

Toward a Sense of Place Unified Conceptual Framework Based on a Narrative Review: A Way of Feeding Place-Based GIS

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Abstract: Space and place are two of the main concepts in several fields of knowledge, such as human geography, environmental psychology, urban sociology, architecture, urban planning, and others. Space is an objective and structured concept. It is mainly a physical location characterized by measured dimensions and geographical coordinates, while place is a location that holds meaning and value for an individual or a group, created through the human experience and social interactions. Sense of place is thus a set of precepted meanings and attitudinal ties toward a place (conative, affective, and cognitive bonds). From a geospatial perspective, the subjective aspect of sense of place is difficult to depict in a cartographic projection. From this angle, Place-Based Geographic Information Systems represent a set of initiatives that attempt to combine the objectivity of spaces and the subjectivity of places in digital systems, and that integrate spatial semantic characteristics as described by places' users. In this paper, the methodological approach is mainly based on a systematic analysis and search of the scientific literature. It is a narrative review inspired and based on a scoping review strategy following the JBI methodology and the PRISMA-ScR (Preferred Reporting Items for Systematic Reviews and Meta-Analysis Extension for Scoping Reviews) checklist. This bibliographic analysis is about understanding the characterization and the components of sense of place. Results take the form of a synthesis of the conceptual approaches most prominent in the literature, in addition to a conceptual model encompassing the full conceptual specificities of the sense of place concept.

Keywords: sense of place; place-based GIS; placemaking; place identity; perception; attitude; place attachment



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1. Introduction

Spatial notions are one of the important topics in human and social sciences that help to describe complex environmental and social phenomena. Among these notions, space and place, with their particularities that distinguish each of these concepts [1], are probably the most important ones in human geography, environmental psychology, and urban planning, as well as in information science [2,3].

Space can be described as a physical entity or a location, with dimensions that can be measured and geographical coordinates through which it can be located. It can be cartographically or schematically represented [4]. Space is characterized by a structured and objective aspect, which lacks some human or social value. It is sometimes a more abstract

concept in human consciousness, such as a neighborhood that is administratively identified by invisible boundaries that can cross physical entities with more discernible shapes and boundaries [2]. On the other hand, place is a location that holds meaning. It is created by human experiences and social interactions when the physical attributes, psychological perceptions, and social practices are combined to impart value to this location [4].

Space becomes a place when we become more knowledgeable about it; therefore, when we start listening, thinking, and talking about it. Places are also destinations where people can satisfy their needs [5]. Yi-Fu Tuan considers that space promotes movement and openness, while a place exists in intervals of pause and stability [6,7]. Thus, a space can become a place when we remain static and survey the scene; in this view, place is primarily a concept of stillness [7]. Each of these intervals of stability constitutes a potential transformation of space into place [6,7]. Human life is an alternation between movement and stillness; and therefore, it requires both spaces and places [6].

The sense of place (SOP) is the subjective meaning that a person or group imputes to a geographic place [8–10]. Further, it is a multidimensional concept that describes the emotional and behavioral connection between individuals and their natural or constructed environments [11–15], to understand the characteristics and values of these environments [11], and learn about the relationship that exists between people and places [10,14,16]. This relationship can be positive or negative, weak or strong [14]. One example of SOP is “*Topophilia*”, translated as “*love of place*”. It is a new term and is largely defined by Tuan [17] as a person’s emotional connection to the physical space. According to Tuan [17], the concept of “*Topophilia*” is complex, as it varies between sensational appreciation, familiarity, and belonging to the environment.

Another term related to SOP is “*Genius Loci*” or “*Spirit of place*”. It has been used by Romans when associating the names of gods with some specific places. Each of these places derives its distinct identity from sacred beliefs [18]. SOP and spirit of place both refer to the process of creating links between places and people [19]. From the architectural angle, Norberg-Schulz used the term “*Genius Loci*” to explain the importance of considering the human dimension in the architectural vision. He sees that architecture is the projection of the “*Genius Loci*” while creating meaningful places that ensure human well-being. According to him, three components feed the formalization of the “*Genius Loci*” concept: natural spaces, man-made spaces, and the people inhabiting those spaces [20].

Edward Relph [18] tried to differentiate the two concepts: “*Genius Loci*” and SOP. According to him, “*Genius Loci*” is the set of distinctive qualities of a place that give it a specific character, while SOP is the ability to feel and perceive this characteristic feature. In other words, “*spirit of place*” reflects the reality as experienced by the person experiencing the place (radiation from the place to the person), while SOP refers to a sensitivity to a physical environment (radiation from the person to the place). In this context, a strong “*Genius Loci*” necessarily produces a strong SOP [18,21]. Each of these two concepts, with all their similarities and differences, represents a phenomenon generated by subjective human experiences [10,21] and is therefore part of the phenomenology of place [20]. Norberg-Schulz and Relph associate the notion of phenomenology with architecture. Architectural phenomenology helps architects to interpret the urban context as a perceptible phenomenon, to create affective links with places, which favors spatial practices and human experiences, rather than the realization of an architectural idea neglecting the social dimension [18,20].

For urban planners, SOP plays a pivotal role in the economic and social development of urban settings. They see the SOP as a powerful tool that helps to form a comprehensive picture of the places lived and practiced by urban communities and the social ties built up with these places. Thus, they consider that the SOP is a way of anticipating the community reaction to changes in urban planning [22]. Relph [23] also spoke of the authenticity of a

place, which is realized through the originality of the meanings and human experiences of that place, and therefore realizes the originality of identity. Conversely, the stereotypical standardization of both spatial and functional characteristics, which is generated by modernization and geographical mobility, gradually hides the authentic meaning of place [10], which is called by Relph “Placelessness” [24,25]. The “Placelessness” is the antithesis of place and is characterized by uniformity, mass production, isolation from context, and ignorance of the past [25]. The “Insideness/Outsideness” model is created by Relph [26] in order to study and measure the SOP. “Insideness” for a person indicates that he or she feels safe, enclosed, protected, comfortable, etc. In short, he or she feels at home [24,26]. “Insideness” reflects the degree of belonging [10], attachment, and involvement of an individual or group in a place [25,26]. This will necessarily build a strong community identity [24,26]. On the other hand, “Outsideness” can be presented as a feeling of estrangement, detachment, vulnerability, or strangeness [26]. In this case, people feel an experienced separation from their environment. It is the feeling that comes to us when we are new in a place, or when we are back to our usual place after a long absence [24]. In another situation, frequenting or staying in a place for a long time encourages knowledge, familiarization, and deep experience of that place. In this case, we can say that SOP is influenced by both time and distance [10].

The SOP helps us to know the difference between space and place, and understand the particularities of the places we live and experience [3]. In contrast to space, which is formally accurate and precise [3], and also consciously abstract [2], place is more ambiguous [3] and informal in terms of accuracy, but is tangible [2] to human consciousness. This characteristic makes place very useful for understanding how people and community are locally engaged, as well as very difficult to represent and analyze in a cartographic and GIS tool. The main aim of this paper is precisely to develop a sense of place unified framework (model) based on a narrative literature review, compatible with the perspective of integrating it into a place-based GIS application for analyzing the correlations between the sense of place and the lever of local community climate action (engagement).

The first section of the article is dedicated to introducing some spatial notions (theories and concepts), specifically the SOP one, and showing the necessity and the role of this concept in the understanding of the urban system with all its dimensions, especially the spatial and social ones. Special attention is given to the importance of these spatial notions and concepts in current developments in Geographic Information Systems. The second section presents the research questions and objectives of this paper. The third section is devoted to the methodological approach followed in this paper, which is mainly based on a methodological analysis of the scientific literature on the topic of SOP and its related aspects. This section contains the process and steps of selecting the literature included in this study. The results are analyzed in Section 4 and delivered in the form of the most usual conceptual approaches identified in the literature. Those results are synthesized by summary tables that serve as a basis for designing the proposed SOP unified model at the end of the section. Finally, the discussion and conclusion sections include the analysis of the results, their position in the set of previous studies, and their addition and scientific contribution.

2. Research Issues and Aims

In the field of Geographic Information Systems (GIS), space can be studied and represented through several geometric reference elements, including coordinates, distances, shapes, topology, and orientations, whereas place is characterized by semantic references (data and queries), including place names and descriptions [2,3,27]. Therefore, place is not easy to operate with GIS [2]. Typically, a GIS requires that incoming data be formalized, which creates great tension with the informality of the concept of place and its human

descriptions [28]. The challenge is to find ways and tools in GIS to be able to manage and accurately represent and geo-visualize SOP with all its semantic aspects.

Place-based GIS (PBGIS) is a set of initiatives that actually attempt to combine the objectivity of spaces and the subjectivity of places in digital systems that integrate spatial semantic characteristics as described by its users [27]. In a PBGIS, spatial cognition is an important tool to collect and process human informational and contextual data [2]. Among PBGIS initiatives, “*Digital Gazetteers*” are used to geographically attach digitized data to places [3]. These geographical entities are organized in the form of an attribute table of records containing the type of data, the location, and the name of the place, as well as a vocabulary and toponyms, controlled in the description of the registered element, automatically detectable and georeferenced through a “*Geoparsing*” process [28]. Given the importance of citizen participation in the decision-making process, particularly in urban planning, the production of bottom-up data has become an inescapable necessity. Acquiring these data makes it possible to maximize the number of participants, understand their preferences, and anticipate their behavior [29].

In the context of GIScience (Geographic Information Science), citizens use technologies to collect and disseminate information related to their places [29,30], and thus become geospatial data generators [29]. These multi-source and multi-origin data come from different computer systems such as Participatory GIS (PGIS), Public Participatory GIS (PPGIS), Volunteered Geographic Information (VGI), and Crowdsourcing and Big Data [2,31–34]. Those data originating from the participation of urban actors effectively contribute to the understanding and representation of the SOP, using different techniques, including PBGIS [2,33], which show the role played by GIScience in the management of urban mechanisms [34,35]. In the same way, PPGIS and VGI, as a part of GIScience, represent an alternative tool to support citizen participation and the decisional process, particularly in urban management [29]. In this context, communities become holders of competencies, especially the spatial ones, which are actively mobilized in and around urban places [30,34]. In this case, mobilized citizens often use mobile technology, such as smartphones, to contribute to the urban sensing infrastructure [29]. Furthermore, the engagement of connected urban actors represents an essential component of smart cities [30].

