

A Systematic Literature Review of Applied Methods for Assessing the Effects of Public Open Spaces on Immigrants' Place Attachment

Marzieh Ghasemieshkaftaki *, Karine Dupre  and Ruwan Fernando

School of Engineering and Built Environment, Griffith University, Gold Coast, QLD 4222, Australia; k.dupre@griffith.edu.au (K.D.); r.fernando@griffith.edu.au (R.F.)

* Correspondence: marzieh.ghasemieshkaftaki@griffithuni.edu.au

Abstract: Moving to a new country is often combined with issues such as stress and a sense of loss that affect the overall well-being of immigrants. Furthermore, immigrants have not yet developed strong attachments to the country and, more specifically, to the places in which they will settle. Researchers have already discussed the role of the built environment for well-being and the sense of belonging and attachment it can provide, specifically through public open spaces, such as parks, squares, etc. These problems are worldwide, and the World Health Organization (WHO) also recommends creating public places that improve human health, well-being, and social inclusion. Moreover, at local levels, designers and urbanists must understand how to evaluate the relationship between immigrants' place attachment and public places in order to improve the design of these places. Consequently, this study reviewed methods used to understand the effects of public open spaces on immigrants' attachment. A systematic quantitative literature review was conducted, and a total of 26 articles were extracted relating to immigrants' place attachment and public open spaces. Research locations, participants' nationalities, the types of public open spaces, the methods applied, and place attachment evaluations were retrieved from the articles and analysed. The results show that evaluating immigrants' place attachment presents many challenges, and there is no consensus on what approaches are best practices. However, qualitative methods were most applied in human–environment interactions, and immigrants' place attachments were primarily assessed based on their social bonds in public open spaces. To conclude, a framework was designed to understand how immigrants' place attachment was evaluated in the reviewed literature, and the dimensions of place attachment were defined.

Keywords: immigrant; place attachment; public open space; method

Citation: Ghasemieshkaftaki, M.; Dupre, K.; Fernando, R. A Systematic Literature Review of Applied Methods for Assessing the Effects of Public Open Spaces on Immigrants' Place Attachment. *Architecture* **2023**, *3*, 270–293. <https://doi.org/10.3390/architecture3020016>

Academic Editor: Hing-Wah Chau

Received: 15 April 2023

Revised: 25 May 2023

Accepted: 26 May 2023

Published: 30 May 2023



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1. Introduction

Immigrants have fewer experiences and perceptions of the host country, which can affect their quality of life and well-being. For instance, studies mentioned that immigrants experience displacement, a sense of loss [1], psychological dissatisfaction [2], and stress [3]. Additionally, ref. [4] stated that “mobility and relocation impact place attachment”, while the experience of uprooting and displacement affects overall well-being [5]. Therefore, a sense of belonging and place attachment are essential to well-being.

Refs. [6,7] argued that characterizing the bond between individuals and certain places points to the multifaceted and complex nature of defining place attachment. Ref. [8] considered place attachment as the emotional bond between people and place. However, refs. [7,9,10] explained that place attachment has not only an emotional (affect and feeling) and cognitive (thought, knowledge, and belief) bond with a place but also a practical one (action and behaviour). Consequently, ref. [11] indicated that there are differences in the conceptualization of place attachment, which have resulted in some studies selecting quantitative methods, others promoting qualitative methods, and others developing

mixed methods. Ref. [12] mentioned that quantitative methods, such as questionnaires (particularly close-ended ones), focus on peoples' differentiation regarding strength and amount of attachment to places, whereas qualitative methods focus on distinguishing places' meanings and how they are viewed by participants. Accordingly, quantitative and qualitative methods provide different results when analysing place attachment. As a result, authors should consider what they want to discover about place attachment when choosing their methodology.

Different places, including dwellings [13], neighbourhoods [14–16], cities [17], and parks [1,4,18] influence immigrants' place attachment. This study chose to focus on public open spaces for three main reasons. First, existing research has already noted how public spaces can positively affect immigrants' place attachment. For instance, refs. [19,20] remarked that public places' social, leisure, and recreational activities facilitated immigrants' adaptation to new environments. Furthermore, identity, also known as one dimension of place attachment, is expressed through the process of immigrants' inclusion and exclusion within the built environment [21]. This process mainly occurs in public spaces to form a sense of "us" [22].

Secondly, public spaces have physical, social, psychological, economic, and political roles and dimensions that symbolize diverse meanings for different people [23]. They represent components of the built environment where interpretation is possible. Thirdly, ref. [24] argued that technological advancements also contribute to changes in the sense of public places. For example, improvements in telecommunication mean that people can communicate without needing to meet in person in a public space. These places need more attention because one subset of the sense of place is place attachment [25].

This paper aims to understand which methods have been applied to explore the effects of public open spaces on immigrants' place attachment. Moreover, it intends to determine how such methods evaluate place attachment and what gaps, advantages, and disadvantages can be identified. Analysing methods indicates how place attachment is defined and measured, thus revealing aspects of importance and bias that can alter design guidelines and recommendations. Furthermore, the methods analysis will clarify the dimensions of place attachment applied in each study and highlight predominant cultural elements of a sense of place and identity. A systematic quantitative literature review of studies published between 2000 and 2022 has been used to address this query.

This paper is divided into four sections. The first section describes the research method, the second presents the extracted results, and the third discusses these results and suggests new methods before the conclusion.

2. Materials and Methods

2.1. Literature Screening and Selection Process

This research, undertaken from May to July 2022, implemented the systematic quantitative literature review method, widely used and recognized for reliability and validity in providing unbiased data [26]. Prognostically, a specific topic and questions were first identified to choose search keywords. Then, appropriate databases were searched to find relevant and original literature based on the inclusion criteria. Finally, the selected papers were comprehensively categorized and assessed to recognize research gaps and future research opportunities [26].

The university library's online databases (including PubMed, Eric, Gale Academic OneFile, World Cat), as well as Scopus and Science Direct, which are all multidisciplinary databases, were selected. Then, search keywords were identified based on the main research question: Which methods have been applied to explore the effects of public open spaces on immigrants' place attachment? The search started with the primary keywords 'immigrant', 'place attachment', and 'public open space'; however, there were just 52 articles available from the selected databases. Consequently, 'belonging' as a synonym for 'place attachment' was added, but many articles referred to national identity, school, and work belonging and were unrelated to the topic. Thus, 'belonging to place' was added. The definition of 'public

open space' was reviewed to find appropriate synonyms. This term, 'public open space', refers to all shared open spaces with shared values that provide opportunities for sports, recreational activities, and social and economic interactions [27,28]. Based on this definition, streets and squares [29,30], plazas [31], areas of water such as lakes and rivers [32], places near water features such as public beaches, green spaces such as parks and gardens, and sports fields [33] are all considered public open spaces. Therefore, 'public space', 'public place', 'open space', 'street', 'plaza', 'square', 'green space', 'garden', 'park', 'river', 'lake', 'public beach', and 'sports field' were also used as synonyms for 'public open spaces'.

