, Poetry, Cognitive Architecture, Architecture, Embodiment, Design, Space".
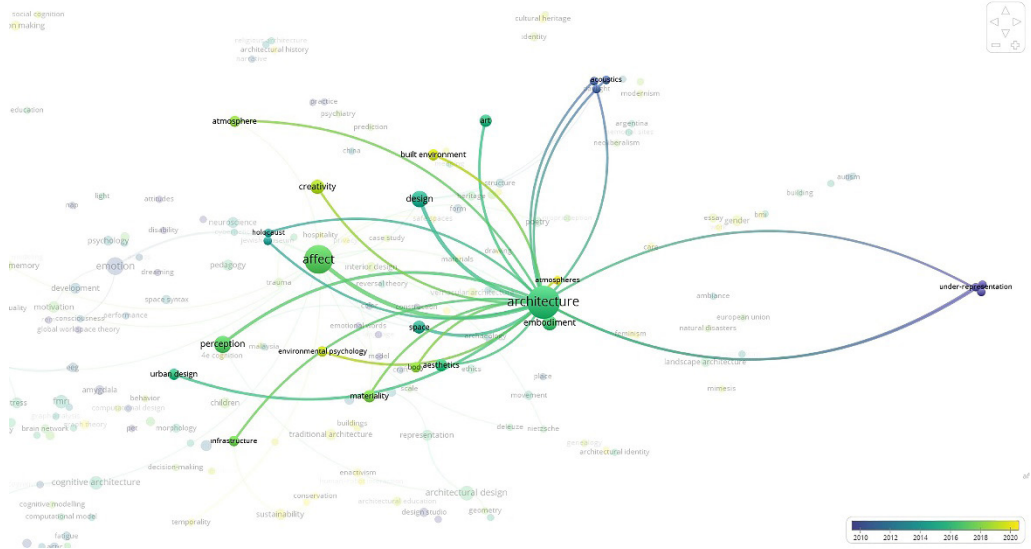
Figure 3. Strength of the lines around "Architecture" by overlay visualization according to first scanning technique in Scopus (VOSviewer).
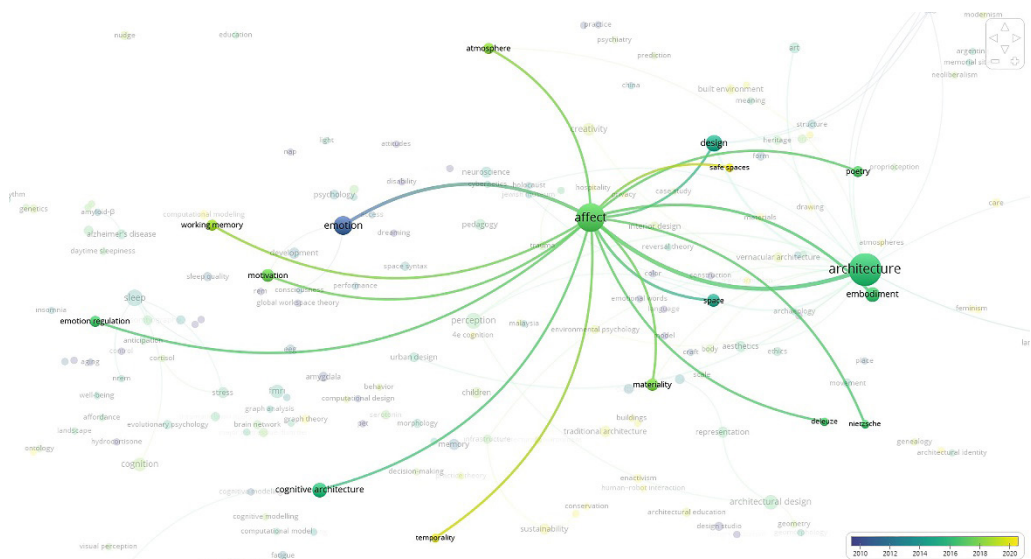
Figure 4. Strength of the lines around "Affect" by overlay visualization according to first scanning technique in Scopus (VOSviewer).

Second scanning technique (scanned keywords "affective-architecture"): Criteria were decided so that the minimum number of occurrences of a keyword is 2. After these selections, of the 1082 keywords, 121 that met the thresholds were selected by the software. For each of the 121 keywords, the total strength of co-occurrence links with other keywords was calculated by the software. The keywords with the greatest total link strength were selected by the software. The number of keywords to be selected was 121.

Before proceeding to the concept of network mapping, the ranking according to the most occurrences of the keywords can be sorted in the interface created by the software (Table 12). The keyword that came first in this ranking was "affect"; the second keyword was "architecture"; the third keyword was "affective computing"; the fourth keyword was "emotion"; the fifth keyword was "cognitive architecture"; sixth keyword was "cognition"; the seventh keyword was "atmosphere"; the eighth keyword was "empathy"; the ninth keyword was "depression"; the tenth keyword was "schizophrenia" (Table 12).

The Ranking According to The Most Occurrences			
Ranking	Selected keywords	Occurrences	Total Link Strength
1	Architecture	30	44
2	Affect	26	35
3	Affective Computing	21	31
4	Emotion	18	46
5	Cognitive Architecture	9	12
6	Cognition	8	13
7	Atmosphere	7	7
8	Empathy	6	17
9	Depression	6	12
10	Schizophrenia	5	10
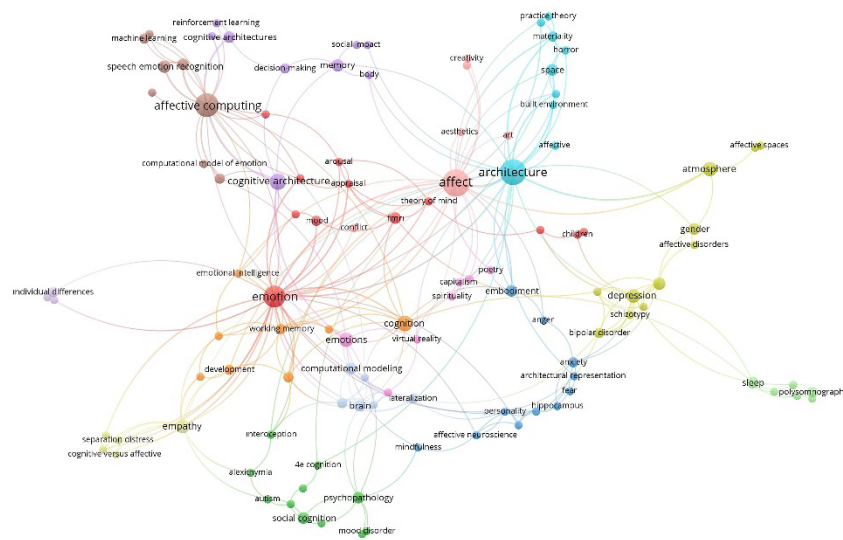
When proceeding with mapping in Scopus data, the VOSviewer software warned that some of the 121 items in your network are not connected to each other and the larger set of connected items consists of 112 items. Asked by the software, "Do you want to show this set of items instead of all items?", the mapping in Figure 5. was created by answering the question "yes". There were 14 clusters in the "Co-occurrences" mapping shown in Figure 5. These clusters were represented by circles of varied sizes and colours. According to this mapping, affect and architecture have more co-occurrences than the other keywords (Figure 5).

