International Journal of Sustainable Transportation

ISSN: 1556-8318 (Print) 1556-8334 (Online) Journal homepage: www.tandfonline.com/journals/ujst20

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To cite this article: Tony Svensson , Job van Eldijk , Meta Berghauser Pont & Ulf Ranhagen (23 Oct 2026): Addressing institutional factors for the realization of TOD potentials of near-station areas through applying a planning support system in Swedish planning cases, International Journal of Sustainable Transportation, DOI: 10.1080/15568318.2026.2745744

To link to this article: https://doi.org/10.1080/15568318.2026.2745744

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INTERNATIONAL JOURNAL OF SUSTAINABLE TRANSPORTATION
https://doi.org/10.1080/15568318.2026.2745744

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Addressing institutional factors for the realization of TOD potentials of near-station areas through applying a planning support system in Swedish planning cases

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ABSTRACT

The article addresses institutional factors affecting the implementation of transit-oriented development (TOD) focusing on small-scale station areas and investigates the role of a planning support system (PSS) in institutional capacity-building. The focus is on the planning process, extending from early initiation and the development of planning scenarios and proposals to implementing a decided and evaluated proposal, maintaining established construction, and considering how this process relates to current planning conditions. The study is based on: a) interviews with planning actors, actor analysis and observations from a workshop series in a staged planning process for three Swedish cases of near-station densification in small urban areas; and b) a study of previous literature on institutional factors affecting TOD implementation. The main theoretical contributions of the study are: 1) a conceptual framework for analyzing institutional factors affecting TOD implementation that facilitates further research into the "processual dimensions" of TOD and helps clarify the relationship among formal structure, informal structure, and agency in the various process phases; 2) insight into institutional factors that influence TOD implementation in small-scale TOD contexts as formal or informal agency or structures that both align with and add to previous research; and 3) insight into how a PSS can support the addressing of institutional challenges to TOD implementation, where we find that the PSS of the Urban Station Communities project can support institutional capacity-building and the integration of analytical and professional knowledge, and thereby aid TOD implementation.

ARTICLE HISTORY
Received 31 December 2024
Revised 16 September 2026
Accepted 19 September 2026

KEYWORDS
Densification; institutional factors; institutional capacity; transit-oriented development; planning support system

Introduction

Background, aim, and research questions

Transit-oriented development (TOD) has, over the last 30 years, been established as a strategy for sustainable accessibility that involves creating compact, mixed-use communities within walking distance of a transit station (Cervero et al., 2002). Although extensive research has examined the benefits of TOD, particularly in larger cities (Jamme et al., 2019; Wu & Li, 2022), several studies highlight major challenges in planning and implementing TOD (Abdi & Lamíquiz-Daudén, 2022; Hrelja et al., 2022; Tan et al., 2014). Issues of process and management, as well as the lack of institutional frameworks to support policy integration and coordination, are frequently mentioned (Abdi & Lamíquiz-Daudén, 2022).

To improve TOD implementation and sustainable accessibility in general, numerous planning support systems (PSSs) have been developed to support and optimize the outcomes of accessibility strategies; however, they are often considered too complex to implement or are weakly connected to the local context (Silva et al., 2017). PSSs emphasizing TOD are primarily designed for multi-criteria analysis or multi-objective optimization (Ibraeva et al., 2020) and do not account for institutional or process-related factors considered key to successful TOD implementation (Hrelja et al., 2022), such as strong stakeholder relationships, political stability, and organizational restructuring (Tan et al., 2014; Thomas & Bertolini, 2015).

Previous studies of TOD implementation have identified a research gap concerning the processual dimensions underlying TOD projects (Hrelja et al., 2020; Maulat et al., 2021; Paulhiac Scherrer, 2019), particularly in smaller towns and settlements (Hrelja et al., 2020; Nigro et al., 2019). These dimensions include the obstacles to and levers of TOD implementation, especially regarding local governance, as well as the need to better understand informal institutional success factors and the implications of interactions between formal and informal institutions (Hrelja et al., 2020).

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Supplemental data for this article can be accessed online at https://doi.org/10.1080/15568318.2026.2745744.

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We therefore address institutional factors that influence TOD implementation, with a particular focus on small urban areas, building on Paulhiac Scherrer's (2019) observation that TOD research "has rarely examined the connection between how the project is carried out (the actors and the processes involved) at different stages (from planning to implementation) and local urban planning" (p. 474). Accordingly, we investigate how applying a PSS at different phases of the TOD implementation process can help planners address these institutional factors.