The new search yielded a total of 3875 papers. Three stages were involved in the selection process. First, to ensure scientific quality and reveal current developments in the field, the search was then restricted to English peer-reviewed papers published from 2000 to 2022. The number of retained papers was still considerable (2333 articles); thus, in the second stage, authors manually read titles and abstracts to screen their relevance and avoid repetition. This stage was conducted based on the following inclusion criteria:

- Articles that focus on the effects of public open spaces on immigrants' place attachment, belonging to places, place meaning, place adaptation, place integration, or place inclusion.
- Articles conducted at public open places, public spaces, public places, open spaces, streets, plazas, squares, green spaces, gardens, parks, rivers, lakes, public beaches, sports fields, or everyday public places.
- Articles that mentioned two of three specified keywords when it was unclear whether they referred to the topic.

For instance, papers that focused on immigrants' physical health and diseases or considered political and economic aspects of public places were eliminated, as well as those that did not investigate public open spaces (e.g., shopping centres, churches, and houses), immigrants, and place attachment or belonging. Finally, the second stage limited the results to 95 papers.

The third stage was the full text reading of 95 articles, and the following exclusion criteria was considered:

- Articles that do not focus on the effects of public open spaces on immigrants' place attachment.
- Article relating to national migrants who moved between cities or from rural areas to cities, such as [15,34,35].
- Articles that do not mention public open spaces despite their focus on immigrants' place attachment, such as [16,36].

The final stage resulted in the selection of 26 articles (Figure 1).

2.2. Classification and Analysis

The analysis first used a quantitative method to obtain a general overview of the reviewed literature and the interconnections it might draw with other data. For example, an indication of the geographical distribution of the reviewed articles can help to demonstrate whether there is a direct correlation with the rate of immigration in each identified country. Similarly, identifying the participants' nationality does also provide fine-grain insight for further qualitative analysis, as culture affects environmental perception [37] and place attachment [25]. Overall, data for each paper were entered into a personal database that highlighted the research's location(s), participants' nationality, types of public open spaces, applied methods and number of participants, place attachment evaluation, and research questions (to explore how they refer to the effects of public open spaces). The data extraction process did not differ between quantitative, qualitative, and mixed method papers.

Next, a qualitative analysis was undertaken to reveal the underlying rationales of the research. For example, immigrants' nationality was extracted, as well as the reasons for choosing these nationalities. A similar process occurred for the selection of the investigated public open spaces and methodologies. Regarding the latter, several classifications were also used. Firstly, methods were compared numerically based on their types (e.g., quantitative,

qualitative, and mixed methods). The second categorization was based on verbal and pictorial (visual) measures as defined by [12], since people's connections to places can be visual and non-verbal [38]. Ref. [39] also indicated that visual approaches provide different information from traditional approaches to place attachment.

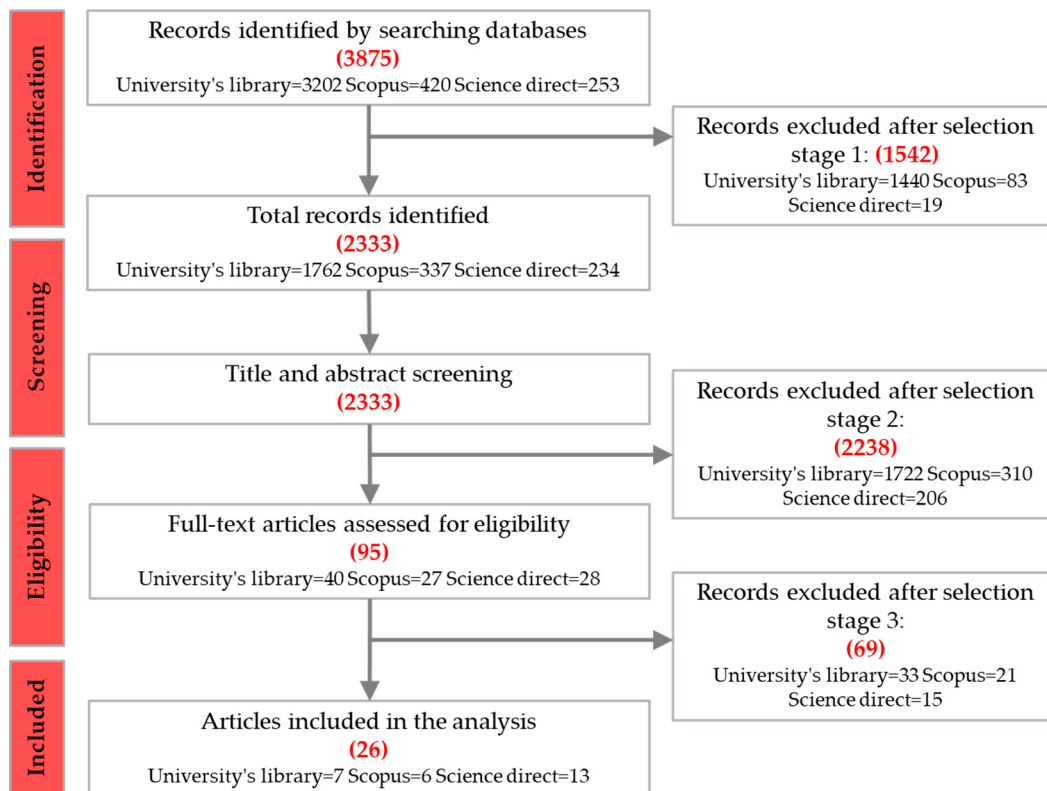


Figure 1. Summary of the systematic literature review process.

To understand how the articles evaluated immigrants' place attachments, a mixed-method approach was applied. Firstly, the dimensions of place attachment were identified from existing studies [9,40–42], and a reference framework was designed to be used against comparatively (Figure 2). The identified dimensions of the framework are 'place dependence', 'place affect', 'place social bonding', and 'place identity'. They are defined as follows:

- Place dependence is defined as the quality and value of a place in satisfying people's needs (e.g., physical and economic needs) and conducting their desired activities [43–45].
- Place affect is the emotional link between people and place [9], and it involves a combination of effects and emotions, knowledge and beliefs, and behaviours and actions about a place [7].
- Place social bonding is an interpersonal relationship that happens in a place [46].
- Place identity primarily refers to a place's distinct identity or characters that discern it from other places [47]. It also considers the cognitive and symbolic links between place and people and addresses how a place acts as a carrier of personal or communal meaning and values [48,49].

Secondly, the factors and features of place attachment mentioned in each reviewed paper were extracted, compared against the reference framework, and rated based on their referring and analysis in articles. Each dimension was awarded five points if an article referred to it. The dimension received 10 points if the article both referred to and evaluated place attachment on that basis. No points were allocated if there were no features or factors in the article that referred to one dimension of place attachment. The star sign '*' indicates additional features and factors that can be categorized in the same dimension (see Section 3.5).

