

Senses of place and mobilities nexus - a scoping literature review

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ABSTRACT

People-place relationships are shaped by people's mobilities within and across places. Thus, mobilities are constitutive of place relations. Multiple disciplines study people-place relationships, here conceptualized as senses of place, and mobilities taking their own disciplinary perspective. Thus, there are few studies that seek to advance the nexus between senses of place and mobilities. To address the lack of a cross-disciplinary synthesis and understanding of the nexus that guides theoretical and empirical work, we reviewed 163 articles that, to some extent, engaged with the interface between senses of place and mobilities. To do so, we first developed an analytical framework based on existing conceptual work, which serves as the basis for a scoping literature review of empirical studies. We identify dominant research topics and knowledge gaps, and discuss the limitations and future directions of research, which should: 1) embrace the complex interdependencies of different mobility types within the nexus, 2) stronger include virtual mobility and imagination acknowledging the omnipresence of the Internet and virtual space, 3) integrate the temporal dynamics of people-place relations given the increasing pace at which environmental change is influencing all geographic regions of the world, and the associated implications for human movement, 4) acknowledge and address the physical characteristics of the place more strongly, and 5) strengthen the use of mobile methods to deal with the inherent characteristics of mobilities.

1. Introduction

People-place relations are challenged by new and different forms and patterns of mobility (Raymond et al., 2021) including online technology (Ozkul, 2013). Uncertainties and changes related to migration, ecological regime shifts and climate change lead to "social-spatial precarities and challenge people-place relationships" (Manzo et al., 2023; Raymond et al., 2021; Devine-Wright & Howes, 2010; Devine-Wright et al., 2020). Due to the importance of the role of mobilities in contemporary societies, Gottwald et al. (2024) proposes the nexus between senses of place and mobilities responding to uncertainties and change of social-ecological systems. Key challenges are related to power dynamics, more-than human actors, spatial scales, temporalities and multi-sensorial experiences (Gottwald et al., 2024). Senses of place refer to the cognitive and emotional connections between people and places

(Stedman, 2008). Understanding senses of places, requires a systemic and dynamic perspective, that in line with assemblage theory, conceptualizes place as "complex, dynamic constellation of materiality, representations, and performative practices" (Cresswell, 2015 in Williams and Miller, 2020, p. 23), and thus integrates mobilities in this process.

Mobilities research, compared to mobility (singular) or transportation research, expands the focus from the measurement of movement to the meaning of it, highlighting that "moves make social and material realities" (Büscher and Urry, 2009, p. 99). Mobilities are understood as dynamic flows of people, goods, and information within societies (Allen-Robertson and Beer, 2010). The "new mobilities paradigm" emphasizes the importance of understanding social phenomena through the lens of movement and flow rather than static structures (Kaufmann, 2018). It prioritizes the study of various forms of mobility, including travel, migration, commuting, tourism, and virtual movement

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(such as digital communication), examines the systems and technologies (like roads, railways, airports, the internet) that enable or constrain mobility, as well as explores how mobility is distributed unequally, focusing on who can move freely and who is restricted by social, political, or economic barriers (e.g., immigration controls or economic disparities) (Hernandez, 2018).

The new mobilities paradigm enables the elaboration of a nexus between mobilities and senses of place, because it emphasizes the meaning of movement including the places that are involved (Cresswell, 2011). Adey (2006) understands mobility as “an orientation to oneself, to others and to the world” (p. 15). This relationality and the spatiality provide a common ground to establish the nexus between senses of place and mobilities, which can be understood as co-constitutive (Massey, 1993; Salazar, 2023; SLAPE et al., 2023). Senses of place are formed through interactions with the environment and thus linked to place-related behavior (Masterson et al., 2017), such as mobilities, which in turn play a crucial role in shaping place belonging and local knowledge (Arp Fallov et al., 2013; Hakkarainen et al., 2022). The nexus acknowledges the dynamic perspective of mobilities that is also promoted by place researchers (Massey, 1991; Raymond et al., 2021; Williams, 2024). An example of mobilities shaping a place can be the changing character of tourism hotspots due to the lack of movement of people, such as La Rambla in Barcelona, Spain during the COVID-19 pandemic (Frago, 2021). Thus, in our study, we extend the notion of mobilities of being “constitutive of economic, social and political relations” (Büscher & Urry, 2009, p. 100), to being constitutive of place relations – here conceptualized as senses of place.

Recognizing that mobilities affect senses of place calls for acceptance of a progressive perspective (Di Masso et al., 2019), which sees senses of place and mobility as complementary rather than in opposition (Di Masso et al., 2019; Gustafson, 2001; Massey, 1991). There are two contrasting theoretical approaches in place research: essentialism and progressive perspective (for a detailed comparison, see Cresswell, 2004; Lewicka et al., 2019). The terms “essentialist” and “progressive” refer to the characteristics of places that contribute to their meanings. Essentialist places derive their identity from qualities like stability, historical continuity, boundedness, physical and social homogeneity. These places foster a sense of insideness and rootedness (Relph, 1976; Tuan, 1977) and possess a recognizable genius loci—a set of distinct features that ensure their stable identity (Lewicka, 2021). In contrast, the meaning of places aligned with the progressive concept is shaped by social construction. These are places that are open and diverse, both socially and physically, dynamic rather than static, and whose identity emerges from the interactions of their users rather than from their historical heritage (e.g., Massey, 1993). The essentialist ‘place as being’ is therefore contrasted with the progressive ‘place as becoming,’ a distinction introduced by Dovey (2010). Because ‘place’ is a key concept to understand human mobilities (Salazar, 2023), in consequence using place as an entry point to study human movement helps to de-essentialize the concepts of ‘place’ (Wyss et al., 2023), and of senses of place, which has been dominant in past research.

Furthermore, mobility extends beyond human perspectives (physical and virtual mobility) to non-human elements (flows of goods and information), including place itself, which can be influenced by mobility and have a dynamic, changing character itself (Salazar, 2023). Place change relates to people’s mobilities (emplaced mobilities, see Salazar, 2023), as well as climate change, transitions to renewable energy, competing territorial claims, urban change and technological transformations (Raymond et al., 2021). This process can have an impact on the intrinsic meaning that individuals and communities hold for places (Raymond et al., 2021) or lead to new place relations (Di Masso et al., 2019; Manzo et al., 2023). However, essentialist perspectives on place also resonate in communities. An empirical study showed that places characterized by essentialist criteria, such as historical and stable (no change), were preferred or perceived as more meaningful than those places with the opposite criteria, such as modern, changing, and open

(Lewicka et al., 2019, 2023). Lewicka et al. (2019) argue that “essentialist environments make us feel at ease, in harmony with ourselves and the nature around us” (p. 378). Yet, despite the ontological dichotomy between essentialist and progressive, Lewicka et al. show that place meanings are not only related to physical features (essentialism) of the place but also depend on the interaction of and construction through participating agents (progressive) (2019). In response, Di Masso et al. (2019) have conceptualized the nexus on a spectrum that displays different configurations of senses of place and mobilities which have permeable fuzzy boundaries.