In this paper, we focus on the urban context, emphasizing the importance of the SOP concept in understanding urban dynamics. Therefore, the need to grasp the role played by the SOP leads us to question this concept, in a methodological way. In the scientific literature, many researchers introduce or integrate the SOP concept in their epistemological and experimental approaches, especially those illustrating case studies. However, there is a lack of specific analytical processes that should capture the composite concept of SOP in a more complete and unified way. In this perspective, the implementation of a research strategy, such as the literature review, consists of an effective alternative. This approach aims essentially to define a study process, especially exploratory, which serves to select and evaluate the existing studies in a critical way [36,37]. It is a process of systematic analysis around the concept of SOP. Consequently, this process represents a decisive element for which a rigorous review of the literature was conducted as a methodological approach in this article. In addition, this narrative review is inspired by the main approaches considered in a scoping review. This methodological inspiration is part of the synthesis of conclusive knowledge through the literature, which aims to systematically identify and map existing data [36,38–40] related to the conceptual characterization of SOP. The central aim of this narrative review is, therefore, to carry out a rigorous and thorough exploratory evaluation of the definition of SOP, its conceptualization, its components, and its related aspects. This exploratory process is based on the “scoping review guidance” and “Manual for Evidence Synthesis” of the JBI (Joanna Briggs Institute) [41].

In an exploratory review, the PCC (Population, Concept, and Context) strategy is recommended for elaborating and developing research questions [37,40] and establishing objectives and eligibility criteria [39]. For the purposes of this narrative review, and after analyzing and projecting the PCC strategy, we conducted our research through the human scientific literature, questioning spatial notions and human relationships with places (Population) to understand and define SOP (Concept) in an urban environment (Context). In this perspective, this study is structured around the three main research questions and a more prospective fourth one:

- (1) How are human relationships with places described through the literature?
- (2) How are SOP and its related concepts characterized?
- (3) How to analyze and summarize the studies sought in a unified overview?
- (4) How to operationalize the sense of place, in the form of a unified conceptual framework, which would be compatible with the requirements of a PBGIS?

The objective of this exploratory narrative study is to clarify the key definitions and determine the main characteristics [38,40] of the SOP concept. It consists of presenting an overview of spatial knowledge in the form of a synthesis of evidence [37,42] on the relationships of individuals (or groups) with their urban places. This study also attempts to explore different theories related to the SOP concept on the one hand, and to identify and fill the gaps in the existing scientific literature [39,43] about this research theme.

The main contribution of this study will be the proposal of an integral unified conceptual model of SOP, which encompasses most possible links and components of SOP and related concepts. This comprehensive SOP model will be exploited and integrated into a socio-spatial experience tool and will later contribute to the structuration of the data model of a place-based GIS (PBGIS). The importance of questioning the utility and significance of integrating SOP analysis into place-based GIS tools for scientific knowledge in general and for urban planning more specifically has been highlighted in the previous sections. This integration requires that the components of the SOP and its related concepts be formally identified, linked, and represented in a unified model. This characterization of the concept of SOP, the illustration of its importance as a spatial notion, and the exposition of its various components, links, and indicators, represent an integral part of the theoretical framework of the first author's research thesis, which focuses on the possibility of undertaking or considering the concept of SOP as a lever for the engagement of urban communities in climate action. Hence, the conceptual model proposed at the end of Section 4.4 of this article will serve as a basis for sketching and assembling a research survey used in the data collection phase within an urban community. These data are mainly related to the most significant places and links with people who use or practice them.

3. Methodology

The present study is a narrative review of the literature based on a systematic and methodological approach. It was first conducted from May 2022 to September 2022, and updated in 2024 following the first round of reviews. It is inspired and based on a scoping review strategy under the JBI methodology and the PRISMA-ScR (Preferred Reporting Items for Systematic Reviews and Meta-Analysis Extension for Scoping Reviews) checklist.

This methodological approach is a powerful tool for identifying references and scientific studies, as well as conducting a rigorous and thorough bibliographic analysis. This helps us to gain an understanding and characterization of the SOP concept and, therefore, achieve our research objective.

3.1. Search Strategy and Data Collection

The research strategy followed in this narrative review focuses primarily on the fields of knowledge of the humanities in a spatial context, such as human geography, urbanism, environmental psychology, and urban sociology. To search for specialized databases, we used the document exploration platform by discipline of study, provided by the Université Laval Library, with the support of our field librarian specialized in systematic reviews. The databases defined are GEOBASE (Engineering Village—Elsevier), Urban Studies Abstracts, PsycINFO (Ovid), and Sociological Abstracts (ProQuest), in addition to the multidisciplinary database Web of Science (WoS) and Google Scholar to complement the collected data.

The search step consists of formulating several keywords assembled in a personalized way in the advanced search bar of the databases in order to promote the quality of the results. The choice of keywords and combinations is carried out through the PCC strategy, as well as the results of preliminary research and previous knowledge around the concept of SOP. For data collection, the query launched is in the form of keyword assemblies that are spread over three lines of the search engine. The first level searches for the main concept “sense of place” in the “Title”, and groups it with its synonyms or related expressions (related concepts). These are different terms with different meanings, but all related to the idea of expressing a specific relationship between people and place. The second level has truncations related to the “Conceptualization”, “Characterization”, “Categorization”, and “Component”. It aims at selecting papers based on their research objectives (related to SOP and related concepts), like conceptualizing, characterizing, categorizing, or identifying the components of SOP. And the third level brings together the combination “conceptual model” and its equivalents. The keyword combinations are linked with the Boolean operator “OR”, while the search lines are tied with the operator “AND” (Table 1). The search stage consists of formulating several keywords assembled in a personalized way in the advanced search bar of the databases in order to promote the quality of the results. The choice of keywords and combinations is based on the PCC strategy, as well as the results of preliminary research and the previous knowledge of the SOP concept. For data collection, the query launched is in the form of keyword assemblies that are distributed over three lines in the search engine. The first level searches for the main concept “sense of place” in the “Title” level, and groups it with its synonyms or related expressions; The second level includes truncations related to “Conceptualization”, “Characterization”, “Categorization”, and “Component”; and the third level gathers the combination “conceptual model” with its equivalents. Keyword combinations are linked with the Boolean operator “OR”, while search lines are tied with the “AND” operator (Table 1).

Table 1. The terms entered in the search strategy.

Boolean Operator	Search Line	Combination	Targeted Part	Criterion/Reason
	Level 1	“sense of place” OR “place identity” OR “place attachment” OR “sense of belonging” OR “place perception”	Title	SOP is essential in this study; to ensure the presence of the conceptualization and the components of SOP and related concepts.
AND	Level 2	“concept*” OR “character*” OR “categor*” OR “component*”	Throughout the document	To achieve the research objective.
AND	Level 3	“conceptual model” OR “conceptual framework” OR “conceptual basis” OR “conceptual schem*” OR “theoretical model” OR “theoretical framework” OR “theoretical basis” OR “theoretical schem*”	Throughout the document	To achieve the research objective.

3.2. Studies Selection Criteria

Once the search questions have been formulated, the databases identified, and the keyword combinations structured, it is important to proceed with the sorting of the studies through the development of inclusion and exclusion criteria (Table 2).

Table 2. Inclusion and exclusion criteria for the studies selection process.

Criteria	Information Considered	Justification
Inclusion criteria		
Year of publication	All years.	For more results to consider.
Type of Study	No restrictions on document type.	The research topic of (SOP) is sufficiently addressed in English.
Language	English.	
Relevance	Presence of SOP characterization, aspects, and components; presence of a conceptual model.	Ensure the availability and quality of relevant information.
Exclusion criteria		
Duplicates	Duplicate documents.	Reduce the number of results to avoid procedural redundancies.
Peer review	Not peer reviewed.	Ensure credibility and quality of studies.
Accessibility	Full text is not available or not accessible.	Keep only studies available and ready for analysis.

3.3. Data Extraction and Analysis

After launching the database search engines, respecting the keyword compositions and search lines, the results pass through the language filter and peer review, without the need for restrictions on year or document type, to maximize the number of outputs.

An initial selection and identification process was carried out as part of this exploratory review. The studies found in the selected databases are subject to this review. The results obtained are organized using the PRISMA flowchart [44] in the form of a multi-phase sort (Figure 1). Citations are sorted and managed using the “EndNote 20” program.

The number of records identified from the databases is 322. These studies have already passed the language criterion (English) and the peer-review criterion. A total of 50 duplicate records are removed. Of the 272 records reviewed, 118 were eliminated after reading the title, and 84 after reading the abstract, due to irrelevance to or remoteness from the subject. And among 70 reports assessed for eligibility, 48 studies are excluded after reading the full text, as they are not focused on the conceptualization and characterization of SOP, and do not contain a theoretical model illustrating its components. This exclusion therefore amounts to a gap in the achievement of the research objectives or elements targeted by the questions in this review. Thus, the new studies included in the review are 22 studies. The study and analysis of these new findings reveal a lack of scientific knowledge on the theme of SOP and its conceptualization. To fill this gap, we were obliged to include additional studies. As a result, we decided to conduct research through scientific reference search platforms, such as the bibliographic search tool “Sofia” of Laval University. The new results include references (113 studies) from scientific databases and organizational websites, among others.

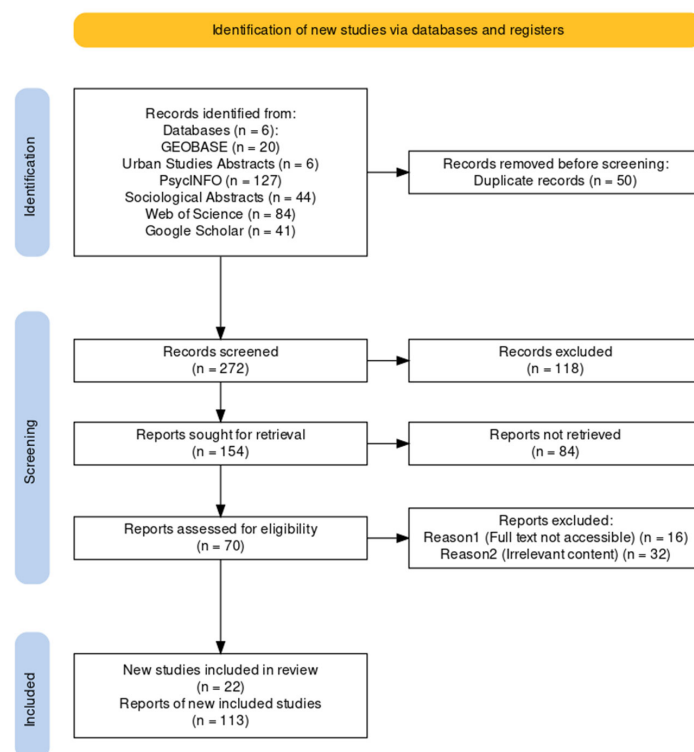


Figure 1. PRISMA diagram [44] demonstrating the study selection approach.

