

# **Bridging inner and outer transformation for the mainstreaming of nature-based solutions**

*An investigation of inner dimensions within the Clever Cities project in Malmö Municipality*

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(30hp/credits)



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## **Abstract**

Cities face multiple social-ecological challenges, which nature-based solutions (NBS) promise to address. Strategies to mainstream NBS have only achieved partial success, hence recent studies suggest that inner dimensions - mindsets and transformative capacities - must be mainstreamed simultaneously. This study investigates municipal employees' engagement with inner dimensions, its impact on sustainability, and inner dimension shifts during NBS implementation. By interviewing participants from the Clever Cities project in Malmö Municipality, no explicit engagement with inner dimensions during the project was discovered. The inner dimensions most reported were openness towards collaboration and a sense of responsibility. Yet, interviewees saw no link to outcomes. Barriers in the political sphere undermined the project, and a shift in inner dimensions was not detected. Inner dimensions at a project level are insufficient to catalyse transformations, revealing a scale mismatch between inner and outer dimensions. Longitudinal studies are needed since inner dimensions develop beyond individual projects.

**Keywords: mainstreaming, nature-based solutions, inner-outer transformation, transformative capacities, inner dimensions, municipalities**

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# 1 Introduction

Cities face worsening climate change impacts and biodiversity degradation, undermining human health and well-being. The IPCC has high confidence that climate change has impacted livelihoods, infrastructure and human health in cities (IPCC, 2023). Further, anthropogenic global warming increasingly exacerbates weather extremes, such as heatwaves and rainstorms (IPCC, 2021). Adding fuel to the fire, built environments intensify such events, and the closely connected infrastructure renders cities exceedingly vulnerable to cascading system failures (Elmqvist et al., 2019; Ferreira & Duarte, 2019). More people will be exposed to urban climate impacts as the urban population is projected to grow by 2.5 billion by 2050 (Dodman et al., 2022; Huang et al., 2019). This warrants exploring how cities may lead transformations towards sustainability that centre on nature's value to urban populations. Thus, urban municipalities face the challenge of tackling complex socio-ecological challenges by reshaping urban environments.

Nature-based solutions (NBS) are heralded as one pathway for urban transformations and climate action with the aim of strengthening cities' abilities to cope with challenges and create environmental, economic and social benefits (Wickenberg, 2022). The NBS concept describes effective and adaptable solutions to societal challenges that restore, sustainably manage and use ecosystems, natural features and processes to create co-benefits for human well-being and biodiversity (Cohen-Shacham et al., 2016; European Commission & Directorate-General for Research and Innovation, 2015). What distinguishes NBS from other 'green' concepts is that they focus on the solutions nature offers to specific societal challenges and provide a comprehensive approach to nature-based urban transformations (Wickenberg, 2022). They count on collaboration to tackle the societal processes that inhibit the integration of nature in cities and thus extend beyond the ecosystem service and biodiversity concepts (Wickenberg, 2022). Research has primarily explored environmental benefits rather than generated action-oriented knowledge that operationalised the concept for effective implementation (Hanson et al., 2020). Thus, this study seeks to create actionable knowledge to support NBS implementation.

In the Swedish context, municipalities actively seek to implement and mainstream NBS into urban planning and governance to address socio-ecological challenges (Wamsler, Wickenberg, et al., 2020). However, barriers preventing the systematic mainstreaming of NBS include institutional structures (i.e. siloed sectors and organisational structures, clashing planning priorities and interests), the absence of policy/legal frameworks and actionable guidance for NBS considerations and mainstreaming, human and financial resources, and knowledge/capacity about ecosystem services (Brokking et al., 2021;

Wamsler, Wickenberg, et al., 2020). These barriers underpin a resistance to transformations (Wickenberg, 2022). While Swedish municipalities strategically employ relational approaches grounded in cross-boundary cooperation and stakeholder involvement to overcome these barriers, these fall short of achieving systematic mainstreaming (Brokking et al., 2021; Wamsler, Wickenberg, et al., 2020).

Fragmented strategies for NBS mainstreaming have not effected transformational change and policy outcomes (Wamsler & Osberg, 2022). It has been theorised that insufficient consideration of ‘inner dimensions’, which comprise our mindsets and associated transformative capacities, coupled with an overemphasis on tangible political and practical solutions have led to this implementation gap (Ives et al., 2020; Wamsler & Osberg, 2022). Inner dimensions guide our understanding of the world, problem-solving, navigating conflict, and relating to each other, and are considered deep leverage points for transformations (Wamsler, Wickenberg, et al., 2020). In particular, project leaders need such capacities “to establish trust, communicate inclusively, and promote social learning” (Wamsler, Wickenberg, et al., 2020, p. 8) for effective NBS implementation and mainstreaming.

Thus, calls to systematically integrate inner dimensions into sector policy and practice and link them to political and practical solutions are growing. Empirical research is still needed “to better understand how, why, when and with what effect changes in mindsets and consciousness occur, and with what sustainability outcomes” (Wamsler & Osberg, 2022, p. 10). This includes a deeper understanding and actionable knowledge of the “specific impact of particular qualities/capacities” (Wamsler & Osberg, 2022, p. 10) as well as tools and supporting infrastructure that enable transformations across contexts.

### **1.1 Aim and research questions**

Our study seeks to understand the role of inner transformations in supporting the mainstreaming of urban NBS at the municipal level in Sweden. For this purpose, we empirically explore how municipal actors engage with inner dimensions, which inner capacities are most important for NBS mainstreaming, and how mindsets and inner capacities shift during NBS processes.

- 1. How do municipalities engage with inner dimensions in processes of implementing and mainstreaming nature-based solutions?**
- 2. What are the particular mindsets and transformative capacities that enable specific impacts of nature-based solutions?**
- 3. How have transformative capacities shifted during the nature-based solutions process, and what has enabled this?**

## **1.2 Contribution to Sustainability Science**

Our research will support urban sustainability transformations by contributing to the knowledge regarding mainstreaming NBS. Climate and ecological pressures on cities are exacerbating pre-existing social issues (Elmqvist et al., 2019; Ferreira & Duarte, 2019). Sustainability science sees the environmental and social systems as intertwined, consistent with the intention behind NBS, which is to tackle these intricate challenges together. However, a need for greater implementation and a research gap within sustainability science regarding effective mainstreaming remains. Our chosen theoretical framework combines inner-outer transformations for sustainability with mainstreaming theory, thereby addressing the root causes, i.e. underlying mindsets, that underpin unsustainable trajectories (Wamsler & Osberg, 2022). Furthermore, sustainability science seeks to produce actionable knowledge that combines academic and other knowledge types to inform implementable solutions that drive change in the real world (Jerneck et al., 2011; Kates et al., 2001). On this note, only a few studies have investigated the inner dimensions of sustainability in a professional setting (Wamsler et al., 2021). This study is solution-oriented in its aim to fill this practical gap by exploring how inner-outer transformations apply in a professional working environment in the context of sustainability. It seeks to identify inner dimensions that could be nourished to effect profound shifts and thereby enhance NBS mainstreaming and sustainability impacts.

## **2 Theory**

This study applies O'Brien's *spheres for sustainability transformations* and Wamsler and Osberg's *transformative climate mainstreaming framework*. These build upon each other as the latter expands on O'Brien's spheres to facilitate the mainstreaming of sustainable transformations.

### **2.1 Limitations of current mainstreaming approaches**

In the field of urban sustainability transformations, the mainstreaming of NBS is a pathway to maximise impacts by scaling them across urban contexts (Collier et al., 2023). Although widely advocated, NBS have not been systematically implemented but are often a single-sector measure, leaving municipalities uncertain about how to change the situation (Wamsler et al., 2017). Mainstreaming generally comprises “the systematic integration of environmental and climate adaptation considerations and related stakeholder involvement at local, institutional and interinstitutional levels” (Wamsler, Wickenberg, et al., 2020, p. 2). This involves changes to policies, planning instruments, working structures and resource allocations to embed specific NBS provisions into practice and policy across governance levels (Wamsler et al., 2017; Wamsler, Wickenberg, et al., 2020). This is especially

true for policies where NBS are not often incorporated (Wamsler & Osberg, 2022). Since the mainstreaming of NBS holds the potential to facilitate sustainability transformations, this point is particularly relevant. (Wamsler et al., 2017).

Yet, mainstreaming practices assumed to be effective have mainly produced isolated policy outputs instead of transformative changes and policy outcomes (Wamsler & Osberg, 2022). This insight reveals an implementation gap brought about by the shortcomings of the mainstreaming paradigm. The latest science criticises the fact that practice and academia have, to date, primarily focused on governance dynamics, the socio-economic context, technological innovations, and prioritised integrating strategies across institutional and sectoral levels (Collier et al., 2023; Wamsler et al., 2017). This is a symptom of a mechanistic paradigm which understands humans and nature as separate entities and thus favours technical solutions (Böhme et al., 2022). However, ecological crises and climate change are not merely technical or external problems but rooted in a complex human relational crisis linked to our inner dimensions (Wamsler et al., 2021). Current mainstreaming scholarship has been criticised for not considering these interior aspects thoroughly (Wamsler & Osberg, 2022). In the following section, we will outline the concept of inner-outer transformations and its relevance to mainstreaming.

## **2.2 The role of inner-outer transformations**

Inner-outer transformations connect changes in inner dimensions with those in the external environment to tackle the root causes of unsustainable development. This idea is visualised in the three interconnected *spheres for sustainability transformations*, which include the personal, political and practical (O'Brien & Sygna, 2013) (**Figure 1**). The practical sphere, where the visible actions are located, is at the centre. It is enclosed by the political sphere, which stands for the enabling and constraining systems and conditions for reaching goals in the practical sphere. The outer sphere symbolises the personal dimension and comprises our mindsets and paradigms – the inner dimensions (O'Brien & Sygna, 2013). The three spheres interact in complex ways. For instance, transformations in the personal sphere affect what interventions and strategies we consider possible in the practical sphere (O'Brien, 2018). Transformative change requires simultaneous efforts across all three spheres to effectively address underlying drivers and barriers. Yet, mainstreaming approaches have primarily addressed the weaker leverage points of the practical and political spheres (Wamsler & Osberg, 2022).