Despite the imminent presence of mobility as well as occurring unquestionable place changes, there is an absence of conceptual and analytical frameworks that are applicable to empirical studies, and allow for a better understanding of the characteristics of the nexus between senses of place and mobilities. An improved understanding of this nexus would help mobility and senses of place scholars to develop new inter- and trans-disciplinary partnerships between place and mobility scholars to jointly assess the effects of rapid environmental and social change on both new mobilities and people-place relationships (Gottwald et al., 2024). Therefore, the goal of this scoping review is to systematically map existing knowledge gaps, and future research directions. This is guided through the following research questions: 1) Which conceptual underpinnings exist in the empirical research? and 2) Which methodological approaches are applied? To do so, we first develop an analytical framework based on existing conceptual work, which serves as the basis for a scoping literature review of empirical literature showing the associations between different subjects, methods and theoretical approaches applied to the dynamic nexus between senses of place and mobilities.

2. Analytical framework

We understand the nexus between senses of place and mobilities as a two-sided relationship (Gottwald et al., 2024). This means that senses of place can influence mobilities when making places attractive for temporal or permanent residency (Stedman, 2006; Tuulentie, 2007), or influencing decisions to stay or leave specific places, for example in the face of environmental risk (Jansen et al., 2017). Vice-versa mobility can influence senses of places, transforming places, and confronting people with new places, leading to renegotiating attachments with “old” and “new” places (Arp Fallov et al., 2013; Drozdowski, 2007; Hakkarainen et al., 2022) (Fig. 1). Such understanding helps to integrate the challenges related to studying the nexus identified by Gottwald et al. (2024).

Thus, senses of place could be a push or pull factor to stay or move at, to, or from a place (Fig. 1). There are also external drivers to mobility, such as economic incentives, war, or environmental threats (Berroeta & de Carvalho, 2021; Castelli, 2018), where senses of place influence the decision to move or resist. Another important external driver is place change. Change of the biophysical setting impacts the opportunities and limitations a place offers to create attachment (Ingalls & Stedman, 2017). There is a myriad of understanding of senses of place and related concepts (represented by the yellow transparent circles in the framework, Fig. 1). Senses of place definitions and conceptualization have been perceived and described as a “braided stream” rather than a coherent body of literature (Williams and Miller, 2020). Thus, a too narrow definition of senses of place would potentially exclude relevant studies from this review.

Using the term *senses of place*, we are aware that there are alternative terms and diverse conceptualizations, such as place identity, attachment or meanings. These terms may be used interchangeably, but may also entail different methodological approaches. We argue that senses of place hold the potential to embrace these. There are both qualitative (for example, Stedman et al., 2004; Knaps et al., 2022), quantitative (for example, Rajala et al., 2020; Ardoin et al., 2019), and mixed studies (for example, Gottwald et al., 2022; Wartmann & Purves, 2018) on senses of place. Additionally, we chose the concept, because more than any other

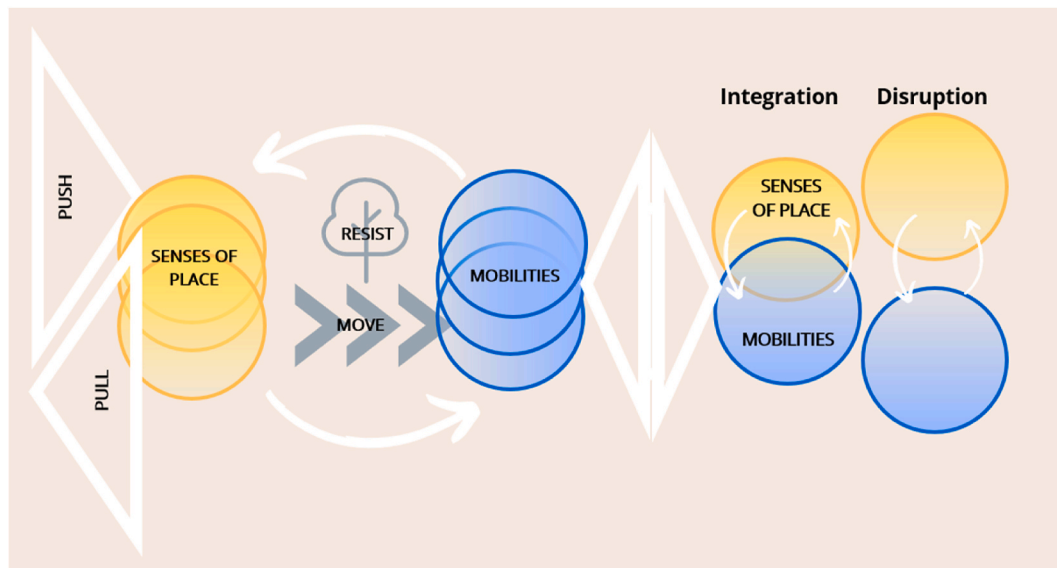


Fig. 1. Analytical framework to understand the relationship between senses of place and mobilities in the context of negotiations between the drivers (push-pull, decisions to move or to resist (stay), and the impact the decision has on the configuration of the nexus (integration-disruption), which in turn influences the negotiations and decisions.

related concept it engages with dynamics and mobilities of our society (see for example: Raymond et al., 2021; Williams & Miller, 2024). Furthermore, in its plural use, it acknowledges the plurality and dynamic of different forms of attachment and meanings that may occur simultaneously and over time at one and the same place.

Related to this broad array of conceptualizations and frameworks synthesizing place attachment (pioneer work of Scannell & Gifford, 2010), senses of place research looks at diverse *foci of attachment* in terms of personal, community, and physical place attachment (Gustafson, 2001; Raymond et al., 2010). Mobilities may relate differently to these types, and vice versa. The personal context to place attachment focuses on place identity and identity expressive attachment, connections that define who the person is, individual perspectives, and personal experiences, in which the connection to the community or specific bio-physical place characteristics is not in the foreground. In contrast, studies centring on the social context focus on social and community attachment, the attachment to or identification with a social group, community, or neighborhood. The physical environment context concentrates on place characteristics, features and how individuals or groups are attached to these specific characteristics of place or landscape. These characteristics include biological, physical, cultural aspects perceived with all senses, which create or (re)configure the spatial setting. All three connections are closely related to each other, and the same study may include more than one context.

Other than “resist” and “move” (Fig. 1) may suggest, there exist various interdependent types of mobilities, such as physical and virtual mobility, imagination, and immobility (Büscher & Urry, 2009) (Fig. 1 blue circles). Within this analytical framework, we distinguish three types: First, corporeal travel of people that includes daily movement for work, leisure, etc., tourism, voluntary and forced migration. Second, virtual, imaginative and communicative travel that do not require a bodily movement, yet they connect people to places and amongst each other “transcending geographical and social distances” (Büscher & Urry, 2009b, p. 101). The Internet enables these processes in real-time, transcending geographical and social distance (e.g., virtual tourism, life streaming from distant places, social media content about places/landscape). Third, immobility which is continuously negotiated against mobilities. Immobility is not passive, and more than just the absence of movement; rather, it represents an active choice or a deliberate obstruction to mobility. Through both, social connections can be made

and maintained at different spatial scales (Urry, 2007). Finally, the overlap of circles represents mixed mobilities that account for the fact that these different types are interdependent, for example, mobility and immobility succeed each other. Daily mobility (e.g. commuting to work) and communicating with someone at a different place or thinking about somewhere else may occur at the same time. Different forms of mobilities from and to places beyond that place shape one very place (Massey, 1991).