In the Swedish Urban Station Communities (USC) project, 2021–2024, a PSS (hereafter, "USC-PSS") was developed to better link near-station densification with improved local accessibility (Berghauser Pont et al., 2022). The USC-PSS combines Bertolini's (1996) place–node model with an indicator-based method for evaluating social sustainability within the TOD area. It also includes a process model for co-creative spatial planning (Berghauser Pont et al., 2024). The place–node model distinguishes between the place and node values of transit stations, as well as the balance between them. Place value is defined by spatial attributes describing the station area (e.g. density), while node value is defined by the station's accessibility within the wider transport network (e.g. number of train departures). Although density is the primary attribute used to define place value, other aspects, such as street connectivity and accessibility, are also considered. The USC-PSS is intended to inform and support planning processes, support improved decision-making, and facilitate collaboration among stakeholders at the local, regional, and national levels in the development and densification of station-adjacent areas (Berghauser Pont et al., 2024).

The USC-PSS was tested in three small-scale TOD cases (i.e. urban areas with under 15,000 inhabitants) using a transdisciplinary staged planning process between 2023 and 2024. This article is based on observations from that process, interviews with planning actors, an actor analysis, and a literature review of TOD research on institutional factors.

The study has been guided by the following questions:

1. What institutional factors hinder or enable TOD realization, especially in small urban areas?
2. How can the USC-PSS support the management of these institutional factors across different phases of a TOD planning and implementation process?

While most TOD studies examine large-scale contexts in North America, Europe, or Australasia, this article contributes by providing insights from Swedish local case studies, addressing the relatively underexplored context of TOD planning in small-scale settings (Hrelja et al., 2020; Nigro et al., 2019). It identifies key institutional factors in such contexts and, extending previous research, examines the potential benefits of applying PSSs to manage these factors.

Conceptual framework

The processual dimensions encompass both the institutional capacity, or agency, of planning actors, and the institutional conditions structuring their actions. Institutional conditions are "the humanly devised constraints that structure political, economic and social interaction" (North, 1991, p. 98). In planning practice, these may include *formal* arrangements, such as regulatory frameworks or technical constraints, and *informal* structures, such as framing, perceptions, politics, acceptability, and awareness (Tan et al., 2014). Institutional capacity (Healey, 1998) may likewise be formal or informal in nature. It includes actors' *knowledge resources* (e.g. competence, available knowledge, frames of reference, discourse, learning, and knowledge integration), *relational resources* (e.g. trust, actor networks, and these networks' configuration and performance), and *mobilization capacity* (e.g. political willingness, implementation techniques, opportunities for joint action, and implementation arenas).

To understand planning and implementation processes, we also draw on Taylor's (1998) concept of procedural planning, further developed by Ranhagen (2020) in relation to small and medium-sized urban areas, comprising:

i. an *initiation phase*, largely based on informal institutional arrangements (Mu & de Jong, 2016), including the definition of actor collaborations, problems, scope, goals, resources, incentives, and planning arenas;
ii. a more formal *planning phase* focused on identifying key issues, developing and selecting scenarios, alternatives, and policy options (Ranhagen, 2020), and statutory planning (Abdi & Lamíquiz-Daudén, 2022);
iii. an *implementation phase*, in which proposals and policy options are realized, and agency shifts from conceptual planning to construction and delivery, supported by formal rules and incentives; and
iv. a *maintenance phase* involving the management and use of the transit-oriented environment, through which users' attitudes and behaviors gradually become embedded in informal structures shaping subsequent planning cycles.

The concepts of formal or informal institutional conditions (structures) and institutional capacity (agency) constitute the main dimensions of the conceptual framework (Figure 1) applied in the literature review and empirical analysis, including:

1. the *USC-PSS*, centrally positioned in Figure 1;
2. *institutional factors*, represented as a matrix with formal and informal dimensions (horizontal) and structure and agency dimensions (vertical); and
3. the *planning and implementation process*, depicted as a cyclical sequence of the phases outlined above.