**Figure 1:** The three spheres of transformation (after Sharma, 2007) (O'Brien & Sygna, 2013, p. 5)

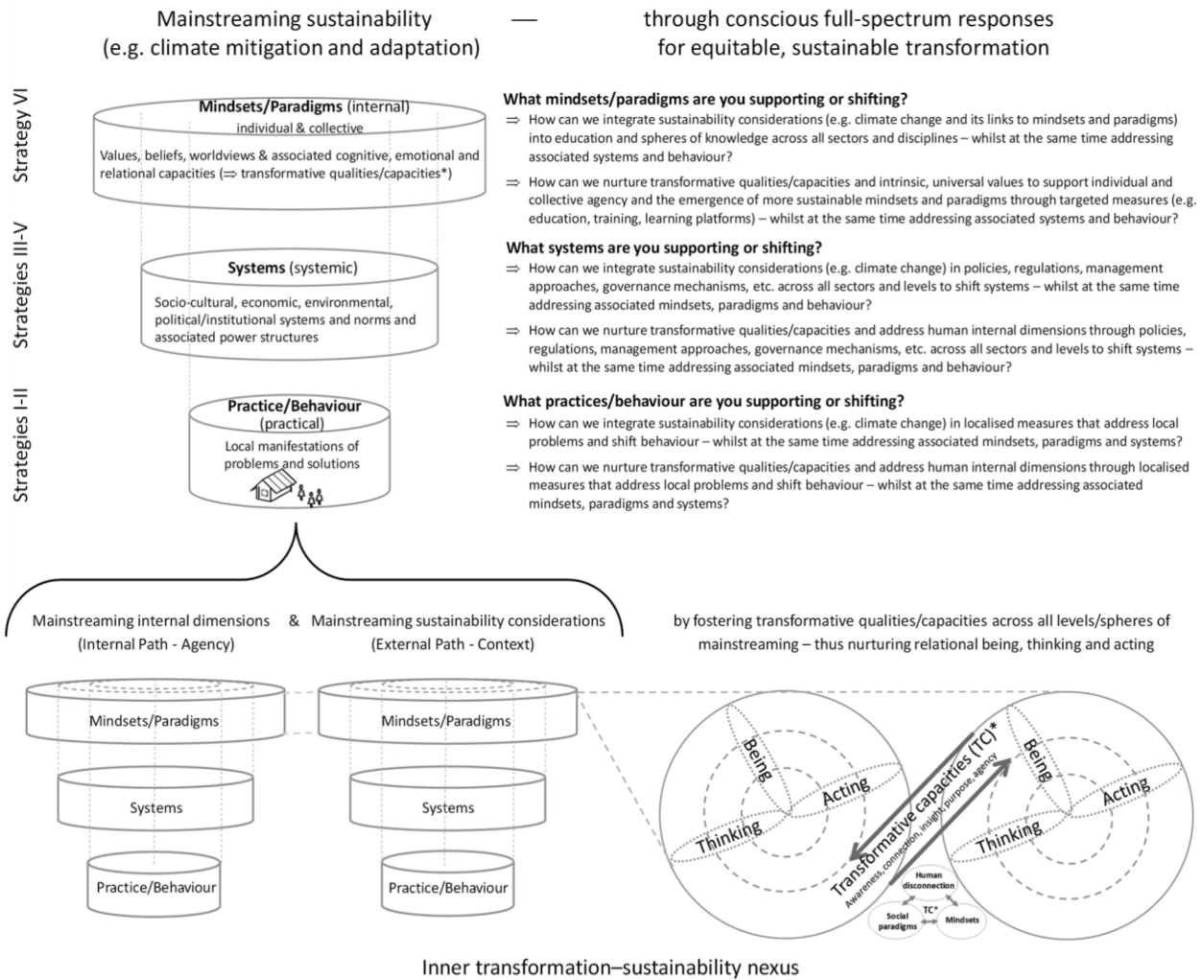
Inner dimensions are crucial to inner-outer transformations and comprise individual and collective mindsets that consist of worldviews, values, beliefs and associated inner capacities (Ives et al., 2023; Wamsler & Bristow, 2022). Further, mindsets are the “internal lens through which people see and navigate life” (Wamsler & Bristow, 2022, p. 2), frame problems, and evaluate solutions. Consequently, mindsets underpin systems and practices, making them deep leverage points for triggering cascading sustainability transformations across all spheres (Abson et al., 2017; O'Brien & Sygna, 2013). Disregarding inner dimensions in mainstreaming, risks that practices will not only be ineffective (Ives et al., 2023) but entrench the de-politicisation and anti-political processes in environmental control (Wamsler & Osberg, 2022). Wamsler and Osberg (2022) thus argue for mainstreaming inner dimensions alongside sustainability aspects.

### **2.3 The transformative climate mainstreaming framework**

Given the challenge of effectively mainstreaming NBS for urban transformations, this study employs the *transformative climate mainstreaming framework* developed by Wamsler and Osberg (2022). The framework provides a pathway to full-spectrum mainstreaming to catalyse inner-outer sustainable transformations (**Figure 2**). To this effect, it combines the principles, strategies and tools from the climate mainstreaming framework after Wamsler (2014, 2015) with the conscious full-spectrum

response framework after Sharma (2007, 2017) which is the foundation of the three spheres of transformation outlined above. The framework can be adapted to specific facets of climate adaptation and mitigation, allowing us to target NBS.

The framework rests on three key principles: (1) to integrate mainstreaming of sourcing inner dimensions and capacities with climate-specific mainstreaming (Wamsler & Osberg, 2022). (2) to systematically consider and nourish people's inner capacities. (3) to apply the three steps for change derived from the conscious full-spectrum framework to mainstreaming activities. These three steps use operational tools for "(1) sourcing interior capacities; (2) designing to make a difference; and (3) practising/implementing new processes" (Wamsler & Osberg, 2022, p. 5). Notably, the framework intends for inner dimensions and sustainability considerations to be combined across all three spheres and all sustainability mainstreaming strategies. The assumption that all humans are potential 'change agents' underpins the process ontology (Wamsler & Osberg, 2022). Consequently, the process depends on nurturing inner capacities which link all spheres of transformation. Thus, it becomes impossible to think of the individual as separate from the collective and systems (Wamsler & Osberg, 2022).



**Figure 2:** The transformative climate mainstreaming framework shows the relation between transformation and inner dimensions (Wamsler & Osberg, 2022, p. 9).

## 2.4 Transformative capacities

The transformative climate mainstreaming framework underscores the need to systematically foster *transformative capacities/qualities* (TCs), located in the personal sphere of transformation. The reason is that TCs promote relational being, thinking and acting across the three spheres (Wamsler & Osberg, 2022) (**Figure 2**). TCs are understood as those relational, socio-emotional, and cognitive processes that “support cultivation of values, beliefs, and worldviews regarding how people relate (or reconnect) to themselves, others, nature, and future generations” (Ives et al., 2023). As such, they influence decision-making, action-taking, and people’s learning, which can support sustainable paradigm shifts (Wamsler et al., 2021) and help navigate ‘wicked’ sustainability challenges (Ives et al., 2023).

TCs fall into the five overarching clusters: awareness, connection, insight, purpose, and agency. *Awareness* includes becoming conscious of one’s thoughts and environment, encompassing perception, attention, and reflection. It supports reasoned decision-making and can foster positive

behavioural changes (Barbaro & Pickett, 2016; Gómez-Olmedo et al., 2020). *Connection* involves relations with others and nature, and strong connections can potentially drive radical societal sustainability changes. Emotions like compassion, empathy, and kindness are associated with feeling connected to both people and nature (Ives et al., 2018; Gomez-Olmedo et al., 2020; Wamsler et al., 2021). *Insight* is a profound understanding that goes beyond surface observations, often achieved through diverse perspectives and integrative thinking. By revealing underlying meanings and implications, insight can lead to new perspectives, solutions, and actions (Wamsler et al., 2021). *Purpose* means navigating life based on intrinsic values, requiring reflection and the courage to act upon them. It entails understanding deeper patterns and one's role within them, fostering an action-oriented attitude essential for sustainable futures (Frank et al., 2019; Wamsler et al., 2021; Wamsler, Schöpke, et al., 2020). *Agency* involves feeling empowered and applying this to skills supporting collaborative action and meaning-making. It emerges through interactions within a system rather than existing independently beforehand (Walsh et al., 2021; Wamsler et al., 2021). Inner dimensions, mindsets and transformative capacities make up the missing piece for NBS mainstreaming. Therefore, they form the foundation for our research questions.

### **3 Methodology**

#### **3.1 Research design**

Qualitative research methods were used to collect and analyse data. This thesis seeks to understand if municipalities engage with the inner dimensions in NBS processes, and if so, how? A qualitative approach using semi-structured interviews within a single case suited the research aim as it enabled us to collect a diverse range of experiences and insights from individual informants who were directly involved in the chosen NBS project (Hay, 2016). This allowed the investigation of individual mindsets and TCs and how these are perceived to have shifted during NBS project (Hay, 2016; Scheyvens & Storey, 2003). We acknowledge that focusing on a single case has implications for the generalisability of results to other municipal contexts. An analysis of policy documents was intended to supplement the interviews. However, since the project finished late in 2023, associated reports were still being written and thus unavailable for analysis. Throughout the thesis progress, we equally contributed to the background research, interviews, coding, analysis, write-up and editing.



## 3.2 Fieldwork methods

### 3.2.1 Case selection

We selected Malmö stad<sup>1</sup> as our case for two main reasons. First, the municipality is a pioneer in sustainable urban development and has been applying NBS to socio-ecological challenges since the 1990s (Wickenberg et al., 2022). Second, Fitzgerald and Lenhart (2016) argue that experimenting with numerous urban transformation projects has shaped the city's departments into "effective learning organizations" (p. 375). A willingness to rethink processes, engage in horizontal and vertical networks, collaborate across departments, and build capacity defines this municipality (Fitzgerald & Lenhart, 2016; Lenhart et al., 2014). This attitude towards changing processes and integrating sustainability into all operations makes Malmö the ideal case for exploring inner dimensions for urban transformations.

Within Malmö stad, we zeroed in on the Clever Cities project completed in 2023. An internal contact at Malmö stad suggested this particular project as it fit our criteria for a municipal NBS project that had recently been finalised and in which stakeholder engagement played a crucial role. The intention was for the project to be recent and still fresh in people's minds to enable deeper reflections on the process. Clever Cities was a 5-year EU-coordinated collaborative project involving several European, Latin American, and Chinese cities in urban nature-based transformation to support the EU's Biodiversity Strategy 2030 (CLEVER Cities, n.d.). To Malmö stad, the goal was to promote the use of NBS in urban planning and address diverse urban challenges through 'green solutions' (Malmö stad, 2023). As part of Clever Cities, Malmö stad applied NBS to social issues in the built-up Lindängen neighbourhood (**Figures 3 & 4**). Poor health outcomes, lower life expectancy, relatively low rates of higher education and employment levels, and socio-economic diversity characterise this suburb (CLEVER Cities, n.d.). The dense, monotonous high-rise blocks connected by unsafe cycling and walking paths were key physical challenges. In our opinion, the project stands out because of its community-based approach which is evident in that municipal actors, local residents, and other stakeholders co-created initiatives and processes for the nature-based urban regeneration of Lindängen that could be supported through the Clever Cities umbrella (CLEVER Cities, n.d.).

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<sup>1</sup> Malmö stad is the official name for Malmö Municipality.



**Figure 3:** The map on the left indicates where the neighbourhood of Lindängen is located within Malmö City in the southern part of Skåne, Sweden (GoogleEarth, n.d.). To the right is an outline of the urban development area Lindängen (Malmö stad (n.d.), public domain).



**Figure 4:** Aerial view of Lindängen looking south over the motorway E6 (Malmö stad (n.d.), public domain).

**3.2.2 Interview design**

The exploration of our concepts led us to choose semi-structured interviews as a method to investigate how a municipality engages with inner dimensions. The advantage of interviews is that they offer to “find out more about the research project than if [the participants] were simply being observed or if they were completing a questionnaire” (Dunn, 2016, p. 150). While interviews give a deeper insight into our chosen project, they are more time-consuming and potentially lead to social desirability bias (Dunn, 2016). A strength in undertaking this research as two researchers was that we could cross-check

the interview guide to ensure the questions were as unbiased as possible. We decided on semi-structured interviews since preserving conversation flexibility allowed us to investigate how TCs have evolved in NBS processes. Maintaining the character of an open, flexible conversation motivated the interviewees to point out specific issues and aspects of the NBS project process that we had not anticipated ourselves. During the interviews, we (researchers and interviewees) reflected and scrutinised assumptions, opinions and experiences vital in the further development of this study (Dunn, 2016). Allowing our participants to share their own experiences and insights freely also produced new ideas for our research.

The interview guide comprised 16 questions, some with several sub-questions and prompts (see the interview guide in Appendix A). These primarily contained storytelling and descriptive questions to let the interviewees narrate as freely as possible. While we mostly adhered to the outline of our interview guide, we were flexible in posing follow-up questions to dive deeper into particularly interesting statements made by the participants. The questions covered four main areas: First, we inquired about background information on the interviewee's role in the Clever Cities project. Then, we talked about the sustainability outcomes of the project, followed by the inner dimensions of the project, specifically mindsets. Lastly, we inquired about their views on the role people's inner qualities played in the project.

