SOCIABILITY IN INNOVATION DISTRICTS

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Abstract

This paper explores the possibilities of conceptualising sociability within innovation districts through the social infrastructure and social capital concepts of social sustainability. Our findings suggest a strong interconnection between these two concepts and we provide some examples of how these conceptualisations and existing frameworks help to potentially measure and foster sociability in innovation districts. Developing social infrastructure and creating appealing public spaces provides the necessary environment for social capital, facilitating collective action and information flow. By creating an environment that encourages sociability, innovation districts could better attract and retain highly skilled knowledge workers and foster innovation. This study emphasises the importance of sociability in innovation districts and aims to generate further discussion on the topic.

Introduction

A smart city is generally understood as oriented towards technological solutions to promote sustainable development for the benefit of its citizens (Treude, 2021). Caragliu et al. (2011, p. 70) provide a comprehensive definition stating that in a smart city, "investments in human and social capital and traditional (transport) and modern (ICT) communication infrastructure fuel sustainable economic growth and a high quality of life, with a wise management of natural resources, through participatory governance." This definition underscores the multifaceted nature of a smart city, emphasising dimensions beyond mere technological advancement.

Despite including various aspects of social sustainability in definitions of smart cities, social factors have often been neglected and underconceptualized (Monfaredzadeh and Krueger, 2015; Sugandha et al., 2022). Compounding this issue is the inherent complexity and elusiveness of sociability and social sustainability as phenomena, compared to more tangible elements like communication infrastructure or environmental standards in smart, green cities. While social sciences offer a multitude of theories, these theories are not readily applicable. A deficiency persists in the availability of adequate concepts to address urban sociability and comprehend its prerequisites within the framework of smart cities, especially innovation districts.

Innovation districts represent the forefront of smart technologies and innovation. They typically embody smaller-scale versions of a smart city, where leading-edge public and private actors cluster together into a mixed-use urban environment to foster innovation, economic growth and regional development (Katz and Wagner, 2014). Physical proximity plays a crucial role in innovation; it allows the exchange of knowledge and ideas (Shahin *et al.*, 2022), but proximity alone does not automatically guarantee increased sociability, networking and collaboration (Katz and Wagner, 2014).

An environment that nurtures and encourages sociability is essential for social interactions to foster innovation (Esmaeilpoorarabi *et al.*, 2018a; Homan, 2014). Sociability refers to the ability and willingness of individuals and groups to engage in social interactions and build relationships (García and Tegelaars, 2019). A highly *sociable* environment not only fosters innovation, but it is also necessary to attract and retain skilled knowledge workers in the district (Esmaeilpoorarabi *et al.*, 2018b; Pancholi *et al.*, 2018; Yigitcanlar *et al.*, 2007).

With rising demand for sociable, high-quality places and changes in workforce habits (Harris, 2015), monofunctional areas like office districts could quickly become non-places (in the words of Marc Auge) that are only used for commuting to work or become vacant altogether (Gupta *et al.*, 2022; Van Zutphen *et al.*, 2015). For innovation districts to succeed and avoid becoming monofunctional office districts, it is imperative to focus on providing not merely an attractive physical infrastructure but a social one (Latham and Layton, 2022).

The current study was initiated due to the necessity identified by Ülemiste, an innovation district developer in Tallinn, Estonia's capital. Ülemiste currently provides office spaces for 500 companies, totalling 16,000 employees. Promoting the benefits of the innovation district community is one of Ülemiste's central values. They actively organise events, support networks, and build communication channels. However, the smart city models they use to comprehend and measure crucial elements of their development lack tools for conceptualising and measuring the district's social sustainability aspects (Ülemiste City, n.d.).

While not yet widely covered, there is growing research focusing on the social sustainability aspects of a smart city, which, according to Sughanda *et al.* (2022), are social capital, social infrastructure, social equity, social inclusion, and collaborative planning. Much of this involves broader aspects of urban living that are irrelevant in the context of an innovation district and remain within the domain of the municipal government. However, business-oriented innovation districts can also take measures to create an environment that fosters sociability to boost innovation.

Social aspects of neighbourhoods have been explored more broadly through various livability, quality of life and community indexes, which include indicators such as health, safety, and education (ConsultantDavidSwainDPA and Hollar, 2003; Marsal-Llacuna, 2017; Sirgy, 2022). Colantonio (2010) has pointed out that the assessment of urban social sustainability primarily relies on "hard" concepts and aspects of basic needs, such as employment, education and housing. While these factors are crucial to the city development at large, they give little insight into assessing or fostering sociability in the context of an innovation district.