Outline of the article

The article is structured as follows: First, the background and conceptual framework are introduced. Second, the findings of the literature review are presented. Third, the methodological approach is described, including the literature review, actor analysis, interviews, and staged planning process, followed by an overview of the case-study context. The subsequent section presents and discusses the results relative

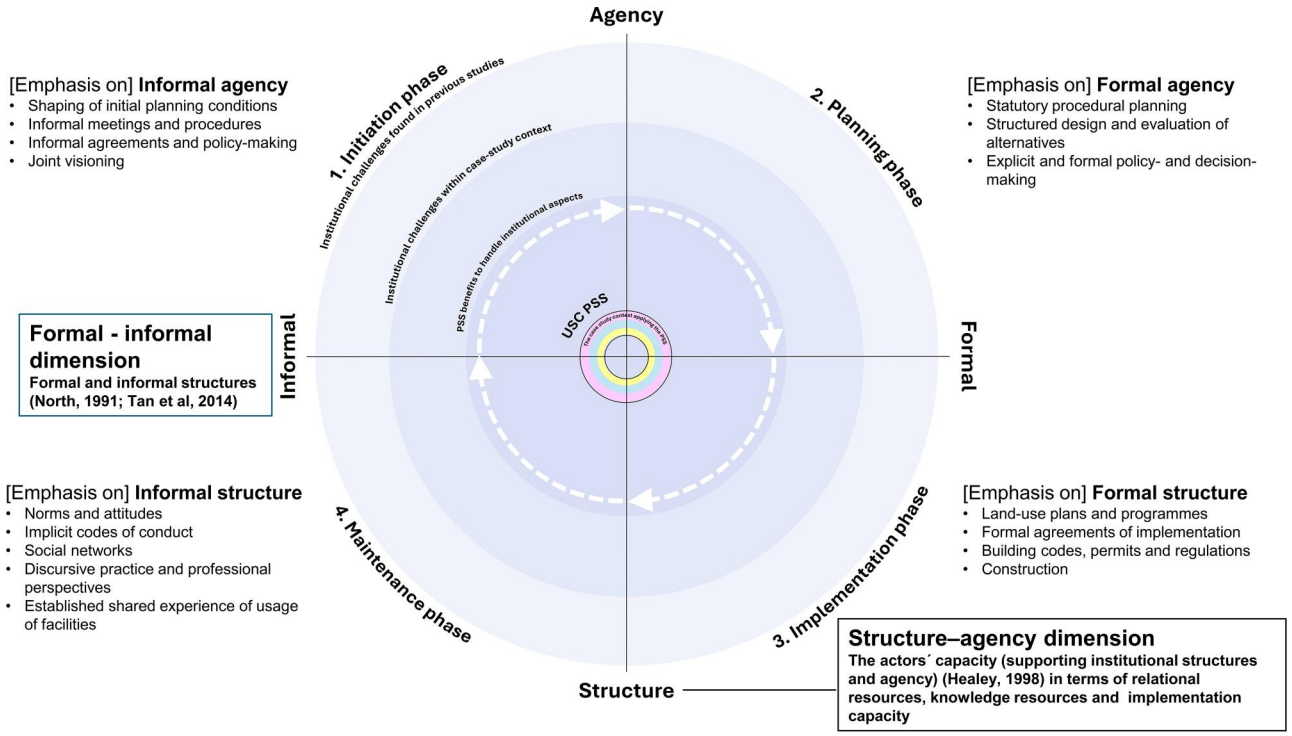

Figure 1. Conceptual framework for an institutional perspective on implementing TOD projects in near-station areas for literature search and empirical analysis.

to the conceptual framework. Finally, the article concludes by outlining the study's key findings and contributions to both research and practice.

Previous research on institutional factors influencing TOD

Here, we review previous research on institutional factors influencing TOD implementation, structured according to the four phases outlined in the conceptual framework (Figure 1). Although most findings are associated with a specific phase, many are also relevant across phases.

Initiation: Informal agency

The literature identifies three main factors related to the initial planning phase. First, several institutional aspects relate to *actor interests* (Abdi & Lamíquiz-Daudén, 2022). State authorities provide formal (legal) and informal (financial, incentive-based) frames for TOD, shaped by national political agendas. *Regional land-use/transport planning bodies* can support implementation by mitigating inter-municipal competition (Thomas & Bertolini, 2015). Municipal and transit agencies are key actors (Ibraeva et al., 2020), although local government may face distrust regarding its ability to deliver TOD due to political inconsistencies, limited resources, and lack of control over privately owned land (Bolleter et al., 2021). Developers often perceive TOD as costly and high risk because of noise and safety regulations, contaminated land, fragmented ownership structures, high land values, and conflicting interests (Pojani & Stead, 2014). Local communities may resist densification in favor of low-density, car-oriented urban form (Tan et al., 2014). *Trust* therefore becomes essential and depends on strong relationships characterized by openness, communication, influential actors, formal agreements, and fulfilling commitments throughout the planning process (Switzer et al., 2013).