### **3.2.3 Selection of interviewees**

Using the snowball sampling technique, we identified and contacted our interview partners (Dunn, 2016). Our initial contact with a key informant involved in multiple NBS projects at the municipal level directed us towards one person who had led and been heavily involved in the *Clever Cities* project in Malmö. This main contact from the Clever Cities project identified and provided contact details for eleven key actors who had participated in project meetings and contributed to different parts of the project at Lindängen. We contacted everyone on the list our primary contact had shared with us and two additional key actors who were pointed out to us during our initial interviews. A total of eight people were interviewed. Seven of them were actors from across six different municipal departments. One informant represented an external organisation that had been closely involved in the project and meetings. This sample accurately reflects both the range of municipal departments and also captured the specific people involved in the Clever Cities project.

### **3.2.4 Interviews**

The interviews were held via Zoom and lasted approximately one hour respectively. All participants provided their informed consent in writing before the session or orally at the beginning (see the consent form in the Appendix B). To maintain confidentiality, all references to information that could identify the informant, such as their name, job title, departmental/organisational affiliation, and names of colleagues mentioned, have been replaced with placeholders (e.g. department 3) in the interview transcripts and this thesis. The informants are thus numbered and referred to as Informant 1 to 8 and I1 to I8 in this text. One of our interviews involved two participants (I2 & I3), with some support from I1, as they had expressed being more comfortable with taking this interview together. Interviews were held in English although interviewees occasionally used Swedish terms in their responses. This did not hinder the understanding as both researchers have a sufficient understanding of the Swedish language. We recorded and transcribed all interviews with the help of the transcription programme Otter.ai. The transcripts included anything that was said, intonation, non-verbal cues, and descriptions of gestures, taken from our interview notes (Dunn, 2016). Of note in relation to data security, the programme Otter.ai utilises AWS S3 storage and uses server-side encryption on data with a root key that regularly rotates (Otter.ai, 2024). The conversations and transcript are accessible only to us as users, and we opted out of making the audio and written files available for training purposes.

### **3.3 Data analysis**

For our analysis, we first generated a comprehensive coding scheme to ensure that our coding would be consistent and comprehensive. Our literature-informed research questions around engagement with mindsets, TCs, shifts in inner dimensions, and enabling conditions formed the core. Since the literature provides a list of TCs, they were coded deductively, while mindsets for which no such list exists were coded inductively. Further, we added key themes the informants had raised. We identified those additional codes by reflecting on and noting down our thoughts immediately after each interview and skimming the transcripts. The additional codes primarily related to the institutional context and the project context. Thereby, we integrated both deductive and inductive codes into a robust coding scheme. Coding inductively with two people could have caused inconsistencies in the coding approach, which would have taken time and iteration to work out. Hence, we invested additional effort in building the scheme prior to starting the actual coding.

We utilised the NVivo Collaboration Cloud for our coding and analysis. This enabled us to code the same documents independently while applying the same coding scheme. Afterwards, we went through the content for each code and discussed, added, and discarded content, merging some codes and splitting some content into new secondary codes. Following this, we summarised the responses from

and identified themes within each code. Based on the resulting list, we organised the themes in accordance with our research questions.

### **3.4 Limitations**

Our methodology revealed limitations regarding people's limited knowledge, perceptions and recollections of the process, and the ability to relate to an alternative control or objective evaluation. As interviewees were involved intermittently and during different project phases, their perceptions of what happened differed greatly. This poses a limitation to the comparability of the data within the study, as their responses were shaped by different project experiences. It also meant that any one interviewee typically had fragmented knowledge, for instance, on the project process, outcomes and any potential engagement with inner dimensions. Besides, this study explored one singular project within one municipality and eight participants within this project, which limits the generalisability of results. While the qualitative approach allowed us to research people's personal views on inner dimensions, the novelty of the field and the intangibility of the concept made it difficult to relate interviewees' responses and findings to some objective criteria. Observations regarding inner dimensions were likely shaped by the project conditions and process and may thus differ between municipal and project contexts.

## **4 Results**

The following section presents the interview findings, which are organised according to our three research questions. First, we outline how municipalities engage with the concept of inner dimensions. Second, we describe the mindsets and TCs that contributed to the project, followed by a summary of the project's impacts. Third, we present how inner dimensions shifted during the project and what the enabling and constraining factors were. Sections that are in quotation marks and italicised reflect that the informant particularly emphasised those words.

### **4.1 Perceptions of the concept of inner dimensions**

The interviewees were generally unfamiliar with the concept of inner dimensions, evident in that all interviewees, except one (I8), struggled with the term. We broke down the concepts of mindsets and TCs to make them more graspable. Mindsets were explained as individual and collective values, worldviews and beliefs, and TCs were broken down to people's emotional and psychological

characteristics, abilities and personality traits that they bring to the table when engaging with other people. We came to these words partly by using explanations from the literature (e.g. for mindsets), and trial and error based on our theoretical understanding of the term ‘transformative capacities’. While all interviewees appeared to be more comfortable with these descriptions, the mannerisms, frequent pauses, and responses that often did not directly address the mindsets and TCs, reflected the unfamiliarity with the concept.

#### **4.1.1 Engagement with inner dimensions**

Overall, an explicit engagement with inner dimensions was not central to the project. Discussions on existing mindsets occurred in some project meetings and at times between colleagues but these were mainly about their visions for Lindängen, project limitations and opportunities, and potential pathways such as through citizen involvement (I2, I3, I4, I8). However, informants 1 and 4 pointed out that they did not notice any explicit discussion of mindsets within municipal departments and with external actors. Furthermore, informant 4 reflected on their personal competing mindsets between adhering to business-as-usual or going out of one’s way to make a project work. The engagement with TCs was even less pronounced in the interviews. Informants 4 and 8 indicated that they neither engaged in nor reflected individually or collectively on TCs during the Clever Cities project. However, as informants 6 and 8 confirmed, there were instances where personal qualities that contributed to the project were actively discussed among close colleagues.

#### **4.1.2 Perspectives on the value of incorporating inner dimensions**

One of the last interview questions asked the informants how they see the value of engaging with inner dimensions and whether they will incorporate them into future work. Three informants reported that they believed the act of engaging with inner dimensions could contribute to their work and intended to discuss these more proactively in future projects (I4, I6, I8). Informant 4 showed an intention to put together teams that already exhibit these inner dimensions. While informants 6 and 8 agreed that TCs could contribute more to their work, informant 6 pointed out that the siloing within Malmö stad makes maintaining a holistic view difficult. Informant 8 reflected that engaging with mindsets is crucial to a project’s success, as it enables people to work together and bring about change.

## **4.2 Inner dimensions and their link to NBS impacts**

First and foremost, informants did not draw clear links between specific inner dimensions and the impact of the project. In the following sections, we will first outline the inner dimensions that

informants identified as having been influential in the project process; then, we will summarise the project outputs and outcomes.

#### **4.2.1 Mindsets**

The interviewees identified several mindsets that shaped the project (**Figure 5**). These can be grouped into beliefs around sustainability and NBS, mindsets regarding the project's scope and ambitions, and views on working approaches.

Most informants emphasised the importance of having a *holistic understanding of sustainability* that integrates ecological, social, and economic/financial aspects (I1, I2, I3, I4, I6, I7, I8). Further, four interviewees noted an *awareness and interest in urban green issues, seeing the value of NBS*, and a municipal agenda aligning with these notions that existed prior to and underpinned the project (I1, I2, I3, I4). Informant 1 emphasised strongly that these mindsets had developed inside Malmö stad over a longer timeframe and had not emerged from any one specific project. In contrast, informant 8 noticed that property companies and staff maintaining green areas surrounding housing blocks in Lindängen were initially unaware of the benefits NBS can offer.

The mindset that stood out regarding project ambitions is that informants valued *taking small, feasible actions towards sustainability* that cumulatively effect a bigger change instead of taking on large-scale projects that cannot be completed (I2, I4, I6, I7, I8). These five informants expressed concerns that an overly ambitious project risks becoming an empty promise and unmanageable, particularly given the budget constraints. For example, informant 2 noted that “if we just did something small, it would be a big change” and informant 3 said “let's not go too far with this or too big with this or otherwise it'll slip out of our hands”.

Interviewees emphasised that mindsets favouring *collaboration* and learning influenced the project approach. Four interviewees reported that project actors seeing the *value in collaborative experimenting and learning* was important (I1, I2, I3, I7), with informant 1 particularly emphasising a shared view that they needed to communicate better between municipal departments. Further, the mindset that values *collaboration with local communities* to create place-appropriate actions was highlighted (I1, I2, I3, I8). This relates to a value shared by three informants to reconnect locals with their area (I2, I3, I6). On this note, informant 3 expressed that they wanted people in Lindängen to go outside and “[f]eel like this is their home. Take back [...] Lindängen”. Furthermore, all eight interviewees considered that a willingness to go the extra mile to serve the Lindängen community was essential. In addition, actors were aware of the need to invest in relationships with the local community

(I1, I6, I7). Informant 8 considers that the project participants' pre-existing positive mindset made all the difference to the project process.

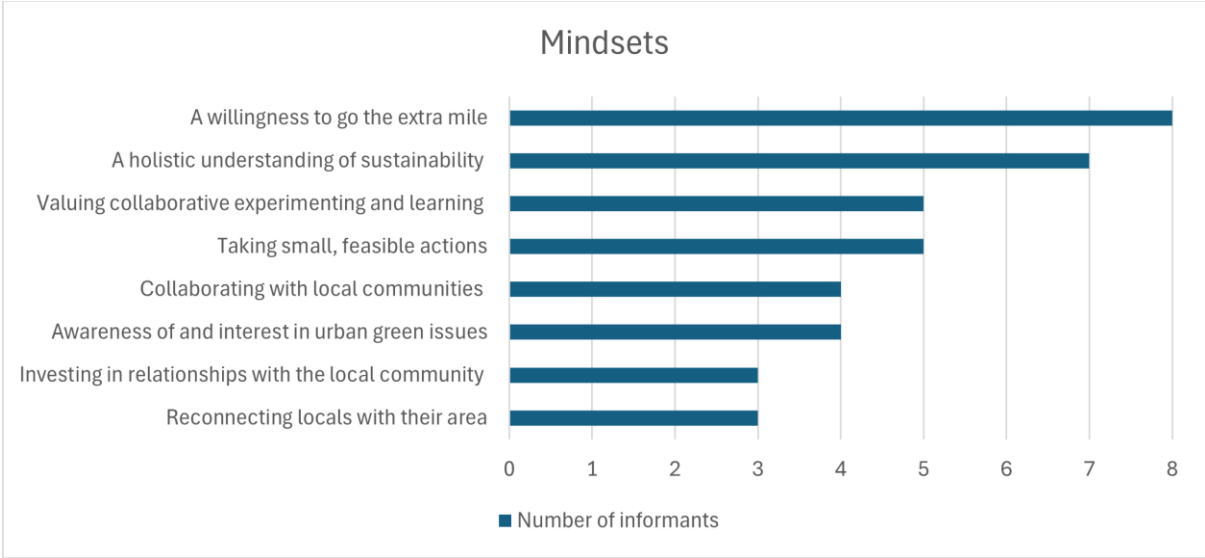
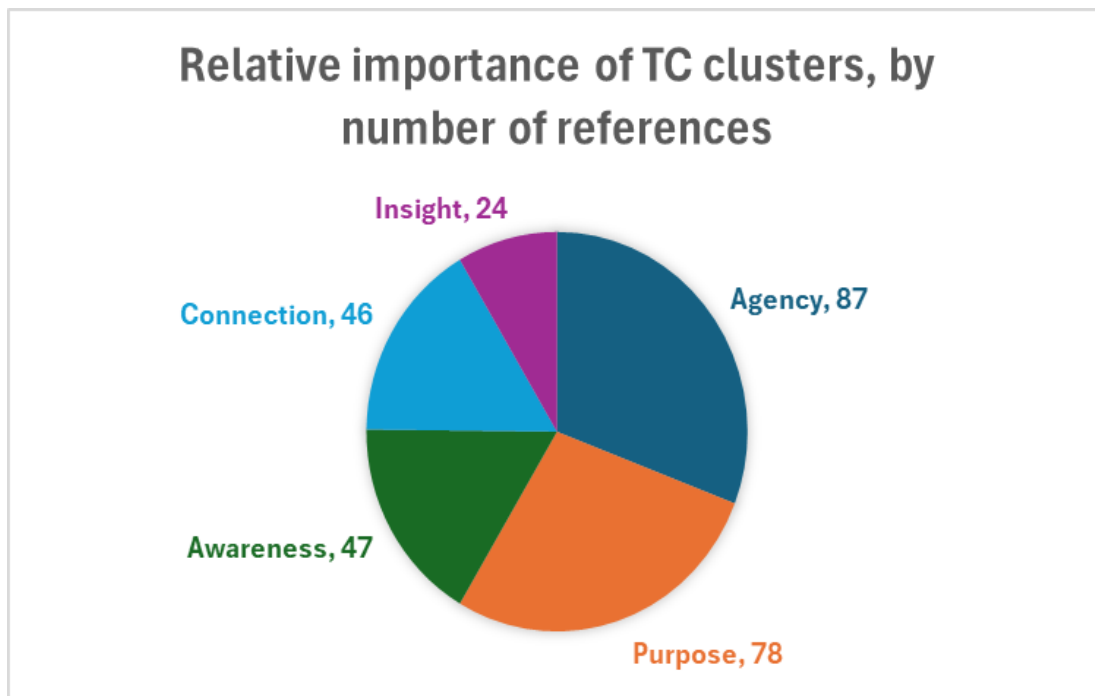


