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# Understanding the role of ‘sense of place’ in the production and consumption of innovation districts

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## ABSTRACT

Innovation districts are purposefully designed places that unite businesses, research institutions, local communities, and cultural assets in one bounded location. While providing numerous benefits, the ultimate outcome of a successful innovation district is the creation of a robust, collaborative, and sustainable innovation ecosystem. Despite their importance, academic comprehension of innovation districts as dynamic places, particularly the relationship between person and place, remains limited. Accordingly, this research addresses this gap by exploring innovation districts through the theoretical lens of sense of place. In doing so, this paper seeks to reframe the understanding of the person-place relationship by drawing on concepts including place attachment, place identity, place dependence, and social bonding. An original propositional framework is introduced, which positions sense of place of an innovation district as an outcome of established (place dependence, place identity, place attachment) and emerging (functional, cognitive, and affective social bonding) place dimensions. Furthermore, the framework delineates critical developmental stages and anticipates innovative and social outcomes associated with these districts. Conceiving sense of place within innovation districts as a holistic consequence of their design, management, and utilisation not only enhances these districts’ economic and social vitality but also ensures their sustainability and resilience in the face of changing economic and social conditions.

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## Introducing innovation districts

Innovation is a critical battleground in the fight for global competitiveness (Leon, 2008). This has never been more apparent than in the wake of the COVID-19 pandemic, with innovative capacity a vehicle for economic stability and resurgence (Yates, 2022). Disruption to global networks has made the all-or-nothing obsession of scaling up by creating large multinational enterprises a much riskier ambition (Beaudry et al., 2021). Instead, pursuing localised innovation-enhancing activities that will help build robust economies is seen as a more realistic path to success (Donegan & Lowe, 2020). On the path to a robust economy, many intermediary benefits are realised, for example, increasing economic resilience in local areas (Boyer et al., 2021), creating new localised

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employment (Andrews, 2019; Wray, 2020), helping to level up regions (Moonen et al., 2021), and acting as a cornerstone for the renewal of urban locations (Lawrence et al., 2019) and traditional industries (Gifford et al., 2021). As innovation strategy becomes closely tailored to the system that it intends to support (Beaudry et al., 2021), innovation becomes more effective at the localised level where influence can be neatly bound within geographic sub-spaces, for example, innovation districts (Donegan & Lowe, 2020) especially in urban areas (Moisio & Rossi, 2020).

Despite their relative newness, innovation districts have become an essential tool of economic development policy (Kayanan, 2022). The rapid growth in innovation districts, spurred by the successes of early models, including Barcelona's 22@District or Boston's Waterfront Innovation District (Drucker et al., 2019), distinguishes them as a global trend (Kayanan, 2022). Current figures estimate around one hundred innovation districts globally, with the scope for this number to climb by an additional two hundred districts (Wagner et al., 2019). This expansion is buoyed by a simple finding that organisations operating within an innovation district are more innovative than those not part of one (Boyer et al., 2021).

For several reasons, geographic and cognitive positioning in a purpose-made district results in effective innovation. For example, innovation districts provide access to infrastructure, proximity to markets, favourable policy incentives (Moonen et al., 2021), economies of agglomeration based on labour pools (Delgado, 2020), input sharing, and spillover (Aldieri et al., 2019). Thus, being part of a close-knit innovation locale allows organisations to search for knowledge and solve innovation-based problems more effectively (Reischauer et al., 2021). However, a number of these benefits often go unexploited with curation not matching construction (Mulgan, 2019), that is, a focus on material design of the district at the expense of less tangible aspects of the space (Esmailpoorarabi et al., 2020). While the diffusion of innovation is shaped by local infrastructure (Fischer et al., 2022), successful innovation districts require not only state-of-the-art buildings (Webster et al., 2021). They need spaces that embed core innovative values, including collaboration, sharing, reciprocity, and creativity (Montanari, 2019). Achieving such a balance between material design and spatial practice in innovation districts becomes necessary to encourage relationships between actors and spaces (Jiménez & Zheng, 2021).