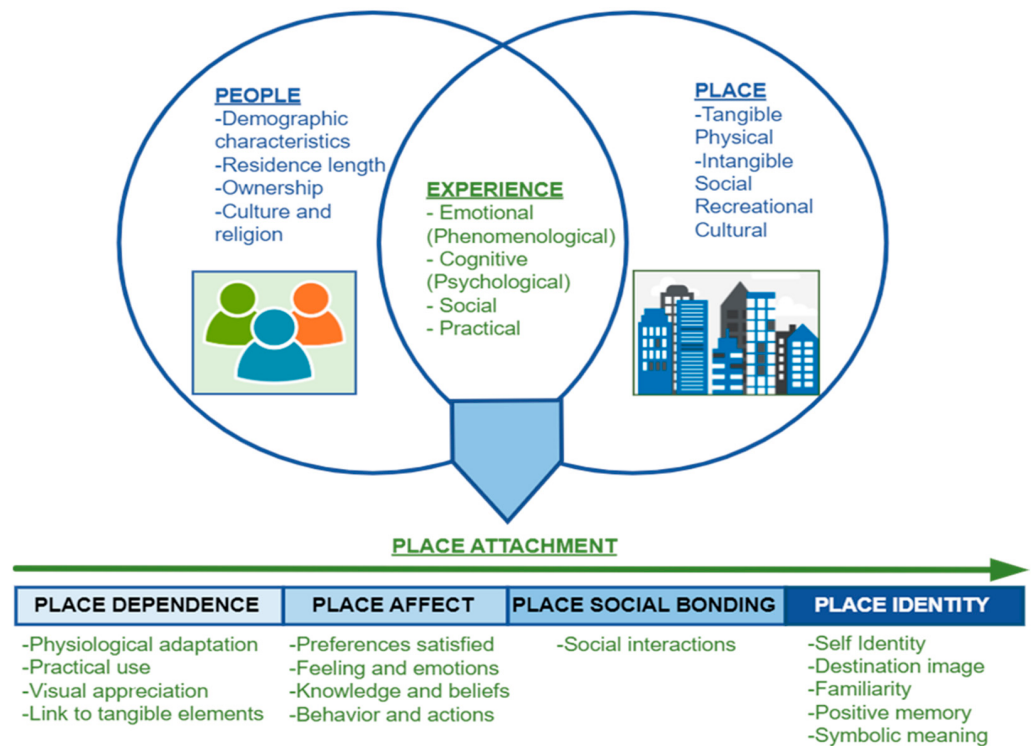


Figure 2. The designed reference framework, based on place attachment dimensions.

The framework (Figure 2) indicates that peoples’ experiences in places can lead to emotional [8], cognitive, and practical bonds [7,9,10]. These experiences and bonds can have dimensions ranging from place dependence to place identity. Additionally, the place features such as tangible and intangible dimensions [50] and individual-related features such as demographic characteristics [51], ownership [52,53], length of residence [54–56], and culture [25] influence place attachment.

2.3. Limitations

In this review, the first limitation relates to the language, since all databases screened were in English. Further, this research focused on immigrants’ place attachment and public open spaces only; thus, the information mentioned in this review cannot be generalized to the built environment as a whole.

3. Results

3.1. Geographical Distribution

As shown in Figure 3, most studies (53.85%) were conducted in Europe, followed by North America and Asia, at 19.2% and 15.4%, respectively. Only 3.85% of studies were performed in Oceania. The other 7.7% of studies relate to two cross-national articles [57,58] between the United States, Poland, Germany, and the Netherlands. There were two other cross-national papers [59,60] undertaken in Europe. It is essential to note that the language limitation of this literature review influences geographical distribution and bias.

Geographically, the most reviewed literature comes from the United Kingdom, with six articles, followed by the United States, with three articles (Figure 3). The Netherlands, Iran, and Canada each provided two articles separately. These results generally align with the ranking of countries having the highest number of immigrants in 2022; the United States, the United Kingdom, and Canada are ranked first, fifth, and eighth, respectively [61].

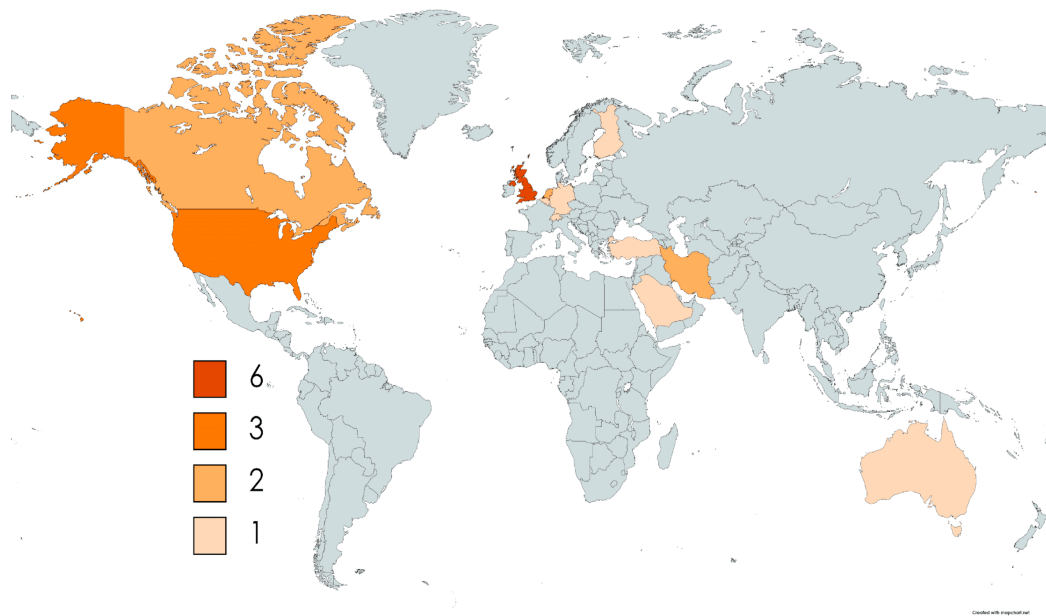


Figure 3. Geographical distribution of reviewed articles and their occurrence in countries (numbers indicate the number of papers).

3.2. Immigrants’ Nationalities

Regarding the investigated immigrants, most articles (19/26) selected a variety of nationalities, while only six studies focused on one specific group [4,62–66] (Table 1). Although 3 papers did not explain the rationale for selecting the cultural background of the investigated immigrant groups [57,58,67], 14 articles correlated their choice with the increasing immigrant population in the researched areas. Other studies related their selections to immigrant groups’ availability in the explored public open spaces or neighbourhoods.

Table 1. The nationality of immigrants in reviewed papers.

Destination Countries	Research	Immigrants’ Nationality
UK	[67]	Different countries (not specified)
	[68]	Yemen, Iraq, Jamaica, Pakistan, Somalia
	[69]	Yemen, Iraq, Jamaica, Pakistan, Somalia
	[70]	13 countries (not specified)
	[71]	Turkey, Guyana, Jamaica, Ghana, the Democratic Republic of the Congo, Wale, and other
	[72]	Latin American countries
The Netherlands	[64]	Syria
	[73]	Turkey, Morocco
USA	[1]	Mexico, El Salvador, Guatemala, other
	[74]	African and Latin American countries (not specified)
	[75]	Korea, Guatemala, Mexico, EL Salvador, Bangladesh, Thailand, Armenia, and other
Canada	[76]	Different countries (not specified)
	[77]	Different countries (not specified)
Iran	[4]	Afghanistan
	[62]	India
Saudi Arabia	[78]	Egypt, Syria, Lebanon, Jordan, Sudan, South Africa, Chad, United Arab Emirates, USA, Palestine, Yemen, Philippines
Turkey	[79]	Afghanistan, Syria

Table 1. Cont.