Sathish and Pujara (2021) have stated the importance of public spaces in encouraging sociability among community members, fostering social capital and building social sustainability. Already in his analysis of the forms of capital (1986), Bourdieu linked sociability to social capital, and Portes (1998) further supported this relationship. Piasek and Garcia-Almirall (2023) have found a correlation between social infrastructure and social capital, linking neighbourhoods with higher-quality social infrastructure to higher social capital levels. Generally, social capital refers to social connections (Putnam, 2000) and the resources accessed through them (Lin, 2001), while social infrastructure provides an environment for social interactions, where social capital can form (Klinenberg, 2018). This

highlights the promise of investigating these two aspects of social sustainability.

The problem we point out with the present study is that the sociability of smart cities and innovation districts is under-conceptualised. We will explore **how to conceptualise sociability within an innovation district (smart city) through the social infrastructure and social capital dimensions. We also provide some examples of how these conceptualisations and existing frameworks help to potentially measure and foster sociability in innovation districts.** We start with a theoretical overview of social infrastructure and social capital, expanding our scope to their applicability, connections, and relevance.

Methodology

Given the different approaches and lack of clarity in the concepts related to sociability, a scoping review method was chosen. The method enables identifying the key characteristics of the context (Munn *et al.*, 2018). Through analysing research on social sustainability within the chosen framework, social capital and social infrastructure, together with the place dimension, proved to be the most notable of the various components. The two theories allow focusing on sociability to the extent it is linked to place whilst remaining within the scope of the relevant actors in the context of innovation districts. Therefore, social capital and social infrastructure were chosen due to their relevance and applicability.

According to Arksey and O'Malley (2005), the scoping study method can address the available evidence within the relevant framework, allowing for a simplified view of specific research interests without strict limitations regarding study design at the outset. The method is not necessarily linear, as the authors need to redefine the search terms and undertake multiple literature searches due to increased familiarity with the topics. To compile a comprehensive overview of studies relevant to the central research question, we searched for research articles, including grey literature, via different sources, such as electronic databases, reference lists, and hand-searching of key journals.

We began with the keywords "sociability", "community indicators", "social sustainability", "social capital", and "social infrastructure", in combination with "innovation district" and "smart city" in Scopus, Google Scholar, and Uppsala University library databases. By looking through the initial results and reading relevant articles, additional keywords were identified and used in combination with the initial keywords and each other. We repeated similar searches throughout the process and added relevant articles from reference lists to the selection.

Through the selection process, 233 articles were selected, of which 153 were chosen for further analysis. The first two authors selected relevant articles for further analysis based on the selection criteria: keywords in the title and abstract, relevance to the context, and no. of citations. An overview of the chosen articles is given in Appendix 1. In compiling the findings in this paper, the first two authors read the full texts of the articles and identified common themes relevant to the context.

Findings

Various approaches can be used to address sociability in an innovation district (or smart city). Based on the scoping review, we provide an overview of valuable concepts to foster

and measure the potential for sociability within urban environments, particularly in innovation districts.

Social infrastructure

Social infrastructure refers to the physical conditions, together with the resources and institutions sustaining them, that enable and facilitate social interactions. Examples include places such as libraries, parks, and playgrounds, but also sidewalks, community gardens and places supporting activities like walking, playing sports or simply lingering. They provide a space for individuals and groups to gather, spend time with one another, experience culture, encourage activities and support community life (Klinenberg, 2018; Latham and Layton, 2019, 2022).

These places are an important part of city life and support the buildup of social capital (Klinenberg, 2018; Mazumdar *et al.*, 2018; Nelson *et al.*, 2022). Social infrastructure, by default, does not guarantee the attainment nor high levels of social capital but simply provides the necessary environment where relationships and connections can form (Klinenberg, 2018). Public encounters in these places build trust, cooperation and friendships (Latham and Layton, 2019) through sustained and recurring interactions that a healthy social infrastructure can provide (Klinenberg, 2018). As Philip Slater explained, "*A community life exists when one can go daily to a given location and see many of the people he knows*" (Oldenburg, 1999, p. vi).