4. Results (Conceptual Approaches)

4.1. Sense of Place Forms (Approaches)

SOP is the subjective dimension of place-based approaches. It represents both the human perception of natural or built environments and the feeling, behavior, or cognitive imagination toward these environments. In other words, SOP is both a psychological and a physical phenomenon, and the links between people and their places are bidirectional [45].

Indeed, after analyzing the articles selected from this narrative review process, we found that the relationships existing between people and their living places can be distinguished into two types of approaches:

- Direction 1: From places to people;
- Direction 2: From people to places.

4.2. Sense of Place Forms: From Places to People (Direction 1)

The first type of approach is about the direction “from places to people” which contains the following (Table 3).

Table 3. Conceptual approaches of SOP (from places to people).

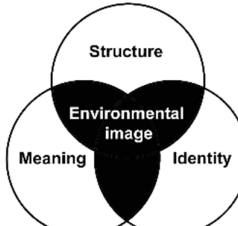
Conceptual Approach	Thinkers/Works	Conceptual Diagram/Components
Environmental image (urban image)	Kevin Lynch [46]	 [46]

Table 3. Cont.

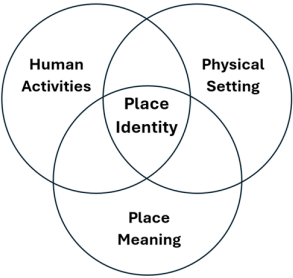
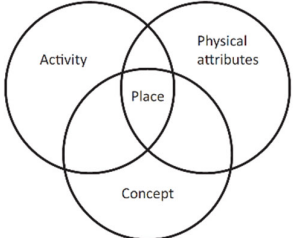
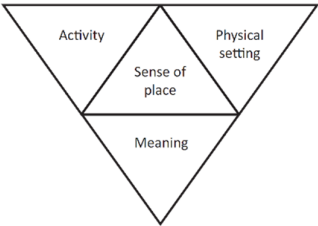
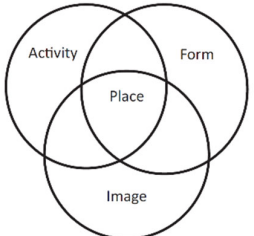
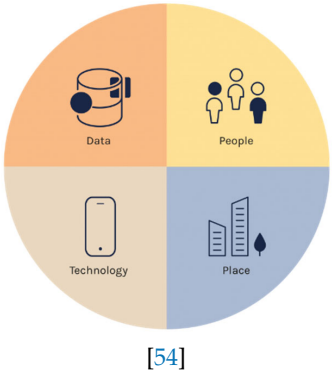
Conceptual Approach	Thinkers/Works	Conceptual Diagram/Components
Identity of place	Edward Relph [23]	 [23]
Nature of place	David Canter [47]	 [48]
Sense of urban place	John Punter [49] John Montgomery [50]	  [51]
Placemaking	Project for Public Spaces (PPS) [52]	 [53]

Table 3. Cont.

Conceptual Approach	Thinkers/Works	Conceptual Diagram/Components
Digital Placemaking	Jo Morrison (Calvium) [54]	

4.2.1. Environmental Image (Urban Image)

Kevin Lynch, in *The Image of the City* [46], defines the city as a large-scale architectural piece, built-in space, and perceived through long temporal intervals. Each citizen has been associated with a part of his city, through an image saturated with memories and meanings [46,55]. This part of the city is made up of both static physical and moving elements, such as people and activities. In this view, individuals are not considered as observers, but rather as integral parts of urban places [55]. In a system of location and orientation, the environmental image represents an excellent strategy through which an individual holds a mental image of his city or neighborhood. This image is produced both from immediate perception and memorized experiences [46,55,56]. Kevin Lynch [46] sees that the environmental image is the result of a two-way process between the observer and his environment. The environment proposes distinctive images, and the observer gives meaning to what he sees. Therefore, the environmental image can vary from one observer to another. It is composed of three elements always appearing together: 1—Identity (distinctive identification); 2—Structure (spatial and environmental relationship) and 3—Meaning (practical or emotional significance) [46].

In the same sphere, some thinkers see the urban image as a historical continuity of the city. Aldo Rossi, in his book *The Architecture of the City* [57], sees this urban image as the product of the collective memory associated with the city, based on historic places and urban artifacts [57,58]. In other words, the image of the city is shaped by historical urban components, such as buildings, monuments, and heritage sites, which embody collective memory and cultural traditions [58,59], and bear witness to the evolution of society. All these ingredients come together to create a meaningful urban image developed over time [58]. Rossi insists on the importance of preserving the historical and cultural aspects as an approach or way of thinking about the city. This approach, developed from collective memory, has become a cornerstone in the city's conceptual process. This has been expressed through the concept of the "Analogous City". According to Rossi, the idea behind this concept is that the urban project is an aggregation of architectures based essentially on personal and collective memories [60]. This accentuates the role of collective memory in architectural and urban design [59]. Rossi also reintroduced the classical concept of "Locus" [57] to emphasize that personal and collective memories become attached to the city to become its main attribute [57,58].

Collective memory is therefore influenced by several factors, such as the spatial context (objective aspect), human activities, and the identity and historical value of urban places (subjective aspect) [59]. From this perspective, the regeneration of these urban places is

therefore based largely on collective memory [60], while simultaneously developing a spatial identity, a meaningful image of place, a sense of community, a sense of belonging [59], a social identity, and other aspects. In short, a sense of place.

4.2.2. Identity of Place

From a heritage perspective, cultural heritage can take two different forms: 1—tangible or physical heritage, such as historic buildings and archeological sites; 2—intangible or movable heritage, illustrated primarily by traditions and customs [61]. According to Relph [23], this cultural heritage represents the foundation of place identity [23,61,62]. Therefore, this identity, in turn, can be divided into tangible spatial identity, and intangible communal identity [62]. In summary, the identity of a place is composed of three correlated and inseparable elements: 1—physical distinctive or formal appearance; 2—observable functions or activities; and 3—meanings or symbolic aspects [23,51,62]. The cultural mapping of this identity is a process of collecting and analyzing data, which informs about the following elements: physical characteristics, sociocultural activities, community interactions [61], and significant aspects of the place.

4.2.3. Nature of Place

Building on the theory of Relph [19,63,64], David Canter [47] created his model, which offers a reasonable view of the tangible and intangible components of a place [48,51]. In this model (Table 3), he considers the urban environment as an assemblage of places, created primarily [63] by the interference of activities (or actions), physical attributes, and conceptions (perceptual experiences and imaginations) [19,48,51,63–66]. Canter [47] proposes his model by emphasizing the importance of human cognitive processes in the understanding of places in their various aspects. Here, the cognitive map, through an exercise in spatial cognition, serves to represent how places and social interactions are perceived, designed, and structured in human thought [63].

4.2.4. Sense of Urban Place

At the city level, the place represents a fundamental component and notion that can serve as a working tool through which city professionals, such as planners and architects, can build databases to analyze the functionality of neighborhoods. Thus, the sense of urban place contributes to the establishment or enhancement of urban quality within these neighborhoods, through social construction [67] and human experiences within urban places [68]. Drawing on the work of Canter [47,69,70], and from an architectural and urban design perspective, John Punter [49] and John Montgomery [50] created a model consisting of the three aspects of SOP (Table 3). This model depends on physical form (spatial aspect), image (meaning), and activity [66,68,70,71] to enhance the identity of the place designers [51]. In this conceptual view, Punter and Montgomery see that the physical aspect of form is related to the spatial configuration of urban places [70]. In this case, the built setting, permeability, accessibility, and street furniture are considered as criteria for measuring the physical component [68,69].

The physical attributes of the urban place come together to construct this spatial form that is inherently fundamental to the genesis of an urban place. However, the presence of form is not sufficient, as in the architectural case, the quote related to modern architecture “*form follows function*” by the American architect Louis Henry Sullivan applies precisely in the context of urban space [68]. The aspect of meaning is related to the perception of people toward the changing formal and functional states of urban places [70]. The observable activities are related to the interactions between individuals in the places. As well as how these places are used by the communities to give distinct meaning to each urban place. The functional attribute encompasses a multitude of elements, such as land, mobility flows,

behavioral aspects, and sound effects [67]. Indeed, all these aspects influence and affect the sense of urban place [70].

4.2.5. Placemaking

Urban placemaking studies have considered public urban life and its complexities. They have demonstrated that it requires a certain composition of integrated elements and factors in urban design [72,73]. These integration interventions include social experiences and values within public spaces [73]. Social interactions allow users to claim the right to reshape public space collectively by creating a unique pattern of the appropriation or spatial rhythm of living with each type of interaction. This actively contributes to how public space is occupied and thus contributes to the process of placemaking, which is an ongoing process [72,74]. Placemaking is about creating meaningful experiences in meaningful places [72]. Placemaking is therefore a process of creating quality living places [75,76] with a strong SOP. Communities interactively mount their urban places through the process of placemaking and place-remaking. Here, SOP is an indelible component that feeds this process and helps people connect to places in creation [77].

This process can be realized through a mix of components such as physical form, activities, and functions, as well as community opportunities [75]. In the same perspective, placemaking enables people to frequently create and recreate their experienced living places [77], in political and social contexts [78]. Indeed, urban thinkers such as Jacobs [79], Whyte [80], and Gehl [81] have valued the role of activity in public spaces, which gives meaning and quality to these places [51].

In a modernist vision, placemaking has lost authenticity and distinctiveness and has become a rather professional practice that favors the modern fabrication and industrialized replication of places (structural uniformity, conceptual standardization, and contextual disconnection). It also neglects the intangible aspects that characterize places (behavior and meaning) [51,72]. Therefore, the placemaking process should be based on an understanding of local social needs and capacities in order to encourage local community engagement in the creation of meaningful places. Some initiatives consider community participation as an unavoidable necessity, as illustrated in the Project for Public Spaces (PPS) [51]. PPS is a non-profit organization, which aims to help neighborhood residents to design and build quality public spaces to create strong urban communities. It serves to equip people with ideas, resources, and expertise. The mission of PPS is to spread the practice of placemaking and to bridge the gap between the theoretical aspect of public space and its transformation into a meaningful place [82].