Destination Countries	Research	Immigrants' Nationality
Finland	[80]	Arab countries (not specified), Russia, Somalia
Australia	[81]	Different countries (not specified)
Germany	[63]	Turkey
Belgium	[66]	Turkey
Switzerland	[65]	Spain
USA, Poland, The Netherlands, and Germany	[57]	USA: Latin America and China Poland: Ukraine, and Vietnam The Netherlands: Morocco Germany: Turkey
	[58]	China, Latin America, Morocco, Turkey, Ukraine, Vietnam
Germany and France	[59]	Different countries (not specified)

3.3. Types of Public Open Spaces

As indicated in Figure 4, most reviewed papers focused on neighbourhoods and everyday public places (46.15%), as well as green public places (34.6%). A total of 7.7% of the reviewed literature [59,67] studied fluid routes between two or three predetermined locations. Some studies (7.7%) concentrated on different types of public open spaces on the city scale. For example, ref. [78] worked on nine public open spaces, including waterfronts, deserts, parks, gardens, squares, pavements, road edges, tunnels, and roundabouts in Jeddah, Saudi Arabia. The study performed by [81] differed slightly in that it also asked participants to select public places, resulting in the selection of several different locations. It was found that only 3.8% of reviewed papers [79] studied public squares.

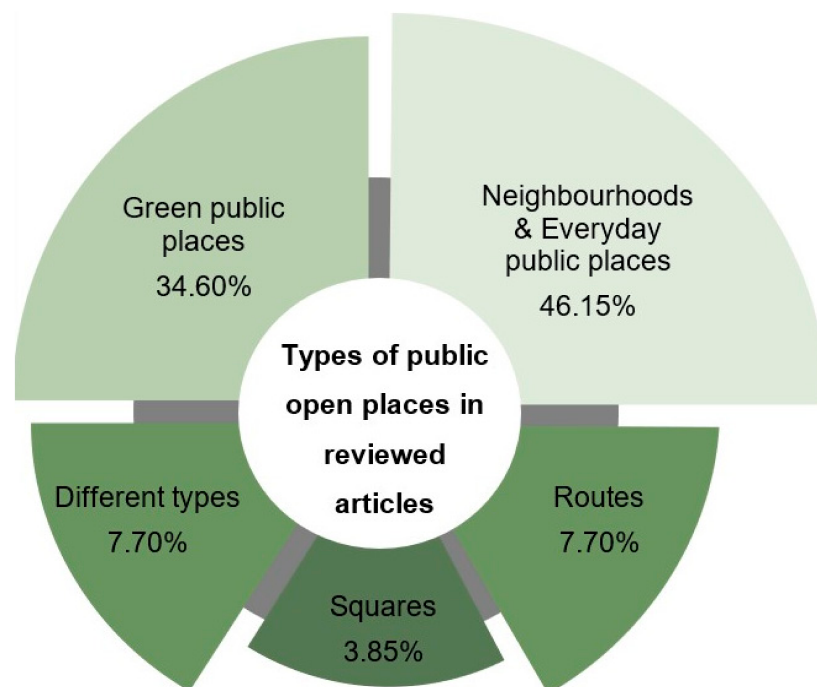


Figure 4. Types of public open spaces in reviewed articles.

Figure 5 shows examples of public open spaces that have been investigated in reviewed articles:



Figure 5. Examples of evaluated public places in reviewed articles. (a) Cumhuriyet Square, Turkey [79]; (b) MacArthur Park, USA [1]; (c) Shazdeh Mahan Garden, Iran [4]; (d) Wilshire Neighbourhood, USA [75].

For almost half of the studies (12/26), these types of public open spaces were chosen due to their known positive effects on place attachment and belonging. For instance, seven articles chose natural environments [57,58,60,70,73,74,80] since they affect social activities, leisure, well-being, and place attachment. Moreover, ten papers [62,63,66,68,69,71,75–77,81] studied public places in specific cities or neighbourhoods due to the availability of immigrants in these locations. Three articles [1,4,79] identified and studied public open spaces mainly used by immigrants. Refs. [1,79] used observations to understand who was using the public open spaces. Ref. [79] referred to observation but did not clarify it in the methodology. Moreover, ref. [4] used theoretical sampling and selected immigrants who stayed in the host country for more than five years. Thus, in the sampling, immigrants who were more familiar with the public open spaces and had various opinions were selected. Only one article [67] selected specific public open spaces (routes) because of the applied method. Ref. [67] chose walking interviews as a methodology and then selected two or three routes to develop the method.

3.4. Research Methods

The research questions and methods are gathered in Table 2 in order of the newest articles to the oldest. Most of the reviewed articles (22/26) used qualitative methods, and more than half (13/22) used a single qualitative method, whereas others (9/22) combined several qualitative methods. Other reviewed papers included two mixed methods articles [73,80], one quantitative article [79], and one literature review [60].

Table 2. Cont.

Articles (Newest–Oldest)	Research Question	Interview	Walking/Photo Voice	Literature Review	Questionnaire	Taking Picture	Drawing	Observation	Cognitive Mapping	Focus Group	Probe
[58] 2017	What is the role of leisure in natural settings (city parks, forest preserves, and gardens) in improving immigrants' adaptation, focusing on interracial/interethnic interactions?	✓									
[57] 2016	How does using natural environments for leisure contribute to developing a sense of belonging among immigrants?	✓									
[67] 2015	How might 'nonlocal' students interpret their sense of place to pre-determined fluid routes within their term-time location?	✓	Walking								
[72] 2015	How does a group of immigrants living in sociocultural invisibility conditions distinguish their daily ways of belonging and emotional processes that combine their present and past senses of self?	✓									
[69] 2013	How are familiar and strange aspects of the everyday local environment for immigrants in the first steps of settlement? What are forms of remembering stimulated by the embodied qualities of using outdoor places? How are emotional dimensions of place attachment developed by experiencing different outdoor places at a neighbourhood and city scale?		✓	Walking voice							
[1] 2013	What are the meanings of urban public spaces (a park) in a context that received less attention?	✓	On site				✓		✓		
[68] 2012	How much familiarity and participation in the public realm improve the place attachment after immigration? What is the relationship between transnational identities and engagement with various urban localities?	✓	✓	Walking voice							
[65] 2011	What are Spanish immigrants' emotional attachments and everyday life experiences in places in Switzerland?	✓									
[59] 2010	How do children from different immigration backgrounds improve their local belongings in large Western European cities? (I.e., their route from home to school and their neighbourhoods)				✓					✓	
[73] 2010	Can social interaction promote social cohesion by looking at the use of public spaces (urban parks) and the specific characteristics of the interactions in these spaces? Which urban parks improve social cohesion, and how may social interaction and place attachment contribute to social cohesion?	✓	On site		✓			✓			
[63] 2005	How do Turkish immigrants create belonging to public places in a neighbourhood in a German city?	✓									

✓ shows the applied methods in each article.

Table 2 also shows the categorization of methods based on verbal (blue) and pictorial (orange) measurements divided by [12]. Ref. [12] classified in-depth interviews, think-aloud protocols, verbal reports, sets of sentences with different meanings rated by participants, and free association tasks as verbal methods, and taking photographs and drawing as pictorial methods. In addition, based on the classifications in [12], this review also considered on-site interviews (e.g., [1,4,62,73,78]), walking voices (e.g., [68,69]), photo voice (e.g., [77]), and walking interviews (e.g., [64]) as combined verbal and pictorial methods. Moreover, taking pictures (e.g., [1]), drawings (e.g., [70]), observation (e.g., [71]), probe (e.g., [80]), and cognitive mapping (e.g., [59]) mixed with verbal methods were also included in the

combined verbal and pictorial categories. Consequently, it was found that 10 articles used verbal method(s), and 15 combined verbal and pictorial ones. The literature review article was not considered in this classification.