Good public space

Public spaces are intended to foster sociability and serve as venues for social interactions (Mehta, 2014; Shahin *et al.*, 2022). However, there is no one-size-fits-all approach to designing public spaces, and definitions of what constitutes a good public space vary. According to Amin (2008), a successful public space is characterised by being "open, crowded, diverse, incomplete, improvised and lightly regulated". After evaluating numerous public spaces worldwide, Project for Public Spaces (2023) concluded that a successful public space is accessible, comfortable and sociable, where people are engaged in various activities. Mehta (2014, p. 57) defined a good public space as "*accessible and open, is meaningful in its design and the activities it supports, provides a sense of safety, physical and environmental comfort and convenience, a sense of control, and sensory pleasure*".

"Third places"

Some of these places can also be called "third places". Typically, people spend most of their time at home ("first place"), while their workplace is considered the second most important place in their life. Then, the "third place" refers to a public place whose primary purpose is to bring people together and offer them the opportunity to enjoy each other's company (Oldenburg and Brissett, 1982). The primary activity in this type of place is conversation (Oldenburg, 1999, p. 49).

Even though these places are public and usually accessible to most, not every public place can be considered a third place, as it is not just physical accessibility or conditions that define it but the social interactions within it (Oldenburg and Brissett, 1982). The third place is typically a low-profile, accessible and inclusive place existing on a neutral ground. The place

is characterised by a relaxed and playful atmosphere, filled with regular visitors and unexpected encounters where individuals can engage in lively conversations (Oldenburg, 1999). It is a place where people in public can feel at home (Klinenberg, 2018). Third places offer numerous direct and indirect benefits. They support sociability and place attachment and are essential in bringing people together (Cabras and Mount, 2017; Goosen and Cilliers, 2020; Waxman, 2006; Wickes *et al.*, 2019).

Placemaking

The definition of placemaking remains a subject of ongoing debate among scholars (Ellery et al., 2021) and is occasionally characterized simply as "making better places" (Palermo and Ponzini, 2015, p. 3). The notion has evolved significantly in practice, and some of the most influential practitioners have been commonly referenced in scientific literature, including Project for Public Spaces, Main Street, Place Partners and Village Well (Ellery *et al.*, 2021; Ellery and Ellery, 2019; Mateo-Babiano and Lee, 2020). Perhaps one of the most influential ones, the Project for Public Spaces (PPS), has been vital in advancing the placemaking movement and developing the concept in practice and theory (Hes *et al.*, 2020b). Placemaking is referred to by PPS (2007) as a collaborative process centred around community-based participation to create high-quality public spaces that not only enhance the physical environment but also contribute to people's overall health, happiness, and well-being.

The community should be considered experts in how they use a place and what is meaningful for them. This makes the collaborative and democratic nature of placemaking vital (Hes *et al.*, 2020b; Project for Public Spaces, 2021; Strydom *et al.*, 2018). The process allows people to form an attachment to a place they often engage with (Ellery *et al.*, 2021; Ellery and Ellery, 2019; Hes *et al.*, 2020a). Placemaking is more than just a facilitated process. It is a dynamic two-way process between people and places in everyday interactions within the given space. Therefore, individuals not only shape their environment but are also shaped by it (Friedmann, 2010; Hes *et al.*, 2020b).

Place attachment

There is still much debate regarding the concept of place attachment and its relations and distinctions from other terms characterising bonds between places and individuals, such as place dependence, place identity, sense of place, sense of community and community attachment, among others (Manzo and Devine-Wright, 2020; Hernández *et al.*, 2020; Lewicka, 2011). Each term has a somewhat different meaning and is often used interchangeably, adding to the confusion (Lewicka, 2010; Williams and Miller, 2020). There is a general consensus that place attachments involve "*emotional bonds to places at varying scales and that they form and change over time.*" (Manzo and Devine-Wright, 2020, p. 1). One can use the Person-Process-Place (PPP) framework to navigate different approaches, which has been thoroughly explained by Scannell and Gifford (2010).

Place attachment offers several psychological benefits, including personal growth, memory support and stress relief (Scannell and Gifford, 2017). It is also associated with a greater willingness to return to and engage in community activities in the future (Manzo and Perkins, 2006; Milligan, 1998), ultimately leading to an increase in social capital (Dallago *et al.*, 2009; Stefaniak *et al.*, 2017).