Figure 5: Mindsets indicated by the informants.

4.2.2 Transformative capacities

The coding of the transcripts showed that 38 TCs spanning all five clusters were reported for the Clever Cities project. However, the importance attributed to individual TCs and clusters differed starkly. By the total number of references, the importance of clusters can be ranked as follows: 1) agency (87 references), 2) purpose (78), 3) awareness (47), 4) connection (46), and 5) insight (24) (Figure 6). Notably, the number of references for the first cluster are nearly twice as many as for any one of the last three clusters. Based on the number of informants who identified them, the most prominent TCs were openness (8 informants), action-oriented mindsets (8), sense of responsibility (7), desire to contribute to the greater good (7), and sense of purpose (7). Similarly, when ranked by the number of references, the five most prominent TCs were a sense of responsibility (28 references), care (24), creativity (19), a desire to contribute to the greater good (19), and openness (17). The following sections present critical findings for the five TC clusters the informants considered essential for the Lindängen project.





**Figure 6:** Number of references for each of the five TC clusters.

### **Agency**

All eight interviewees highlighted the TC cluster agency (**Figure 7**). All informants found an *action-oriented mindset* essential, as evident in a willingness to take tangible action using NBS in Lindängen (I1, I3, I6). Informants 2 and 3 argued for a focus on small, feasible interventions as “We cannot change the world but we can change something” (I3). However, informant 4 criticised that there was too much talk and not enough action. Six informants underlined the significance of *creativity* regarding a willingness to experiment (I1, I8), adapt to pandemic-related challenges (I1, I6) and tailor NBS to the local (physical, social, financial) context (I1, I2, I3, I7). This connects to a *solutions-based mindset*, which six informants highlighted with respect to finding pragmatic solutions for the local context despite resource limitations (I1, I2, I3, I6, I7), community outreach (I2, I6, I7), and collaborating (I3, I5, I7). Informants saw *passion* in lead actors who were “full of energy” (I2, I3) and other participants whose full-bodied engagement they experienced (I4, I6, I8), which had a motivating effect on them (I6, I7, I8). The responses of four informants revealed that a *sense of empowerment* was important, as evident in participants supporting one another (I2, I3, I8), although one informant stated that having an explicit political mandate to act would have helped (I7). Six informants considered a *sense of agency* as important, as demonstrated by their capability to get involved and find project synergies (I5, I7), drive ideas, and mobilise networks (I7). According to informants 6 and 7, this sense of agency stemmed from a mutual understanding and politically-adopted goals. However, the pandemic and political interference compromised this sense of agency (I1, I2, I3). Further, four informants found that

capacities that enhance cooperation were essential, especially social skills that enabled meeting and uniting people from different backgrounds (I1, I4) and achieving consensus (I2, I3). Perseverance, which included not giving up on the community despite frustration (I1, I4, I5, I6), was identified. Lastly, the capacities of hope (I1, I8) and optimism (I6) were mentioned, but no one identified the TC courage.

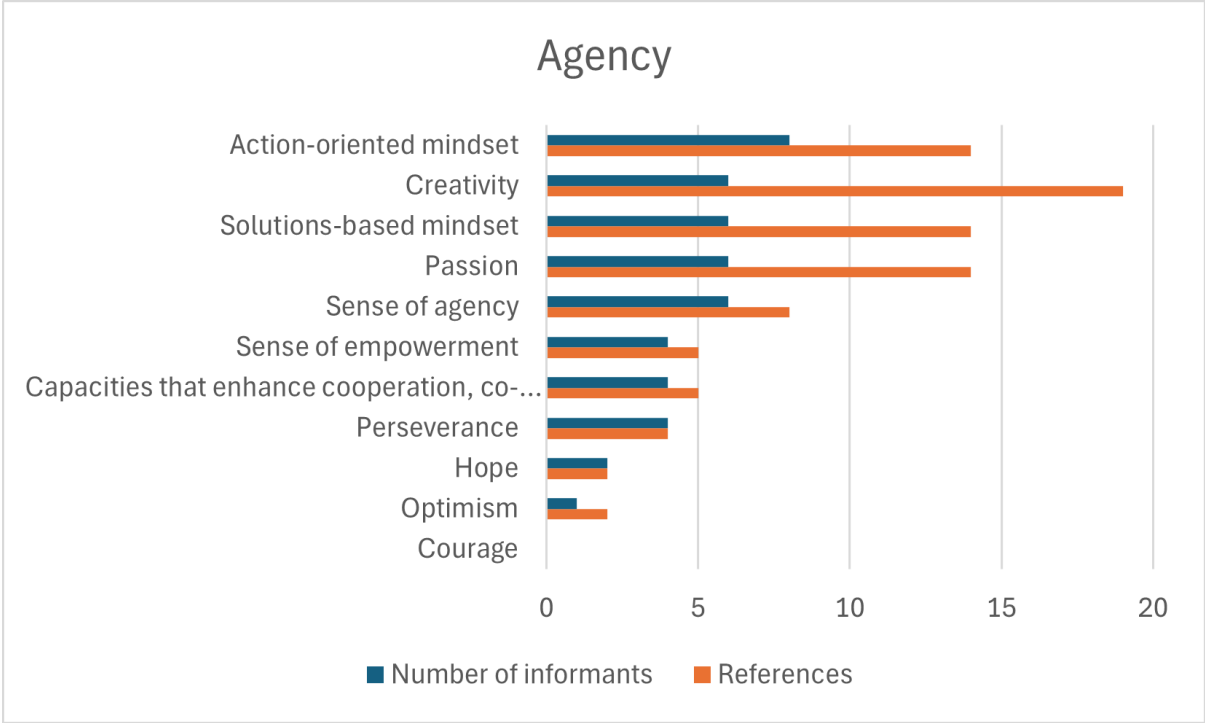
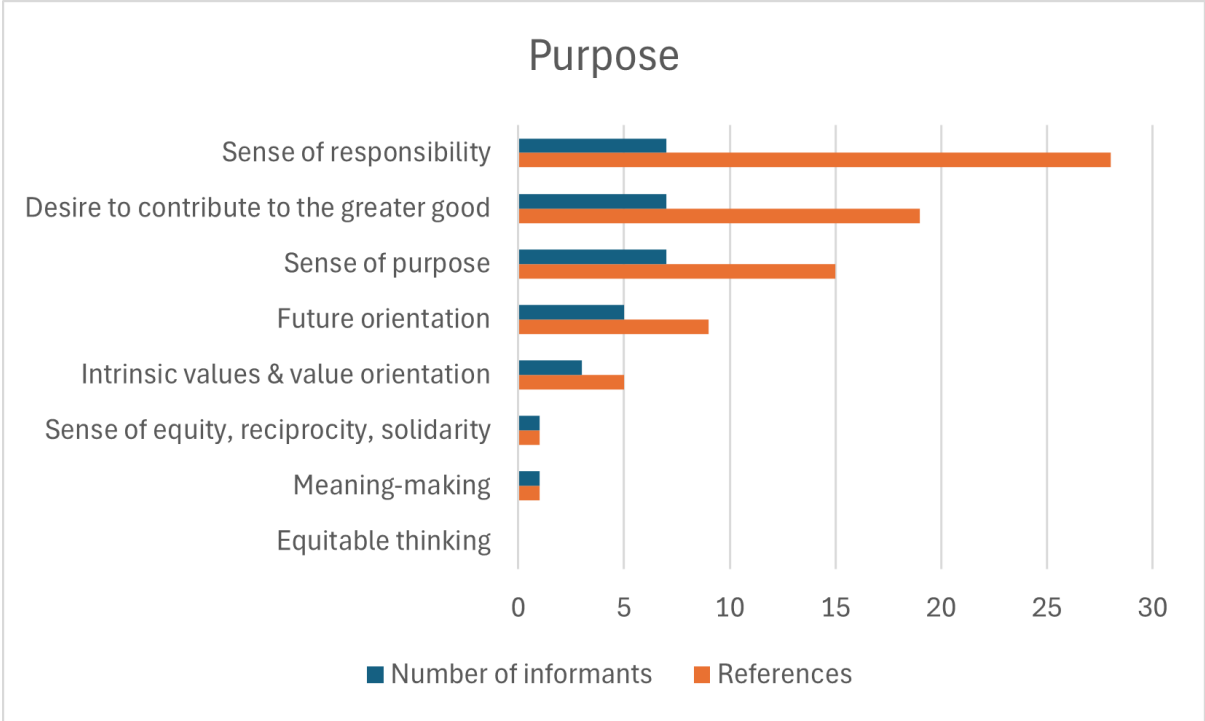


Figure 7: Number of informants and references that indicated TCs within the agency cluster.

**Purpose**

TCs associated with purpose were identified by seven informants (Figure 8). First and foremost, they highlighted a sense of responsibility to the people of Lindängen (I1, I2, I3, I5, I7, I8) and to taxpayers (I1, I5). They also felt responsible for spearheading urban climate action and showing leadership (I1, I5, I6, I8). On this note, informant 5 explained, “We have to take leadership because we are not bound to, to earn, to make money in the way that other companies are. So we have to be number one, and make ways so others can follow”. There was a strong shared desire to contribute to the greater good (I1, I2, I3, I5, I6, I7, I8). Informant 1 explained, “That’s the whole reason you work for a municipality; you want to make a difference, you want to contribute. So we wanted to make a difference and wanted to contribute in Lindängen”. This capacity ties into a sense of purpose that stemmed from seeing a need for change in Lindängen (I1, I2, I3, I5, I6, I7, I8). Five informants highlighted future orientation as important to the project, such as addressing climate change through NBS (I1, I3), integrating sustainability into urban development (I5, I6, I7), having a holistic view of sustainability (I6), and

wanting to improve the world for future generations (I6, I7). Besides, three informants pinpointed that advancing nature-based climate adaptation through their work was important (I1, I5, I6), indicating an *intrinsic value orientation*. Informants pointed out a *sense of equity* (I7) and *meaning-making* (I2), but not *equitable thinking*.