Second, several studies highlight the importance of *strategic governance*. Imbalances between transport and spatial planning may hinder implementation (Pojani & Stead, 2014). Such challenges may be addressed through the integration of land-use and transport authorities (Staricco & Vitale Brovarone, 2018; Tan et al., 2014; Thomas & Bertolini, 2015) and establishing "cross-portfolio coordinating committees" (Mu & de Jong, 2016, p. 58). Ibraeva et al. (2020) and Tan et al. (2014) further emphasized the importance of regional planning. Regardless of whether the regional governance cultures are formal, top–down and negotiation-oriented, or informal and collaborative, strategic planning must ultimately be translated into operational plans (Paulsson et al., 2016).

Third, the literature highlights factors related to the *integration of perspectives*, *knowledge*, and *legitimacy*. TOD implementation requires both the multi-level alignment of objectives (Ibraeva et al., 2020) and intersectoral coordination between spatial planning and transport systems (Paulhiac Scherrer, 2019). This underscores the need for institutional harmonization across sectors and governance levels, local capacity to operationalize integrated approaches (Lee et al., 2024), and the development of a shared professional language (van Lierop et al., 2017). At early stages, limited competence (Bolleter et al., 2021) or staff shortages (Braun et al., 2022) may challenge the legitimacy of TOD initiatives (Hrelja et al., 2020, 2022). Diverse interpretations of TOD (Hrelja et al., 2020; Ibraeva et al., 2020) underscore the importance of establishing shared visions and goals

(Hrelja & Rye, 2024). Institutionalizing local–regional integration and developing shared TOD projections may strengthen regional investments while managing local expectations (Björling & Capitao Patrao, 2024).

Planning: Formal agency

During the planning phase, five factors emerge as influential for TOD implementation. First, *contextualization* is emphasized because no universal approach to TOD exists (van Lierop et al., 2017). In small and low-density settings, contextual conditions become particularly influential (Björling & Captiao Patrao, 2024), including property values and residents' attitudes (Hrelja & Rye, 2024). Contextual factors also encompass barriers such as the transport infrastructure shaping TOD precinct design, deficient TOD design, and inadequately integrated public and active transport options (Bolleter et al., 2021).

Second, the *formalization of regional-local collaboration* constitutes an important characteristic. To promote strategic perspectives, collaborative arrangements are considered more supportive than competition-based approaches. When collaborative formal and informal interfaces become institutionalized, they may function as instruments (Paulsson et al., 2016). It is therefore important that actors clarify their motivations for TOD and any potentially competing interests (Hrelja & Rye, 2024). Developing shared guidelines as a basis for formal agreements may help to address lock-in and process stagnation.

Third, formal *planning systems and regulation principles* are important, as fragmented regulatory environments or inflexible planning principles may constitute a barrier (Papagiannakis et al., 2021). These principles may also need to be market sensitive, particularly in small and low-density settings (Hrelja & Rye, 2024). Local policy instruments and regulatory principles that support TOD implementation (Maulat et al., 2021), including favorable land-use zoning (Thomas & Bertolini, 2015), growth boundaries that stimulate densification (Tan et al., 2014), and financial support for infrastructure and real-estate development (Chorus & Bertolini, 2016), should therefore be flexible (Hrelja & Rye, 2024).

Fourth, *inconsistencies and vagueness of policy design* create challenges, such as local land-use policy favoring low-density development or "one-size-fits-all" TOD policies that fail to accommodate local conditions (Curtis, 2012). Flanking policies must also be aligned to avoid adverse effects (Rongen et al., 2022).

Finally, *managing conflicts through formalizing shared ideas* is important, particularly in small urban settings, including through flexibility in balancing tradeoffs between high density and "small-town qualities" (Hrelja & Rye, 2024). Mu and de Jong (2016) identified the coordinative umbrella organization as important for overcoming problems of early substantive selection and perceptual fixation; successful policy integration requires careful goal alignment that compels actors to shift from go-alone strategies toward interaction and concerted actions.