<u>Social capital</u>

Over the decades, a wealth of scientific research has linked social capital and the beneficial consequences of sociability (Portes, 1998). However, no single agreed-upon definition exists due to the theory's complexity and various approaches. Bourdeau (1986) first explained social capital as the cumulation of certain and possible resources available to an individual in a network or group, which stems from the amount and quality of relationships. In other words, social capital refers to the benefits of participation in networks and alternative social structures (Portes, 1998).

Coleman (1988) defined social capital as involving diverse entities (e.g. obligations, trust, information) with two common elements: they exist within social structures and facilitate actions for individuals or organisations. Like other forms of capital, it helps to accomplish otherwise unattainable goals. Putnam (1993, 2000) tied social capital to certain social features promoting coordination and cooperation. These features, such as networks, norms, and trust, will benefit individuals and their communities through cooperation (Putnam, 1993; Putnam, 2000; Putnam and Goss, 2002).

Social networks have been previously analysed through the diverse associations between people, mainly focusing on strong and weak ties. Smaller, homogeneous groups might form stronger ties with a common purpose, but weaker ties that bridge groups provide opportunities for mobility, influence and cooperation (Granovetter, 1973). Research built on this concept has divided these ties into bonding, bridging, and linking social capital. Respectively, these categories denote robust relationships between similar people, weaker relationships between different people, and connections between varying levels of power and status (Gittell and Vidal, 1998; Putnam and Goss, 2002; Woolcock, 1998).

Lin (2001) concluded that social capital is constructive by facilitating information, providing access to resources through influence and credentials from social ties, and providing emotional support and claim to resources by reinforcing identity and recognition. Fukuyama (2001) added that social capital as informal norms can promote cooperation and aid in attaining both socially "good" and "bad" objectives. This relates to the ongoing debate on defining social capital's various sources and functions, its potential benefits or drawbacks, and possibilities for measuring it within a community. From these theories, the OECD has conceptualised social capital as "*networks together with shared norms, values, and understandings that facilitate cooperation within or among groups*" (OECD, 2001, p. 41).

Several studies have linked social capital elements with various economic benefits (Beugelsdijk and Smulders, 2009; Dinda, 2008; Knack and Keefer, 1997; OECD, 2001; Stam *et al.*, 2014; Westlund and Frane, 2010). The concept can help explain the disparity in accumulating resources by enabling decision-making, resource mobilisation, conflict resolution, and creating beneficial conditions for collective action (OECD, 2001; Uphoff and Wijayaratna, 2000). Social capital is linked to control, informational advantages, and the creation of trust and support in organisations (Bizzi, 2015). Trust may reduce transaction costs and enhance the efficiency of businesses (Fukuyama, 1995), and the flow of information can help identify available individuals and opportunities (Lin, 2001).

The concept has been applied in various smart city research (Albino *et al.*, 2015; Bartelt *et al.*, 2020; Caragliu and Del Bo, 2018; Nakano and Washizu, 2021; Sughanda *et al.*, 2022),

emphasising its relevance in developing sociability. Nakano and Washizu (2021) linked smart city management with improvements in social capital indicators, highlighting its importance in enhancing residents' happiness. Bartelt *et al.* (2020) showed that elements of social capital can improve collaboration and innovation in smart cities. Caragliu and Del Bo (2018) noted that social capital as one axis of smart city policies positively impacts urban innovation.

There is a consistent lack of agreement on the possible definitions and approaches of social capital (Poder, 2011; Robison *et al.*, 2002; Portes, 1998). The need for clarity on how social capital could be applied also creates difficulties in defining and researching its outcomes and benefits (Robison *et al.*, 2002). Coleman (1988) also emphasised that social capital may not always be beneficial. A network might benefit from dense relationships (bonding social capital) for preserving resources and weaker ties (bridging and linking social capital) for gaining resources (Lin, 2001). However, excessive levels of any type may be detrimental by creating closed networks inaccessible to outsiders and can lead to the spread of destructive or prejudicial values (Gilchrist and Taylor, 2022; Woolcock, 1998). Therefore, social capital should be fostered cautiously, considering the specific contextual nuances and relying on methods with relevant scientific backing (Lin, 2001; Stam *et al.*, 2014).

Measuring and fostering sociability through these concepts

The scoping review pointed out several concepts for promoting and evaluating the quality of sociability, with even some toolsets available. To illustrate their potential and initiate discussion, we provide examples of sociability measurement and promotion opportunities.