The VOSviewer software can also show developments over time (current trends) by overlay visualization of the keywords network mapping created in Figure 5. In this way, the relationship of new keywords that have been used in publications recently can be seen in Figure 6. New study areas are expressed with yellow and light green toned small clusters in the time mapping. The keywords "Affect" and "Architecture" were compared according to developments over time. It was observed that the keyword "Affect" was expressed in light tone green colour. It was observed that the keyword "Architecture" was expressed in light tone green colour (Figure 6). In addition to this situation, it was determined that the affective cluster is directly related to the architecture cluster, while the affective spaces cluster is indirectly related to the architecture cluster.
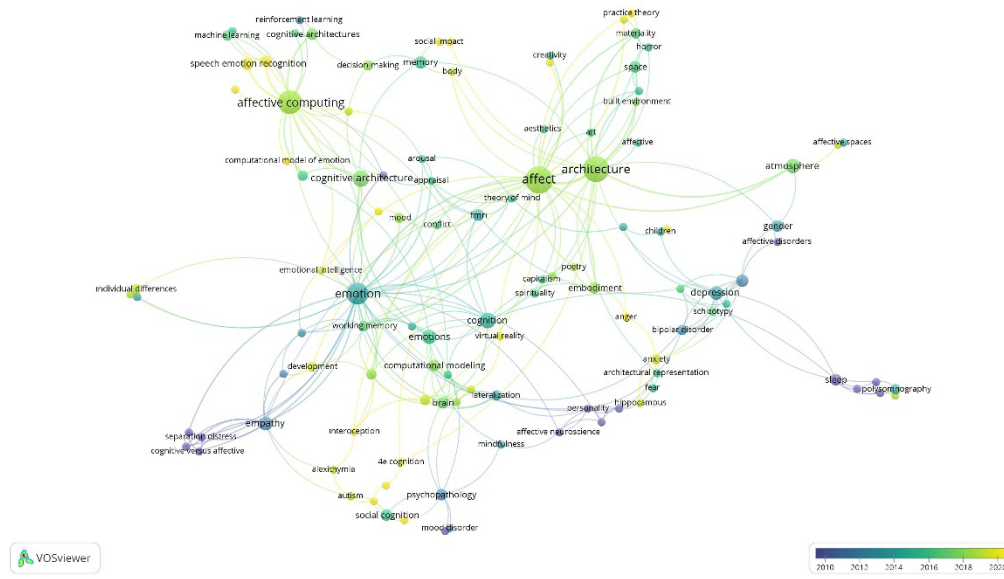
Figure 6. Mapping based on developments over time by overlay visualization of "Co-occurrences" data according to second scanning technique in Scopus (VOSviewer).

In the developments over time (current trends) by overlay visualization network map made in the VOSviewer analysis program, yellow and light green tones represent new study areas. According to Scopus data, it was determined that the field of "Affect" and "Architecture" are current fields of study. Therefore, the concept related to the fields of "Affect" and "Architecture" have been accepted as current research gaps according to the strength of the lines around it.

Firstly, in this context, to select new concepts that can be associated with the "Architecture" keyword, small clusters networked with in yellow and light green tones close to the cluster they belong to were considered (Figure 7). According to Figure 7, the new areas associated with the "Architecture" cluster can be listed as follows, from yellow to mid tone green colour: "Atmosphere, Affect, Space, Design, Emotion".
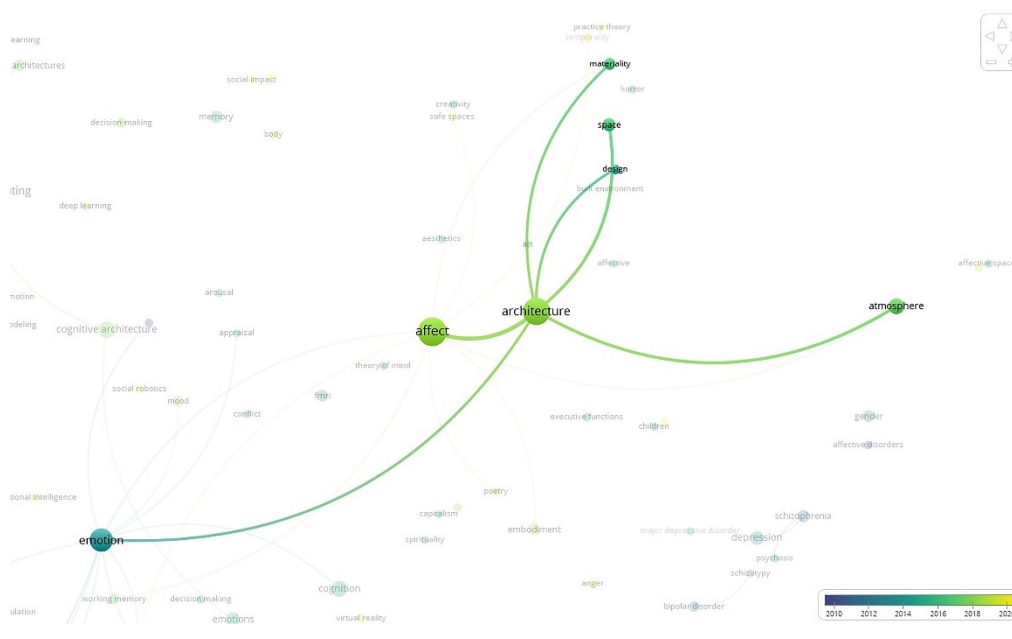
Figure 7. Strength of the lines around "Architecture" by overlay visualization according to second scanning technique in Scopus (VOSviewer).