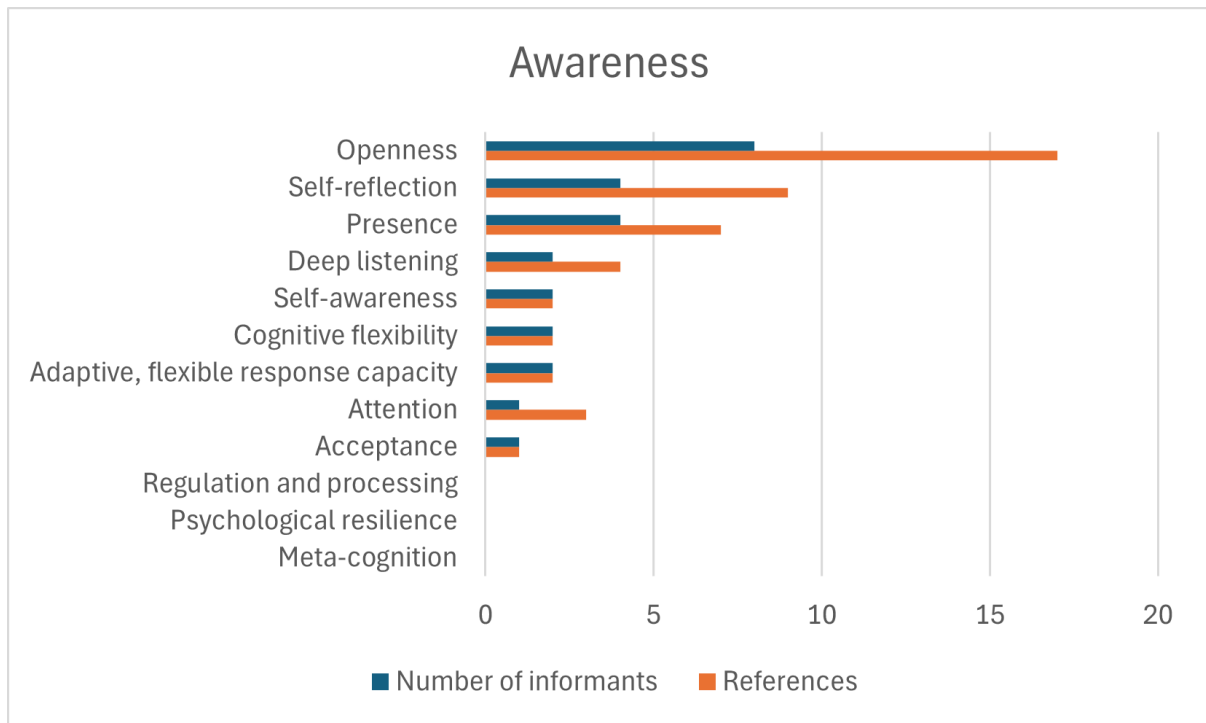


**Figure 8:** Number of informants and references that indicated TCs within the *purpose* cluster.

**Awareness**

All informants identified capacities falling into the *awareness* cluster as important (**Figure 9**). With all eight informants pinpointing *openness* to a total of 17 times, at least twice the references of any other capacity in this cluster, this TC is paramount. An openness to collaborate across departments (I2, I3, I5, I6, I7), to engage with citizens (I3) and share who you are (I7), and understand the local context (I7) were particularly important, as well as an openness to learn and change one’s practices (I2, I4, I6, I7, I8). Simultaneously, two informants expressed regret about the overall lack of openness to collaborate interdepartmentally (I1, I3). Moreover, four informants expressed the capacity for *self-reflection*. They critically reflected on their own motivation and limitations in the project (I4, I7), on their own and colleagues’ behaviour (I5), and what they themselves could have done better (I8). They did not specify if they thought self-reflection was vital to the project. *Presence* was a capacity that four informants strongly emphasised, stating that being physically present with people and sharing experiences (I1, I5,

I6, I8) enabled people to connect. While informant 1 considered that *deep listening*, such as listening to locals' concerns, was important, informant 6 found this capacity lacking. Further, some interviewees' responses related to the capacities of *self-awareness* (I6, I7), *cognitive flexibility* (I6, I8), *adaptive, flexible response capacity* (I5, I7), *attention* (I1), and *acceptance* (I7). The capacities *regulation and processing*, *psychological resilience*, and *meta-cognition* were not raised.

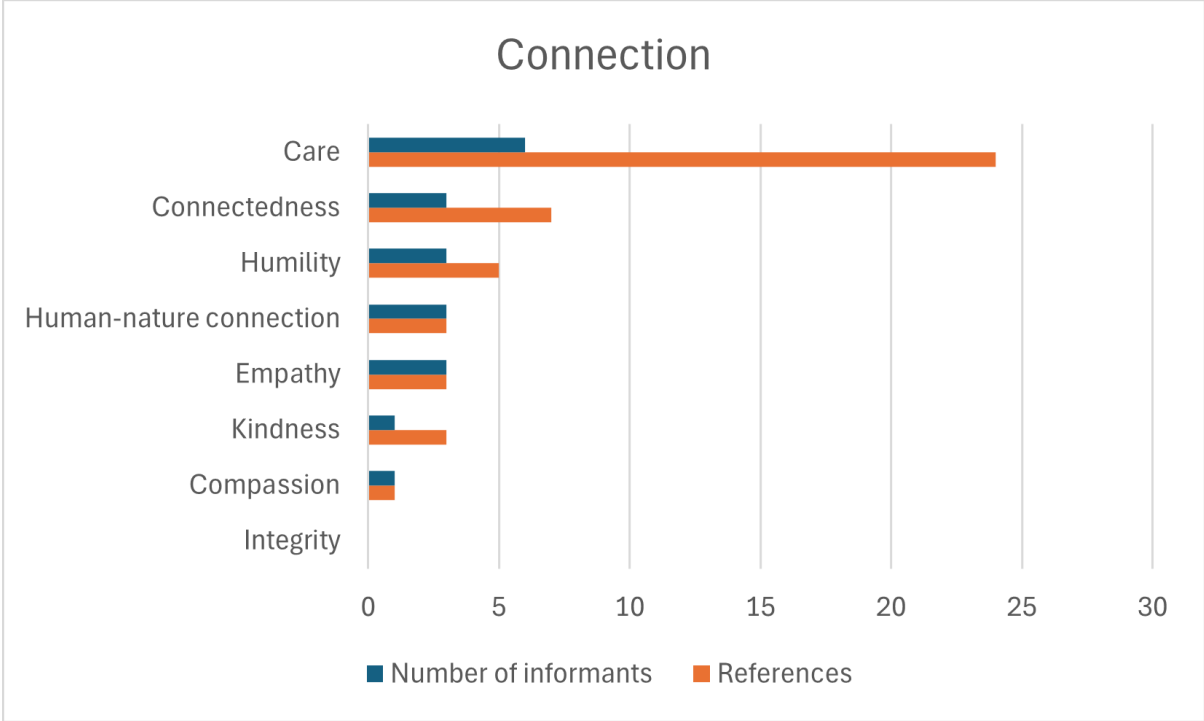


**Figure 9:** Number of informants and references that indicated TCs within the *awareness* cluster.

### **Connection**

All informants highlighted capacities that fall under the cluster of *connection*. By far, most of the responses in this cluster are related to *care* (**Figure 10**). Six informants stressed that the project participants cared for the people in Lindängen (I1, I2, I3, I6, I7, I8). On this note, informant 6 pointed out “the inner qualities of [...] caring for each other and for their community and their closest environments” (I6), while informant 2 stated they wanted to get it “Right for the children, right for the money, right for the green, right for the trees”. Besides, three informants highlighted the importance of *connectedness*, such as through collaboration and “good chemistry” (I8), and feeling connected to the community through embedding oneself in Lindängen (I7). Informant 6 saw that something really clicked when they “saw each other's engagement and passion for this”. Three informants expressed *humility* as they realised that actions needed to address local needs first rather than implement an

external agenda (I6, I7, I8). Further, *human-nature connectedness* was evident as informants wanted to reconnect locals with nature (I1, I6, I8). Informant 6 viewed this as a powerful catalyst for bigger changes, noting, “It’s hard to hate a plant. But a lot of people love them and care for them. And from these small things, I think, bigger things can grow, the plants they grow, but also the notion of taking care of your place or each other” (I6). Lastly, the TCs *empathy* (I2, I4, I5), *kindness* (I8), and *compassion* (I7) were raised, whereas *integrity* was not mentioned.

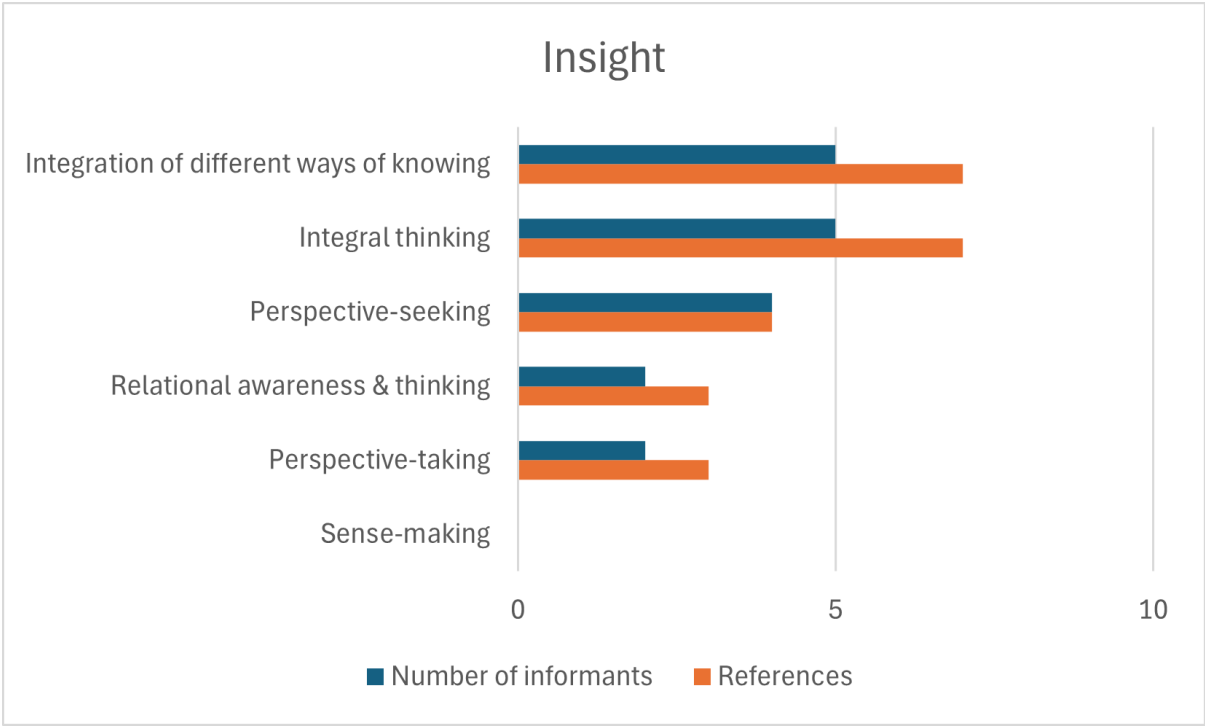


**Figure 10:** Number of informants and references that indicated TCs within the *connection* cluster.

**Insight**

All informants identified capacities relating to *insight*, yet it was the least reported cluster judging by the total amount of references (**Figure 11**). What stood out was *integral thinking*, which five informants found important. It was beneficial to the process to integrate perspectives from across departments and disciplines (I2, I3), incorporate social, ecological and financial aspects (I2, I4), hold a holistic view of sustainability (I6), and include local interests in the project (I7). A similarly significant TC was the *integration of different ways of knowing*. Bridging the gap between property owners, municipal departments, external stakeholders, and locals allowed to integrate local and experiential knowledge (e.g. feelings of safety) (I1, I7) and create new knowledge together (I4, I5, I8). This links to the TCs of *perspective-seeking* (4 informants) and *perspective-taking* (2 informants). Asking locals for their vision

for the area (I1), seeking out the perspectives of colleagues from other departments (I2, I3), and seeking collaborations (I6) point towards *perspective-seeking*. Informant 2 emphasised the importance of perspective-taking when it comes to understanding problems from other departments' perspectives, while informant 7 highlighted the importance of understanding local people's needs. Lastly, two informants indicated that *relational awareness* was critical as one saw how their own engagement motivated the group (I6), while the other expressed an awareness of the negative impact of municipal actions (e.g. discontinuity, staff turnover) on local realities (e.g. lowered trust levels) (I7). *Sense-making* was not mentioned.