As pointed out in the introduction, we expand the definition of mobilities provided by Büscher and Urry (2009), highlighting that mobilities constitute place relations. The negotiation between senses of place and mobilities in relation to different drivers that push and pull, and the respective decision, can be distinguished in four categories, which can be well related to the fixity-flow framework by Di Masso et al. (2019). Di Masso et al. (2019) explore the relation between place attachment and mobilities on a spectrum between *Fixity* and *Flow*, ranging from spatially static and temporally stable place relations (*Fixity*) to more progressive perspectives that culminate in a maximum degree of movement and territorial disconnection (*Flow*). The relationship between place attachment and mobilities being stretched between fixity and flow, is characterized by different modes of configuration e.g. mobility and senses of places can be perceived as contradictory, complementary or compensatory. Mobility can trigger overarching or multi-centered sense of fixity between places. *Fixity* describes for example individuals who’s attachment is anchored in one unique place. They perceive leaving their home as highly disruptive and thus are more likely to prefer to remain both physically and virtually immobile. This configuration has been dominant in research with an essentialist perspective. An essentialist perspective assumes that a strong continuity and/or the genius loci of the place characteristics affords strong attachments (Lewicka et al., 2019, 2023), which has been substantiated in a study where participants perceived places with stronger essentialist features (e.g. historical invariance, homogeneity, or naturalness) to be more meaningful than non-essentialist places (e.g. modern, chaotic, or open) (Lewicka et al., 2019). Accordingly, some studies have proven the positive relation between strength of attachment and length of residence (Lewicka, 2011; Scannell & Gifford, 2010). However, as Lewicka (2011) demonstrated, there are nuances to this relationship. The authors showed for example, that the strong relationship to length of residence does only apply to what they called traditional place attachment, and

not active place attachment. This also stresses the need to understand the configuration between mobilities and sense of place on a spectrum, which does leave room for non-essentialist perspectives. These are of importance in times of high mobilities that do not allow for simplified conclusions about the relation between mobility behaviour and senses of place. Thus, Di Masso positioned on the other pole of the spectrum *Flow*, which - could be represented by individuals who are constantly on the move, both physically and virtually, but do not form emotional ties with places (Di Masso et al., 2019). While the framework proposed by Di Masso et al. (2019) provides a very clear conceptual overview, it lacks empirical applications. For an empirically and analytically more applicable version of the framework, we simplify between integration (i.e. multiple senses of place can be built, even if under certain constraints), and disruption (i.e. movement will have a negative impact on senses of place or senses of place will disable movement). We acknowledge that this is a simplification of the complex relations within any social-ecological system, but we find it useful to be able to categorize the diverse literature reviewed. Overlaying these two configurations with push and pull drivers, results in the following four categories: push and resist, pull and resist, push/pull and move, pull and move (Fig. 1). *Push and resist* characterize the situation of a clearly defined push to leave a place (for economic reasons, war, environmental threat etc.) but people resist to leave, because of acceptance of the situation as part of the “normal” condition and part of the place’s identity, their high place attachment, or their lack of opportunity or ability to leave. *Pull and resist* refers to a (latent) pull, e.g. toward better work or education conditions but people resist to leave, because of their high place attachment. In both categories (*push and resist*, and *pull and resist*), people resist drivers of movement. This can be related to strong rootedness and senses of place that are “defined by a maximum degree of spatial stasis and temporal stability” and conceptualized as “fixity” by Di Masso et al. (2019, p. 128). *Push/pull and move* describes a situation in which people are forced to leave a place (e.g. for economic reasons, war, environmental threat). While their sense of place would make them resist, this may not be a choice, thus leading to disruption of attachment. *Pull and move* refers to an attraction or pull towards places, where senses of place can be one pull factor. There is no push factor and thus no force, the movement has been a decision. Thus, it results in some form of integration, either through places offering complimentary amenities, offering some form of spatial or social continuity, and/or belonging to what is considered “home” (Di Masso et al., 2019).

Finally, the framework highlights the dynamic context of the nexus (arrows indicating an ongoing process), because the nexus between mobility as well as immobility and senses of place is very fluid (Di Masso et al., 2019) across (nested) spatial and temporal scales (Gottwald et al., 2024). The relationship between people and places can be changed rapidly or slowly over time and happen in different relation to the life stage (e.g. youth or retirement migration) as well as from different time perspective (past, present or future, e.g., future mobility intentions) (Di Masso et al., 2019).

3. Methods

Methodologically, we followed Preferred Reporting Items for Scoping Reviews (PRISMA) guidelines <https://www.prisma-statement.org/scoping> (Munn et al., 2018). We queried the Web of Science database with a search string containing terms related to senses of place, mobilities and the nexus (see [Supplementary Material A.1](#) for full search string). The search string was applied to Abstract, Title and Keywords on March 24, 2022, limited to peer-reviewed articles in English, and returned 1358 papers. Abstracts of the papers were screened to ensure that they were reviewed and published in an academic journal, reported on empirical data (i.e. excluding reviews, conceptual papers or critical commentary), and studied the nexus between senses of place and mobilities (full decision tree criteria provided in [Supplementary Material A.2](#)). As a result of abstract screening we have chosen 276 papers for

further analysis. Subsequently, the full articles were screened, which returned a final set of 163 papers (Supplementary Material B). This approach has few limitations. Key words used in the search string are limited to the mostly used terms in the existing literature, and we may have overlooked niche or less used terms. The reviewed papers are limited to peer-reviewed articles in English meaning that papers published in other languages which could provide a valuable input to our study are excluded.

The assessment of the nexus between senses of place and mobilities is based on the introduced framework (Fig. 1), which addresses: a) information on mobilities; b) people-place relationships; c) the nexus of both. Additionally we assessed: a) descriptive information about the article and the authors, b) methodological approaches (see [Table 1](#) for more details on categories and specific items). Five of the authors have coded simultaneously the first 10 % of papers, and response categories and items were clarified and adopted where inconsistencies were found. Coding by multiple authors was used to assure the consistency between readers who were categorising the papers (Ives et al., 2017). After multiple coding we divided all papers between the authors and coded them individually.

4. Results

4.1. Overview

The papers selected for analysis, based on the aforementioned criteria, span the period from 1996 to 2022. Research that could be situated at the nexus between senses of place and mobilities increased after 2017 (69 % of papers come from 2017 onwards, Fig. 2). The empirical research has been biased towards Europe, Northern America, Asia and Australia. Authors belong to various disciplines with a large share of papers from tourism related disciplines (24 %) and geography (19 %). Other disciplines researching this topic include: psychology (14 %), environmental studies (11 %), sociology (11 %), landscape or urban planning (7 %) and others (14 %), such as economy or anthropology.

4.2. Mobilities

Migration was the most researched mobility type (34 %), followed by tourism (25 %) and mixed mobility types (15 %). Least studied were virtual, imaginative travel and communication (6 %), immobility (10 %) and daily movement (10 %) (Fig. 4). Studies concerning migration include forced (e.g., Bazrafshan et al., 2021; Drozdowski, 2007; Kirkwood et al., 2013) and voluntary migration (Carton & Thissen, 2009; Kim et al., 2015; Trąbka, 2019). The second refers to different types of voluntary migration related to work (Lynnebakke, 2021; Thulemark, 2017), education (Chow & Healey, 2008; Cicognani et al., 2011), retirement (Spina et al., 2013), and rural-urban migration (Ngo & Brklacich, 2014; Njwambe et al., 2019; Pedersen, 2018; Riethmuller et al., 2021; Simões et al., 2020). The category of tourism includes papers on the relation between emotional reactions of tourists to landscape change (Butler et al., 2021; Marshall et al., 2019; Wu et al., 2020), on achieving environmentally responsible behavior for tourists mediated via place attachment (Confente & Scarpi, 2021), as well as on the relationship between senses of place and the intention to revisit (Abou-Shouk et al., 2017; Scarpi et al., 2019; Stylos et al., 2017). Research referring to mixed mobility types is rather focused on studying the phenomenon, not the mobility type itself. This includes, for example, the process of lifestyle migration and growing older on remote island (migration and immobility of the islanders) (Sampaio & King, 2019), the geographies of well-being (migration and immobility in the urban-rural context) (Berg, 2020), virtual reality as a tool for environmental conservation and fundraising (virtual travel and tourism) (Nelson et al., 2020) and the concept of movement in relation to place-based narratives with the use of Story Walks (daily movement and virtual travel) (Powell, 2020).