Secondly, in this context, to select new concepts that can be associated with the "Affect" keyword, small clusters networked with in yellow and light green tones close to the cluster they belong to were considered (Figure 8). According to Figure 8, the new areas associated with the "Affect" cluster can be listed as follows, from yellow to mid tone green colour: "Safe Spaces, Temporality, Architecture, Atmosphere, Motivation, Poetry, Embodiment, Materiality, Working Memory, Emotion".

Third scanning technique (scanned keywords "affect-architecture-water"): Criteria were decided so that the minimum number of occurrences of a keyword is 1. After these selections, of the 1061 keywords, 1061 that met the thresholds were selected by the software. For each of the 1061 keywords, the total strength of co-occurrence links with other keywords was calculated by the software. The keywords with the greatest total link strength were selected by the software. The number of keywords to be selected was 1000.

The Ranking According to The Most Occurrences			
Ranking	**Selected keywords**	**Occurrences**	**Total Link Strength**
1	Throughfall	10	49
2	Stemflow	9	40
3	Climate Change	7	39
4	Root Architecture	7	34
5	Eddy Covariance	5	25
6	Photosynthesis	5	24
7	Drought	5	23
8	Canopy	4	22
9	Groundwater	4	21
10	Canopy Structure	4	19

Before proceeding to the concept of network mapping, the ranking according to the most occurrences of the keywords can be sorted in the interface created by the software (Table 13). The keyword that came first in this ranking was "throughfall"; the second keyword was "stemflow"; the third keyword was "climate change"; the fourth keyword was "root architecture"; the fifth keyword was "eddy covariance"; sixth keyword was "photosynthesis"; the seventh

keyword was "drought"; the eighth keyword was "canopy"; the ninth keyword was "groundwater"; the tenth keyword was "canopy structure" (Table 13).

When proceeding with mapping in Scopus data, the VOSviewer software warned that some of the 1000 items in your network are not connected to each other and the larger set of connected items consists of 429 items. Asked by the software, "Do you want to show this set of items instead of all items?", the mapping in Figure 9. was created by answering the question "no". There were 116 clusters in the "Co-occurrences" mapping shown in Figure 9. These clusters were represented by circles of varied sizes and colours. According to this mapping, affect-architecture-water have no co-occurrences than the other head keyword clusters (Figure 9).
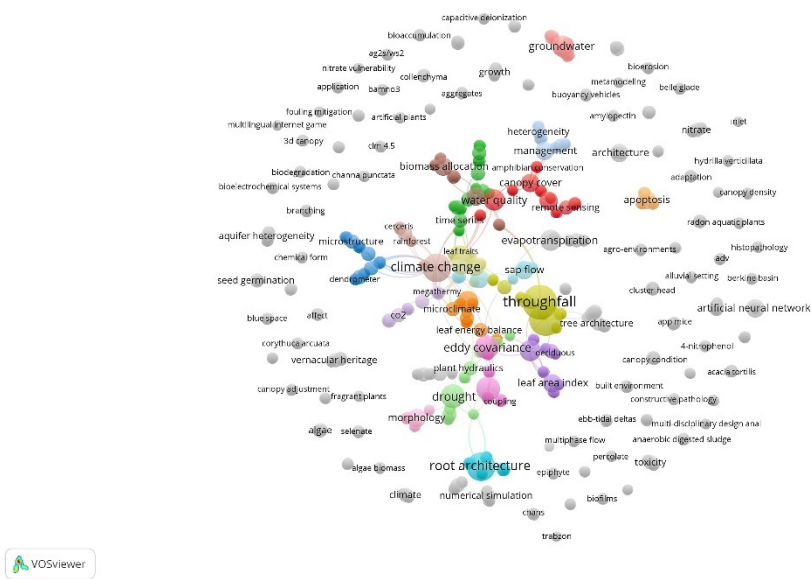
Figure 9. Mapping based on "Co-occurrences" data according to third scanning technique in Scopus (VOSviewer)
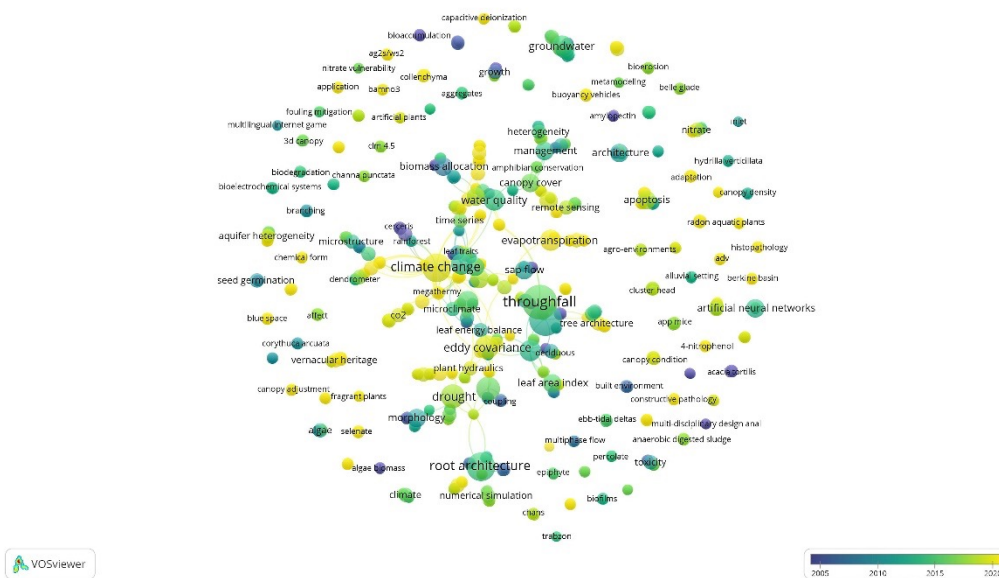
Figure 10. Mapping based on developments over time by overlay visualization of "Co-occurrences" data according to third scanning technique in Scopus (VOSviewer)

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The VOSviewer software can also show developments over time (current trends) by overlay visualization of the keywords network mapping created in Figure 9. In this way, the relationship of new keywords that have been used in publications recently can be seen in Figure 11. New study areas are expressed with yellow and light green toned small clusters in the time mapping. The keywords "Affect", "Architecture" and "Water" were compared according to developments over time. It was observed that the keyword "Affect" was expressed in light tone green colour (Figure 10). It was observed that the keyword "Architecture" was expressed in mid tone green colour (Figure 10). It was observed that the keyword "Water" was expressed in assorted colours according to the cluster it is in (Figure 10).