Implementation: Formal structures

During the implementation phase, the focus shifts from "what" to "how", emphasizing the *balance between regulation and flexibility*. Hrelja and Rye (2024) highlighted the importance of both regulation agreements and flexibility in statutory land-use plans. van Lierop et al. (2017) identified flexibility in project economics, land-use, service, and technology as crucial for managing economic and financial challenges as well as expectations. Convincing both residents and property developers to support a densification concept can be difficult (Hrelja & Rye, 2024; Papagiannakis et al., 2021).

As control involves *incentives*, policy consistency and the stability of TOD visions are decisive (Thomas & Bertolini, 2015), as are steering instruments and incentives at various organizational levels (Abdi & Lamíquiz-Daudén, 2022; Maulat et al., 2021; Searle et al., 2014), ensuring the continuity of initial ambitions. These incentives can be regulatory, informative, institutional, best practice oriented, or project based, many fostering informal institutional development such as planning guides and collaboration arenas (Maulat et al., 2021).

Maintenance: Informal structures

In the *maintenance* phase, *socio–cultural challenges* and *economic constraints* are broadly present (Abdi & Lamíquiz-Daudén, 2022). For instance, a lack of dedicated funding (Ibraeva et al., 2020) and reliance on market conditions and developer perceptions (Curtis, 2012) can hinder justifications for higher densities. Under unfavorable market conditions, local authorities may opt to plan for suburban and less dense development (Hrelja et al., 2022).

Also playing a significant role are *informal behaviors and residents' and users' perceptions* (Papagiannakis et al., 2021), including resistance to infill densification and concerns about negative impacts on the local environment (Bolleter et al., 2021). Local governments may face constraints from NIMBYism, residents' negative perceptions of station areas or public transport, strong car culture, or opposition to parking restrictions (Tan et al., 2014; Tan et al., 2014).

Actor perspectives can be understood *from a structural perspective* as the outcome of the interaction between "valent" (attractive) ideas (e.g. sustainability concerns) and the interests of involved actors and institutions. These interactions are mediated by key individuals skilled in creating "frames" that make sense of the dynamics (Pojani & Stead, 2014).

Summarizing comments

The reviewed literature identifies numerous institutional factors, yet few studies examine institutional factors related to process and none addresses processual phases. To summarize (see also Appendix A of Supplementary Materials), and considering the concept of institutional capacity (Healey, 1998), the reviewed literature primarily addresses factors

related to knowledge and relational resources in the initiation phase, while largely neglecting mobilization capacity. In the planning phase, previous studies emphasize relational and mobilization factors but pay limited attention to knowledge-related factors. Regarding the implementation phase, the literature emphasizes mobilization capacity, whereas other dimensions of institutional capacity receive little attention; finally, no studies explicitly address institutional factors in the maintenance phase. Thus, important knowledge gaps remain concerning mobilization factors in the initiation phase, knowledge resources in the planning phase, and relational and knowledge resources in the implementation phase, as well as institutional factors related to TOD maintenance.

Most previous TOD studies examine large cities or metropolitan regions, which likely differ substantially from small-scale TOD situations. Notably, Hrelja and Rye (2024) emphasized these differences, arguing that the local context becomes increasingly important in small-scale settings. However, like Abdi and Lamíquiz-Daudén (2022) and Ibraeva et al. (2020), who have identified several cross-contextual similarities, we find clear multi-level interdependencies between local TOD (Björling & Captiao Patrao, 2024; Paulhiac Scherrer, 2019; Staricco & Vitale Brovarone, 2018) and TOD at the metropolitan or regional level. Although generalizing from individual studies may be difficult, we argue that an understanding of small-scale TOD conditions should not be restricted to the local level but instead be situated within a multi-level system. This interpretation is supported by Abdi and Lamíquiz-Daudén (2022) conclusion that large-scale TOD factors are often relevant in small-scale contexts as well.

Ibraeva et al. (2020) is the only study concentrating on PSSs for TOD. As their study is inconclusive regarding the advantages and disadvantages of using PSSs, further research is needed into their role in addressing institutional TOD factors.