The imbalance between design and practice is partially due to the design, implementation, and management of innovation districts being a new practice area (Lawrence et al., 2019), with academic interest only now matched by industry and policymakers (Beaudry et al., 2021). When aspects of place are used, they are often used incorrectly or interchangeably (Marques et al., 2015), with debate stalling due to a lack of clarity of meaning (Bleam, 2018). To understand the relationship between contextual conditions and innovation activity (Barrutia et al., 2014), sights must be set beyond the components of the system alone (Mack & Mayer, 2016) and focus on how these components are organised to support innovation effectively (Sharma et al., 2012).

Overcoming previously identified explanatory inadequacies (Herstad et al., 2019), this paper addresses, conceptually, innovation district literature through the lens of place psychology to 'bridge existing theories in interesting ways, link work across disciplines, provide multi-level insights, and broaden the scope of our thinking' (Gilson & Goldberg, 2015, p.128). In doing so, the paper questions, redefines, and

expands the oft-static conceptualisation of place to show it as a more integral part of innovation district success. Specifically, the paper (1) highlights the role place plays within the innovation district; (2) applies the notion of sense of place to the innovation district; and (3) defines the dimensions responsible for sense of place development within the innovation district. It achieves this by conceptualising relevant literature from management and environmental psychology disciplines, including innovation ecosystems, ecosystem governance, and sense of place and its core dimensions.

## The innovation ecosystem

Innovation districts rely on networks of talent, industries, and urban design (Burke et al., 2022; Kayanan, 2022) to provide coherence across agents' activities (Roundy et al., 2018). The innovation ecosystem is a commonly used term to describe these networks and includes actors, activities, artefacts, institutions, and the relations between these components (Granstrand & Holgersson, 2020). The origins of the innovation ecosystem can be traced from weaknesses in previous network thinking (Scaringella & Radziwon, 2019). For example, clusters and strategic alliances do not always capture the articulation between formal and informal components in the system (Cohendet et al., 2021), while innovation systems focus on a more static view of the network (Rong et al., 2021). Overcoming these weaknesses, the innovation ecosystem shows the complex, adaptive system that maps and facilitates the interaction and interdependence between resources essential for successful innovation performance (W. Liu et al., 2021). Furthermore, innovation ecosystem thinking allows for a more focussed approach, specifically in terms of geography, with Yanzhang et al. (2021) highlighting the ability to explore innovation ecosystems at an appropriate level, for example, cluster, city, or country.

Aligning with the opening discussion and following Yanzhang et al. (2021) suggestion, a micro-level ecosystem approach is adopted. This ecosystem exists on a local/regional level with critical challenges, including upscaling promising ventures, engaging with and establishing links with larger stakeholders (Pombo-Juárez et al., 2017), implementing technology to diffuse innovation and community interactions, and attracting new organisations and individuals to the district (Surie, 2017). To help achieve these goals, a robust micro-level ecosystem should outline the system's physical components, provide a foundation for human and social capital, culture, and place, and map the relationships between these pieces (Lawrence et al., 2019). As the complexity of networks increases, so does the need for an effective ecosystem approach (W. Liu et al., 2021). When ecosystems lack this complete comprehension, aspects of the innovation process, such as social, cultural, administrative, political, and environmental issues, may be overlooked (Meissner & Kotsemir, 2016). Such a sedentary approach (DiMasso et al., 2019) creates relatively static conceptualisations of the actors, resources, and environments involved in the innovation process (Sullivan et al., 2015). This can lead to an over-simplified approach to place-bound innovation dynamics (Bunnell & Coe, 2001). Rather, the geography of innovation is not static (Fischer et al., 2022); instead, place should be treated as a legitimising factor that allows for the adaptation and coevolution of actors in the environment (Boyer et al., 2021).

Places are more than just physically bound spaces. They provide a shared and notional understanding of reality (Foley, 2007) and allow for the production and accumulation of knowledge in an interactive, social context (Acs et al., 2014). Place, therefore, becomes a critical component in the innovation process, not necessarily in determining outcomes but in generating, developing, and promoting innovative processes through its relationship with actors (Berger & Brem, 2016). One way to verbalise this relationship is sense of place, which can be described as a cultural understanding of behaviours and interactions organised around, but not defined by, spatial features (Harrison & Dourish, 1996).