In the developments over time (current trends) by overlay visualization network map made in the VOSviewer analysis program, yellow and light green tones represent new study areas. According to Scopus data, it was determined that the field of "Affect" and "Architecture" are current fields of study. Therefore, the concepts related to the fields of "Affect" and "Architecture" have been accepted as current research gaps according to the strength of the lines around it. Since the colour of the keyword "Water" changes according to the cluster it is connected to, it has been examined one by one. In this case, "Water" has been seen that it has a yellow colour in areas that will be associated with affect and architecture.
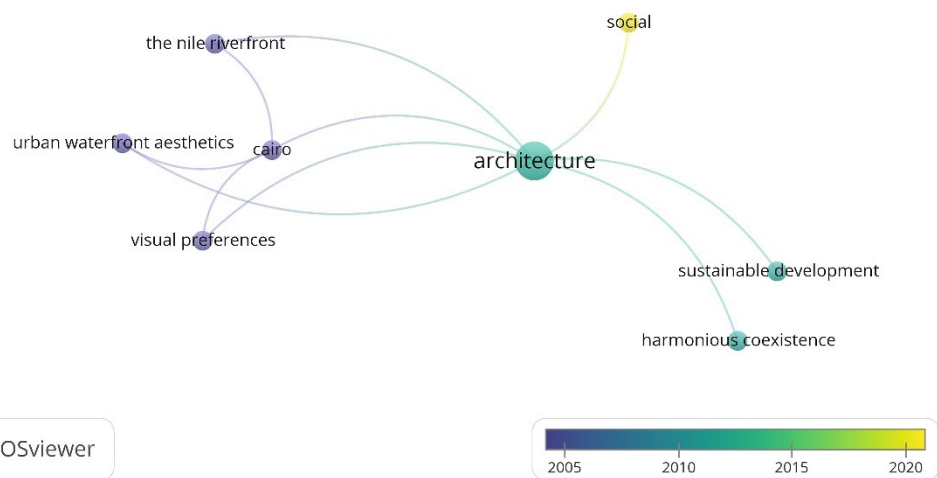
Figure 11. Strength of the lines around "Architecture" by overlay visualization according to third scanning technique in Scopus (VOSviewer)

Firstly, in this context, to select new concepts that can be associated with the "Architecture" keyword, small clusters networked with in yellow and light green tones close to the cluster they belong to were considered (Figure 11). According to Figure 11, the new areas associated with the "Architecture" cluster can be listed as follows, from yellow to mid tone green colour: "Social".