One way to take advantage of sociability in an innovation district is to foster social capital by building better social infrastructure within the area. An emerging trend is to use social infrastructure as a proxy for social capital (Nelson *et al.*, 2022). However, the relationship is more complex, as social infrastructure cannot guarantee the emergence of social capital (Klinenberg, 2008).

Innovation districts would benefit from serendipitous meetings and information sharing that foster new connections (Bizzi, 2015). This can be done more easily through a shared physical environment with supportive social infrastructure (Piasek and Garcia-Almirall, 2023). Public spaces can enable spontaneous sociability among strangers, bringing economic benefits through trust and flexible forms of cooperation (Fukuyama, 1995). The availability and access to third places may be favourable to various forms of social capital (Littman, 2022), whereas limiting factors, such as social or physical inaccessibility, can be tied to a lack of social inclusion (Littman, 2022; Gilchrist and Taylor, 2022).

There is no concrete formula for building a successful social infrastructure that fosters social interactions. Still, certain features and strategies that are more likely to lead to success have been distinguished. Latham and Layton (2019) argue that there should be an abundance of diverse and accessible spaces for various individuals and groups; they need to be safe and well-maintained and evolve over time to meet the needs of their users. Places should encourage interaction and lingering (Klinenberg, 2018; Wickes *et al.*, 2019) and frequent patterned use to lead to the formation of strong social ties and social capital (Amin, 2008; Klinenberg, 2018; Wickes *et al.*, 2019).

A comprehensive tool, the Public Space Index (PSI), exists in the literature to evaluate the quality of public spaces. It combines structured and semi-structured observations, surveys, and interviews (Mehta, 2014). However, most evaluation tools come from practice, for example, the Project for Public Spaces' (2023) Place Diagram or their concept of "The Power of 10+" (2009). Additionally, the Anne T. and Robert M. Bass Initiative's audit guide for innovation districts involves multiple indicators, including the evaluation of public spaces (Vey *et al.*, 2018). Moreover, various digital tools are available to evaluate specific aspects of public spaces, such as user density, walkability, and movement patterns.

Turning a public space into a third place is a desirable yet difficult thing to plan for, as the very nature of a third place is mainly unplanned and spontaneous (Oldenburg, 1999; Oldenburg and Brissett, 1982). The places are more defined by the nature of conversations, interactions, and regular visitors rather than the design of the physical characteristics, which can often be relatively unimpressive (Oldenburg, 1999). Coffee shops, places to eat, and parks, where people are welcome to linger, are good candidates to become one of these places (Jeffres *et al.*, 2009; Klinenberg, 2018; Waxman, 2006). Deliberate planning for third places should include placemaking, as the concept's core is creating meaningful community spaces (Cilliers and Timmermans, 2014; Goosen and Cilliers, 2020; PPS, 2007, 2021).

Placemaking essentially means turning a traditional planning process around to a bottom-up approach, where the process is as important as the outcome (Cilliers and Timmermans, 2014; PPS, 2007; Strydom *et al.*, 2018). Placemaking is a long process and requires significant commitment and involvement from the community, but in turn has the highest chance to create meaningful and lively places (Ellery and Ellery, 2019), create social capital among participants, and a sense of ownership for the place (Cilliers and Timmermans, 2014; Toolis, 2017). The quality of a place is often used as a proxy for measuring placemaking (Mateo-Babiano and Lee, 2020; Switalski *et al.*, 2023). However, other approaches have been proposed, such as relationship-based evaluation (Hes *et al.*, 2020a) or a comprehensive survey covering dynamic interactions of person, procedures, and place (Switalski *et al.*, 2023).

Place attachment formation is influenced mostly by social factors, but physical aspects also play a role (Lewicka, 2011; Low and Altman, 1992). The two most significant factors distinguished in the literature by Zahnow (2023) are the frequency and duration of visits and the positive social experiences one has had in a place.

Place attachment is mostly measured by quantitative methods in the form of a questionnaire with various measurement scales (Hernández *et al.*, 2020; Lewicka, 2011). However, qualitative methods exist to capture personal stories about places, mostly through verbal and pictorial techniques (Lewicka, 2011; Rishbeth, 2020). A combination of the two has also been proposed (Hernández *et al.*, 2020). Research has primarily focused on measuring place attachment towards the neighbourhoods where people reside (Giuliani, 2003). However, people can become attached to various places (Raymond and Gottwald, 2020), and the methods can be easily adjusted to any context (Lewicka, 2010).