**Figure 11:** Number of informants and references that indicated TCs within the *insight* cluster.

**4.2.3 Project impacts**

Although the informants did not link project impacts back to inner dimensions, there may be a connection that went unnoticed. Thus, we will outline the project impacts in this section. As reported by informants, the project outputs comprised study trips, community events, material provision, greening interventions, and project reports and plans. Actors from different municipal departments and housing companies jointly travelled to the European frontrunner cities (i.e. ten went to London and 18 to Hamburg) to learn from those cities' experiences with NBS (I1, I4, I5, I7). The project group organised activities in Lindängen such as informative talks and workshops around pollinators on World

Bee Day (I1, I7, I8), and weekly family events to receive community input (I1, I7). In addition to the project team meeting every other month (I1, I5, I8), learnings were shared in a final seminar (I7). The project distributed materials (e.g. soil, plants, seeds) and information to local communities (I1, I6). Native trees and small meadows were planted around housing blocks (I1, I8), and the green space around sports fields and schools was diversified (I2, I3). As regards deliverables, the project produced the NBS Plan for the whole of Malmö. The plan targets the municipality, property owners and the general public and outlines how people can use NBS to improve their area (I1). Besides, four extensive reports were delivered to the EU (I1).

Four informants responded that the project at Lindängen had no outcomes and that if it did, it was hard and/or too early to know the outcomes (I1, I2, I3, I4). Nonetheless, they indicated there had been positive impacts on relationships, communities, and biodiversity. Seven informants emphasised how the project enabled the building of new and nurturing of existing relationships. In terms of interdepartmental relations, participants partly broke down silos and built knowledge networks (I1, I2, I3, I6, I7). For instance, informant 2 appeared delighted when saying “now we know [...] each other, so now we can just start to talk. And we have questions so we know who to ask”. Likewise, the project nurtured relationships with external organisations and communities (I1, I5, I6, I7, I8), creating a mutual understanding of common and different goals and each other’s reasoning behind decisions (I2, I3, I5). Two informants emphasised how much they had learned and that they intended to apply it in future work (I3, I8). Informant 6 considered that their actions during the pandemic helped combat isolation in the Lindängen community. As regards biodiversity, the small planting interventions increased pollinators by 70% from low levels and red-listed species were found within three seasons of the interventions (I1, I8).

The project has inspired and contributed to some changes in policies and practices for NBS. While policies for urban greening in Malmö stads environmental plan had been increasing for years, informant 1 stated that Clever Cities had likely added to the momentum. Further, the municipality and property owners have now established common goals (I5). Furthermore, one property owner created their own sustainability goals, including a native plants directory that will be applied across their Sweden-wide property portfolio as a direct result of the project (I8). An external NGO involved in Clever Cities now collaborates with other non-municipal stakeholders (e.g. academia and property owners) on other, bigger NBS projects (I8). In contrast, two informants were adamant that the project had no specific impact on their departments’ policies or practices (I4, I6).

### **4.3 Shift in inner dimensions and their enabling factors**

While tangible project outcomes were scarce, people's inner dimensions developed during the process, which will be explored in this section.

#### **4.3.1 Shifts in inner dimensions**

During the Clever Cities project, two mindsets were reinforced: The development of an active desire for more interdepartmental collaboration (I1, I2, I3, I5, I6, I7) and more strategic collaboration with external stakeholders, property owners and local communities beyond individual projects (I5, I6, I7). Through the interdepartmental collaboration within the project, trust and a sense of safety grew so that most municipal informants agreed that they were more inclined to include each other in future projects (I1, I2, I3, I5, I6, I7). Informant 1 pointed out that "it's better that we [...] can move forward *together* instead of working against each other" (I1), expressing a desire to build unity among the municipality. Similarly, informant 2 enjoyed working together and reflected that "in some big questions like this, we need to work together [...] we're Malmö stad, you are Malmö stad, and *we all work for Malmö stad* [...] *we want the same things right here*". Informant 2 stated that valuing the expertise of a colleague they met through the Clever Cities project, they had already invited them to another project. A sense of unity has been sparked among the different municipal departments and will likely continue to grow in future projects (I1, I2, I3).

Further mindset shifts included realising the importance of NBS, paired with a deeper understanding of the concept and an increased willingness to use them (I1, I2, I3, I4, I6, I7, I8). This development cannot be attributed to Clever Cities alone, as informant 1 stressed, instead, it contributed to an awareness that had been growing outside of the project. Informant 6 agreed, but also stated that the Clever Cities project served as a reinforcement of a wake-up call to the climate crisis and informant 7 understood the multi-faceted nature of sustainability issues (I6, I7). At the same time informants 1, 6 and 7 recognised that there is no one-size-fits-all solution, on the contrary, the local context and history of an area play a key role in designing sustainable solutions (I1, I6, I7).

The value of communicating more openly and effectively to grow mutual understanding was expressed mainly by informants 5 and 7. The experience of sharing knowledge and the desire for more study trips was seen as a way to break down interdepartmental barriers (I1, I2, I3). While new relationships were built and continue to thrive, informant 7 acknowledged that their scope of work needed to provide for this time-intensive undertaking. Informants 3 and 6 did not recognise a mindset shift in themselves when asked directly, and informant 1 stated that the project merely reinforced an ongoing shift towards urban greening and climate action (I1, I3, I6). Lastly, informant 4 regretfully noted a negative



mindset shift in the team as their involvement in the project was cut short, and their own engagement was therefore limited (I4).

#### **4.3.2 Enabling conditions for an inner dimension shift**

##### **European Union / Clever Cities umbrella**

The informants identified the EU umbrella project of Clever Cities as one factor enabling mindset shifts. The reason was that it helped to put issues on the table that were otherwise not discussed at Malmö stad. The EU umbrella project also reinforced a growing momentum towards urban climate and greening work with NBS as pathways to address socio-ecological issues (I1). Most importantly, it initiated interdepartmental collaboration and knowledge sharing that also to some extent facilitated the overcoming of silos (I1, I4, I5, I6). As informant 1 put it, “It was Clever Cities. *It was Clever Cities.* We wouldn't have been, I personally wouldn't have been there without Clever Cities because, as I say, we're project-based” (I1). Only one participant saw the umbrella project as hindering (I6). The other interviewees agreed that “the Clever City *umbrella* holds the group together *continuously* to achieve goals so I think that's the big thing” (I5). Particularly, the study visits enabled collaboration, the exchange of ideas, and the shared experience of witnessing NBS in a different context and imagining how it could be adapted to the Malmö context (I1, I4, I7). They sparked learning, inspiration, and new ambitions to work together in the future, although more concrete steps are still needed (I1, I7). Informant 1 shared the reflection that “just *seeing something together, sharing* that experience was really *valuable*” and hopes that this will translate into more co-creation of NBS in the future.

##### **Collaboration**

All interviewees agreed that the collaboration between departments, external stakeholders and the local community was an enabling factor (I1-I8). The most significant impact resulted from combined internal and external collaboration (I6, I7), which, for instance, enabled the identification of areas for meadows and community gardens (I1). Within the interdepartmental collaboration, it was primarily combining different backgrounds and areas of expertise and existing relationships in the local area that unlocked opportunities for change (I2, I3, I6, I7) and the act of generating innovative ideas with fresh perspectives (I2, I3, I5). The latter also means a merging of funding and generating mutual understanding (I5, I7). Informant 2 remarked that “together we could take a bigger risk to *ansvarighet* responsibility for the whole area”. The collaboration with external stakeholders was most evident in working with property companies and the Lindängen community. Informants 1 and 7 stressed the importance of working with the local community and listening to their needs (I1, I7). This also included local actors such as NGOs and libraries to enhance community involvement and outreach and open up

two-way communication (I1, I4, I7, I8). The municipal collaboration with property companies enabled planting and gardening programmes on adjacent land (I1, I2, I3, I4, I5, I6, I7, I8). This knowledge exchange and bundling of resources made space for creating locally appropriate solutions such as tackling pest animal issues and increasing biodiversity (I1, I4, I7, I8) and assisted in finding new ways of working together (I1, I2, I3, I4, I5, I6, I7, I8).

### ***Existing social networks***

Already existing social networks played a crucial role in enabling an inner dimension shift. Through established meeting hubs, such as ReTuren, Allaktivitetshus and Framtidens hus in the centre of Lindängen the project leaders could tap into social networks to engage with the local community (I1, I6, I7). Moreover, relationships with local NGOs also helped implement solutions (I6, I7, I8).

## **4.4 Barriers affecting the project**

Political, organisational and communication barriers hindered the project from achieving its original goals. To begin with, a political decision to withdraw funding from *Ekoprogram Lindängen* in 2020 thwarted the original plans (I1). The obligation to follow organisational procedures and being forbidden to prioritise municipal funding for socio-economically weaker areas frequently limited experimentation and creativity (I1, I4, I7). Municipal silos were another key barrier. Four interviewees observed difficulty in involving some departments that were seen as gatekeepers to funding (I1, I2, I3, I4). One department, on the other hand, lamented that they were not but should have been involved from the start, which they ascribed to an unclear project mandate and structural problems (I5, I7). There was a perceived inherent unwillingness to communicate openly (I1, I2, I3), resulting in a sense of detachment from other departments and a hyper-focus on their own fields of duty (I5). The organisational restructuring of the municipality in 2012/2013 gave rise to this silo culture (I4) as the city was divided into districts and governed by the municipality with big departments. The loss of local governance resulted in the severing of connections with local communities (I4, I6, I7). The funding issues paired with municipal siloing meant that the Clever Cities project could not realise all its visions (I1, I2, I3, I4, I6, I8).

Another major hindering factor was a high staff turnover and discontinuous personal involvement (I1, I2, I3, I4, I5, I6, I7), partly due to low funding (I4). Many participants were involved in different project stages but not throughout, which caused unsustainable relations and disrupted collaborations (I1, I6, I7). As informant 7 summarised it “I think one of the main challenges was that there were lots of people that came and went, that the continuity was lost” (I7). Four interviewees criticised the lack of clarity

on roles. Individuals and entire departments were unclear about why they were part of the project and what was expected of them, which sparked confusion, unwillingness to participate and some participants leaving (I4, I5, I6, I7). Issues of projectification were another factor (I6, I7). As informant 6 explained, “You can't just create something and then leave it behind, because that doesn't, that only causes a lot of frustration”. Besides, the social isolation during the COVID-19 pandemic prevented physical interactions and presence. Being newly introduced to the project, informant 1 reflected, “I didn't know anyone to try and to try and be creative and engage people in that sterile setting was very difficult and very challenging”. Online meetings could not make up for the need for real connection, engagement and creativity which made maintaining social bonds difficult (I1, I6). The discontinuity, and the lack of local presence and visibility of the Clever Cities project in Lindängen posed another barrier (I1, I6).