Table 1
Coding themes, categories and items.

Theme	Category	Items
Descriptive information	Discipline	Sociology, Geography, Tourism/ education/business/administration, Psychology, Landscape/urban planning, Environmental studies, Other
	Year Country	
Mobilities	Types of mobilities	Daily movement, tourism, voluntary migration, forced migration, immobility, virtual, communicative and imaginative travel, mixed
	Place change	Yes/No
People-place relationships	Terms used for people-place relationships ^a	Sense of place, sense of community, topophilia, biophilia, place attachment, place identity, place meanings, rootedness, community attachment, place connectedness, nature connectedness, neighborhood attachment, destination attachment, place relatedness, human-nature relationship, people-place connections, landscape attachment, other
	Senses of place contexts ^b	Personal context, community context, physical environment context, personal and physical environment context, community and physical environment context, personal and community context, tripartite, not specified
Nexus	Directionality	Sense of place influencing mobility, mobility influencing sense of place, both (mobility and senses of place influencing each other)
	Modes of interaction	Push and resist; pull and resist; push, pull and move; pull and move, multiple options, not relevant
Methodological details	Temporality	Yes/No
	Data type	Qualitative, Quantitative, Mixed
	Method of data collection	Interviews, Open-ended interviews, Semi-structured interviews, Structured surveys/questionnaires, Free-response surveys, Direct observation, Focus groups, Creative methods, Biophysical assessment, Textual analysis, Visual methods, Mixed-methods approach, Other
	Type of respondent studied	Individuals, Households, Group, Community (people somehow related to each other, knowing each other), Society (population of city or country), Stakeholders, Interest group
	Sampling	Population, Stakeholders, Interest group
	Unit of analysis for place	Local community (neighborhood/village), city/metropolitan area, region, country, continent
	Method of analysis	e.g. discourse analysis, statistical analysis etc.
	Mobile methods	observing people's movement, participating in the movement, time space diaries, methods for exploring imaginative and virtual mobilities

^a *nature-connectedness* and *human-nature relationship* were excluded in the final screening, because papers which engaged with those terms did not relate to specific place.

^b To assess which dimension was most prominent in the study we focused on the discussion part, or if non-existent, on the result and/or conclusion section, to avoid overly general or short definitions provided in the introductions.

Examples of studies on daily mobility are investigating the relationship between senses of place and daily commuting (Gerber et al., 2020), as well as senses of place created by residents (Ikalović & Chiesi, 2019) and migrants (Tang et al., 2021) in the context of recreation (Lauckner et al., 2022) and lifestyle (Ikalović & Chiesi, 2019). Immobility studies looked at, for example, people staying despite place disruption, such as climate change (Adams, 2016; Khanian et al., 2019),

disaster (Madhuri et al., 2015; Phillips et al., 2012) or disaster risk (Blondin, 2021; Steimanis et al., 2021; Wiegel et al., 2021). Immobility is also researched in the context of attachment to rural areas (Gielsing et al., 2017; Husa & Morse, 2022; Stockdale et al., 2018; Thomas et al., 2016).

Less than one quarter of all articles included place change in their research. Research on immobility had more articles on place change (59 %) than without. Around one third of articles on daily movement included place change. Studies on virtual, imaginative travel and communication had no example of place change, and of the studies on migration, tourism and mixed mobility types, each had less than 20 % of the articles on reconfiguration of place (Fig. 3). Papers referring to place change often referred to urban change (von Wirth et al., 2016), environmental and landscape change (Askland & Bunn, 2018), or natural disaster (Knez et al., 2018).

4.3. People-place relationships

Most articles used the term *place attachment* to describe people-place relationships (64 %), yet this varied across topic areas. Almost 80 % of articles on tourism and immobility use this term, whereas 38 % of the articles on daily movement do so. Furthermore, a variety of terms is used, such as *sense of place* (8 %) and *place identity* (6 %). Some terms are exclusively used within the study of specific mobility types, such as *destination attachment* in tourism or *place connectedness* in virtual travel research (Fig. 4).

People-place relations are most frequently studied including the personal, physical environment context and community dimension (*tripartite*) (33 %), and in the majority of mobility types, except tourism and virtual travel where *personal and physical environment context* and *personal context* are more frequently studied (32 % and 24 % respectively, Fig. 5). While many articles include the *physical environment context*, the extent to which this is done differs considerably. Almost two third (61 %) of all articles focused on the *physical environment context* of senses of place, in combination with *personal context* (n = 24), *community context* (n = 13), or both dimensions (*tripartite*, n = 53). Relatively few articles looked only at the *physical environment context* (n = 10). The extent to which the physical or environmental characteristics are described or explored differed considerably between the studies. Because of the low threshold for classifying a study to the physical environment context, articles which just mention key terms are included. Other studies were much more explicit in their reference to the physical environment. For example, Drozdowski (2007) analyzed a place in Australia where a characteristic Polish natural environment has been rebuilt by Polish migrants, making reference to specific types of trees, e.g. fir tree. Forty-one articles with a physical environment context employ some sort of place attachment scale – compared to 77 articles in the total sample.

4.4. Nexus

The interplay between senses of place and mobilities can take into account different directionalities, where one influences the other or they mutually influence each other, the latter being the least studied. Overall, most studies looked at a unidirectional relation equally distributed between senses of place influencing mobility (43 %) and vice-versa (42 %), only 15 % considered a bi-directional relation. Mobility influencing senses of place creation dominated in virtual travel (56 %), migration (57 %), and daily movement (56 %) (Fig. 6). In the context of migration studies, mobility influencing senses of place creation can be illustrated by one of the examples of Polish refugees who aimed at creating place in Australia that reminded them of their time by the Vistula river and at the same time created senses of place by managing the scout community as well as planting the same trees they knew from Poland (Drozdowski, 2007). Senses of place influencing mobility dominate in immobility research (94 %) and tourism (44 %).