Secondly, in this context, to select new concepts that can be associated with the "Architecture" keyword, small clusters networked with in yellow and light green tones close to the cluster they belong to were considered (Figure 12). According to Figure 12, the new areas associated with the "Architecture" cluster can be listed as follows, from yellow to mid tone green colour: "Architectural Education, Design Studio, Ecolodge Design, Ecotourism, Ecolabelling, Sustainable Architecture, Vernacular Architecture".
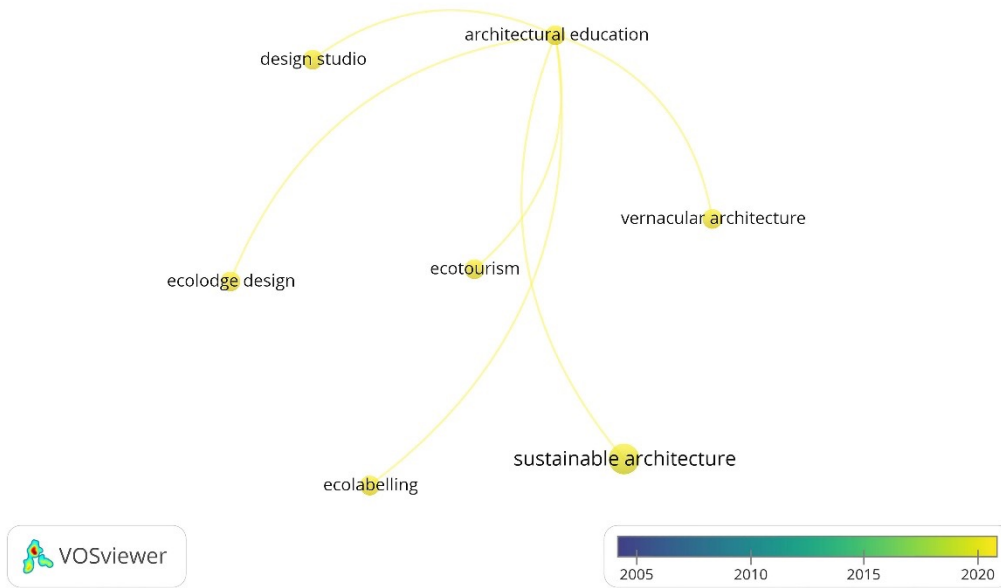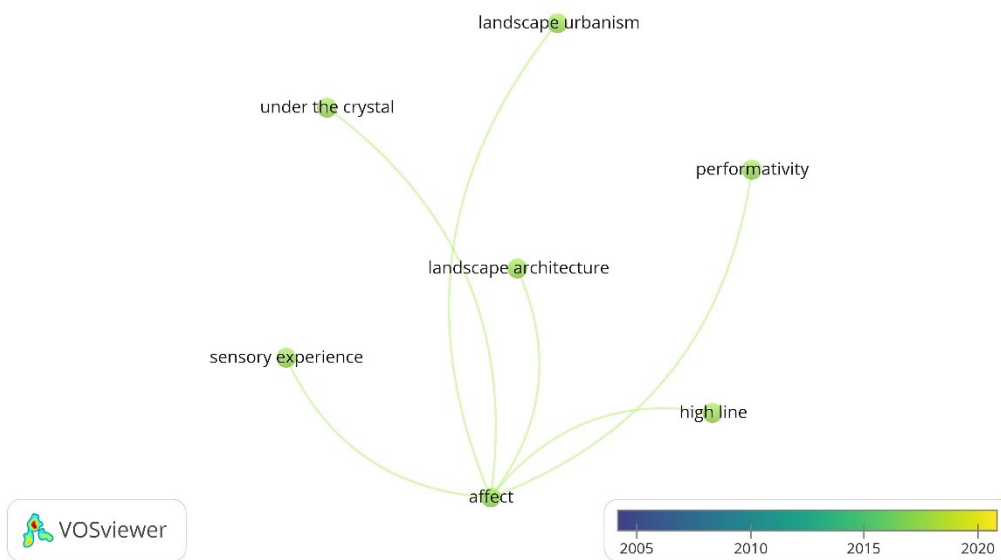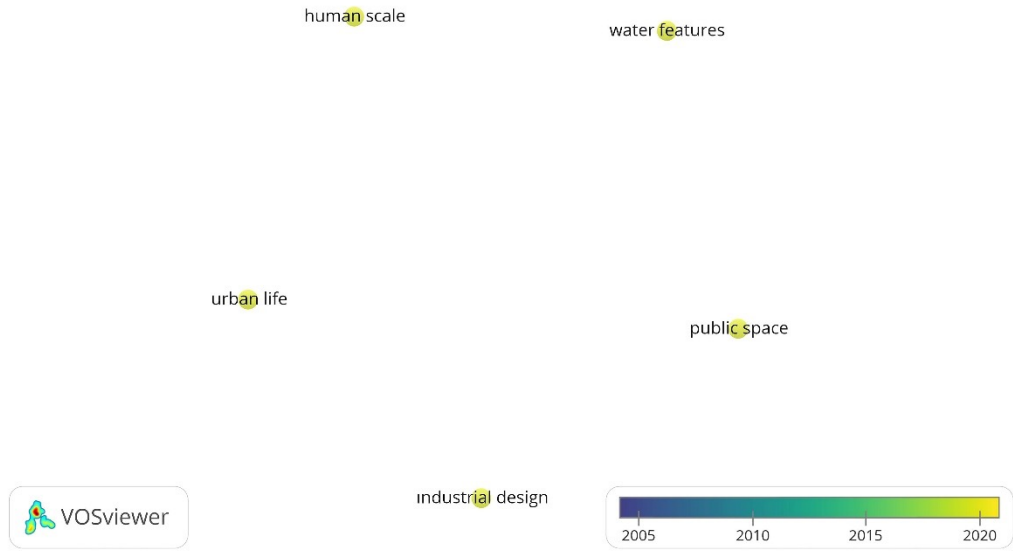
Thirdly, in this context, to select new concepts that can be associated with the "Affect" keyword, small clusters networked with in yellow and light green tones close to the cluster they belong to were considered (Figure 13). According to Figure 13, the new areas associated with the "Affect" cluster can be listed as follows, from yellow to mid tone green colour: "Sensory Experience, Landscape Architecture, High Line, Under the Crystal, Landscape Urbanism, Performativity".
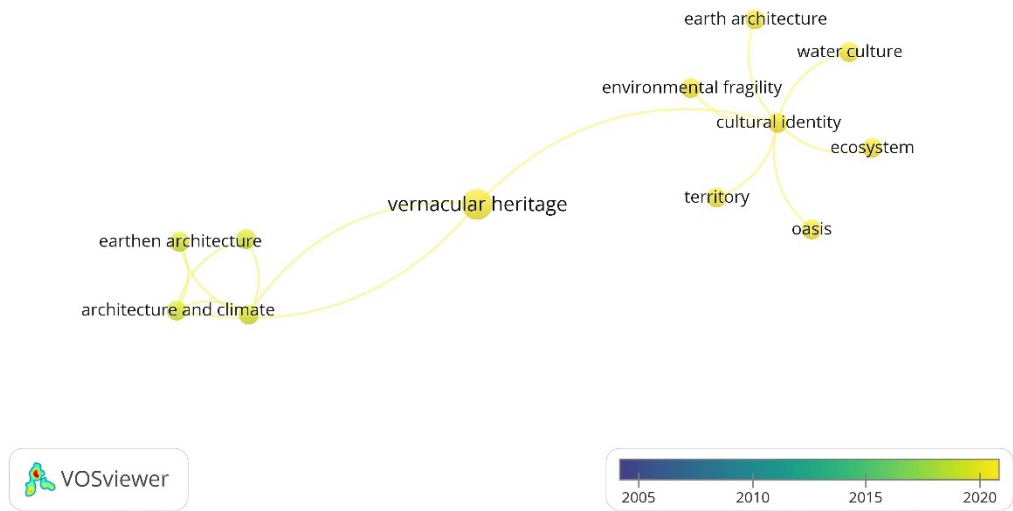
Fourthly, in this context, to select new concepts that can be associated with the "Water" keyword, small clusters networked with in yellow and light green tones close to the cluster they belong to were considered (Figure 14). According to Figure 14, the new areas near with the "Water" cluster can be listed as follows, from yellow to mid tone green colour: "Human Scale, Urban Life, Industrial Design, Public Space".

Fifthly, in this context, to select new concepts that can be associated with the "Water" keyword, small clusters networked with in yellow and light green tones close to the cluster they belong to were considered (Figure 15). According to Figure 15, the new areas near with the "Water" cluster can be listed as follows, from yellow to mid tone green colour: "Water Culture, Earth Architecture, Environmental Fragility, Cultural Identity, Ecosystem, Oasis, Territory, Vernacular Heritage, Earthen Architecture, Architecture and Climate".

Mapping based on "Co-citation" data by the "Cited Authors"

Co-citation analysis is a provider method to study the speciality structure of science in the specified field (Small, 1973, p. 265). In addition, co-citation analysis is one of the techniques that devised to identify documents likely to be closely related (Smith, 1981, p. 85). Cited authors co-citation analysis is used in understanding intellectual structure and can produce empirical maps of prominent authors in various areas at science (White & Griffith, 1981; McCain, 1990). Co-citations to the third document in two independent documents are

examined through authors cited together. In this analysis, the clusters and the sizes of the clusters represent the cited authors' frequency. The links between the clusters express the cooperation between the cited authors. The thickness of the line of networks increases according to the total link strength between the cited authors.