## **5 Discussion**

### **5.1 Engagement with inner dimensions**

The key findings for RQ1 indicate that the concept of inner dimensions is unfamiliar to the interviewees. The informants did not explicitly engage with inner dimensions during the project process, but they were, to some extent, informally discussed among participants. Political and organisational barriers were perceived as having influenced the project process more significantly than the inner dimensions of project participants. However, at the end of the interviews, several interviewees expressed that they saw value in explicitly incorporating inner dimensions into their work. We recognise that rather than being a reflection of their own volition, their response might have been influenced by the questions we posed to them for our research.

#### **5.1.1 Perception of and engagement with the inner dimension concept**

The fact that participants were unfamiliar with the terms of inner dimensions, mindsets, and TCs may reflect the novelty of these concepts and the field of inner-outer transformations in general (Wamsler & Osberg, 2022). It reveals a critical gap between the academic concepts and their practical application. Reformulations and clarifications did not make the concepts clear to the interviewees. Although they made the informants more comfortable, they also compromised some of the concepts' actual meaning. It is imperative to emphasise that this inadequacy in comprehension lies not with our informants but with academia. Ives et al. (2023) criticise that the knowledge paradigm in sustainability science favours academic insights over practical knowledge and argues that knowledge systems should

be broadened to enable new pathways for transformative practice. We argue this is why the concepts of inner dimensions, mindsets, and TCs currently lack practical applicability. To become usable in practice, the concepts must be operationalised by integrating practical know-how with academic theory.

Although no intentional engagement with inner dimensions occurred during the project, there was some discussion among participants. This, however, was not formally integrated and mainstreamed into the project approach. Here, the fact that the inner dimensions concept is rooted in academia could play a role. Furthermore, Wamsler and Osberg's (2022) transformative climate mainstreaming framework rests on the assumption that inner dimensions must be mainstreamed alongside sustainability considerations for mainstreaming to achieve full-spectrum outcomes that catalyse sustainable transformation. It also claims that inner dimensions influence sustainability across all levels (Wamsler et al., 2022) but this field is still in its infancy. This notion aligns with our findings, which show that while tendencies to engage with inner dimensions could be detected in the project participants, these were neither intentional nor large-scale. For that to happen, a roadmap for a more integrated approach is required. As Wamsler and Bristow (2022) state, "current policy approaches are characterised by a 'divorce between inner and outer'" (Wamsler & Bristow, 2022, p. 8). As long as this is the case, bridging the gap between the personal, political, and practical spheres and thereby creating deep sustainable transformation will remain difficult.

### ***5.1.2 Mismatch of scales at which inner-outer transformations are considered***

The inability of identified inner dimensions to spark transformations in the political sphere points towards a mismatch between the scales at which people's mindsets and the political sphere are considered. Most informants did not identify inner dimensions or an engagement with these concepts during the project work as the main problem. Rather, they expressed high levels of frustration with the substantial barriers arising from the political and organisational system. This reflects the dominant focus on the political sphere (Ives et al., 2020). The project participants' mindsets and TCs did not, and likely could not, overcome the tangible political and practical barriers, such as funding restraints and discontinuity. A possible explanation is that these structural barriers stemmed from mindsets that existed on a higher institutional level, whereas the individual and shared mindsets of the interviewees existed on a project level. Hence, there is a need for concrete policy restructuring and transformations facilitating the integration of inner dimensions on all levels (Wamsler & Bristow, 2022).

Focusing on individuals and their impacts while neglecting collective settings reinforces a scale mismatch (Wamsler et al., 2021). The transformative climate mainstreaming framework is based on

the assumption that “all individuals are potential agents of change” (Wamsler & Osberg, 2022, p. 8). Thus, it “becomes impossible to speak of individuals without also speaking of the collective and systems” (Wamsler & Osberg, 2022, p. 9) once TCs are nurtured and enshrined in all spheres of transformation. Since this is not (yet) the case, it is important not to falsely assume that the mindsets and inner transformations of individuals necessarily align with the collective and have enough influence to transform the political sphere. O’Brien emphasises that “personal transformations alone are seldom sufficient to transform inequitable and unsustainable systems and structures that are maintained by power, politics, privilege, and vested interests” (O’Brien et al., 2023, p. 1450). Future research needs to consider this and pay careful attention to the organisational levels at which inner dimensions manifest. Otherwise, scale mismatches occur and hinder transformative change, as this research has shown. We argue that the transformation of inner dimensions has to happen on a more organisational level to spark long-lasting change in the political and practical spheres.

## **5.2 Inner dimensions and their link to project outcomes**

RQ2 aimed to create a deeper understanding of what mindsets and associated TCs produce specific sustainability impacts to create actionable knowledge that helps integrate inner dimensions into policy and practice. The data in this study showed that the most relevant pre-existing mindsets were those that embrace collaboration and learning, a holistic view of sustainability, and a preference for smaller actions. The TC clusters of agency and purpose were the most frequently identified, followed by awareness and connection, while insight played a minor role. Of note, the different clusters contained unequal amounts of TCs. In part, this reflects that each cluster contains a different number of ‘key capacities’ and ‘related capacities’ (Osberg & Wamsler, 2022). The ‘key capacities’ formed the core of our coding scheme, whereas we only added those from a long list of ‘related capacities’ that we identified during an initial scan of the transcripts. We do, however, acknowledge that this could have influenced how many total references were produced for each TC cluster.

The TCs reported by most informants were openness, action-oriented mindsets, sense of responsibility, desire to contribute to the greater good, and sense of purpose. This largely overlaps with those most reported by reference with the exception that care and creativity were frequently reported, albeit by only six informants. Informants found it challenging to identify project outcomes, and some saw none. Nonetheless, outcomes included new and enhanced relationships and increased local biodiversity. This increased the momentum for NBS and resulted in shared goals between the municipality and external organisations. However, two informants stated that the project had changed nothing in their departments.

### **5.2.1 *Mindsets as deep leverage points***

This thesis shows that mindsets around collaboration, having a holistic view of sustainability, and taking smaller steps all have the potential to influence the project process and, to some extent, overcome barriers to NBS mainstreaming in the political sphere. Mindsets are the lenses through which we see and understand the world (Wamsler & Bristow, 2022). Situated within the personal sphere, mindsets underpin and interact with the systems and practical spheres (O'Brien & Sygna, 2013). Through a mindset that values collaboration, project participants reached out to other departments, external stakeholders, and the Lindängen community to understand local needs and develop context-specific solutions. They did so despite institutional norms around siloing and projectification to achieve change in the practical sphere.

Informants expressed a realistic, verging on cynical view of larger projects and associated problems with discontinuity (I3, I4, I5, I6, I7), which shaped the practical response. This mindset influenced the focus of this project on smaller, feasible steps towards sustainable change. This aligns with the literature on how mindsets inform problem understanding and what solutions appear feasible in the practical sphere (O'Brien, 2018). This collective mindset interacted with the other spheres of transformation in a way that helped deal with the barriers, particularly the departmental silos and funding constraints which existed in the political sphere. As such, the mindsets acted as 'deep' leverage points (Ives et al., 2020; Wamsler & Bristow, 2022), which enabled informants to do things differently, work better with others, and adapt their actions to the local context. Although these mindsets helped circumvent barriers to some extent, there is no evidence that they transformed the political and practical spheres. The literature shows that aspects such as power structures and priorities, which are linked to dominant mindsets, hinder change (Wamsler & Bristow, 2022). This ties back into our reflection on the potential scale mismatch at which the personal sphere and political spheres are considered.

### **5.2.2 *Reflections on the applicability of the identified inner dimensions***

Although working environments "are contexts where individuals can, potentially, have more influence on sustainability outcomes at collective and systems level compared to the private sphere" (Wamsler et al., 2021, p. 4), few studies have explored beneficial mindsets and TCs in professional contexts (Wamsler et al., 2021). This study explored inner dimensions in the professional setting of a municipal project. When considering the most reported mindsets, TC clusters, and individual TCs together, informants shared a sense of responsibility and care towards the public they serve, which underpins

their strong desire to contribute to sustainable change. Further, informants saw the need for openness to collaborate and find creative solutions together.

These findings raise questions about the kinds of processes, institutions, and projects for which the highlighted inner dimensions are important. We argue that they are particularly important to handle public sector dynamics and demands. Employees at Swedish local authorities are under a weakly enforced external accountability demand, pressuring them to meet public expectations regarding sustainability (Johnstone et al., 2023). More importantly, it is employees' beliefs, opinions and values shaped by relationships with colleagues and extra-organisational relations that drive action-taking for sustainability (Johnstone et al., 2023). This aligns with informant 1, who stated that the desire to contribute is the whole reason one works for a municipality. The identified inner dimensions around care and responsibility are thus characteristic of this sector and needed in public projects that aim for the sustainable development of communities.

The informants' inclination towards smaller, feasible actions reflects their sense of purpose and responsibility towards communities and pragmatism, coupled with regulatory duties and budget constraints typical of municipalities. It has been shown that such incrementalism is prevalent in public institutions, where sustainability-oriented employees seek to implement more sustainable practices within the organisational structure rather than transform existing structures (Johnstone et al., 2023). Similarly, the identified mindsets and TCs align with the characteristics public administrations need to shape sustainability transformations. It has been found that cross-departmental collaboration, which combines areas of expertise and solves complex problems, can mobilise capacities and is pivotal to achieving sustainability impacts (Jacob et al., 2021; Wamsler, Schöpke, et al., 2020). Similarly, the informants in our study identified openness towards experimentation as important, which aligns with a common desire of public sector agents for more flexibility within their organisation (Jacob et al., 2021; Wamsler, Schöpke, et al., 2020). More studies on different organisational forms are needed to identify how specific these TCs and inner dimensions are to municipalities.

Here, we would like to note that frequency does not necessarily equal the importance of TCs. We evaluated and ranked the TCs first based on how many informants reported them and second on how frequently we identified them in the interviews (i.e. how many sections were coded to the respective TC). However, we cannot estimate how the informants would have evaluated the significance of all TCs in relation to one another. While the informants sometimes stated that a capacity was essential, they generally did not directly name the capacity or rank its importance. Instead, they described a capacity, which was interpreted during the coding phase. To evaluate the relative importance of TCs we could have asked informants to respond to and rank each TC on a list. However, we decided against

this option as it could have directed their responses towards TCs that they might not have brought up otherwise. Future research could undertake such an exercise in the aftermath of the interviews to avoid this bias earlier on.

### **5.2.3 Link between specific inner dimensions and sustainability impacts**

This study sought to create a deeper understanding and actionable knowledge of the “specific impact of particular qualities/capacities” (Wamsler & Osberg, 2022, p. 10) based on the notion that certain TCs result in better sustainability outcomes. While informants saw inner dimensions as important to the project *process*, they did not identify a specific link between inner dimensions and project *impacts*. The reasons given were trifold: 1) Some held the opinion that the project had no outcomes, 2) others were unaware if the project had outcomes, and 3) a few saw outcomes but did not link them to inner dimensions.