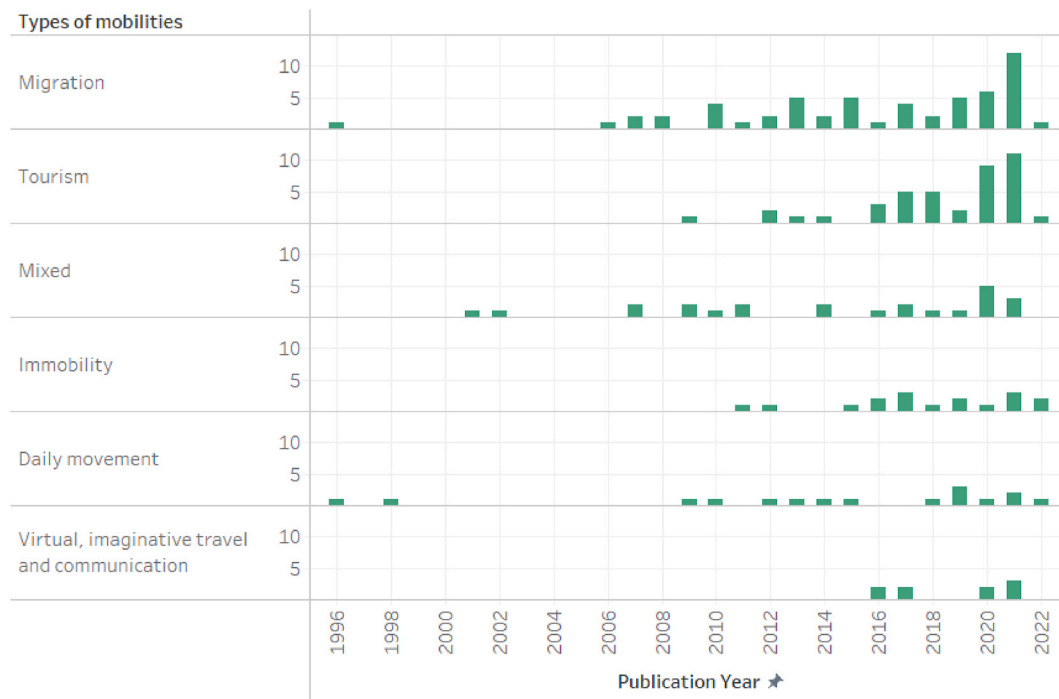


Fig. 2. Number of papers in each mobility category per year.

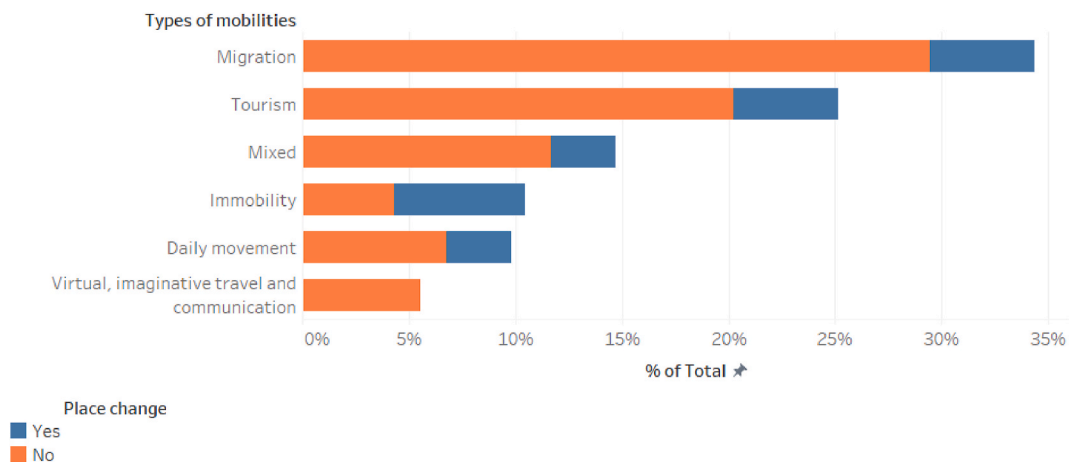


Fig. 3. The share of papers that referred to the influence of place change on the nexus between senses of place and mobilities; cross-table can be found in Supplementary Material C.1.

The different articles revealed various drivers of mobilities that can be distinguished into *push* and *pull*: drivers that push people away from a place, and those that pull people towards new places. These can occur simultaneously. A special case is the resistance to these drivers, hence immobility. The results show that in the majority of articles (69 %) and all mobility types the *Pull and move* interaction dominates, with the exception of immobility where studies are about the resistance to either *push* or *pull* factors (Fig. 7). *Pull* factors include rural youth out-migration (Carton & Thissen, 2009; Njwambe et al., 2019; Pedersen, 2018), transition from home location to university town (Chow & Healey, 2008; Cicognani et al., 2011), seasonal homes (Van Patten & Williams, 2008) and migration (Moores & Metykova, 2010; Trąbka, 2019) or seasonal work (Thulemark, 2017; Tuulentie & Heimtun, 2014). Drivers pushing people away were for example events related to climate change such as series of flood and rain events, hurricanes (Madhuri et al., 2015; Phillips et al., 2012) and others (Blondin, 2021; Kelman et al., 2017; Khanian et al., 2019), as well as living around a hazardous facility (Hou et al.,

2019) or occurrence of earthquakes caused by gas exploration (Jansen, 2020). Resistance to *push* and *pull* factors may be caused not necessarily by the lack of resources but by place attachment itself (Adams, 2016; Wiegel et al., 2021).

The majority of papers lack consideration of temporality (72 %, Fig. 8). Temporality is given the least attention in tourism studies (12 %), while it is most considered in mixed mobility types (42 %), daily movement (31 %), and immobility (35 %). Temporal aspects were studied in relations to past events and their effects on senses of place or mobilities, and future scenarios. For example, how place change influences senses of place illustrated by relationships with place before and after landscape changes, such as fires (Butler et al., 2021) or how place attachment is influencing mobility, e.g. in the context of staying processes despite disaster risk (Blondin, 2021). Some studies looked at future threats and mobility intentions (Jansen et al., 2017), or future time perspective in relation to mobility of the youth to urban centers (Simões et al., 2020).

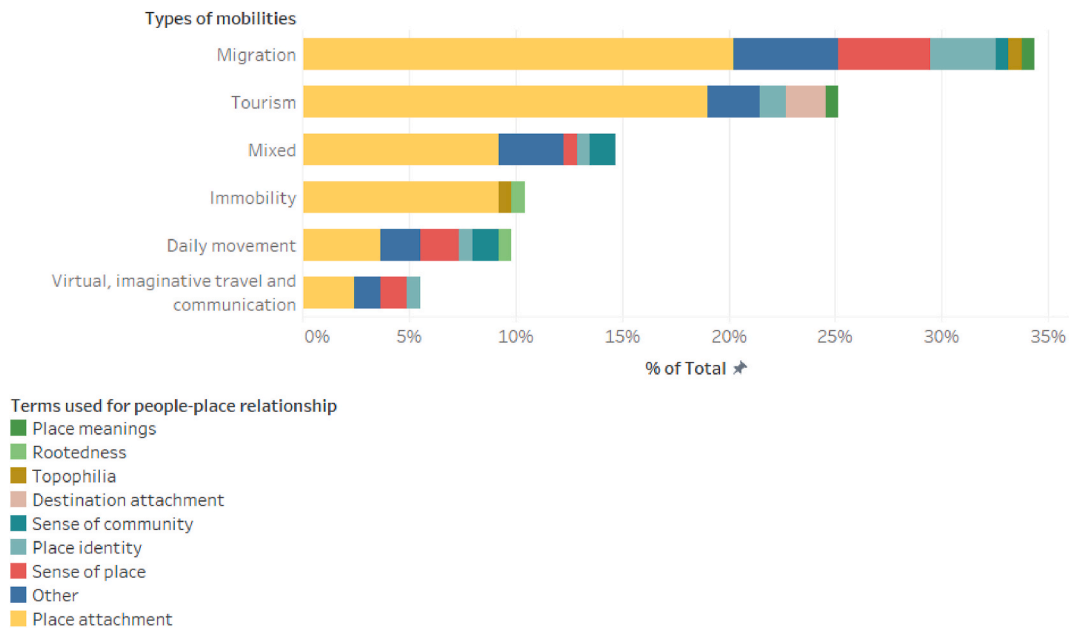


Fig. 4. The diversity of terms used to describe people-place relationships in different mobility type categories; cross-table can be found in Supplementary Material C.2.