Methods

A combined-methods case-study approach

Within a case-study framework, this research combines a literature review with actor analysis, interviews, and a transdisciplinary staged planning process across three cases. Empirical material and theoretical insights from previous research were abductively triangulated to inform the conclusions (Figure 2). The transferability of the findings (Lincoln & Guba, 1985), i.e. the extent to which the knowledge generated can be understood, interpreted, and applied in other comparable contexts, comes from the integration and analysis of the multiple empirical data sources alongside the findings of the literature review.

The cases were selected based on the willingness of municipalities in the Gothenburg Region (GR) to participate in the USC project and the representativeness of small urban areas with potential for TOD. The GR has a longstanding tradition of incorporating TOD ambitions into regional development strategies, which has both encouraged municipal participation and facilitated data collection as well as the implementation of the staged planning process.

Literature review

The literature study on institutional factors affecting TOD implementation was conducted as a systematic-hybrid narrative literature review (Turnbull et al., 2023), integrating systematic searches, inclusion/exclusion criteria, and transparent synthesis within a narrative structure. Literature was collected from the Scopus database and categorized

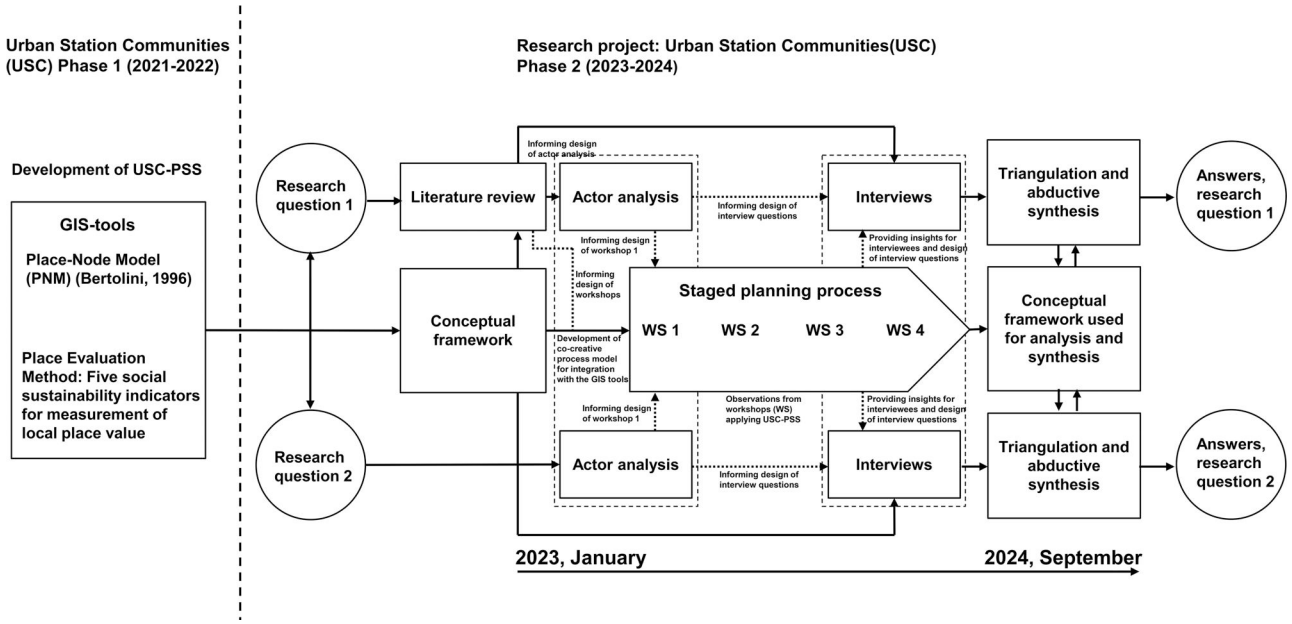

Figure 2. Research design for the Urban Station Communities project, detailing the Urban Station Communities research project phases, methods, and timelines spanning 2021-2024.

according to the conceptual framework (Figure 1) into the informal-agency, formal-agency, formal-structure, and informal-structure dimensions. Keywords were selected and combined for each category (Appendix B, Table I of Supplementary Materials). The Scopus searches were complemented with snowball sampling. The number of identified articles is presented in Appendix B, Table II of Supplementary Materials. Articles for each category were selected following title and abstract screening (Appendix B, Table II of Supplementary Materials). The selected timeframe (2010–2022) reflects the increasing number of TOD publications during this period (Wu & Li, 2022). Following the final selection, findings relevant to implementation and institutional factors were identified through, first, inductive synthesis of emerging themes and, second, deductive categorizing according to the four planning phases.