## Understanding sense of place

A sense of place is a relationship between a person and a place that develops from the unique character of a place (Pancholi et al., 2019). Understanding and leveraging sense of place in innovation districts can be particularly valuable, with sense of place shown to be a positive predictor of creativity (Zhang et al., 2023), business development (S. Liu & Cheung, 2016), community participation (Ellery & Ellery, 2019), and entrepreneurship (Redhead & Bika, 2022). However, applying sense of place as a concept can be difficult, with a lack of conceptual consensus among scholars causing the term to be interpreted and operationalised differently across disciplines (Nelson et al., 2020).

To contextualise to this discipline, this paper borrows from seminal environmental psychology literature, notably Jorgensen and Stedman (2001), who identify three dimensions of sense of place. These reflect behaviour within this place compared to other places, beliefs about the relationship between self and place, and feelings towards the place. This multi-dimensional approach cited more than 2,500 times, is more commonly reported as place dependence, place identity, and place attachment, respectively (see, for example, Christiaanse & Haartsen, 2020; Costlow et al., 2020; Davis, 2016).

The behavioural dimension of sense of place is termed place dependence. Place dependence (Stokols & Shumaker, 1981) reflects the quality of the place in terms of the availability of social and physical resources that allow goal-directed behaviours to be satisfied. Workplace dependence and corresponding workplace design become essential as they contribute to an individual's functional work needs (Montanari, 2019). Because innovation processes are different, for example, not all innovators require equal intensity of interaction with other actors (Shearmur, 2012), there has been little agreement on the design of functional aspects of innovation spaces and districts. For example, hot-desking and open offices are concepts often associated with innovation spaces but are not necessarily conducive to the innovation process (Pearce & Hinds, 2018).

Place identity defines an individual's identity in relation to their physical environment (Proshansky, 1978). Place-based self-categorisation occurs (Kavaratzis & Kalandides, 2015), allowing individuals to see themselves as a part of a specific category based on, for example, a town, city, or country (Lewicka, 2008). More relevant to the innovation district, workplace identity allows an individual to prescribe a personal and professional identity based on status and distinctiveness in the workplace (Elsbach, 2004). Among other means, workplace identity can form through physical identity markers, such as how an individual chooses to decorate their personal office space or the design and layout of office buildings. A change in the workplace environment can significantly impact the individual's sense of self (Reissner, 2010).

Place attachment can be defined as the positive and negative emotional bonds (Manzo, 2005) that occur between individuals and meaningful environments (Cole et al., 2021). Workplace attachment, a form of place attachment, is the emotional bond resulting from a dynamic interaction between a person and their organisational environment. Workplace attachment can be measured with the Workplace Attachment Scale (Rioux, 2006) using variables including attachment at work, quality of workplace relationships, involvement in organisation life (Scrima, 2015), intensity of attachment, quality of attachment (Scrima et al., 2017), or thoughts of self and thoughts of place (Scrima, 2020).

As stated above, an exhaustive list of dimensions related to sense of place is lacking. While place dependence, place identity, and place attachment are commonly reported, other dimensions reported include but are not limited to affective attachment, social bonding (Kyle et al., 2014; Wynveen et al., 2012); family bonding, friend bonding, socio-cultural attachment, psychological attachment, economic attachment (Dentzman, 2018), community attachment, civic attachment, neighbourhood attachment, and place belongingness (Raymond et al., 2011). Of these, social bonding is regularly reported as a driver of innovation in urban contexts (Herstad et al., 2019), with social architecture necessary to allow access to a broad pool of resources (Alam et al., 2022). Given the noted importance of social interaction in the innovation district (Donegan & Lowe, 2020), social bonding should also be considered a necessary dimension for sense of place to form in innovation districts.