In the context of globalization, cities increasingly run to attract external creators and talents. Hence, placemaking represents a challenge in the urban context because of the complexity of approaches to enhance the local meanings (social and cultural) of cities [78]. In this light, PPS sees that cities, and more specifically neighborhoods, should identify their needs and take advantage of their local opportunities and talents while empowering and engaging the community. To this end, place is seen as a set of physical attributes inseparable from its local sociocultural context [51]. According to PPS, placemaking is an approach that puts the community at the center of the conceptual and decision-making processes of public space [74,83]. These processes include appearance and function aspects [83] and are realized through the following actions: supporting the connection between people and place [84], creating some capacity for the community to invest in public space, and finally, incorporating a participatory process. All these factors generate positive relationships with the urban place [74]. In other words, the local community must be considered as the expert in the design phase of public spaces, by determining the problems and operating

overview related to these spaces [84]. According to Mark Wyckoff [75], there are four types of placemaking (Figure 2):

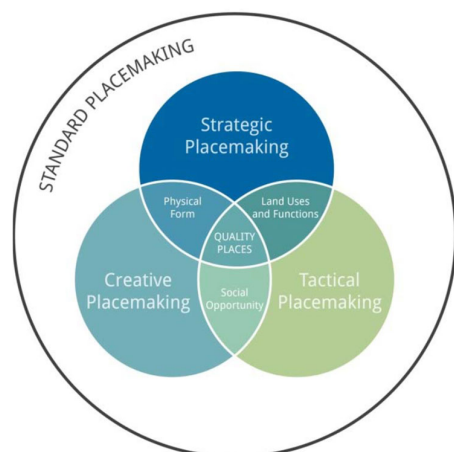


Figure 2. The four types of placemaking [75].

1. Standard Placemaking: associated with the creation of quality places [76] in a general way (encompasses the other three types), as advanced by the (PPS) [75], which sees placemaking as inspiring people to collectively reimagine the public spaces that represent the heart of the community by facilitating modes of creativity and supporting its ongoing evolution [52,84];
2. Strategic Placemaking: aims to design quality places that are particularly attractive to talented workers, especially in downtown areas;
3. Creative Placemaking: this type is used to emphasize the use of the arts in community development [76]. It is about shaping the place character (physical and social) of urban places through artistic and cultural activities;
4. Tactical Placemaking: aims at integrating citizen engagement into the process of modeling and modifying public spaces to create tactical places.

It is a combination of these two concepts [75,76], ultimately linked:

- A. *“Tactical Urbanism”* was created to improve the livability of neighborhoods. It includes several actions such as *“Guerrilla Urbanism”*, *“Pop-Up Urbanism”*, *“City Repair”*, *“D.I.Y. Urbanism”*, and others [75];
- B. *“Lighter, Quicker, Cheaper (LQC) experiment”*, originally proposed by Eric Reynolds at Urban Space Management, and later developed by PPS. This concept describes strategies for developing and transforming community spaces into successful and well-known places, on a large scale.

This transformation can be achieved by harnessing the energy and the creative initiative of local communities to generate quality urban places [75,76].

Based on the PPS model (Figure 3), public spaces are the places where social, economic, and cultural interactions take place. From this perspective, four qualities are necessary to create a successful public space:

1. Accessibility: this characteristic is measurable by the number of physical passages or visual connections of a place to its environment;
2. Comfort and Image: a place must be comfortable and well presented or reputed; comfort includes, among other things, the feeling of safety, cleanliness, and availability of urban equipment and furnishings;
3. Uses and activities: represent the main reasons why a place is unique, and why people visit and continue to visit public spaces;

4. Sociability: a successful place must provide social gatherings and activities that promote exchanges with acquaintances and even strangers, which will provide a sense of community attachment or belonging [53].

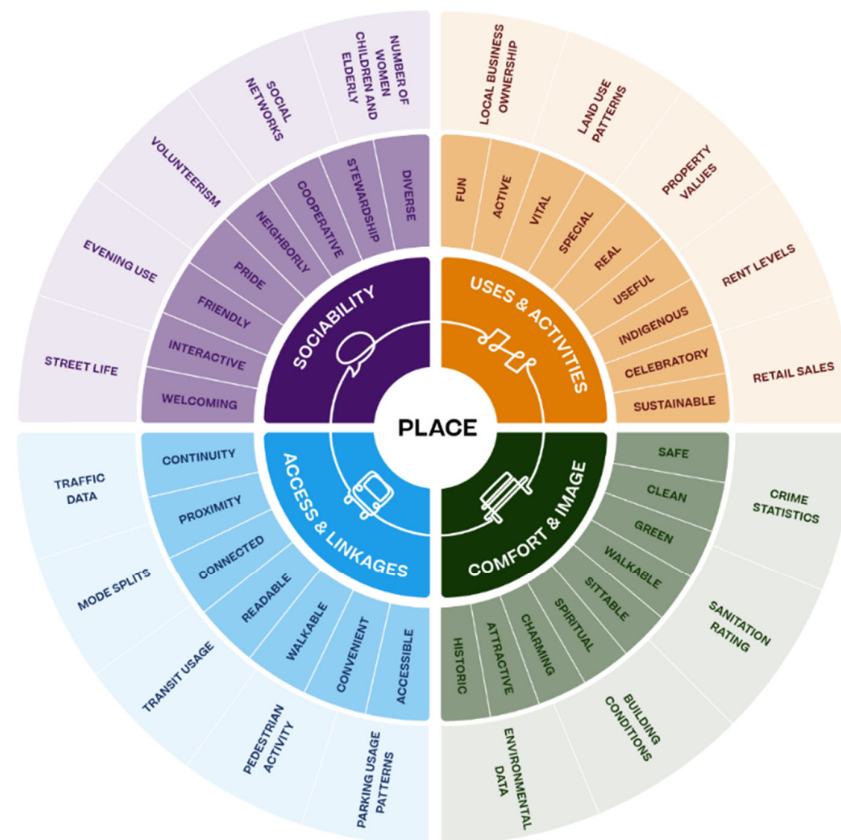


Figure 3. The place diagram [53].

4.2.6. Digital Placemaking

At the beginning of the COVID-19 pandemic, urban life underwent an abrupt shift in daily mobility, with the incorporation of distancing and isolation measures, in an attempt to limit the potential spread of the virus. This shift directed the world toward a home-based social and virtual life, based on connected networks and mobile media [85].

When sociocultural activities, such as travel and tourism, were interrupted due to the COVID-19 pandemic, digital platforms played an important role in the transition and survival of these activities. These digital platforms are characterized by the implementation of wholly digital adjustments and innovations. In this sense, “Airbnb” has, for instance, adopted a new strategy called “Online Experiences—OE” (Figure 4) which has been added together with the slogan “a new way to travel from home”. These experiences are organized and exhibited by the hosts through the video communication platform “Zoom”. The activities vary between traditional and modern cuisine, guided tours, drawing and music exercises, sports and leisure activities, and others [86].

Digital placemaking can thus be understood as the development of digital strategies that enable experiences to be lived in physical space and represented in virtual forms [87]. These experiences combine several elements, such as means (material and immaterial), significations, and creativity. All these factors contribute to the construction of digital meanings and narratives related to places, to attract people’s attention [88].

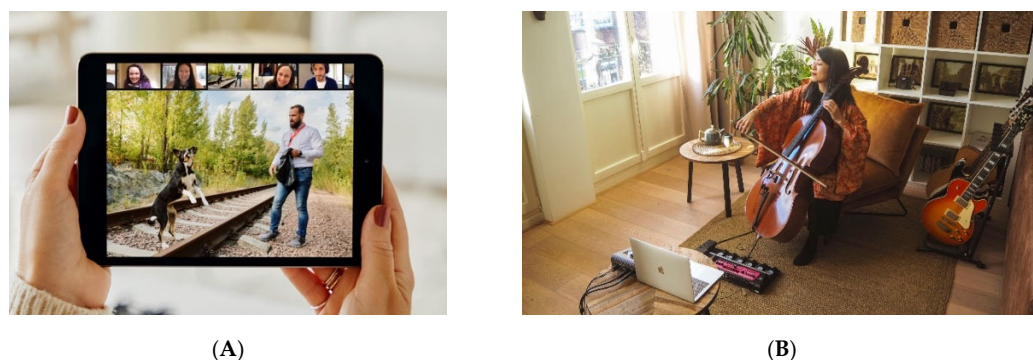


Figure 4. Examples of Airbnb's online place-based experiences. (A) A virtual visit to Chernobyl ("<https://medium.com/airbnb-engineering/zooming-towards-human-connection-66bb6e45161c>" (accessed on 20 January 2023)). (B) A girl shares her music activity with guests ("<https://news.airbnb.com/enjoy-the-magic-of-airbnb-experiences-from-the-comfort-of-your-home/>" (accessed on 20 January 2023)).

Through digital and interactive experiences, hosts try to engage guests to actively participate in the proposed activities in order to create in them the feeling of "*being there*". These activities also help to add an affective aspect to digital places, comparable to the concept of "*authenticity*" that represents a structuring element of digital placemaking [86].

In the same way, the physical journey to a destination helps us to interact with its inhabitants and understand its history and culture, which develops a SOP and an emotional bond with this destination. Similarly, the discovery of a place from virtual travel leads to the generation of SOP through beliefs and emotions [89]. In the example of video games, players discover and become familiar with digital spaces through virtual travel. This digital familiarity is often accompanied by a mental and affective connection [90].

Within the framework of urban intelligence and media architecture, digital technologies are increasingly used in the efficient management of cities, by connecting city dwellers with their living spaces [91]. In this context, the physical environment is viewed and shaped by digital information, of which several computer programs, such as "*Google Maps*", offer geolocation, routing, and information retrieval services regarding desired locations [92]. In this case, digital space represents an extension of geographic space [87]. The digital image of a place helps to understand its characteristics and meanings [93]. In other words, places represent geographical and material expansiveness, but they are also created by social experiences and narratives embedded in contributory spatial media, such as the "*participatory counternarrative*" approach, where Jordan Frith and Jacob Richter [92] talked about students at Clemson University who used the "*Geotourist*" app to invite people to discover their university campus through a "*participatory counternarrative project*", which represents a new form of digital placemaking [94]. Indeed, digital placemaking is a process that describes how people interact with public places [87] and serves to pair these social interactions with the embodiment of personal and collective experiences [86]. In addition, it allows the study of local experiences of the place and the discovery of digital systems that express the SOP [94].

Human experiences have become increasingly hybrid [95]. They derive from physical existence and spatial media [93] by generating mediated digital flows [95], which influence the perception of and interaction with places [93]. Through the digital sharing of events, meaningful online experience and embodiment help to generate a strong SOP [86], which can be represented by mobile media and connected networks. This mobile SOP is sometimes created among former users who regularly participate in events organized in their significant place, using mobile digital technologies [94]. In the context of everyday life, mobile devices are a significant part of our usual practices. They affect our daily

movements in physical space, during which we infuse meaning into the places we visit (the concept of “wayfaring”) [85].