Co-creative staged planning process

A "staged" planning process was organized to outline improved TOD implementation processes by generating insights into actor perceptions of TOD planning conditions and providing a basis for reflection in subsequent interviews. The process was staged in that it was organized as a co-creative experimental arena in which to develop and test the USC-PSS in parallel with, and without strict formal ties to, on-going planning processes for TOD implementation in the municipalities.

The process comprised four phases, i.e. initiation, planning, implementation, and maintenance, corresponding to the four steps of the USC-PSS procedural framework (Figure 3). For each phase, a full-day workshop was conducted with representatives of the municipalities, the Västra Götaland Region (VGR), the County Board (CB), the public transport company Västtrafik, and the Swedish Transport Administration (STA), all public actors responsible for urban development, infrastructure, and transport planning. This setup followed a research-by-design approach, previously developed by Ranhagen (2020) and specifically related to TOD for small and medium-sized urban areas. It included a structured set of tools with which to generate and evaluate design artifacts through transdisciplinary co-creation (Puerari et al., 2018) and to strengthen institutional capacity (Rădulescu et al., 2023). This procedural framework systematically and iteratively combines theory-informed analytical activities with synthesizing activities informed by professional and contextual planning knowledge.

The USC-PSS includes two GIS-based tools, the place–node model (PNM), and place evaluation analysis (PEA), used together within the procedural framework (Figure 3). The PNM, based on Bertolini's (1996) model, describes the relationship between a station's node quality in the larger public transport network, represented by the number of train departures from the station, and place quality, represented by the population density of the station-adjacent area. PEA uses GIS data to measure five socio–spatial sustainability indicators: accessibility to public transport, accessibility to green areas, accessibility to service facilities, interconnected pathways, and the place quality of the station area (Berghauser Pont et al., 2022).

To carry through the staged planning process with the support of the USC-PSS, the participants were divided into smaller groups, each considering one of the three TOD cases. Using GIS data, place and node values were calculated for all approximately 100 stations in VGR, enabling comparison (Figure 3, step 1). The PEA indicators were compared to corresponding municipal objectives for the three selected TOD cases to evaluate alignment; the PEA indicators were also used for calculating indicator values for the current state, presented as maps and diagrams (Figure 3, step 2), and for co-created TOD scenarios, enabling scenario evaluation. Based on this evaluation, the scenarios for each TOD area were further developed into a more advanced future image for each case (Figure 3, step 3) as a basis for another round of PNM and PEA analyses. In turn, the future images constituted the basis for the development of key projects, incentives, and collaboration arrangements for implementation (Figure 3, step 4).

During the workshops, participants recurrently discussed institutional conditions for implementation. Notes were taken during group presentations, and the workshop results were compiled and published as a manual (Berghauser Pont et al., 2024).

Actor analysis

In early 2023, preceding the workshop series, the municipalities' institutional capacity, including relational resources, knowledge resources, and mobilization capacity (Healey, 1998), was mapped. For each municipality, a two-hour group interview was held with three planning officials, using a focus diagram to collect information. Afterwards, interview results were compiled and cross-analyzed to identify patterns and differences from which aggregated results were extracted.

Interviews

In total, 18 semi-structured interviews, each averaging 1.5 h, were conducted in late 2023 with participants involved in the staged planning process. The interviewees were: 14 municipal officials in positions ranging from strategists and land-use-planning coordinators to detailed regulation planners, transport planners, and real estate and development officials; two regional-level planners; and one national-level planner. Although the interviewees were not TOD experts, they were involved in TOD projects through their professional roles. The interviews included questions (Appendix C of Supplementary Materials) related to their experiences of working within the staged planning process using the USC-PSS, their previous experience with TOD, and their perceptions of challenges and the need to improve TOD planning and implementation processes.