First scanning technique (scanned keywords "affect-architecture"): Criteria were decided so that the minimum number of citations of an author is 50. After these selections, of the 60766 authors, 10 that met the thresholds were selected by the software. For each of the 10 authors, the total strength of co-citation links with other authors was calculated by the software. The authors with the greatest total link strength were selected by the software. The number of authors to be selected was 10.
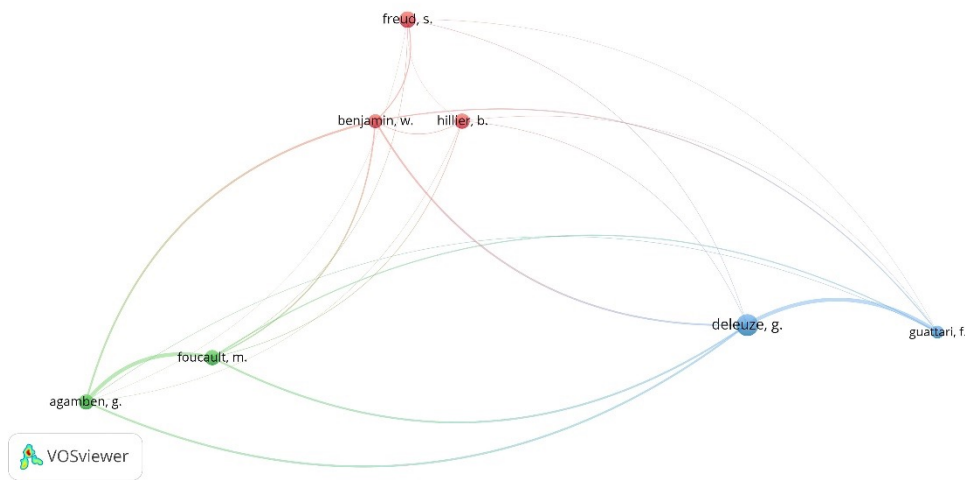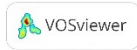
When proceeding with mapping in Scopus data, the VOSviewer software warned that some of the 10 items in your network are not connected to each other and the larger set of connected items consists of 7 items. Asked by the software, "Do you want to show this set of items instead of all items?", the mapping in Figure 16. was created by answering the question "yes". According to this mapping, the first author was, with 127 co-citations, "Deleuze"; the second author was, with 80 co-citations, "Freud"; the third author was, with 71 co-citations, "Agamben"; the fourth author was, with 71 co-citations, "Foucault"; the fifth author was, with 67 co-citations, "Hillier"; the sixth author was, with 61 co-citations, "Benjamin"; the seventh author was, with 59 co-citations, "Davidson"; the eighth author was, with 55 co-citations, "Steg"; the ninth author was, with 54 co-citations, "Guattari"; the tenth author was, with 59 co-citations, "Damasio" (Figure 16).

Second scanning technique (scanned keywords "affective-architecture"): Criteria were decided so that the minimum number of citations of an author is 40. After these selections, of the 26567 authors, 13 that met the thresholds were selected by the software. For each of the 13 authors, the total strength of co-citation links with other authors was calculated by the software. The authors with the greatest total link strength were selected by the software. The number of authors to be selected was 13.

When proceeding with mapping in Scopus data, the mapping process has been completed without any warning by the software when proceeding for the mapping (Figure 17). According to this mapping, the first author was,
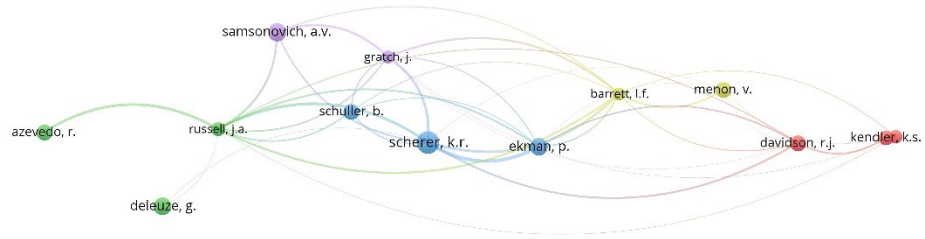
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with 100 co-citations, "Scherer"; the second author was, with 71 co-citations, "Samsonovich"; the third author was, with 69 co-citations, "Ekman"; the fourth author was, with 66 co-citations, "Deleuze"; the fifth author was, with 58 co-citations, "Azevedo"; the sixth author was, with 57 co-citations, "Davidson"; the seventh author was, with 56 co-citations, "Schuller"; the eighth author was, with 56 co-citations, "Menon"; the ninth author was, with 51 co-citations, "Kendler"; the tenth author was, with 45 co-citations, "Russell"; the eleventh author was, with 43 co-citations, "Kupfer"; the twelfth author was, with 41 co-citations, "Barrett"; the thirteenth author was, with 40 co-citations, "Gratch" (Figure 17).

Third scanning technique (scanned keywords "affect-architecture-water": Criteria were decided so that the minimum number of citations of an author is 40. After these selections, of the 28972 authors, 12 that met the thresholds were selected by the software. For each of the 12 authors, the total strength of co-citation links with other authors was calculated by the software. The authors with the greatest total link strength were selected by the software. The number of authors to be selected was 12.