Questions arise about what role is played by gaps that exist in the project’s continuity and feedback loop, and if outcomes can be evaluated yet. In this case, it is difficult and possibly too early to draw a causal link between inner dimensions and specific outcomes, which is a limitation of the data collected. One reason could be that the project only just finished in late 2023, hence it will take time for outcomes to manifest. A potentially more significant reason for this finding is that the political decision to discontinue the local project Ekoprogram Lindängen cost the project its funding in 2020. Therefore, the original project plan could not be realised, limiting potential outcomes. Further, the undertaking suffered from severe staff fluctuation, as employees joined for different stages without being involved from start to end. This added to the discontinuity and likely limited the reach and depth of outcomes. It also explains why informants’ recollections of the project varied as, for most, their more active phase was a few years before the project ended. Several informants noted that there was no feedback loop that communicated outcomes. Hence, those involved earlier on could not comment on project outcomes.

The mindsets and associated TCs which underpinned collaboration across silos and knowledge exchange contributed to the building and nurturing of relationships. These serve as a strong starting point for future work, whether NBS-related or otherwise. It also contributed to implementing NBS that were appropriate for the local context, both socially and environmentally, which in turn inspired informants as well as actors outside the municipality to use NBS. However, we acknowledge that we cannot know exactly if and how the informants would see these mindsets and TCs as linked to these outcomes.



### **5.3 Inner dimensions shift and enabling/constraining factors**

As regards RQ3, this study showed that participation in the project reinforced mindsets favouring collaboration and an active desire to communicate more effectively and openly both interdepartmentally and with external stakeholders. Likewise, the willingness to use NBS and an understanding of NBS increased. The enabling factors for changes in inner dimensions included the EU/Clever Cities umbrella, collaboration, and existing social networks. Simultaneously, political, organisational and communication barriers hamstrung the project and inner dimension shifts. These barriers included the withdrawal of political support resulting in budget cuts, insufficient clarity on roles, siloing, pandemic effects, staff turnover, and discontinuity.

#### **5.3.1 Shifts in inner dimensions**

Our findings indicate that a single project is not an ideal scope and timeframe to examine inner dimension shifts. Notably, none of the interviewees identified a TC shift specific to the Clever Cities project, although the Clever Cities project was a lengthy undertaking (5.5 years). We consider that these shifts take much longer to develop and become detectable. Many participants reflected this when stating that Clever Cities mostly reinforced the ongoing development of inner dimensions at Malmö stad instead of initiating a shift. This illustrates the limitations of the human capacity for change within a brief time period. However, long-term change processes and the supporting factors are understudied (Wamsler et al., 2021). To identify how and why inner dimension shifts happen on a municipal level, we suggest taking a more transdisciplinary approach in which academia is directly involved. This would offer the opportunity to observe and evaluate participants' TCs over a series of projects or processes, meaning before, during and after. Our study supports the call for more longitudinal studies on the development of inner dimensions and the associated causal mechanisms (Panno et al., 2018; Richter & Hunecke, 2020).

#### **5.3.2 Enabling & constraining factors**

A major finding in our research was the importance of collaboration within municipalities and with external stakeholders. It sparked the identification and understanding of problems, joining resources, and developing solutions together. Besides, the collaboration bolsters the ability of NBS to tackle multiple issues (social, ecological, economic) simultaneously. Furthermore, it points towards the transformative potential of using relational (i.e. relationship-based) approaches to NBS implementation and mainstreaming. This, however, requires supporting infrastructure and tools, which further research needs to identify.

It was evident that the EU Clever Cities umbrella programme initiated collaboration and provided room for posing and debating new questions that might not have emerged from within the city. It also enabled study visits to Hamburg and London, facilitating collaboration and building trust among the project participants. While there were no direct outcomes concerning NBS, a more general shift towards using NBS more frequently within Malmö stad was reported. The associated shifts in mindsets are more subject to ongoing long-term shifts that need further investigation. The relationships built during the project process can be utilised, maintained and established more in future collaborations. This aligns with Wamsler and Bristow (2022), who suggest using existing drivers to tackle systemic barriers and connect this with “other measures to create systems, structures and mechanisms that allow us to move from vicious to virtuous cycles of mind and climate change [...]” (p. 4).

## **5.4 Recommendations**

This thesis aims to illuminate which inner dimensions specifically cause sustainability/NBS impacts, including how and under which conditions they shift and develop. Following the discussion, we make the following recommendations for academia and practice.

### **5.4.1 Recommendations for research**

- Further research is needed on how to assess inner dimensions at different governance and organisational levels, not simply at the project level.
- Changes in inner dimensions need to be assessed over time (before, during, and after a process), which could be achieved through more transdisciplinary research in which the researcher is involved throughout the process.

### **5.4.2 Recommendations for practice**

- Communication and active reflection on the project outcomes and inner dimensions of the project work can help capitalise on those inner dimensions. This will enable the identification of essential mindsets and TCs that could be nurtured to improve NBS implementation and mainstreaming in the future.

## **6 Conclusion**

This study took a closer look at the inner dimensions that support the mainstreaming of NBS. By interviewing eight participants from the Clever Cities project at Malmö stad, the engagement with inner dimensions and TCs on a municipal level was explored. The key results were that no direct engagement could be detected, but collaboration across departments and with external stakeholders was stressed as crucial to building new, lasting relationships. The interviewees overwhelmingly

expressed that mindsets valuing collaboration, a holistic view of sustainability, and a preference for incremental actions shaped the project. Likewise, the TCs openness, action-oriented mindsets, sense of responsibility, desire to contribute to the greater good, and sense of purpose, as well as care and creativity were important. However, the individual mindsets of the interviewees did not fully overcome nor transform barriers in the political and practical spheres.

This study aimed to fill the gap of exploring the engagement with inner dimensions of sustainability in a professional setting to facilitate NBS mainstreaming. Further research is needed to address barriers present in the political and practical spheres and how they can be overcome. Additionally, there is a need for research regarding the implementation of inner dimensions across all spheres and levels to create transformative change.

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## 8 Appendix

### 8.1 Appendix A: Interview guide

#### **Section 1: Background information/personal data**

1. Which department/organisation do you work at and what are your duties and responsibilities within it
2. Can you tell me about your and your department's/organisation's role within the Clever Cities project?
  - Prompt: How did you come to be involved in this project?

#### **Section 2: Sustainability outcomes of the project**

3. What does sustainability mean to you?
4. In your opinion, what sustainability outcomes did the Clever Cities project achieve?
  - Prompt: regarding social, environmental, economic sustainability. Focus on implemented outcomes, not just policy 'outputs'
5. How has this project influenced the way \*insert the interviewee's department/organisation\* incorporates NBS into its activities?
  - Prompt: How did the project change how you integrate NBS into policies, regulations and management approaches? Specific examples?
  - Prompt: How did this affect your department's practices and behaviours about using nature-based solutions? Specific examples?
6. For Malmö stad interviewees only:
  - What problems were you trying to address with this project?
  - Why did you think nature-based solutions were suitable?
  - How do you think the project contributed to integrating nature-based solutions across the municipal activities?

#### **Section 3: Engagement with mindsets**

7. In a broad sense, how do you think people's minds and inner lives relate to implementing and mainstreaming nature-based solutions?
  - How do you understand this relationship?
8. What role do you think your own but also collective mindsets, such as values, beliefs and worldviews played in the Clever Cities project?

- In how far did you discuss these mindsets internally but also with external stakeholders?
  - In how far did you consciously integrate them into your project work? (E.g. working processes, stakeholder engagement, structures, policies, resource allocation.)
9. How, if at all, do you think these mindsets influenced the project process and outcomes and why?
10. How, if at all, do you think that individual and organisational mindsets have shifted during or as a result of this process?
- What conditions enabled and/or hindered this?

#### **Section 4: Transformative capacities**

11. What kinds of inner human qualities or capacities\* do you think were important for achieving sustainability outcomes/ implementing NBS through this project, and why? \*What we mean by inner qualities are people's emotional and psychological characteristics/abilities and personality traits, rather than skills.
- What inner qualities do you think you have that helped you in the Clever Cities project?
  - What inner qualities did you see in the project team that supported the project?
  - Why do you think these inner qualities were important?
  - Were these capacities considered in the Clever Cities project e.g. in its working processes, structures, and resource allocation?
12. In your opinion, were there any inner qualities missing during the Clever Cities project that could have improved the process?
13. In your view, how did these qualities influence the project process and outcomes?
14. How, if at all, do you think people's inner qualities have developed if you compare the start of the project (or your involvement in it) with the end?
- How did these capacities evolve during the process, both on an individual and organisational/collective level?
  - What conditions enabled and/or hindered this?
15. Please take a moment to reflect on the role of inner qualities in your own work. How could these capacities be built into your work to support implementing and mainstreaming nature-based solutions?
16. Final question: Is there anything else you would like to add?

## 8.2 Appendix B: Consent form



### Consent to Participate in a Master Thesis at the Faculty of Social Science

FOR QUESTIONS ABOUT THE STUDY, PLEASE CONTACT:

Eileen Schröders ei7818sc-s@student.lu.se or Kim Wölper ki1424wo-s@student.lu.se

Before we ask you if you agree to participate in this research project, we will provide you with some information about the research and your rights as a participant. We invite you to ask any questions that you feel will help you understand this information. Personal data need to be collected for the purpose of this thesis. The aim of collecting them is to better understand the profiles of the interview participants.

#### **Purpose**

This research is being conducted as part of Eileen Schröders' and Kim Wölper's master's thesis in Environmental Studies and Sustainability Science at Lund University. It is supervised by David O'Byrne, post-doctoral researcher at Lund University Centre for Sustainability Studies (LUCSUS).

#### **Description**

The focus of this research is to better understand the role of inner dimensions (mindsets and associated personal capacities) in the implementation and mainstreaming of urban nature-based solutions in Swedish municipalities. Our study explores how Malmö municipality engaged with inner dimensions during the Clever Cities project, including how and under which conditions these dimensions may have developed or shifted.

#### **Interview procedure and processing of data**

You will be asked to answer questions orally, which will take about one hour of your time. The interview will be recorded over Zoom and additionally, a voice recording will be made using a phone. Audio files will be transcribed and used for our analysis. Copies of your interview will be made available to you upon request.

Personal data will be stored on password-protected drives for the duration of the research project, and data will be deleted when the degree project has been examined and received a passing grade. Access to personal data will be strictly restricted to the researchers and their supervisors. We do not share your personal data with third parties. Your privacy will be maintained in all published and written data resulting from the study.

#### **Risks and benefits of participation**

The risks associated with this study are anticipated to be minimal. The questions will not involve sensitive personal information. If you wish not to answer a particular question, you are free to simply decline. The benefit of participating in this study is that you will have the opportunity to reflect on and discuss your insights and experiences working within the Clever Cities project in

Lindängen, Malmö. Moreover, you will have the opportunity to reflect on your role and transformative capacities when collaborating on projects for NBS implementation and mainstreaming.

**Participant’s rights**

If you have read this form and have decided to participate in this project, please understand that your participation is completely voluntary. You have the right to:

- withdraw your consent, discontinue participation, and request that the audio recording be paused at any stage without penalty
- refuse to answer particular questions
- contact us at any time in the future to change or delete an answer
- receive information about the personal data we process about you
- have inaccurate personal data about you corrected.

Tapes and transcripts will be made available to you upon request. Your privacy will be maintained in all published and written data resulting from the study.

**If you have questions about your rights as a study participant or are dissatisfied at any time with any aspect of this study, you may contact us at the provided contact details stated on the first page.**

**Unless the assigned written acknowledgement of consent has been received before the interview, verbal consent will be requested on the audio recording, at the start of the interview.**

**Do you understand the project and the implications of your participation?**

YES

**Do you agree to confirm that you consent to participate?**

YES

**Do you agree to have this interview recorded?**

YES

<b>Location Date</b>
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**Signature Name clarification**

Thank you very much for taking the time to participate in this study.

**Researchers:**

**Eileen Schröders**

**Kim Wölper**

*[electronic signatures of both researchers were included in the version sent out to informants]*

**Location: Lund, Sweden**

**Date: 2024-03-14**