Connected networks and mobile media interfaces are important components of the spatial experience that actively contribute to digital placemaking. Hence, digital placemaking is a subjective [93] and logical approach, which takes a position in urban regeneration [96] and the reintegration of identities (spatial and communal). These identities are previously weakened due to political, sociocultural, and demographic changes [87]. It is thus about adding a digital aspect to physical and social contexts in order to create a unique and distinct SOP. This digital aspect can be added through different options offered by digital media [93,94] and through the intersection of bodily and digital practices in urban places [93]. As such, digital placemaking enables the democratization of citizen participation [93,96] through digital data. These data are collected and processed by codes and algorithms that operate digital platforms and systems. Therefore, spatial media acts as an effective source of digital data collection and creation. This leads to the emergence of new democratic pathways in order to embody the experience related to urban places [93].

Collective conceptions of urban places are increasingly dependent on Information and Communication Technologies (ICTs) [95]. The deployment of digital technologies such as urban screens in a public space serves to capture the sociocultural reality of that space through the understanding of behaviors and social interactions. Thus, ICT contributes to digital urban placemaking. For example, the authorities in the United Kingdom have transferred the management of digital facilities in cities (specifically urban screens) from the well-known information company BBC to local authorities (municipalities). This transfer of power has made it possible to transform advertising content into sustainable content. This strategy has effectively contributed to the creation of urban places. This has allowed adequate responses to the challenges of the physical and sociocultural environment. In this regard, and through the use of ICT, local managers, as well as urban planning professionals [91] seek to support local culture [87]. This creation of local identity is achieved through the engagement of the urban community with its lay knowledge and social experience in order to ensure a real urban added value.

Jo Morrison [97], the director of digital innovation and research at CALVIUM, defines digital placemaking as “*The augmentation of physical places with location-specific digital services, products or experiences to create more attractive destinations for all.*”. Digital placemaking is therefore a process that occurs by merging physical and digital space to generate a “hybrid space” [97] (Figure 5).

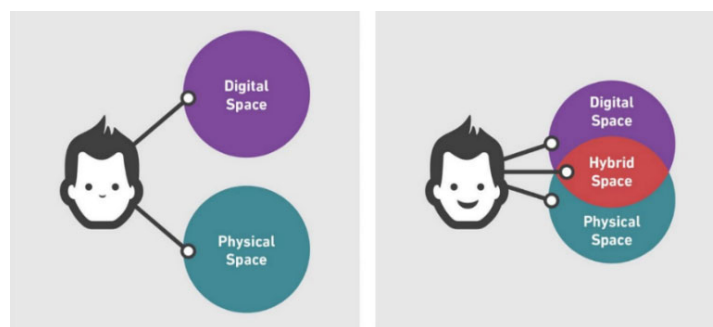


Figure 5. Calvium’s hybrid space diagram (“<https://medium.com/@gemmacampbell/building-the-hybrid-space-ba406426ffeb>” (accessed on 10 February 2023)).

A multitude of factors must be taken into consideration during the digital placemaking process. In fact, digital placemaking is based mainly on the understanding of the urban context, through the intersection of four axial elements used in Calvium’s digital placemaking diagram (Figure 6):

1. **People:** The human component is an important factor to include in the process of designing solutions and initiatives for digital placemaking, to ensure lucidity and creativity; human interaction can take many forms, among others, the use of mobile applications or the input of data stored and managed by digital systems.
2. **Place:** The design of urban places must take into account their physical environment, but also the understanding of their social and cultural environments, in order to ensure the inclusiveness and authenticity of the human experience related to these places.
3. **Technology:** Within public space, the presence and reliability of technological infrastructure (including digital hardware and programs), as well as its inclusivity, supports digital placemaking approaches.
4. **Data:** In a digital placemaking process, it is necessary to know the type and source of data (local or external) to use.

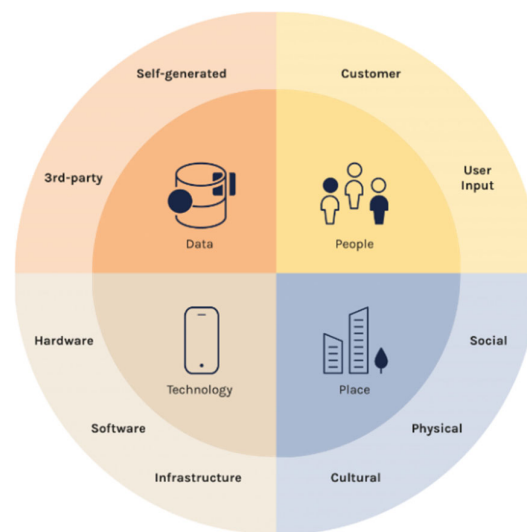


Figure 6. Calvium's digital placemaking diagram [54].

Digital placemaking plays a key role in revolutionizing and regenerating urban environments. It connects city dwellers to urban places, making it a long-term investment in the attractiveness, prosperity, and sustainability of future cities [54].

According to various thinkers, SOP is a multidimensional concept [98]. It is defined by the emotional value of a place to its users [99], and also by the connections between people and their environment. These connections are understood as dynamic phenomena rather than a static and quantitative view [100].

Some researchers see that people who perceive their natural or urban setting positively have a strong SOP. Therefore, their attachment to their environment will be higher [101]. According to Vanclay et al. [102], sensory perception and spirituality effectively contribute to the experience of place [103]. For example, in urban and territorial marketing research, the visual and esthetic aspect plays a key role in the perception of places. And therefore, it contributes to the creation of spatial identity [103]. SOP is, therefore, the product of perceptions and feelings about a place, but also the social interactions within that place [104]. Communities need to interact with their natural and built environments and thus collectively interact with each other [12]. These psychological and social interactions in place create a sense of appreciation and interest, which will turn into a sense of attachment. This is part of spatial and community identity [105]. The comparison between the concepts of SOP and place attachment represents one of the research trends. These studies try to analyze the relationship between the human being and his spatial setting, as well as the external factors, such as the physical and social ones, that influence this relationship [101].

Throughout the debates around SOP and place attachment, different models have been proposed, two of which are quite apparent. The first is the model where researchers believe that attachment is equivalent to SOP [98], meaning that it is at the first level. The second one proposes attachment as a derivative component of SOP.

4.3. Sense of Place Forms: From People to Places (Direction 2)

The second type of approach in this paper is about the concept of “sense of place as an attitude”, which takes the direction “from people to places” and contains the following approaches (Table 4).

Table 4. Conceptual approaches of SOP (from people to places).

Conceptual Approach	Thinkers/Works	Conceptual Diagram/Components (Source: Authors)
Sense of Place as a Place Attachment	Williams and Roggenbuck [106]	<pre>graph LR; PA([Place attachment]) --> PI([Place identity]); PA --> PD([Place dependence]); PD --> S([Social]); PD --> E([Economic]); PD --> P([Physical]);</pre> [107]
	Kyle, Graefe and Manning [108]	<pre>graph LR; PA([Place Attachment]) --> PI([Place Identity]); PA --> PD([Place Dependence]); PA --> SB([Social Bonding]);</pre> [108]
	Elizabeth A. Halpenny [109]	<pre>graph LR; PA([Place Attachment]) --> PD([Place Dependence]); PA --> PI([Place Identity]); PA --> PAff([Place Affect]); PA --> PSB([Place Social Bonding]);</pre> [110]

Table 4. Cont.

Conceptual Approach	Thinkers/Works	Conceptual Diagram/Components (Source: Authors)
Place Attachment as a Component of Sense of Place	Jorgensen and Stedman [111]	<pre>graph LR; A([Sense of place]) --> B([Place identity]); A --> C([Place attachment]); A --> D([Place dependence]);</pre> [111]
	Deutsch, Yoon and Goulias [112]	<pre>graph TD; A((Sense of Place)) --> B([Identity]); A --> C([Dependence]); A --> D([Attachment]); A --> E([Satisfaction]); A --> F([Atmosphere]); A --> G([Community]);</pre> [112]

4.3.1. Sense of Place as a Place Attachment

According to Rubinstein and Parmelee [113], a space becomes a place when people are attached to it, emotionally and functionally. This contributes to SOP and spatial identity [105]. Emotional, cognitive, and functional connections help to create this SOP, which is translated into a sense of attachment for people. The stronger these connections are, the deeper the attachment to place [105]. From this perspective, visitors or tourists can develop an attachment to a visited city. And this is through the activities performed in that city, as well as its attractive landscapes [114].

SOP is often used in the field of human geography, while most environmental psychologists use the term place attachment [115,116]. According to theorists such as Williams and Vaske [117], the concepts of SOP and attachment are close, even sometimes similar. They intersect at the theoretical and methodological levels [99]. Place attachment is used by some other thinkers as a synonym for SOP, which describes the positive affective relationship, maintained by individuals with their environment [118]. It represents a first-degree psychological bond that connects people with their environment [85]. Williams and Vaske [117] see that place attachment can take two forms. An emotional attachment [107,116]: a cognitive attachment which represents the identity of the place, and a functional attachment which explains the dependence on the place [116]. Attachment to place is thus known for its affective, cognitive, and conative aspects between people and their environment. It is generally measurable in an evaluative way that varies between positive and negative [9,115].

Some thinkers consider attachment to be a two-dimensional entity. They have based their hypothetical models on two components [99,101]. For example, Williams and Roggenbuck [106] see place attachment as consisting of place identity and place dependence [9,107,116,119]. These two dimensions are considered central to the concept of place attachment [120]. They are regularly mentioned in their description and expressions [100,101]. Theorists, such as Kyle et al. [121], have clearly identified the dis-

inction between the meaningful aspect of place identity, and the functional aspect of dependence [103].

Place identity is considered to be a psychological investment of people in their living places [114]. It is characterized by several aspects such as beliefs, values, and behavioral patterns in the physical environment [107,118]. Place identity is the set of aspects that define individual or collective identity [9,107,115], which is constituted through the outstanding physical symbolic characteristics of places [107,115]. Individuals or groups often identify themselves through their environment, which they believe reflects their personal or community identity [114]. This identity exposes both the cognitive and emotional connection between these individuals and their environment [107,116]. This connection is formed by a multitude of constructive elements, such as attitudes, meanings [116], memories, and feelings about that environment [114]. In short, it is about spatial identity, which plays a critical role in the formation of self and community identity [9].