The social aspect of the innovation district consists of key stakeholders within the ecosystem (Benneworth & Ratinho, 2014) and the exchange of knowledge between them (N. Lee & Rodríguez-Pose, 2014). An effective local innovation ecosystem must direct actors and structures to create and maintain social networks, thus creating social and intellectual capital (Nicolopoulou et al., 2017). Existing across the innovation space (Galbaldon-Estevan & Ybarra, 2018), social capital is at the heart of the innovation process (Montresor & Marzetti, 2008) and a vital asset of a successful innovation district (M. P. Feldman & Zoller, 2016). Effective social networks also create spillover, which is the frequent contact between workers, leading to meetings and serendipitous encounters (Owen-Smith & Powell, 2004). This allows for the flow of tacit information and the generation of transformative experiences (Lorne, 2020) in relatively close-knit environments (Shearmur, 2012). Alongside social capital and spillover, social bonding also leads to social cohesion, social connectedness, social control, and social efficacy (Lenzi et al., 2013). Although these benefits relate to the primary stakeholders of an innovation district, they can also extend to others through social dynamism. This can improve social life within the broader community, with social networks strengthened, ties deepened, and new connections generated (Lawrence et al., 2019).

Despite being able to conceptualise sense of place using the operational dimensions identified above, sense of place continues to be an overlooked concept in current innovation district literature (Pancholi et al., 2018).

## Redefining innovation districts

The omission of sense of place becomes problematic given its role in influencing characteristics of place (Esmaeilpoorarabi et al., 2020), for example, quality of place (Vey et al., 2018), authenticity of place (Blakely & Hu, 2019), or creativity of place

(Zhang et al., 2023). Pancholi et al. (2018) confirm this, commenting that a future challenge for innovation districts will be building a sense of place. If this is to happen, though, the current definition and rules around creating innovation districts need to be expanded, with greater integration of place throughout (Pancholi et al., 2018).

While a challenge, the opportunity to redefine innovation districts is one of current significance and in keeping with other contemporary trends in the workplace, such as dematerialisation and de-spatialisation (Montanari, 2019). These trends allow ‘people-place bonds to become dynamically re-configured’ (Devine-Wright et al., 2020, pg. 3), contributing to the emergence of transient and dynamic spaces (Ibert, 2010). In these spaces, individuals form broader social networks with less defined social boundaries (Blakely & Hu, 2019), allowing for increased mobility and interactions across diverse groups (W. Lee & Choi, 2013). However, the increased flexibility afforded by modern place is often juxtaposed against institutionally produced spaces managed by individuals or groups (Farmaki et al., 2020). Resultantly, the attitudes of management stakeholders play a direct role in innovation capacity (Fitjar & Rodríguez-Pose, 2014), with leadership relied upon to develop, diffuse, exploit (Montanari, 2019), and shape the vision of an innovation district (W. Liu et al., 2021). In doing so, pre-determined management narratives and associated symbolic values become embedded in the innovation district, ensuring dominant stories and norms create spatial truth (Massey, 2005). Thus, holistic input from all stakeholders is contrasted against rigid management styles, leading to a discussion about how ecosystems can best be managed (Rong et al., 2021).

A calibrated ecosystem should not be governed by a single leader or controller (Roundy et al., 2018), with professionally-driven systems less likely to elicit a sense of place than community-driven systems (Ellery & Ellery, 2019). Instead, the ecosystem should allow all stakeholders a chance to interact in a beneficial, organic manner (Boyer et al., 2021), reflecting top-down and bottom-up styles (McKelvey & Saemundsson, 2018), formal and informal sources of knowledge (Barrutia et al., 2014), and strong and weak network ties (Kayanan, 2022). Therefore, boundaries between production and consumption of space should become blurred (Lorne, 2020) with information coming from upper-ground, middle-ground, and underground sources (Boyer et al., 2021). This leads to users converging on a shared understanding of the place (Dennis et al., 2008). However, it may also lead to discrepancies in interpretation. Such divergences are noted conceptually and empirically by Kalantaridis and Bika (2011) and Jiménez and Zheng (2021), respectively.