When proceeding with mapping in Scopus data, the VOSviewer software warned that some of the 20 items in your network are not connected to each other and the larger set of connected items consists of 13 items. Asked by the software, "Do you want to show this set of items instead of all items?", the mapping in Figure 18. was created by answering the question "yes". According to this mapping, the first author was, with 66 co-citations, "Zhang, Y."; the second author was, with 65 co-citations, "Sperry"; the third author was, with 56 co-citations, "Liu"; the fourth author was, with 52 co-citations, "Li, J."; the fifth author was, with
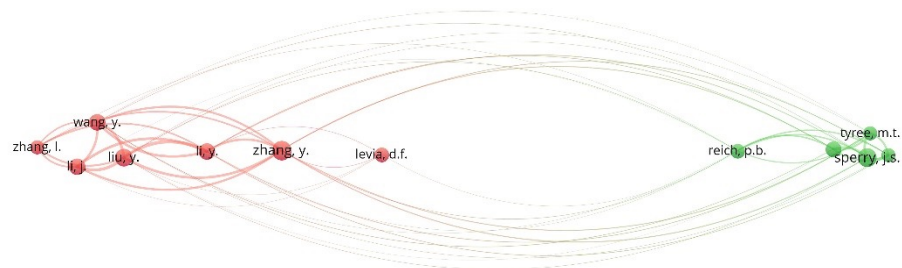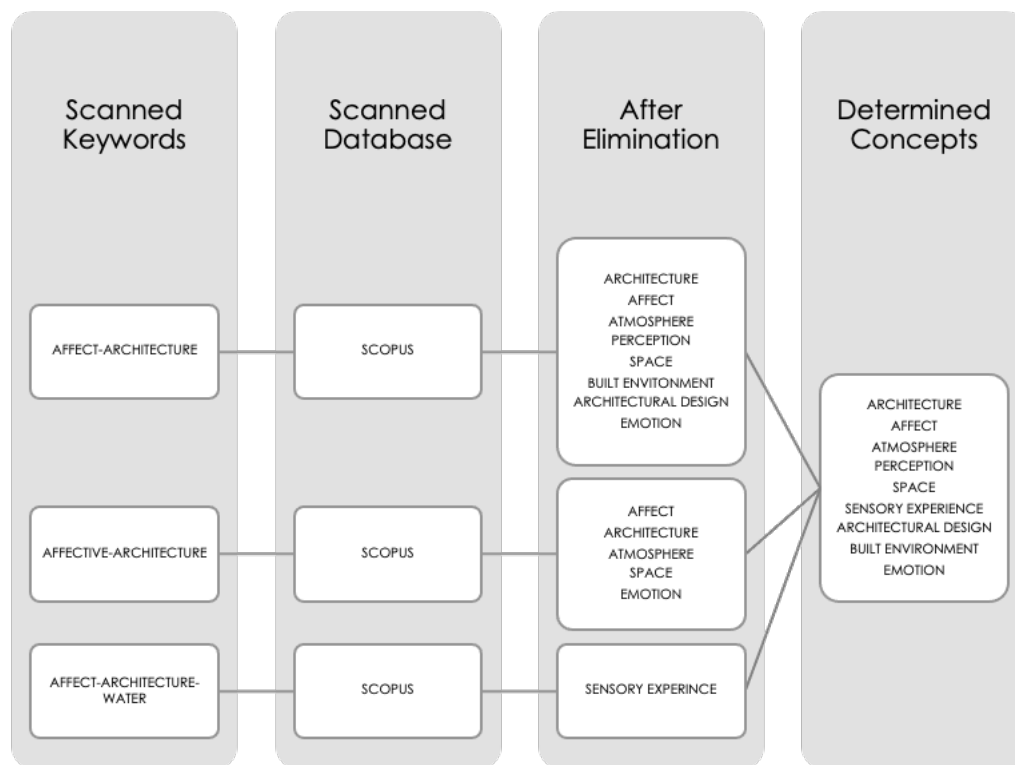
50 co-citations, "Li, Y."; the sixth author was, with 50 co-citations, "Wang"; the seventh author was, with 47 co-citations, "Mainzer"; the eighth author was, with 42 co-citations, "Reich"; the ninth author was, with 42 co-citations, "Levia"; the tenth author was, with 40 co-citations, "Hacke"; the eleventh author was, with 40 co-citations, "Tyree"; the twelfth author was, with 40 co-citations, "Zhang, I." (Figure 18).

CONCLUSION

In this study, scientific documents about the "Affect, Affective, Architecture and Water" were examined by bibliometric data collected from Scopus database according to some criteria in selected scientific disciplines which are Arts and Humanities or Psychology or Environmental Science. In order to understand these concepts, the search was detailed by creating three different combinations with the selected keywords. These combinations were "Affect" and "Architecture; "Affective" and "Architecture"; "Affect", "Architecture" and "Water". In this context, document types, publication years, top countries, top subject areas, top sources, top affiliations, top funding sponsors, author keywords and co-occurrences, co-citations of cited authors were evaluated based on the bibliometric data of 1557 documents in total conducted since 1921.

Bibliometric analysis with science mapping techniques methods was applied to the data downloaded by scanning with the keywords "Affect, Affective, Architecture and Water" in Scopus database. The concepts related to the "Affect, Affective, Architecture and Water" clusters and the developments over time (new trends) by overlay visualization for the concepts were determined by "co-occurrences mapping". The cited authors related to the "Affect, Affective, Architecture and Water" clusters were determined by "co-citation mapping".

As a result of co-occurrences of author keywords mapping, related concepts in the current research gaps were determined according to the findings (Table 14). In the database selected for three scanning techniques, the nine concepts

Table 14. From the keywords to the new research related gaps "Concepts"

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determined by the scanned keywords are Architecture, Affect, Atmosphere, Perception, Space, Sensory Experience, Architectural Design, Built Environment, Emotion (Table 14). While determining these gaps, new concepts that may be related and networked to "Affect, Architecture and Water" were emphasized. As a result of co-citation mapping, authors were determined according to the findings (Table 15). After the names of the authors were determined in the co-citation mapping, back to the references and screened according to the related texts. Other authors who were not in the priority rank in the co-citation mapping by the selected criteria were determined according to the references related to the subject. In this case, in the database selected for three scanning techniques, the 26 authors who can be examined as reference sources determined by the scanned keywords are Gilles Deleuze, Félix Guattari, Richard J. Davidson, Ben Anderson, Lisa Feldman Barrett, Antonio R. Damasio, Peter Kraftl, Sonja Lyubomirsky, Lynne C. Manzo, Brian Massumi, Paul Libbey