Despite being a vague theoretical concept, social capital offers some applicable elements for innovation districts to conceptualise and measure sociability, like networks, collective action, and values, such as trust and cooperation (Fukuyama, 2001; Putnam, 2000). Social capital

can be analysed through individual or group indicators (Lin, 2001), whether the focus is on resources available to an individual through their networks, such as information and support (Portes, 1998), or how social capital may affect the community as a whole (Coleman, 1988; Putnam, 1993).

Measuring social capital can be done using qualitative and quantitative methods, such as conducting surveys and analysing available data (OECD, 2001). From the various measuring methods developed by the World Bank, for example, the Integrated Questionnaire for the Measurement of Social Capital surveys multiple dimensions of the concept, like collective action and cooperation, to create quantitative data (Grootaert *et al.,* 2004). Another example is the Copenhagen Psychosocial Questionnaire for measuring workplace psychosocial factors, which covers a multitude of domains, including social capital. It measures workplace cohesion by evaluating aspects of social capital, such as a sense of community, social support, and trust (Burr *et al.*, 2019).

Putnam (2000) used longitudinal and cross-sectional data sets to analyse social capital through trust, networks, and norms. Social capital has been tied to indicators such as the level of trust within the community and voluntary participation or membership in numerous organisations (Putnam, 2000; Nakano and Washizu, 2021; Fukuyama, 2001). However, OECD (2001) has noted that elements of social capital can be hard to measure and codify, there may be confusion in defining the sources, functions and outcomes, as well as difficulties in comparing surveys measuring attitudinal and behavioural aspects, which need to be modified according to cultural contexts.

Similar approaches may be taken in innovation districts by combining surveys and data of various elements, for instance, by evaluating
- *trust* in personal relationships, the unknown, or the general community (Grootaert *et al.*, 2004; Nakano and Washizu, 2021),
- *networks* like social relationships (Coleman, 1988; Uphoff and Wijayaratna, 2000), and interactions (Meija *et al.*, 2022), the participation in community and organisational life (Putnam, 2000; Westlund and Frane, 2010), as well as the intensity of involvement (Grootaert *et al.*, 2004; Nakano and Washizu, 2021),
- *norms* like volunteering (Carradore, 2018; Coleman, 1988; Nakano and Washizu, 2021), public involvement and democratic attitudes (Putnam, 2000; Fukuyama, 2001), shared vision (Meija *et al.*, 2022) and social cohesion and inclusion (Grootaert *et al.*, 2004).

Most agree that to benefit the community, strong and weak ties must all exist to an extent, as sociability is developed through homophilous and heterophilous connections (Lin, 2001). In the context of innovation districts, stronger emphasis may be put on the latter, as broader connections might lead to new opportunities and resources (Beugelsdijk and Smulders, 2009; Lin, 2001). However, the most beneficial environment should be able to combine the advantages of both strong and weak ties, enabling stability and novelty, which can lead to economic productivity and place attachment (Lewicka, 2011).

Discussion

Our findings suggest that social infrastructure and social capital play an important role in the sociability of innovation districts. By developing these aspects of social sustainability,

innovation districts could better attract and retain highly skilled knowledge workers and foster innovation.

The scoping review further highlighted the complexity arising from diverse concepts originating from various disciplines and traditions, each with distinct application areas and some already with an established usage in urban development.
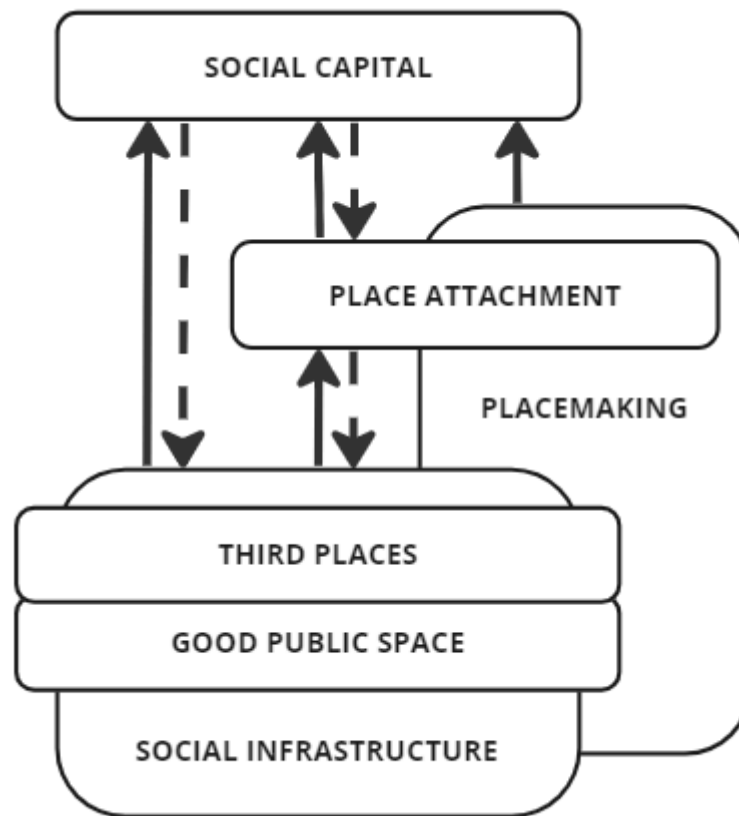
Fig. 1 Connections between the addressed concepts