Because place selection is suggested to improve place attachment [82,83] and recent articles such as [84] tried to apply methods in which participants select places that are attached to them, this aspect was also investigated. It was found that only four papers [59,65,75,81] used methods whereby immigrants chose public places. Specifically, ref. [81] applied an open-ended questionnaire and asked 293 participants (local and immigrant) to choose public places they are attached to and explain the reasons for their selection. In [65], 20 Spanish immigrants were interviewed and asked to select places with sentimental and symbolic meaning, as well as places used for their daily activities. Ref. [75] used cognitive mapping and interviews to ask 43 immigrants to draw the boundaries of their neighbourhood on a map and select cultural landmarks and social places on it. Ref. [59] also applied a cognitive mapping study and asked 233 immigrants to draw their routes from school to home on the map and then choose attractive things during the routes.

Since this research aims to distinguish methods that evaluate the effects of public open spaces on immigrants' place attachment, the research questions (Table 2) were analysed to understand how they referred to the effects of public open spaces. For instance, two questions [57,58] relate to the effects of leisure activities, while two [73,76] are about the effects of social activities in public open spaces. Another research question [4] referred to the effects of contemporary and historical parks on immigrants' place attachment. In two research questions [68,69], familiarity with public open spaces were evaluated, whereas in other research questions, the experience and use of public open spaces were mainly investigated. Overall, it shows that the research questions referred differently to the effects of public open spaces on immigrants' attachments.

Figure 6 shows the number and average of participants in the reviewed articles as well as the number of articles for each method. In this figure, methods that have only one article, such as prob, focus group, and photo voice, are not included because the average number of participants is not meaningful. Small vertical red lines show the number of participants for each article, while vertical black lines show the average number of participants for each method. More specifically, the average number of interviewed participants was around 30 in 15 articles. Closed-ended questionnaires were applied in three articles with the highest average number of participants (about 380). As a result, Figure 6 indicates that the number of participants varies according to the applied methods.

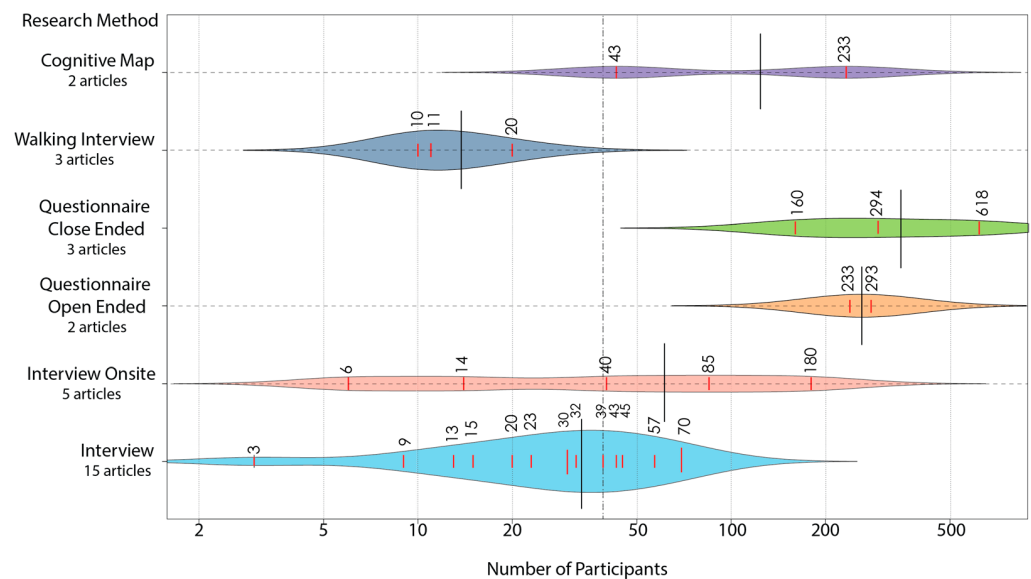


Figure 6. The number and the average of participants in the reviewed methods.

3.5. Place Attachment Evaluation

Table 3 shows the features and factors used in the reviewed articles to analyse immigrants’ place attachment against the reference framework (Figure 2). From the reviewed literature, it quickly became evident that some terms were important but not found in the framework. Therefore, these terms were added to Table 3 and explained to clarify their connection to the framework dimensions. For instance, this included ‘continuity’ [1,67] and ‘inclusion and exclusion’ [71,72]. ‘Continuity’ is the person–place relationship that links past and present behaviours. For instance, individuals can be attached to places with a similar climate to their origin [85]. Therefore, continuity can be like familiarity and lead to identity [1]. ‘Inclusion and exclusion’ experiences are related to social cohesion and affect social interactions [72], so they are considered in the social bond dimension.

Table 3. Place attachment evaluation of the reviewed articles.

Place Attachment Evaluation		Dimensions			
Article	Features and Factors	Place Dependence	Place Affect	Place Social Bond	Place Identity
[57]	1. History: historical connections to natural environments in: <ul style="list-style-type: none"> • Their countries (purpose and pattern of use, accessibility, memories). • Host countries (familiarity, length of residence, cultures in places, social facilities). 2. Place: different natural environments, distance, access, physical features (safety, cleanness, inviting, natural or artificial). 3. People: social interaction, safety, and crime experience (fear).	10	10	10	10
[86]	1. Distinctiveness: people being recognized by other people. 2. Continuity and memory: choose locations and activities like their countries. 3. Self-esteem: good and bad experiences of place (emotive value). 4. Self-efficacy: finding new places to visit and socializing in new public places.	0	10	10	10*
[4]	1. Place dependency: practical use, visual appreciation, tangible elements. 2. Place attachment: feelings and emotions, safety and privacy, individual preferences, social bonding, and gathering. 3. Place identity: memory and meaning, history (historical elements), familiarity.	10	10	10	10
[1]	1. Continuity/Discontinuity: places (not) like home country, meaningful places. 2. Community/Isolation: social meanings. 3. Restoration/Disturbance: physical elements lead to relaxation, distraction, amusement, entertainment, annoyance, disgust, and anger. 4. Safety/Insecurity: streetlight, fence, dangerous at night, crime. 5. Freedom/Unity: feel free, relax, gender restrictions, and prohibited activities.	10	10	10	10
[74]	1. Sanctuary and solace 2. Experiences of themselves: responsible men 3. Sovereignty and sociability of male 4. Belonging and feeling at home (identity) 5. An emergent civic culture: community, develop their skills 6. Referred to facilities and tangible elements	5	10	10	10*
[81]	Immigrants’ reasons for place attachment: 1. Location of the family home, childhood memories, a venue for family holidays, and recreational activities. 2. Familiarity, a significant life event, a symbol of homecoming. 3. Built environment, historical significance, aboriginal cultural connection, association with the community, cultural significance, beauty, spirituality, and nature connection.	5	5	5	5*