Table 15. From the keywords to the "Authors"
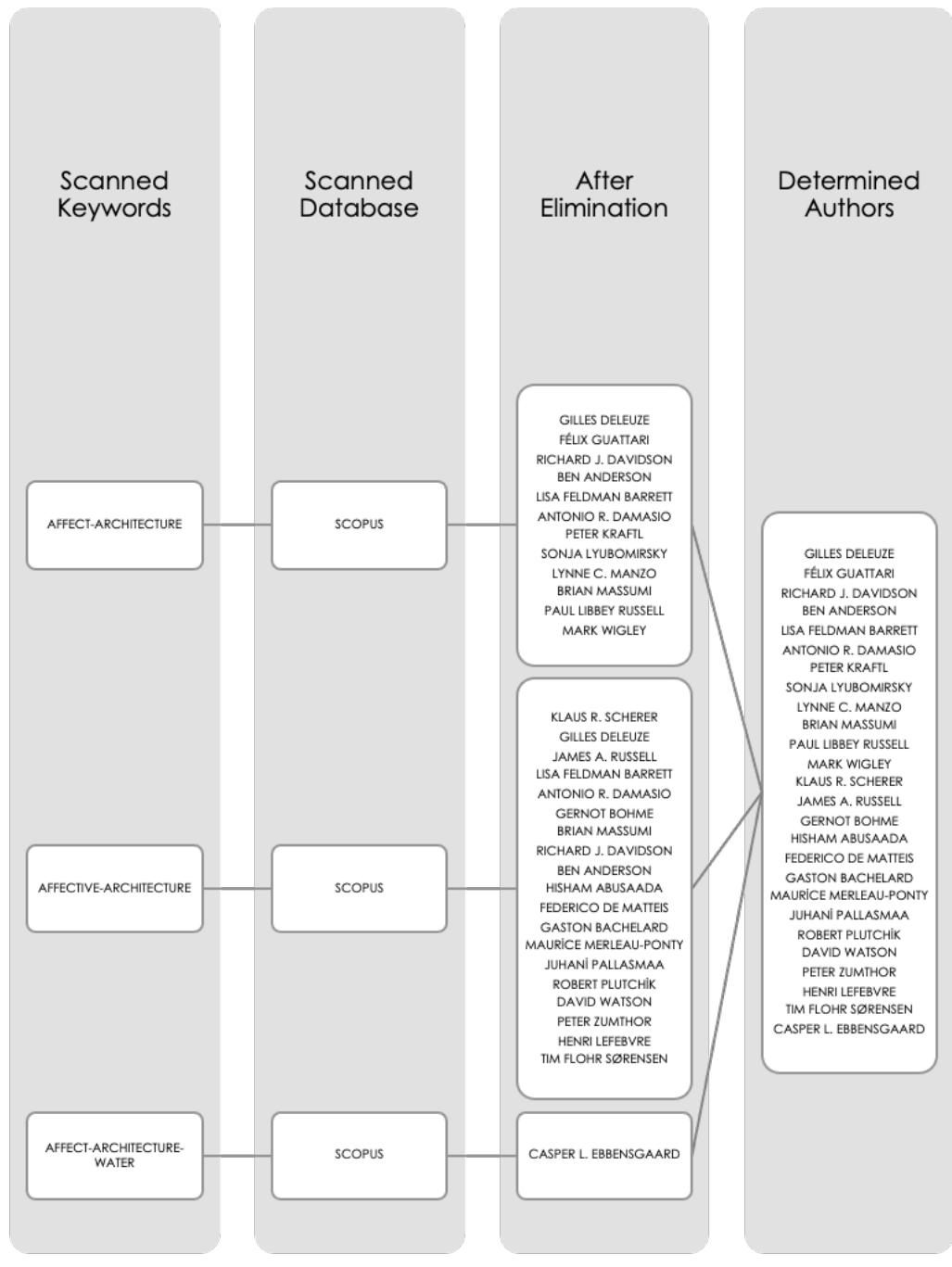
Russell, Mark Wigley, Klaus R. Scherer, James A. Russell, Gernot Böhme, Hisham Abusaada, Federico De Matteis, Gaston Bachelard, Maurice Merleau-Ponty, Juhani Pallasmaa, Robert Plutchik, David Watson, Peter Zumthor, Henri Lefebvre, Tim Flohr Sørensen and Casper Laing Ebbensgaard (Table 15). While determining these authors, mainly cited references that may be related and networked to "Affect, Architecture" were emphasized. In spite of, primary author could not be reached according to "Affect, Architecture and Water" keywords combination according to some criteria in selected scientific disciplines, only one author determined by backing to the articles (Table 15).

It has been illustrated that the keywords "affect-architecture-water" were not found together at the same time in the findings obtained as a result of the analyses from the Scopus data in with the criterias determined by the third scanning combination and the selected disciplines. On the other hand, it has been proved that the keywords "affect-architecture" and "affective-architecture" were found together at the same time in the findings obtained as a result of the analyses from the Scopus data in with the criterias determined by the combination of the first and second screening and the selected disciplines. To conclude, it was pointed out that a new network could be established with "water" for the relationship between "affect-architecture" and "affective-architecture". Moreover, the concepts determined in these research areas have just started to be studied and have a growing tendency. In addition to this situation, in the approach to the relationship between space and water in architecture; "affect" with the other keywords around it have been found to be actual and open to development.

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Conflict of Interest

No conflict of interest was declared by the authors.

Authors' Contributions

The authors contributed equally to the study.

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BIOGRAPHY OF AUTHOR(S)

Damla Katuk is an architect, who received B.Arch. degree (2012) from the Department of Architecture at Erciyes University. She currently studies her master's degree under the supervision of Assoc. Prof. Dr. Emine Köseoğlu with full scholarship in the Master of Architecture at Fatih Sultan Mehmet Vakif University. She is a visiting lecturer and design studio instructor at Yildiz Technical University Department of Architecture in Introduction to Architectural Design, Architectural Design 1 and Aquarelle Technique courses. She continues to

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develop conceptual and experimental works subjects such as watercolour, ink, sketch, illustration, design, architectural space, and Franz Kafka's literary works.

Emine Köseoğlu graduated from the Department of Architecture at Trakya University in 2002. With her thesis on cross-cultural spatial perception in hotel lobbies, she graduated from Yıldız Technical University, Department of Architecture in 2004; completed her Ph.D. research in 2012 on formal, subjective and syntactical spatial legibility at YTU; and received the title of Associate Professor in April 2018. Her main research areas are architectural design, environmental psychology, and urban morphology, where she focuses on spatial cognition, spatial perception, spatial legibility, environmental image, architectural phenomenology, literary space, destination image, tourist behaviour, literary tourism, design/architectural education, culture-space relations, space syntax.