Place dependence is considered to be the functional attachment. It is characterized by specific activities performed in that place [100,114,115]. Through these activities, people evaluate places according to the satisfaction of their functional needs [114]. In other words, place dependence is the functional component of attachment [107], which can be understood as the instrumental relationship. An individual or group can achieve their goals and satisfy their functional needs through this functional relationship [9,107]. Thus, dependence can be measured by the degree to which people achieve their goals and satisfy their needs, which can be the preferable activities, compared to other places with the same opportunities [118]. In this case, socio-community surveys can be an efficient tool that revolves around the places chosen by participants to carry out their preferred activities [9]. In short, dependence consists of the conative dimension that embodies the behavioral aspect of an individual toward a place [114]. In addition to the two-dimensional example (identity and dependence) proposed by Williams and Roggenbuck [106], there are many other theoretical models. For example, the three-dimensional model created by Kyle et al. [108] added social connection. In certain contexts, people socialize in cultural surroundings and consequently develop bonds of community attachment and belonging to significant places [110,122]. The significance of these places is often associated with social ties [122], or the four-dimensional model that incorporates the affective connection to place [123], proposed by Halpenny [98,109] (Table 4). Place affect represents the emotional relationships developed and shared by people with the preferred places in their setting [110]. In a natural environment, emotional relationships generate a sense of psychological well-being among visitors [110,122]. These emotional ties also play a remarkable role in behavioral change and active engagement, especially in the preservation of natural environments [110].

4.3.2. Place Attachment as a Component of Sense of Place

Some other studies consider place attachment as a subset of the concept of SOP. From this perspective, place attachment represents specifically the emotional aspect that individuals or communities feel toward particular places [124]. The place attachment is therefore a dimension of SOP that connects people and their significant places strongly and solidly. This sensual connection helps to create a positive experience and image in human thought [105].

According to Jorgensen and Stedman [111], SOP is a general concept that involves three types of aspects and explains the potential forms of person–place connection. The three aspects are emotions, beliefs, and behaviors [99], which is the opposite of what Williams and Roggenbuck claimed [106], considering that place attachment is a first-order concept compared to identity and dependence [116]. The human dimensions of SOP are based on attitudinal theory. The interactions between human and natural systems can

take three distinct forms: cognitive (spatial perceptions of the environment), conative (functional activities and relationships), and emotional (appreciation and attachment to particular places) [99,114,124].

Consistent with the attitudinal framework with its aspects, Jorgensen and Stedman [111] described SOP as a three-dimensional construct [98]. They created a specific conceptual model (Table 4), which includes these interrelated components: place identity, place dependence, and place attachment [98,115,116], which correspond to the cognitive, conative, and affective aspects of the attitudinal approach, respectively [99,104,116]. *Place identity* represents the cognitive component. It reflects individual or collective identity in relation to spatial identity [12]. It is about the cognitive relationship and how the place contributes to personal and collective identity formation [104]. *Place dependence* is the conative or behavioral component. It measures the functional association between a person and a place [12]. It explains the functional relationship related to the satisfaction of people's needs and goals, compared to other alternatives [104]. *Place attachment* is a social and cultural bond that develops toward places, which leads to the creation of an affective attachment [124]. It expresses, therefore, the positive affective connection between people and their spatial context [98,104,115]. In addition to these three dimensions, some researchers have tried to expand the scope of the SOP concept by adding other components to the equation. For example, Deutsch et al. [112] added satisfaction, atmosphere, and community, resulting in a six-dimensional conceptual model [98] (Table 4).

Deutsch et al. [112] clarify that satisfaction informs the degree of enjoyment and benefit concerning the activities offered in the places. The atmosphere indicates the interactive state of the places, especially in terms of esthetics and spatial ambiance, and community, which helps to show the level of the livability of places, especially for families and older people [98,112]. According to the Deutsch et al. [112] model (Table 4), the six dimensions together were used to understand the behavioral aspect of people as well as the sequencing of their activities within places [112].

4.4. Conceptual Model of Sense of Place Proposal

SOP is the users' interactions with locations. It is a crucial component that can improve the bond between people and places. It may be affected by one's own values, beliefs, and actions [125]. As a result of activities and interactions, the physical spaces help individuals to give meaning [126], form bonds, and connect memories. This is what gives places their identity [120]. In this perspective, Relph [23] asserted that even if the idea of a sense of place is difficult to define, he proposed to define it as the capacity to construct a place's identity through a sustained relationship between people and that area [19,125]. The idea basically refers to how people relate to specific locations, including place attachment and place meaning [103]. According to Tuan [5], SOP is the sense of identification, attachment, and belonging that a person or group of people have to a specific location as a result of their cultural experiences with it [125]. SOP is a theory that clarifies why people are confined to meaningful spatial contexts [19]. After a thorough analysis, it was found that SOP is a notion that explains how a standard environment can be transformed into a place with unique sensory and behavioral features for individuals [48]. SOP is influenced by both individual and group values, and it has an impact on both individual behavior and community values and attitudes. It seems that the notion of SOP encompasses both psychological and physical aspects [125,127]. People take different interests from the environment and then apply them in some way. As a result, there is a mutual or bidirectional tie between people and places [127] (Figure 7).

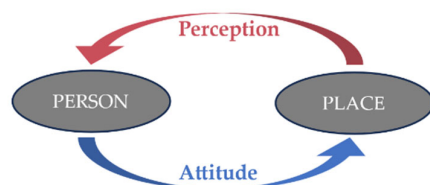


Figure 7. The fundamental idea of bilateral interaction characterizes the sense of place (© Ahmed Rezeg, 2023).

As a result of this review, this paper proposes a conceptual model (Figure 8) showing and explaining the different possible components and connections of the SOP concept and illustrating the existing relational reciprocity. This model is built on the notion of place as the central core of the composition, starting from the idea that place is a location where activities, events, and social interactions take place, forming individual and collective experiences.

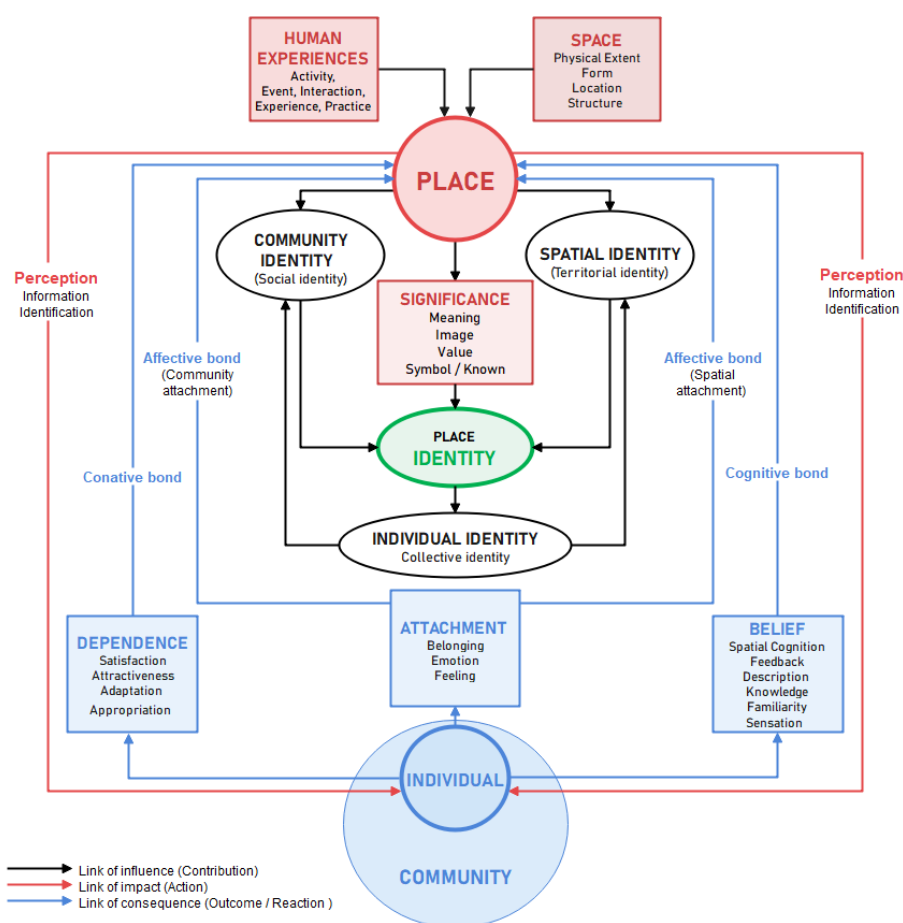


Figure 8. Proposed conceptual unified model of sense of place (© Ahmed Rezeg, 2023).

Place has both a physical and a psychological component. In other words, place is primarily characterized in the context of environmental psychology, by a physical environment built based on its interactions with a person's internal psychological and social processes and traits, as well as by the activities performed at the place [128]. When distinct features and events are integrated into a place, the place becomes more than just a physical setting and takes on cultural and symbolic significance [129]. Therefore, place is more than just a space characterized by its physical attributes such as geometry and location [130]. A human component is added to the physical aspects of that space to form a place. Thus, place is a product of the interplay of physical space and human experience

(Figure 8), which is characterized by socio-political, historical, cultural [128], economic, and socio-demographical aspects. These factors have significantly altered the city's morphology [120]. Physical characteristics with social activities of place construct meaning and add significant value through a social process. The combination of physical settings (forms) and events that occur will develop meanings therein and yield the feeling of place [127]. The environment's physical features and its ability to satisfy human needs determine the meaning of a place [128,131]. This correspondingly offers this place a spatial and communal identity. Consequently, people develop a sense of identity [128]. A person's individual and collective identities define the place identity, which is the symbolic significance of a place. The geographical and spatial qualities of a place are related to place identity and reflect the preferences of the inhabitants for their environment [120].

The concept of SOP is linked with human perception, attitude, cognition, and feelings toward space [120]. Places could not be isolated from humans who build and invest values in them. As well, these places are imagined, interpreted, felt, experienced, and perceived through people's cognitive and psychological connections with these places [128]. Cognitive perception includes analysis, knowledge, and imagination as basic human mechanisms to understand and identify their environment [19]. SOP is not solely a social process but also a property of the interaction between perception and action inside and throughout place-based experiences [128]. Hence, it is generated by the interlinked bodily and perceptual experiences of place. SOP is integrated into an objective construct, such as a spatial environment. Yet, the same environment might have different senses of place, depending on which individual is experiencing this environment [2]. The patterns of relationships between a person and his environment are specified by knowledge perceivable in the spatial context [103]. SOP can be understood as an interaction between people and their environment, which is a bilateral bond created via perception [131]. This environment gives something that the person views as offering the prospect for attitude (action, thought, or feeling) [103] (Figure 7).

The study of the literature demonstrates that surrounding physical attributes not only help distinguish between various places but also have an impact on how individuals perceive those places [125]. Factors related to our mental and physical condition influence the kinds of meanings we rapidly infer from a specific environment [103].