Table 3. *Cont.*

Article	Place Attachment Evaluation	Dimensions			
	Features and Factors	Place Dependence	Place Affect	Place Social Bond	Place Identity
[78]	1. A longing for freedom and simplicity: A less materialistic place. <ul style="list-style-type: none"> • A place connected to belief and religion. • A restorative place for a family gathering (e.g., deserts). 2. Places like the home country: memory of home country with same physical elements (e.g., trees, water, and sky), emotional connection. 3. Viewpoints of loss: places create memories of loss and longing (e.g., historical places and activities that happen in places). 4. Physical elements	5	10 *	10	10 *
[68]	1. Familiarisation and participation: develop knowledge of the place, interactions, and identity. 2. Providing a social position and self-identity 3. Interaction or escape: socialize, feel safe, warm, and relaxed. 4. Movement provides alternatives: opportunities and adventures, socializing, self-identity, feeling stress, better facilities, and less crime.	10	10 *	10 * *	10 * *
[69]	1. Recollection and normality: familiarisation (places and landmarks like their countries), making memories. 2. Social interactions and embodied experiences: connections, relaxation, identity, and expression of spirituality. 3. Time passing and place attachment: opinions about staying or leaving places, emotions changed to the places, shaped memories of places, experience different places.	0	10 *	10	10 *
[58]	1. Psychological adaptation: <ul style="list-style-type: none"> • Improving psychological and emotional well-being. • Strengthening feelings of attachment to local places. • Increasing social bonds, building memories and family traditions. 2. Socio-cultural adaptation: <ul style="list-style-type: none"> • Acquiring cultural knowledge and skills. • Providing interethnic/interracial interactions. 	0	10 *	10 *	10 *
[70]	1. Engagement with the weather: sensory responses. 2. Care and nature: transnational (sometimes nostalgic) practices. 3. Transnational identities and nature relations 4. Social context	0	10	5	10 *
[76]	1. Sense of inclusion and exclusion in public places 2. Emotion: feel welcoming.	0	5	10	0
[59]	1. Landmarks and cultural symbols 2. Places of fear and neglect or social bonding and play 3. Segregated urban structures and children’s networks and activities: access, facilities, and social networks. 4. The imagined ‘homeland’ and nostalgic places	10	10	10	10
[77]	1. Comfortable places: <ul style="list-style-type: none"> • Settlement Service Provider Organizations: services and needs • Religious Organizations: spiritual support, material help, feeling at home (relaxed), and social bonding. • Learning places: interactions, services, social place. • Restorative spaces: peaceful places, resting and decreased stress, and relaxation. 2. Uncomfortable places: <ul style="list-style-type: none"> • Winter condition: mobility problems and fear of driving. • Unsafe place and fear of crime. 	10 * *	10 * *	10 *	5 *

Table 3. Cont.

Article	Place Attachment Evaluation Features and Factors	Dimensions			
		Place Dependence	Place Affect	Place Social Bond	Place Identity
[72]	Making self-identification: 1. Places for religious groups (church). 2. The experiences of inclusion and exclusion. Memories in places. 3. Lack of places for celebrations and cultural events. 4. Places lead to emotional bonds.	10	10	10	10 *
[65]	An emotional approach to place: 1. Place of identification: with symbolic power and experienced emotional moments, connected to memories, meaningful and favourite places. 2. Place of daily actions: living, working, socializing.	0	10 *	10	10
[71]	1. Belonging to society (politics): • Seeking belonging: identity. • Being granted belonging: the feeling of exclusion and discomfort, and social differentiation. 2. Belonging to place: feel at home (identity), have memories, social inclusion and exclusion, self-esteem, and self-efficacy.	0	10	10	10 *
[75]	1. Cultural assets and cultural traditions, festivals, and the symbolics of place identity. 2. Socializing places and social cohesion in the neighbourhood	0	0	10	10
[64]	1. Social interactions in transitory spaces: social ties refer to emotion. 2. Social interaction in the third space: inclusion and exclusion (socially and economically), refer to emotion and feelings. 3. Create a sense of belonging in a new place: make their places and memories, go to places like their home country (e.g., Turkish markets), and feel at home (identity, remembering).	0	5 *	10 *	10
[66]	Social identity: 1. Language skills 2. Gender tension 3. Importance of belonging: feel at home (familiarity), comfort, security, and social connections, expressing themselves in the neighbourhood (e.g., speech, dressing, and behaviour).	0	10	10 * *	10
[63]	1. Consumption tie: e.g., main shopping streets with shops from their country, feel excluded from other markets in the host country. 2. Belonging to the religious community: e.g., mosque. 3. Belonging to social places where immigrants of the same nationality go: e.g., teahouses in the neighbourhood. 4. Change facades and make them for their own culture: e.g., adding satellite dishes to see Turkish TVs. 5. Make their own home and neighbourhood: e.g., buy houses, feel safe, and feel comfortable.	10	5	10 *	10 *
[62]	Social integration: 1. Social (and emotional): social contact, inter-ethnic friendships, partnerships, participation in social organizations, intermarriage, and emotional and spiritual ties. 2. Cultural: a sense of belonging, language skills, formation of identity, attitude to the rules and values of the host society, and media use. 3. Economic: income and employment, new economic activities. 4. Political: participation in power and election. 5. Structural (socio-economic): health, housing, income level, social access, educational attainment, and involvement in the labour market.	10	10	10 *	10
[80]	1. Nature experience: social, emotional, normative (refer to needs). 2. Integration: interactive, identificational, cognitive.	10	10	10 *	10

Table 3. Cont.

Article	Place Attachment Evaluation Features and Factors	Dimensions			
		Place Dependence	Place Affect	Place Social Bond	Place Identity
[73]	Social cohesion: 1. Intention of activities and social interactions, the meaning of behaviour, and perspectives on other ethnic groups. 2. Referred to feelings: comfortable, acceptance, feeling at home (relaxed).	0	5	10	0
[79]	1. Frequency and duration of use. 2. Activities and preferences: sitting, resting, meeting, getting information, ceremony, watching, listening to music, reading, taking photos, riding a bike, skating, and stand-date. 3. Opinions of users: represent history, socializing, use easily, presence of foreigners, activities, and accessories.	10 * *	10	10	0
[60]	1. Structural integration: access to nature and recreational activities, physiological well-being, stress relief, and feeling comfortable. 2. Cultural integration 3. Interactive integration: social interactions. 4. Identificational integration: a sense of nostalgia.	10	10	10	10
Ranking of each dimension of place attachment by the compilation of points for the reviewed literature		135	225	250	220

* shows additional features and factors that can be categorized in the same dimension.

Some features could be categorized into different dimensions, so it was essential to review the context in which the feature is used to classify it correctly. For example, 'feel at home' can sometimes be interpreted as 'place identity' [64,74] or as 'place affect' [73,77].

Finally, Table 3 indicates that place social bond is the most mentioned and analysed dimension (250 points) for evaluating immigrants' place attachment in public open spaces, whereas place dependence (135 points) ranked last. There were similar ratings for place affective and identity dimensions, with 225 and 220 points, respectively.

Similarities and convergence can be determined by evaluating the features and factors associated with all articles. Physical and tangible elements, and facilities of public places are repeated features for describing place dependence in articles. Table 3 shows that common factors and features regarding place affect are emotional bonds, feeling safe, comfortable, and relaxation. Articles that evaluated place social bonds mostly referred to social interactions, gatherings and events, and social inclusion and exclusion. As for place identity, common features and factors include familiarity, memories, and feeling at home.