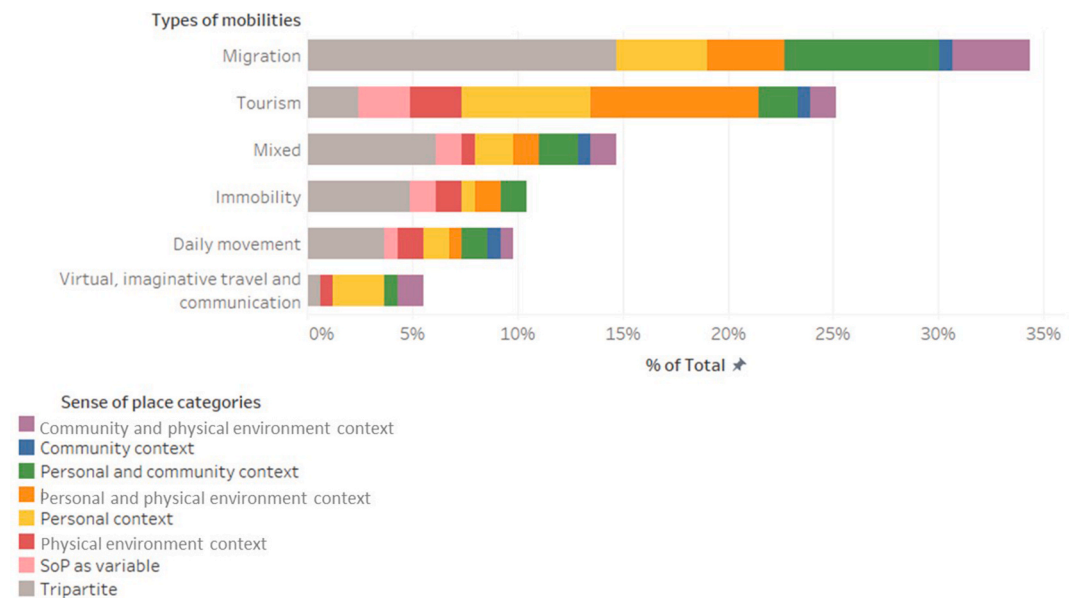


Fig. 5. Senses of place contexts within different mobility categories, cross-table can be found in Supplementary Material C.2.

Studies focusing on mixed mobility types and temporal aspects often study place attachment in relation to migration and staying processes (Sampaio & King, 2019). Research on daily movement focuses on impacts on attachment after changes of everyday life environments, such as workplace relocations (Gerber et al., 2020), park renovation (Cheng & Chou, 2015), or political transformation (Hodúlová, 2021).

4.5. Methodological details

Of all articles, there is an equal distribution of quantitative and qualitative methodological approaches (48 % and 44 % respectively), with around 7 % employing a mix of both qualitative (e.g. content analysis, mind maps, grounded theory approach) and quantitative methods (e.g. structural equation modelling, correlation analysis,

hierarchical multiple regression analysis). Qualitative methods were dominant in studies on migration (70 %), mixed mobility types (58 %), and daily movement (56 %), whereas quantitative methods dominated in research on tourism (83 %), immobility (65 %) and virtual travel (78 %). Data was collected mainly through structured surveys (48 %), followed by mixed-methods – yet not necessarily a mix of qualitative and quantitative approaches – (26 %), and interviews (23 %). Structured surveys were mainly used in studies on tourism (42 %), followed by migration (17 %), and immobility, and mixed mobility types (12 % each). Simultaneously, it was the dominant method in research on tourism (81 %), immobility (53 %), virtual, imaginative travel and communication (78 %). Mixed methods approaches were mostly used in migration studies (40 %), research on mixed mobility types and daily movement (both 14 %). Art-based methods, such as visual and creative

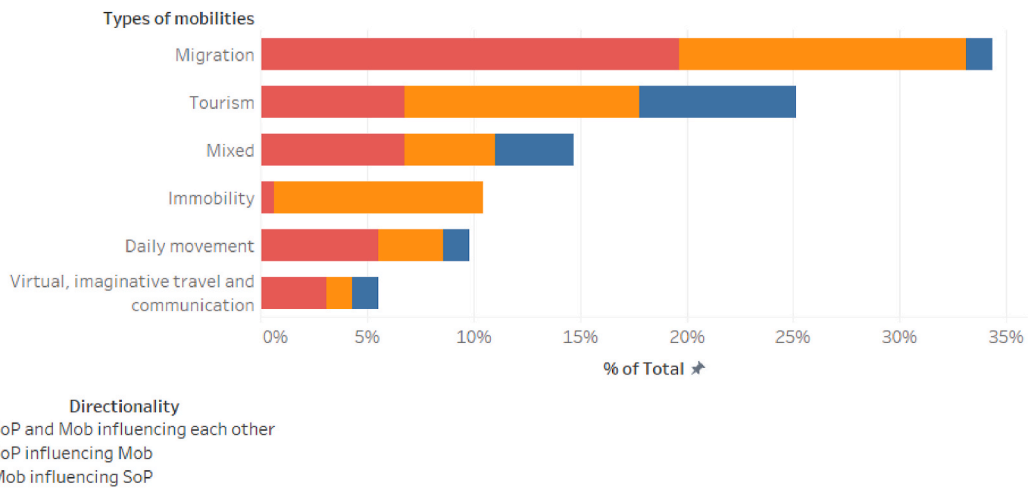


Fig. 6. Various types of directionality between senses of place and mobilities within different mobility types. Legend: SoP - senses of place, Mob - mobilities; cross-table can be found in Supplementary Material C.3.

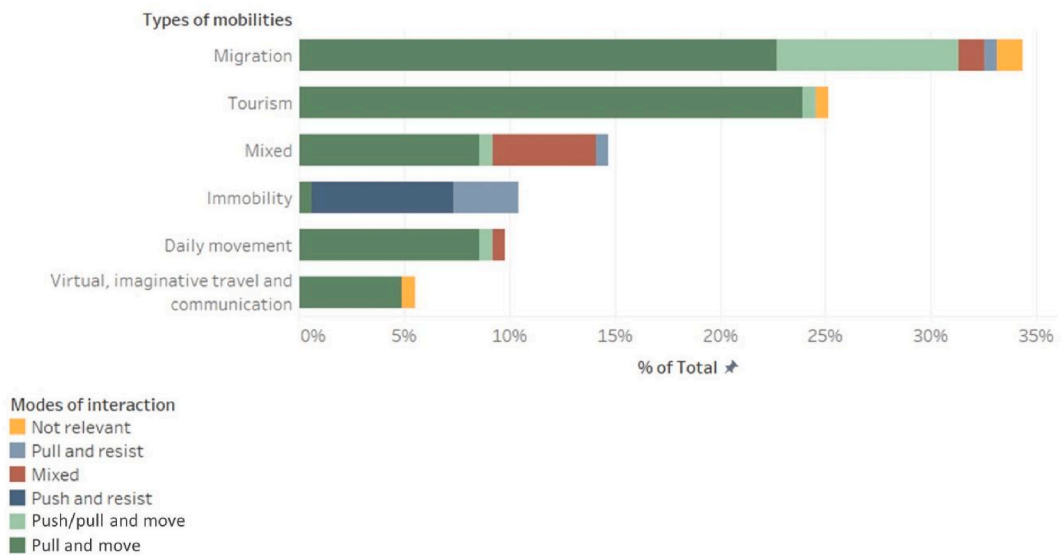


Fig. 7. Various interaction modes between senses of place and mobilities within different mobility types; cross-table can be found in Supplementary Material C.3.