The perception of place is a set of thoughts and pictures formed after receiving the characteristics of this place, including physical and social features, and transforming them into behaviors, reactions, facts, feelings, and beliefs. In short, to attitudes toward the place. The physical characteristics of a place can be received and perceived in two forms: (1) static form, through structural appearance, physical extent, geometric form, location, etc.; or (2) dynamic form, such as odors, sound, humidity, temperature, etc. [126]. The person's cognitive, emotional, or psychological systems are used to affect this transition. In other words, the mental image, awareness, physical feeling, and intuitive cognition of a place's components are all related to perception. Cognition, in this sense, is a type of environmental understanding in which complex knowledge from the surroundings is arranged, sorted, and assigned values [128]. Furthermore, places are lived and experienced through the senses (sight, smell, touch, taste, and spiritual dimensions), with or without human consciousness. This experience thus considers spatial cognition and sensory perception [103]. Eventually, human sensations and perceptions are transformed into emotional and mental crystallizations. As a result, humans have a SOP that informs how they perceive the environment and also guides how they behave. Because of this, we can say that people think in terms of place [18]. It is generally acknowledged that varying levels of familiarity can influence people's perceptions, attitudes, and strength of attachment [128]. Some studies revealed that place attachment could only be increased when urban transformations

were perceived positively, attractively, and as a familiar context [98]. People's memories, familiarity, and impressions of geographical spaces all contribute to the development of the identities and perceptions of those spaces [128]. Humans can acquire new abilities and achieve better physical shape, which create the possibility for new kinds of instantly perceptible place meanings. A place is also altered by human actions, creating opportunities for various meanings [103].

Place identity is recognized and understood through the level of people–place relationships and the profundity of meanings, focusing on physical appearance and social perception [128]. The physical environments contribute to the mental image [126], enhance relationships, provide meaning, and link memories for people through interactions and activities [130]. This is why places have a distinct identity [120]. Although the identity of a place is expressed via people's awareness, which is produced mainly by the human neural system, it stems from the geographical, symbolic, organizational, social, and other features of the place. Any modifications to these features, resulting from either internal or external factors, would affect the spatial and social identities, and therefore, the place identity. The development of place identity is a reciprocal, dynamic, and cyclical process, such as interactions between people and a place, which are mutual, active, and eternal [132]. A person may use the phrases “my home”, “my city”, or “my nation” in his narratives to build a connection to a specific place as a form of (re)defining self-identification. When this self-identification as well as the place identity intersect, the person could be reidentified across the place.

That is to say that place identity is a set of thoughts, meanings, and beliefs that derive through cognitive experiences of spatial attributes (spatial identity) and social characteristics (communal identity) of places (Figure 8). These identity values are seen to be able to determine self-identity [19]. Therefore, a person's identity can be communicated through the place identity when they perceive and feel that it reflects themselves [129]. Individual identity is defined by the dimensions of place identity through values, meanings, feelings, behavioral preferences, and beliefs linked to a specific place [123,133]. Place identity is seen as a means or factor in the construction of individual identity. In this sense, urban planners are concerned with how the city will be built, taking into consideration the potential creation of urban experiences that foster attachment to the city, while generating perceptions, spatial cognitions, and memories over time. These would enable the creation of the city's spatial and community identity, effectively contributing to the formation of residents' individual and collective identities [123].

On the other hand, place identity can be significantly influenced by individual identity, through the constant human experience within places, as well as the cognitive, affective, and conative aspects that link people to these places. In this context, individuals interact with behaviors and emotions, contributing their values and knowledge and their interactional characteristics, which contribute to shaping the place and consequently constructing the identity of that place [129]. Indeed, people who live in or know a place to which they are attached attribute a personality to that place through subjective ties. Subjective place identity therefore refers to the beliefs and emotions held by individuals both inside and outside the place and is thus linked to social and territorial awareness [132]. From another point of view, individual participation in sociocultural and community activities makes a remarkable contribution to the image of the place. It enriches the place identity, particularly in terms of cultural diversity. This reinforces the authenticity of place, and in turn, reflects a sense of connection and belonging among the people who live in or visit the place [132,134]. In this way, individuals integrate their knowledge, experience, and skills into social groups, contributing to the collective knowledge base and, consequently, to collective identity [129]. Community identity is constructed through identifying and integrating the attributes that

characterize the individual in community and social groups, as well as in significant places. From this perspective, urban places are the context for receiving and projecting this personal identity [135].

Jorgensen and Stedman [134] highlighted three types of connections to examine the concept of SOP: cognitive relationships (e.g., ideas and perceptions), affective relationships (e.g., emotions and sentiments), and conative relationships (e.g., behavioral intentions and commitments). According to them, SOP is a multidimensional composite analysis, including conative thoughts (place belief), emotions or affective bonds (place attachment), and behavioral engagements (place dependence) (Figure 8). Based on this opinion, place identity therefore represents an individual's belief about a place, the individual's positive feelings toward a place, and the functional satisfaction and expectation of a place [129].

The extent to which an individual feels dependent on or tied to a place depends on how successfully his or her needs, aims, or aspirations are satisfied there. Thus, how pleasant they believe their experiences are in that place [128]. A person's thoughts and hence relationship toward a place may be influenced by their physical and communal familiarity with it, as well as by their level of involvement [129]. Additionally, if a person or group believes that a place presents them with a potential for individual or collective improvement, they may acquire a positive attachment to the place as confidence, happiness, and appreciation, and depend on it to satisfy their needs, such as housing and employment [129]. Thus, place attachment is a beneficial feature that can support place identity and hence foster the psychological well-being, satisfaction, and happiness of city dwellers [128]. In this case, place attachment is created by an individual's emotional and intuitive ties to a place [129].

In our proposed conceptual model, we tried to synthesize the concept of SOP with all its components by defining SOP as a concept that indicates a significant connection between a person or community and places, according to their mental, emotional, and behavioral ties [19]. In this regard, those links (place belief, place attachment, and place dependence) are represented as individual or collective attitudes, which are associated with spatial perception and social involvement as factors (Figure 8).

5. Discussion

The concept of SOP is intricate [9,135] and has been used in the context of many academic fields, such as sociology, anthropology, education, geography, urban planning, architecture, and political studies [135]. As seen earlier in this paper, two main visions—human geography (or urban sociology) and environmental psychology [136,137]—are used to analyze various conceptual approaches. From this analytic view, the type and orientation of links between people and places serve as the foundation of our model. Thus, there are two main sections shaping it.

5.1. From a Social and Human Science Perspective

Starting from the concept of place, which is the main notion of our conceptual framework, places include the environment's physical characteristics as well as how people experience and interpret them [138]. Hence, place is formed from both physical and social components [139]. The physical features of a place encompass natural areas and urban areas, whereas the social functionalities of a place correspond to the social construct, such as sociocultural interactions between inhabitants [140]. These interactions form and develop the human experience. These spatial and human aspects give significant values and meanings to this place [135], such as symbolic images and memories (Figure 8). In other words, the notion of place refers to the symbolic significance that space has for a person or a group [141]. Place meaning is concerned with the symbolic connotations that

people assign to specific places and what drives people's attachment to these particular places. Thereby, place meaning is based on the qualities that people assign places in terms of value. What is affirmed by Tuan [5], who notices that indistinct spaces acquire values and meanings via lived social experience and thus become places [14,138]. From the same angle, Lefebvre [142] argues that the place is a space constructed socially [10,13,142,143] and made with meaning [143,144]. Therefore, a place is characterized by its authenticity. For example, an old village rooted in history could be defined as an "authentic" place [141]. From the globalization perspective, Augé [145] argues that transitory spaces that appeared across the modern world were presented as "non-places" because they lost the qualities of place that allow the development of long-term social and impactful relationships [141].

In a geographic and social context, SOP can be seen as a specific experience of a person in a specific place that associates social interactions and memories with it [136,141,146]. It typically deems three related features: a physical space, activities in that space, and significance. In other words, a location (geographic space) increases meaning (becomes a place) via human activities and interactions with and within it [8].

Place identity refers to the close association between a place's characteristics and a person's interpretation of place. It describes the combination of cognitions and affective ties regarding physical attributes and social experiences in a particular place. Hence, it defines the symbolic associations to that place [135]. Place identity aids people in organizing their experiences in a variety of spatial settings [135]. It also reveals social bonds to the community [147]. The loss of spatial or social identity can be depicted through different phenomenal manifestations. For example, according to Devine-Wright [148], NIMBY is a place protection that results from potential harm to place identities and alterations to place attachments. When someone's identity is intertwined with a place, damage to that location is perceived as damage to himself [149]. Place identity relates to the manner in which the symbolic and sensory characteristics of particular places influence the person's identity [148]. Furthermore, as people become more actively involved in their community, their identities grow and develop accordingly [150].

The geographical and social qualities of a place are associated with place identity and show persons' preferences toward this place. These place qualities affect an individual's self-identity [151]. In other words, individuals progressively gather a set of values and meanings concerning a place, which contributes to a sense of identity [141]. Thus, place identity, which is determined by spatial or collective identity or both, refers to the emotional and symbolic significance of a place [120,149] (Figure 8). For example, Tuan [17] used the concept of "*Topophilia*" to explain how sturdy attachments to meaningful places contribute to a solid sense of identity [149]. The feelings of togetherness with or belonging to a place, including community aspects, allow a person to identify himself or herself [152,153] in terms of spatial or social identity. Otherwise, when someone achieves a strong connection to a significant group with a solid communal identity, he identifies himself in terms of his community, leading to the formation of his personal identity [152].

5.2. From a Psychological Perspective

SOP is a multidimensional construct, formed through a reciprocal interactional aspect [154]. It can be seen from the angle of a perception–action process [103]. It is inevitably a dual aspect that includes awareness, an interpretive view of the environment, and an empathic or behavioral reaction to it [14,136]. People's perceptions or sensations turn into attitudinal changes or collective reactions that produce several exploitable aspects such as useful feedback and adaptive ability [8]. Hence, SOP is the product of the personal perception of a particular place and human feelings or attitudinal interactions toward it, which are deeply embedded in its physical or social attributes [9,155]. In other words, SOP

is the individual or collective reactions stimulated by place aspects such as material settings and social context [156,157].

Perceiving a place generates a distinct meaning and a positive emotional bond, such as a sense of belonging. Furthermore, it contributes to the sense of identity that impacts a person's assessment of that place [99]. For example, public space can be understood as more than just physical features and the people who occupy it. However, its dynamics can be investigated as a symbolic or social construct perceived through the sensory systems and the mind. Thus, the spatial or human characteristics of a place influence how it is perceived and perceived [13] (Figure 8). Jorgensen and Stedman [134] describe SOP in environmental psychology as a complex and multifaceted construct indicating beliefs, feelings, and behavioral commitments regarding a specific geographic environment [13,116,137].