This research focused on similarities and convergence, as shown in Table 3. However, from the analysis, the essential differences between public place descriptions regard the focus on tangible or intangible elements. For example, 35% of articles were more concerned with social features (e.g., [66]), 23% with emotional (e.g., [65]), 23% with place identity (e.g., [72]), and 19% with tangible elements (e.g., [80]). In the latter category, articles predominantly looked at the historical elements and greenery in public places.

3.6. Architectural Practices and Benefits

Two main findings can benefit architectural practices:

- The first regards improving public place design, thanks to the tangible elements revealed through these studies. This research revealed that some studies (e.g., [1,70]) employed visual methods such as taking photos and making drawings to understand tangible elements.
- The second benefit concerns the creation of user-centred and inclusive public places since most of these methods analyse immigrants' needs and activities to create inclu-

sive public places and increase their place attachment. Architects and urban designers may benefit from this knowledge to extract design guidelines and recommendations for inclusive and user-centred public places.

4. Discussion

4.1. Gaps, Advantages, and Disadvantages

In this study, we have reviewed the literature on public open spaces and immigrants' place attachment. There were two aims: firstly, to analyse methods used to understand public open spaces' effects on immigrants' attachment; secondly, to discover how immigrants' place attachments were evaluated in these places. The review included 26 articles, of which 22 used qualitative methods. This predominance could be explained by the fact that qualitative methods do not focus on the pre-set meaning provided by researchers but rather pay attention to participants' perceptions and interpret complicated relationships between factors instead of discovering statistical relationships [87].

Additionally, most of the reviewed research questions focused on evaluating immigrants' use, activities, and experiences of places to understand the effect of public open spaces on immigrants' attachment. These experiences provide meanings for places, and qualitative methods help to extract these meanings [12]. Ref. [88] also emphasized that qualitative methods are the best way to gather a person's unique experiences and perceptions. However, the findings from the qualitative interpretive methods cannot be generalized to a larger population [57]. Additionally, one problem of qualitative methods is that researchers' knowledge and background affect the research process and outcomes, and this problem is known as reflexivity [89,90].

Among the reviewed articles, only one article used a quantitative method, possibly because most researchers, such as [91], believe place attachment cannot be measured. Despite this, several studies [82,92–94] argue that measuring place attachment is possible and valuable. Generally, refs. [11,95] mentioned that most quantitative procedures used questionnaires and defined scales for measuring place attachment. For example, refs. [42,83,96,97] determined scales for the measurement of place attachment. However, there is diversity in the proposed scales for measuring place attachment as the same concept, so [11,95] considered it a validity problem of the measurement.

Moreover, two articles used mixed methods. Ref. [57] suggested that future studies on place attachment would benefit from mixed methods because qualitative methods consider a high amount of interpretation which is one of their limitations. Moreover, quantitative methods could only differentiate people based on the importance and strength of attachment to places and are not suitable for discovering the places' meaning [12]. Therefore, quantitative and qualitative methods for measuring place attachment can be complementary, and if combined, they could discover different aspects of place attachment. It is consistent with previous studies [98,99] suggesting that mixed methods provide a deeper understanding of place attachment and overcome the limitation of solely quantitative and qualitative methods.

Furthermore, among the reviewed literature, 10 articles applied verbal methods, and 15 articles combined verbal and pictorial methods. Compared to verbal methods, the combined verbal and pictorial methods have the advantage that participants can visually remember more features and factors of public open spaces. This advantage is also supported by previous studies on place attachment with combined verbal and pictorial methods such as walking voice and interviews [100,101], photovoice [102,103], and map surveys [104].

On the other hand, some of these combined verbal and visual methods have some limitations. In the case of walking interviews, many people cannot participate in mobility activities, and the number of participants would decrease. For example, among the reviewed literature, refs. [67–69,74] applied walking interviews and voices, and the number of participants was, respectively, 20, 10, 11, and 11. This finding is in line with other papers [100,105] on place attachment that implemented walking interviews. They also indicated that participants who cannot walk would be excluded from walking interviews.

Another limitation is related to taking photos and photovoice methods. Interviews are conducted after taking pictures, as visual experience and interviews cannot be conducted simultaneously, and consequently, some information may be missed. It is also possible that some participants dislike taking photos [106]. These problems should be overcome when studies combine visual and verbal methods in the future.

The selection and definition of case studies (public open spaces) and samples (participants) play a significant role in the methodologies. Some authors believe public open spaces should not be broadly defined and evaluated, and case studies should be on similar scales. For example, ref. [58] indicated that their research limitation relates to broadly defined natural environments, including various settings (e.g., parks, forests, and gardens). Ref. [77] also studied everyday places, including various places and experiences; thus, they considered this variety a limitation.

Regarding types of public open spaces, as case studies in reviewed articles, there is only 1 article about squares, while there are 9 on green places and 12 on neighbourhoods and everyday public places. Moreover, there is no research on the effects of public open spaces such as plazas, public beaches, rivers, and lakes on immigrants' attachments. Accordingly, reviewed articles do not show a diversity of types of public open spaces. In addition, only four studies [59,65,75,81] asked immigrants to select public open spaces to which they are attached. Therefore, most of these public open spaces are selected by authors, and perhaps if participants selected them, there would be more diversity. This assumption is in accordance with a previous study [107] that applied place selection for evaluating place attachment and indicated that participants selected different places. This finding also clearly indicates that most studies do not consider empowering their participants with decision-making regarding the investigated places. At a time of promoting climate responsive urban planning and design to increase public health and well-being in public open spaces [108], it seems quite surprising.

Furthermore, ref. [109] argued that to design meaningful places, architects should emphasise human values. Immigrants have different cultural values that can lead to selecting different public open spaces. Therefore, a method could specifically choose that immigrants select public open spaces and mention their reasons for selection to distinguish their values. In the four articles mentioned, open-ended questions and cognitive mapping were used to ask immigrants to select the places. Thus, it seems that these methods provide freedom for participants in the selection, and if the methods are visual, participants can easily remember places.

Regarding samples, most articles (19/26) evaluated immigrants from various origins and cultures in public places. Culture connects people to places through values, symbols, and shared historical experiences [44]. However, these studies did not consider the effects of cultural differences on immigrants' purpose and pattern of use, experiences, amount of place attachment in public open spaces, and place selection. Four articles about immigrants from different nationalities [57,77,80] briefly referred to similarities and differences in immigrants' feelings, belonging, and opinions about public open spaces. Therefore, no holistic research provides a method to compare and categorize immigrants' place attachment and experiences in public open spaces based on their nationalities. This finding clearly indicates a gap that needs to be urgently addressed.

Moreover, the limitations of some papers are related to their sampling size, as mentioned by [77]. Another sampling limitation is the one selected by [81], who excluded illiterate participants; however, the research was on immigrants and local people in Tasmania, and it may be that the opinions of illiterate respondents can also be influential. Ref. [68] referred to participants' poor verbal English as a research limitation because participants with poor English language cannot clearly describe their opinions. Ref. [80] worked on immigrants' place attachment in natural places and used self-selecting participants; thus, most immigrants interested in nature participated in the research, which can cause bias in results. Overall, these findings regarding sampling criteria question the ultimate outcome of the research: whom will

it benefit? It seems incongruent not to use a translator if immigrants are being investigated and if the overall aim is to contribute to increasing their place attachment.