Fig. 1 offers a visual representation to elucidate the overlaps and interrelations between the main concepts within the context of sociability in innovation districts. Social infrastructure represents a broader framework essential for the effective functioning of public spaces. Nevertheless, certain dimensions of the concepts of "placemaking", "good public spaces", and "third places" extend beyond the parameters of social infrastructure.

Crucially, social infrastructure provides a (physical) environment and serves as the foundation for sociability, the formation of place attachment (Lewicka, 2011), and social capital buildup (Klinenberg, 2018; Latham and Layton, 2019, 2022). Placemaking as a method for development has been proven to be an effective way to create successful public places while fostering place attachment and social capital formation (Cilliers and Timmermans, 2014; Ellery and Ellery, 2019; Toolis, 2017). When a supportive environment fosters social capital, the community can access additional resources through social

structures like networks (Lin, 2001). An abundance of social capital can be favourable for cooperation (Fukuyama, 2001; Nakano and Washizu, 2021; Uphoff and Wijayaratna, 2000), and aspects of the concept have been linked to various economic benefits (Putnam, 2000; Westlund and Frane, 2010; Stam *et al.,* 2014). This process is, however, less linear than so far described, as the concepts and processes may affect each other bidirectionally (Piasek and Garcia-Almirall, 2023).

A recurring finding from the concepts highlighted in the scoping review is that the vitality of sociability cannot be manufactured through top-down design; rather, it arises from fostering conditions that encourage social interactions and engender a sense of ownership and belonging. Lively social spaces tend to emerge organically and spontaneously; excessive design interventions can even stifle them. Caragliu et al. (2011, p. 70) emphasized in their definition that the realisation of a smart city hinges on "participatory governance." While participation and openness in governance may seem like hollow buzzwords or unattainable abstract ideals, they are fundamental pathways – or even prerequisites – for fostering socially vibrant and valuable spaces within smart cities and innovation districts.

Smart cities are focused on using technological advancements and various measurement tools for identifying problems and their possible solutions for the benefit of their citizens. Similar to many concepts, social capital and social infrastructure will likely not develop without informed intervention approaches, including measuring and monitoring their existence and progress. However, this would entail including qualitative methods within the traditionally quantitative metrics used in developing smart cities. Therefore, developing social capital and social infrastructure requires establishing clearer benchmarks and parameters to indicate a satisfying level of these concepts to foster sociability.

The scoping review has identified several concepts that offer insights and tools for fostering community engagement. Furthermore, social science studies affirm that individuals stand to benefit significantly from increased sociability and the accumulation of social capital.

The scale and disciplinary differences in the concepts vary greatly. Therefore, the relationships and connections presented are conditional. Other aspects of social sustainability could be essential in sociability and should be further researched. Our research discovered additional concepts that fall under social infrastructure and social capital. These concepts include various terms used to describe the bonds between places and individuals (Manzo and Devine-Wright, 2020; Hernández *et al.,* 2020; Lewicka, 2011), the significance of community narratives and stories (Toolis, 2017), social obligations and sanctions (Bourdieu, 1986; Coleman, 1988), brokerage and social structural holes (Burt, 2004), and more.

The concepts of social infrastructure and social capital are extensive, and whilst this paper provides a simplified overview, it is not exhaustive. Further research is necessary to capture the many complex factors that influence sociability. We aim to emphasise the importance of sociability in innovation districts and generate further discussion on the topic.

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