In addition to the perceptual aspect, involvement and socio-functional connections around a significant place can also generate a sense of satisfaction or belonging. For example, the restoration activities of an ecosystem connect individuals to the places they collaborate to restore, generating a SOP. In this view, involvement and perceptions matter since they frame reality [8] and explain human attitudes toward meaningful settings (Figure 8). Human attitudes can take the form of mental, emotional, or conative outcomes [99]. Three aspects of value judgment and interpretative ties characterize a person's attitude: cognition, emotion, and conative bond. Cognition relates to beliefs, understanding, and ideas about the physical and human construction of place. Emotion refers to the feeling reaction and affective attachment toward a place, and more precisely toward the place identity, whereas the conative aspect refers to the behavioral aim, dependence, and functional satisfaction of that place [116,137,147,151,157,158]. In tourism, for example, most visitors generally evaluate landmarks after visiting and experiencing them concerning quality, distinctiveness, attractiveness, and others. These evaluations incite tourists to create a sense of satisfaction and emotional attachment to the attractions, and thus to the larger geographic region in which the attractions are situated. In other words, SOP developed at the first visit is predicted to motivate travelers to revisit and re-experience the same site or to explore the region's other underutilized attractions in the future [99].

5.3. Study Limitations

This narrative review has some limitations in terms of the number of documents produced following the methodological strategy of bibliographic research undertaken in this review. This number is considered insufficient, as the studies obtained do not encompass the conceptual completeness of the SOP. Consequently, other search requests are launched to try to maximize the results and cover what was targeted through the research questions and objectives. Thus, we are dealing with a non-exhaustiveness in terms of results, probably caused by the subjectivity and qualitative nature of the subject treated (SOP), as well as its multidisciplinary nature.

6. Conclusions

This narrative review attempted to answer the questions and research objectives related to the definition, description, and composition of the SOP concept, so as to propose a unified conceptual framework that can serve as a reference for the implementation of SOP components and related concepts in place-based GIS applications. SOP is a difficult concept to grasp, given its complexity and subjectivity, on the one hand; and on the other hand, the scarcity of bibliographic sources which treat it simultaneously in different fields of knowledge and analyze it from several angles. In addition to proposing an in-depth analysis of the concept of SOP and formalizing a unified model of these components, allowing a better understanding of its composite characteristics and its specificities, this paper

proposes to define the SOP as a set of connections and interactions mutually existing or constructed between a person (or a group) and a particular place. The proposed conceptual framework is indeed primarily based on the characterization, specification, and interrelation of the deferential components of the SOP concept. This model is designed around two major structuring axes of scientific research, related to the relationship of individuals with their living places:

The Place as Perceived and Experienced: The place is a combination of physical space and an event. The space is characterized by its geographical extent, its location, its geometric shape, and its physical impact on its environment, while the event is related to an activity, an action, a memorable moment, or a set of memories that lead to a human experience within this place. The presence of one or both components gives meaning and significant value that serve as an image about this place, and that will be the basis of its identity. The physical characteristics of the place generate its spatial identity, while human interactions generate its social or communal identity. The place identity influences personal identity. An individual perceives a physical space mainly through his five senses. This perception serves to take information about the place and identify its physical properties. Human experience shows a commitment to the community construction of the place chiefly through sociocultural interactions.

The Attitude to Place: Information about the place received by the individual is transformed into interpretation and reaction. This attitudinal position toward a place can take three forms: (1) dependence on the place, which is translated by a functional reaction or a behavioral attachment and expressed by the degree of functional satisfaction; (2) emotional attachment to the place, expressing different emotional connections to the place, such as a sense of belonging and well-being. Attachment to a place helps to build the identity of the individual attached, who considers that this place is part of his life, or even reflects his personality in some cases. In other words, the place identity can occupy a part of the personality of the individual and therefore that of the group; and (3) beliefs linked to the place, which expose how the place is thought of or imagined by the individuals. It is often evoked by spatial and functional cognitive exercises.

The innovative character of the proposed unified model does not only rely on its richness regarding the inclusion of the complex and composite nature of SOP. This is also due to its operational scope. In fact, the model is designed to serve as a basis for the collection of field data, making it possible to locate, qualify, and represent geographical variations in the sense of place. Today, the SOP concept plays an increasingly important role in urban planning. While classical urban initiatives generally focused on the physical attributes of urban spaces, there is an increasing emphasis on the perceptual dimension of a place. This paradigm shift aims to establish a robust spatial and community connection. Therefore, recognizing and integrating the SOP into planning strategies is vital for fostering a resilient community and territorial identity. This significantly contributes to the development of high-quality built environments, imbues people's interactions with their living spaces with meaning, and consequently influences their well-being and sense of belonging. Hence, the consideration of SOP also plays a crucial role in shaping sustainable urban communities, ensuring social inclusivity, and promoting spatial justice. For instance, the placemaking concept operates on the principle of creating public spaces that are equitably distributed, accessible to the entire population, inclusively designed, and respectful of sustainable initiatives, particularly concerning mobility. Thus, SOP influences urban planning decisions by mirroring the reality of communities' bonds with urban spaces. This involves understanding a community's specific needs and respecting its identity, incorporating historical and sociocultural elements. This influence is evident in projects such as the preservation of historic buildings or the development of local cultural activity spaces. In essence, by

grasping the unique characteristics of a place, urban planners can propose solutions tailored to improve community life while respecting the local features of that place.

This leads us to argue that the SOP shapes the way urban resilience and sustainability are addressed, from two different perspectives: at the level of regulations and policy decisions, such as the implementation of mitigation and adaptation measures to climate change in an urban context for example; but also, at the level of the involvement and commitment of communities to safeguard or improve urban living environments in response to climatic and environmental challenges. Positioning SOP as an effective tool and a significant means to encourage citizen involvement in urban resilience and sustainability is an innovative way of considering it. Civic commitment, if improved by a better mobilization of SOP, can play a pivotal role in reducing the ecological impact of households by contributing to daily behaviors and practices changes. Simultaneously, it could contribute to the enhancement and protection of significant places within urban communities.

In all cases, taking SOP into account in policies, and mobilizing it as a lever to support political or individual decision-making, requires going beyond theoretical considerations and turning it into an operational tool. This is precisely what this article aims to propose. In order to lay the conceptual foundations of such a tool, the first unified formal representation of the concept of SOP extended to its related concepts has been designed and graphically formalized (no other unified model of this type is currently available in the literature). The design of this model is an absolutely necessary first step to test (via its integration into a place-based GIS tool) its effectiveness in the face of a new and disruptive environmental urban reality. The second step will therefore consist of mapping, on the basis of a collection of field data articulated around the produced unified model, the variations in the components of the sense of place in the central districts of Quebec City. This mapping of SOP will then be compared to the spatial distribution of the main places of citizen engagement for climate action.

The steps mentioned are part of the scientific thesis carried out by the main author of this paper. They will be further detailed in another phase of this thesis. However, the following paragraph attempts to explain the possible transition and clarify the existing alignment between the unified conceptual model and place-based GIS initiatives. This brings us, simply, to understand the integration of the sense of place (SOP) concept into a place-based GIS (PBGIS). This integration represents a rigorous, multi-stage methodological framework (Figure 9), aimed at structuring the analysis and representation of sensitive and subjective data relating to people's perception and attachment to their significant urban places, and investigating the relationship between these data and citizen engagement in urban climate action. The first step was to develop a solid conceptual framework describing the theorization and various specificities around the concept of sense of place (SOP), culminating in the design of our integral theoretical model, which served as the basis for the creation of a research questionnaire, aimed at exploring individuals' subjective ties with the places in their neighborhoods. The data collected from the questionnaire responses are analyzed and grouped typologically to identify spatial indicators, representative of the "sense of place" concept. These indicators are also grouped according to the conceptual model's main directions (perception and attitude), components (dependence, affective attachment, belief, etc.), and different types of links (influence, contribution, impact, consequence, etc.). The next step is to set up and populate a database with categorized and structured indicators. The database will then be integrated into a place-based GIS framework, with the key aim of mapping subjective urban indicators. The results of this representation are technically usable in future urban planning. Thus, this "Data-Use" combination enables the creation of a prototypical model facilitating the storage and visualization of subjective and sensitive data, with a view of spatial analysis solicited by urban decision-makers.

Finally, the prototype enables the overlay of data, notably cartographic ones, relating to the sense of urban place with data on community involvement in eco-responsible and sustainable initiatives. This cross-referencing of data identifying and describing significant urban places, with indicators of commitment to climate action in the study area, on the one hand, provides a clear overview of the significant correlations between sense of place and the environmental involvement of residents, and on the other, potentially demonstrates the concordance between the urban context of attachment and that of commitment. In the same vein, this innovative approach makes it possible to identify places with a stronger sense of place (SOP), in which citizen environmental initiatives are most likely to succeed; it thus offers paths for reflection and realization for more effective and sustainable urban interventions.

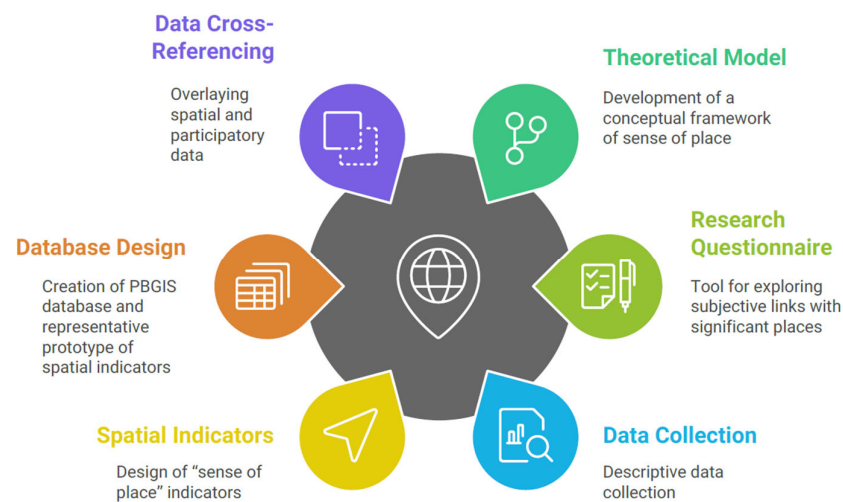


Figure 9. Integration of subjective “sense of place” data into a PBGIS database. (© Ahmed Rezeg, 2023).

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