Regarding place attachment evaluation, all reviewed studies considered a framework. A similar conclusion was reached by [11], which evaluated place attachment studies in general (no focus on immigrants) and emphasized the need for defining a framework. However, one finding that emerged is the discrepancy regarding the level of comprehensiveness to investigate place attachment. Some articles restricted their investigation to only one dimension for immigrants' place attachment (e.g., [76]), while others were multi-dimensional. This result is consistent with previous non-immigrant-focused studies on place attachment that some consider one-dimensional (e.g., [6,56,110]) while others consider multi-dimensional (e.g., [40,42,111]). Again, in terms of outcomes, it would be interesting to evaluate which studies are more efficient and/or beneficial. For example, in this study, the reviewed literature mainly evaluated immigrants' social bonds in public open spaces. It would also be essential to understand and compare which dimensions of place attachment are the most important for immigrants, according to their cultures and nationalities, and which features and factors of public open spaces may contribute to that attachment. Several articles have already shown the benefits of such studies [112]; however, these types of questions were not evaluated in the reviewed articles.

The result of this research can be used to develop the study subject in cross-disciplinary fields. Some related disciplines are urban planning and design, environmental psychology, human geography, and public health. The result of this study fosters collaboration among researchers, architects, urban designers, policymakers, and community members. Moreover, thanks to the study, we can develop a new mixed method to avoid pitfalls identified in the previous methods.

In order to improve urban design policies, urban designers and policymakers can benefit from the results of this research. This inquiry is clarified by the following reasons:

- This research refers to immigrants' needs and activities in public places, which can help urban designers and policymakers in understanding the needs and aspirations of communities.
- The tangible features of public places which lead to immigrants' place attachment are mentioned in Table 3. These features can provide design guidelines to shape urban design policies.
- This study will inform urban designers and policymakers aiming to increase social interaction and inclusion in public spaces. Table 3 shows that immigrants' place attachment will be increased due to features and factors that support social interactions in public places.
- Many of the reviewed articles referred to the effects of green public places on immigrants' place attachment. The research can contribute to urban design policies that promote sustainability in public places.

The value of the findings in the research is that they suggest novel methods to analyse the effects of public places on immigrants' place attachment. Moreover, the findings are worthwhile because they show which features and factors of public open places (tangible and intangible) are significant for improving immigrants' place attachment.

4.2. Direction for Future Research

New methods are suggested in this section to fill research gaps and solve some issues evidenced in this review.

Firstly, it is worth noting that the gap relating to place selection and place attachment not only pertains to immigrants and public places. So, other papers about place selection and attachment were also reviewed to find other methods that had been implemented. For example, ref. [84] identified boundaries of landholders' place attachment and valuable places in a region in South Australia. Participants were asked to select the boundary of their place attachment and the places that are valuable to them on an online map. This method for gathering and using non-expert spatial data for different applications primarily

related to land use planning is called 'Public Participation Geographic Information Systems' (PPGIS) and was introduced in 1996 [113]. One advantage of the PPGIS is that participants can select any public open spaces (e.g., streets, parks, squares, plazas, beaches) to which they are attached. The online map also visually helps immigrants to remember and find places more easily. Ref. [113] mentioned that this method is an up-to-date cognitive map and allows participants to select known but not frequently visited places. Unlike open-ended questionnaires, online maps qualify participants to select places without names. The disadvantage of this method is that participants' selections can be on any scale; for instance, they can be on the scale of neighbourhoods or cities.

Addressing the disadvantages of the combined verbal and pictorial methods, as discussed previously, we found two new methods of interest. One is videos of simulated walking that contain sound and reproduce the movement of walking; they look realistic, which is their advantage [114]. The videos are shot with a camera (e.g., GoPro), and the duration, time, and day of recording (weekday or weekend) and the weather conditions at the time of recording (cloudy or sunny) are consistent throughout all movies. To our knowledge, this method has not been used for place attachment studies but for other research areas, such as the effects of urban walking on psychological well-being [114] and the effects of the natural environments on levels of stress and attention fatigue [115].

The second method concerns Virtual Reality (VR) technology. VR is defined by [116] as "the use of the computer-generated 3D environment that the user can navigate and interact with, resulting in real-time simulation of one or more of the user's five senses". VR technology has been integrated into computers, smartphones, and tablets because of improvements in information communication technologies and new media, resulting in highly engaging user experiences [117]. A VR platform applies a 360-degree view of environments and attracts users' attention to interact with the provided virtual environment. Not much research evaluated participants' place attachment in virtual environments; those that did [117,118] focused on the effects of VR on tourists' place attachment. These studies concluded that VR has a positive effect on improving place attachment.

The advantage of these two visual methods is that they can be combined with verbal methods such as interviews. When participants are watching the videos or experiencing the VR platforms of the public open spaces, they can be simultaneously interviewed to extract the place's features and factors that affect their place attachment. Furthermore, these two methods do not exclude people who cannot walk, as there is no need for mobility.

The literature review in this article was conducted in English; however, several advantages can be derived from conducting one in other languages [119,120]. Future studies can conduct multilingual literature reviews.

- Firstly, it can access a wider range of perspective on place attachment and public places. Users from different cultures and regions that have different languages may have unique theories, concepts, and approaches to discover the relationships between users and their built environments.
- Secondly, it enables comparisons between different cultures and geographical contexts in order to distinguish similarities and differences in public places factors influencing place attachment.
- Finally, it may offer new research methodologies and data collection techniques applied in studies conducted in other languages.

5. Conclusions

This research firstly indicated that understanding the effects of public open spaces on immigrants' place attachment is significant. Moreover, there are differences in the conceptualization of place attachment, so the choice of methodology for evaluating place attachment is an essential issue. A systematic literature review was conducted on methods because there is no holistic research on the applied methods in articles relating to the effects of public open spaces on immigrants' attachment. Additionally, it is not clear how articles evaluate immigrants' attachment to public open spaces.

Most reviewed articles were conducted in Europe and on immigrants from different nationalities. However, these studies did not compare immigrants' place attachment based on their different cultures and nationalities. The reviewed articles evaluated immigrants' place attachment mainly based on their social bonds in public open spaces. In the articles, there is no diversity regarding the types of public open spaces, and authors mainly select these places. Primarily qualitative and verbal methods are applied to evaluate immigrants' place attachment in public open spaces; however, it is suggested that future studies use mixed methods with a combination of verbal and pictorial measurements for this kind of human–environment interaction.

Many studies investigated the effects of places on peoples' place attachment. However, our study indicated that there are still gaps in this field, and there are not many articles that evaluate immigrants' place attachment in public open spaces. It is time to define new methods to discover factors and features of public open spaces that affect immigrants' place attachment and then provide design guidelines for these places. Even more when Sustainable Development Goals target wellbeing, equity, and inclusiveness within our built environments.

Author Contributions: Conceptualization, M.G., K.D. and R.F.; methodology, M.G., K.D. and R.F.; software, M.G.; validation, M.G.; formal analysis, M.G.; investigation, M.G.; resources, M.G.; data curation, M.G., K.D. and R.F.; writing—original draft preparation, M.G.; writing—review and editing, M.G., K.D. and R.F.; visualization, M.G., K.D. and R.F.; supervision, M.G., K.D. and R.F.; project administration, M.G., K.D. and R.F.; funding acquisition, M.G. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding; a Ph.D. scholarship from Griffith University supported Marzieh Ghasemishkaftaki.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: The presented data in this article are available upon request from the corresponding author.

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

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