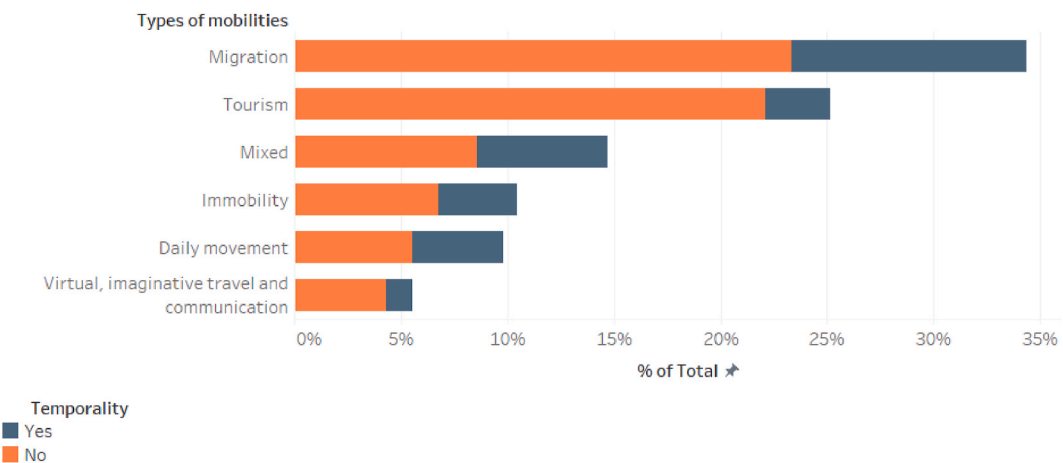


Fig. 8. The share of coded papers which referred to temporal aspects of the relationship between senses of place and different mobility types; cross-table can be found in Supplementary Material C.3.

methods, and ethnographic methods such as direct observation were used as well (cross-table can be found in Supplementary Material C.4).

Mobile methods were used in 17 % of all articles. Of all 29 articles which employed mobile methods, 38 % used some form of observing people's movement, followed by 28 % using methods for imaginative and virtual mobilities, and in 6 articles researchers participated in the movement. Only one study used time-space diaries (Milbourne & Kitchen, 2014), and three studies combined participant observation and participation, for example by observing participants of a canoe tour, participating in the tour and engaging in group discussions during the excursion (Mullins, 2009). Observation studies focused, for example, on people's activities in their meeting places (Kong et al., 1996), or everyday settings (McLaughlin & Jesilow, 1998). Usually, observation studies are combined with some other non-mobile data assessment method, such as interviews. Furthermore, mobile methods were very diverse in articles on virtual and imaginary mobilities, these include rating of place attachment for imagined places (semi-structured survey, Ratcliffe & Korpela, 2016), spatial mapping exercises to assess important places for foraging before and after a fire (Butler et al., 2021), or exploration of social media use through surveys to explore how residents connect to other neighborhoods outside their communities (Shaw et al., 2020). Mobile methods employing active participation, usually draw on walking interviews, for example to explore senses of place of non-local students (Holton, 2015). Mobile methods were mostly used in research of migration (7 %), followed by daily movement (4 %) and mixed mobilities (3 %). However, these methods are employed in 44 % of all research on virtual mobility, imaginative travel and communication (cross-table can be found in Supplementary Material C.4).

Individuals were the most studied type of respondent in all mobility types (80–100 %), followed by households (5–17 %). Community, society and group were the least studied respondent types. Most mobility types used interest groups as sampling groups (63–90 %), except immobility, which studied population as sampling group (56 %). Region was the unit of analysis for places studied mostly in migration (36 %), and mixed mobility types (41 %). Country was studied mostly in tourism research (26 %) as well as virtual travel (50 %). A city/metropolitan area was investigated mainly in daily movement research (56 %) (cross-table can be found in Supplementary Material C.4).

5. Discussion

The aim of this study was to systematically map existing knowledge gaps and future research directions. Few of the studies directly engaged with the nexus between senses of place and mobility, but were rather targeted towards a very specific mobility - senses of place configuration. We identified research supporting essentialist, progressive, and hybrid perspectives. The essentialist perspective emerged in studies where individuals chose to remain in place despite disasters (Madhuri et al., 2015) or ongoing disaster risks (Blondin, 2021). A particularly illustrative example is a study on Polish war refugees in Australia, who recreated familiar landscapes from their homeland—demonstrating an essentialist response to displacement (Drozdowski, 2007). The progressive perspective, on the other hand, was more evident in cases of voluntary mobility, such as seasonal migration to second homes (Van Patten & Williams, 2008) or for temporary employment (Thulemark, 2017; Tuulentie & Heintun, 2014). In these instances, mobility did not disrupt the sense of place, but rather led to a form of multi-centered integration (Di Masso et al., 2019). Some studies, particularly those taking a life-course perspective, demonstrate how both perspectives can be present (Stockdale et al., 2018). This underlines the importance of frameworks such as Di Masso et al. (2019) that include a wide spectrum of configurations of the nexus acknowledging the spatial and temporal dynamics. Based on the developed analytical framework and the scoping literature review results, we derive five main topics for further discussion: 1) the interdependency of mobility types; 2) virtual mobility; 3) temporal dynamics; 4) the different dimensions of place; 5) mobile

methods.

5.1. Interdependency of mobility types

The interdependency of mobility types has been addressed in only 15 % of the articles (mixed mobility types). These included, for example, how tourism activities have led to residential migration (Tuulentie, 2007), or research on the relation of mobility types to human connection with nature (Duvernoy & Gambino, 2022). Yet, the largest share is dedicated to the relation between mobility and immobilities (Supplementary Material C3). This is in line with Adey (2006, p. 86), who states that mobility systems are “built upon dialectical relationships between mobilities and relative immobilities”. There is a need to acknowledge and integrate the interdependence of different mobility types into the nexus research. For instance, residential immobility (staying in one place) does not preclude daily physical mobility, or physical immobility—such as during COVID-19 lockdowns, it can co-exist with virtual mobility, which even increased during the lockdowns (Jarratt, 2020). Different forms of mobility, including migration, daily movement, virtual travel, and imaginative travel, coexist and influence one another, shaping the complex and fluid nexus of senses of place and mobilities. Rather than examining mobility types in isolation, research must address their interconnections, both theoretically and empirically, to fully capture the dynamics of *fixity* and *flow* (Di Masso et al., 2019).

5.2. Virtual mobility

Virtual mobility coexists with other types of mobility, for example when people commute to work, travel, or migrate to a new place (see Bork-Hüffer, 2016 for a specific case of virtual mobilities and migration; and Kellerman, 2006 for an overview of different configuration between physical and virtual mobilities). Virtual, imaginative travel and communication mobilities studies explore the contribution of digital places to the senses of place construction (Gurney et al., 2017), digital media choices and use during the relocation and settlement process (Bork-Hüffer, 2016), or social media usage for community connectedness in local and global scale (Shaw et al., 2020).