### **Spatial levels of the innovation district**

Acknowledging that multiple parties are responsible for creating and interpreting places, innovation districts operate as a multiplicity of spaces that enact socially constructed meanings differently to different individuals and groups. This follows seminal space theory, which divides space into levels that serve different purposes, such as Lefebvre’s Production of Space (Perceived/Conceived/Lived) or Soja’s Thirdspace (Firstspace/Secondspace/Thirdspace). In both examples, levels combine to create what we see and experience – Thirdspace (/lived space) being the experience of Firstspace (/conceived space) mediated by the expectations of Secondspace (/perceived space) (Bustin, 2011).



These levels of interpretation are evident in Pancholi et al. (2017) Conceptual Framework of Place Making. Modelled on Lefebvre's production of space, the framework demonstrates how conceived, lived, and perceived forms of space combine to form: conceived soft factors of place (feature); conceived hard factors of place (form); socio-economic processes and networks (function); and perceptions of users and stakeholders (image) in the knowledge and innovation space. While portraying a valuable process-driven method of producing innovation space, due to the multi-dimensional nature of the framework, some of the more subtle dimensions, for example, sense of place (a part of the function quadrant), receive relatively little attention. Similarly, Yigitcanlar et al. (2020) identify the necessity of generating a sense of place in their 'feature' domain, however, this is limited to the make-up of actors, social capital, and social activities.

### Developing a sense of place in an innovation district

Driven by a multitude of benefits, there is a strong desire from many parties to develop effective innovation districts (Herstad et al., 2014). However, innovation districts are complex environments, and any attempt to cut corners in the design and implementation, for example, using pre-conceived or prototypical ideas, is unwise. Innovation districts must account for different pressures at different levels, with none taking priority (Acs et al., 2014). Origins and events are irreversible. Therefore, these need to be accounted for from the outset to ensure initial identity, culture, and reputation are not constraining factors on the future direction of the innovation district (Roundy et al., 2018). To accommodate these pressures, it is recommended that rather than designing an innovation district physically and then letting users curate their own meaning, innovation districts must control sense of place from the outset to align these perspectives better. While previous research has shown sense of place to be a minor part of the process, for example, Pancholi et al. (2017) or Yigitcanlar et al. (2020), this research calls for sense of place and its components to be included at all stages of planning (see Figure 1).

Fusing existing streams of literature from distinct but complementary disciplines, the framework shows that sense of place in innovation districts is an outcome of place attachment, place identity, and place dependence. Each relates to a different stage of the innovation district's production and consumption.

Conceived space represents the space from a physical perspective, that of an architect, planner, expert, or social engineer. With a focus on physical design and development, place dependence, the functional component of sense of place, must be prioritised at this stage to ensure the innovation district functions effectively. The conceived level tends to receive the most attention of the three levels of place, often at the expense of the more subjective perceived and lived levels of place.

The perceived level aligns more broadly with innovation district society, with a related focus on place identity. At this level, it is essential that people cognitively see the constructions and structures around them as an innovation district rather than merely office buildings and workspaces. Thus, creating a cognitive relationship between person and place lets individuals declare themselves a part of the innovation district and the innovation district a part of them. To achieve this, symbolic items and boundary objects must be used. Importantly, these must be chosen in consultation with all district

<b>INNOVATION DISTRICT SENSE OF PLACE</b>			
<b>Level of Place</b>	Conceived / Firstspace	Perceived / Secondspace	Lived / Thirdspace
<b>Primary Mechanism</b>	Place Dependence	Place Identity	Place Attachment
<b>Secondary Mechanism</b>	Functional Social Bonding	Cognitive Social Bonding	Affective Social Bonding
<b>Development Focus</b>	Creating Physical Infrastructure	Creating a Common Purpose	Creating a Shared Vision
<b>Innovation Outcomes</b>	Spillover of Resources	Sharing & Reciprocity	Collaborative Innovation
<b>Social Outcomes</b>	Social Connectedness	Social Cohesion	Social Capital

**Figure 1.** A propositional framework of innovation district sense of place evolution.

members rather than a pre-prescribed top-down approach. Elements like branding and positioning of the innovation district are critical at this stage to ensure a clear and consistent understanding of what the innovation district represents.