Virtual and imaginative mobilities were the least researched mobility types (6 % of reviewed articles). Imaginative travel includes the evocation of place memories and respective attachments, shown to predict imagined restorative value (Ratcliffe & Korpela, 2016). Furthermore, imaginative travel can be a useful element in forecasting and planning activities addressing landscape changes, for example through the projection of future visioning (Hamann et al., 2022), hence imaginative travel can be effectuated across space and time. Thus, acknowledging the omnipresence of the Internet and the potential of imagination for well-being and planning, both virtual and imaginative mobilities need to be stronger emphasized in future research.

5.3. Temporal dynamics

The temporal dimension was assessed in relatively few of the reviewed articles (28 %), yet time – as in spending time – repetitions, and temporal scale, is a determining variable when researching a place, as Cresswell (2018) has illustrated in his description of Maxwell Street. Configurations of mobilities and place relations can change over time (Di Masso et al., 2019). Apart from the category of mixed mobility types (42 %), it was mostly studied in articles on immobility (35 %) or daily movement (31 %). As mentioned before, studies on immobility engage with the negotiation between staying or moving – which are temporally dynamic, looking at past, present, and sometimes even future perspectives (see e.g. Butler et al., 2021; Jansen et al., 2017; Simões et al., 2020; Stockdale et al., 2018; Thomas et al., 2016).

Studies on daily mobilities that engaged with temporalities focused rather on external drivers that led to changes of workplace (Gerber et al.,

2020), recreational spaces (Cheng & Chou, 2015) or residential spaces (Hodúlová, 2021). Temporal aspects in researching the relationship between senses of place and mobilities can be assessed with a variety of methods, such as the life-course approach in narrated interviews (Bailey et al., 2021; Sampaio & King, 2019), interviews at different time periods (Chow & Healey, 2008), multi-generational interviews (Sarrica et al., 2016), use of time-space diagrams in interviews (Ikalović & Chiesi, 2019), trans-generational analysis of place attachment (Chen et al., 2021), focusing on temporal topics such as return experiences (McHugh & Mings, 1996) or childhood memories (Bazrafshan et al., 2021). There is a need to integrate the temporal dynamics of people-place relations given the increasing pace at which environmental change is influencing all geographic regions of the world, and the associated implications for human movement (Hauer et al., 2020).

5.4. The different dimensions of place

While studies in this review highlighted the importance of place context, only a few studies engaged in deeper descriptions of the biophysical context of place (6 %, 10 studies). Yet, the role of biophysical place characteristics in attachment processes is critical as they provide the opportunities and limitations for meaning creation (Ingalls et al., 2016; Masterson et al., 2017). In relation to mobilities, spatial settings similar to home place may empower migrants and help the settlement process (e.g., Biglin, 2020; Drozdowski, 2007). Additionally, the review showed that the methodological approach may already define to what extent place information is excluded. For example, the use of place attachment scales (Turki and Amara, 2017; Abou-Shouk et al., 2017) may include references to place characteristics but by choice of method do not further engage with the place's specific biophysical characteristics. These scale items may range from a rather generic statement, such as "I feel 'X' is part of me" (Williams & Vaske, 2003) to more specific descriptions such as "unusual landscape features, unique heritage sites, variety of natural attractions" (Abou-Shouk et al., 2017). Exceptions are studies that combine scales of place attachment with open-ended questions related to place meanings (Gieling et al., 2017; Quinn et al., 2018).

Furthermore, the review showed that there is a relatively low share of literature on the nexus between senses of place and mobilities that engages with landscape or place change (22 %). Place change was most often considered in the studies related to immobility, resistance and staying processes (14 %), for example, when people's decision to stay despite environmental risk was related to place attachment and values (e.g. Jansen, 2020; Wiegel et al., 2021). In the era of global climate change, more and more people will be exposed to place disruption and forced to move (De Reuver et al., 2020; Manzo et al., 2023; Raymond et al., 2021). The review identified a lack of engagement with place change from a systems perspective of senses of place being dynamically related to mobilities. For example, viewing "place as a site of social-ecological assemblage" (Williams & Miller, 2020, p. 23), where place change, mobilities and senses of place are dynamically interrelated within a complex system.

5.5. Mobile methods

Relatively few studies (18 %) made use of mobile methods, as defined and advocated by several authors (Büscher et al., 2011; Büscher & Urry, 2009; Everuss, 2020). A wide range of mobile methods require active engagement of researchers, or otherwise put, their physical or virtual mobility, for example walking with the interviewee, or being outside observing human or non-human actors, but also tracking participants' movement with digital tools or their virtual mobility (Büscher et al., 2011). The review showed that mobile methods were mostly used in articles on virtual mobilities and imaginative travel (44 % of these articles), and daily movement (37,5 %). Examples include the use of VR technology (Kim et al., 2020), the use of surveys to explore social media

usage (Shaw et al., 2020), or attachment and restorative capacities of imagined places (Ratcliffe and Korpela, 2016), or for daily mobility, spatial analysis of map-based surveys (Tang et al., 2021). Mobile methods ranged from quantitative, as these previous examples show, to qualitative approaches. For example, Vannini (2011) examined daily movements and immobilities in the context of ferry-dependent communities, drawing on extensive ethnographic field work including participation of the ferry journeys. In another example, Milbourne and Kitchen (2014) assessed complex forms of rural mobilities acknowledging its relation to place attachment using a time-space diary method. These findings point towards two things: firstly that new phenomena, such as virtual travel, may push us to use mobile methods and also new approaches, for their inherent characteristics, but also because there is no established approach yet. This is especially interesting, giving our pledge for more studies considering interdependence of mobility types and the omnipresence of virtual mobility. Secondly, the low number of studies employing mobile methods, requests empirical proof of the argument by Law and Urry (2004) that these allow to deal with the "fleeting", the "distributed", the "multiple", the "complex", the "sensory", the "emotional", and the "kinaesthetic" of mobilities. This is relevant for the nexus research, as all these adjectives fit as well the nexus, as Gottwald et al. (2024, p.1) have explored in their list of research challenges: "1) accounting for power dynamics, inequalities and motility; 2) doing justice to more-than human actors; 3) integrating multiple and sometimes nested spatial scales; 4) considering temporalities of place and mobilities, and 5) embracing multisensoriality". Thus it would be an emergent research question to explore the potential of the range of mobile methods.

6. Conclusions

The importance of assessing the relationship between senses of place and mobilities is increasingly recognized (Di Masso et al., 2019; Raymond et al., 2021; Salazar, 2023). In order to better capture, study and understand the interplay between senses of place and mobilities the authors of this paper developed an analytical framework, based on which, empirical studies on the nexus were reviewed. It is shown that several aspects of this relationship in empirical research remain undiscovered. Based on the results, future research should: 1) embrace the complex interdependencies of different mobility types within the nexus, 2) stronger include virtual mobility and imagination acknowledging the omnipresence of the Internet and virtual space, 3) integrate the temporal dynamics of people-place relations given the increasing pace at which environmental change is influencing all geographic regions of the world, and the associated implications for human movement, 4) in relation to the previous point acknowledge and address place and its physical characteristics more strongly, and 5) strengthen the use of mobile methods to deal with the inherent characteristics of mobilities.

CRedit authorship contribution statement

Iga Kołodyńska: Writing – original draft, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Sarah Gottwald:** Writing – original draft, Visualization, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Agnieszka Jakóbiak:** Visualization, Formal analysis. **Jasmin Otto:** Formal analysis. **Wiktoria Morawska:** Formal analysis. **Christopher M. Raymond:** Supervision, Conceptualization.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.jenvp.2025.102658>.

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