Finally, the lived space is the level that allows regular users of the innovation district to give it lived meaning. This is also the space where emotional bonds form between person and place. Developing these bonds, in turn, triggers a range of pro-environmental behaviours, such as increased time spent in the district both during and outside of working hours. However, achieving place dependence, place identity, and place attachment alone won't achieve a sense of place, with a fourth dimension, social bonding, also necessary.

While previous literature looks at social bonding as a singular unit, this paper suggests that to embed social bonding in innovation districts best, it can be split into three distinct parts:

- functional social bonding – connections based on functional cooperation.
- cognitive social bonding – connections based on a common purpose.
- affective social bonding – connections based on shared emotions and values.

These align with the primary dimensions (dependence, identity, and attachment), respectively, and can only be successfully achieved when primary dimensions have been accounted for. The secondary dimensions (functional-, cognitive-, and affective-social bonding) require different means to activate; for example, formal places for work and interaction to occur, informal places for team bonding to occur, places for events and extra-curricular activities to occur, and places that allow serendipitous encounters to



occur. Only when these six dimensions are accounted for in the conception, perception, and use phases will a unique sense of place emerge.

Alongside place dimensions, the conceptual framework allows additional propositions to be mapped. Propositions emphasise development focus, innovation outcomes, and social outcomes that develop as sense of place evolves. Highlighting these propositions will enable stakeholders to understand where the development focus should be as the innovation district is evolving, along with expected outcomes and benefits at each stage. This complete understanding of the sense of place evolution process ensures little divergence between the developer's vision for the innovation district, the manager's operationalisation of the innovation district, and the user's interpretation of the innovation district. Achieving this will help ensure innovative and social potential are maximised.

## Looking forward

While conceptual in its application to innovation districts, the topic of sense of place is empirically developed in complementary fields of literature, specifically environmental psychology. To validate the proposed measures of sense of place in innovation districts, future research should empirically test, in context, the dimensions of place attachment, place identity, place dependence, and social bonding (at a functional, cognitive, and affective level) as part of sense of place. Established scales should be adapted to the innovation district to create an Innovation District Sense of Place Scale. Testing of dimensions should pay specific attention to the level of place to see how dimensions are similar or different. To select the level, 'ecosystem boundaries must be defined according to formative processes rather than reflect predefined political or administrative boundaries' (Fischer et al., 2022, p. 27). A scale such as Freundschuh and Egenhofer's (1997) taxonomy of spaces (see Table 1), which uses more defined characteristics to categorise spaces, would allow this to be achieved objectively and comparatively.

While discussed in the context of innovation, the conceptual outcomes may also apply to other closely related disciplines, for example, the role of sense of place in entrepreneurial activity. With entrepreneurship shaped by the absence or presence of place-based social legitimacy, entrepreneurial activity shares many of the same pressures as innovation districts, for example, the role of informal social networks in promoting success (Leyden et al., 2014).

**Table 1.** Innovation district taxonomic levels of space (adapted from Freundschuh & Egenhofer, 1997).

Level of space	Definition/examples	Innovation district examples
Manipulable Object Space	A small space that can be manipulated and requires no locomotion	Personal office
Non-manipulable Object Space	A space that is not easily manipulable and requires some locomotion to experience	Open plan office
Environment Space	A space that requires locomotion and route knowledge	Innovation hub, innovation district
Geographic Space	A large space that cannot be perceived fully through locomotion	Innovation zone
Panoramic Space	A space that can be viewed from a single vantage point, varies in size and requires no locomotion	Innovation landscape
Map Space	A large space that can be downscaled and represented through symbols	Innovation corridor

Addressing these questions will help develop the sophistication of thinking around innovation districts and other places of innovation. This understanding will prove an absolute necessity to economic developers, planners, and city officials as innovation districts grow to be the core tool of economic development policy in modern societies (Kayanan, 2022).

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