The interviews were conducted via Microsoft Teams to facilitate practical access to the interviewees. With the interviewees' permission, the interviews were recorded,

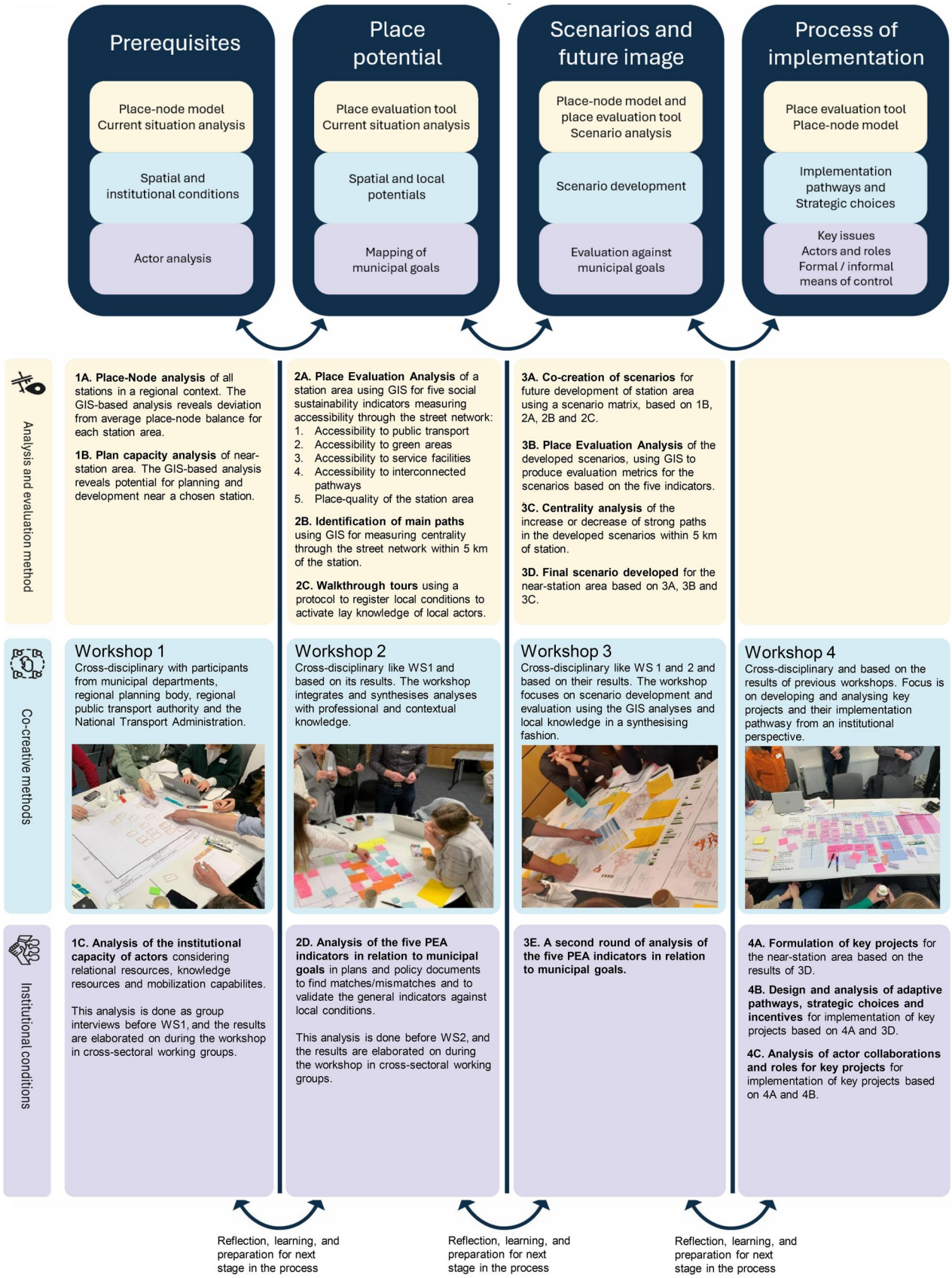

Figure 3. The USC-PSS procedural framework for integrating analytical and lay knowledge. Yellow bars (above) represent analytical tools. Purple bars (below) represent lay knowledge and institutional conditions. Blue bars (middle) represent qualitative process tools for integrating analytical results and lay knowledge at each main step. This multi-panel flowchart outlines a four-stage development and evaluation process: Prerequisites, Place Potential, Scenarios and Future Image, and Process of Implementation. It integrates analysis methods, workshops, and participant engagements. Each stage contains specific tasks, including place-node and capacity analyses, co-creation of scenarios, and project formulation. Workshops illustrate collaborative activities for each phase, highlighting iterative learning and planning reflections, underscored by arrows showing the flow of information and feedback. The four main stages here roughly correspond to the four phases shown in Figure 1.

transcribed, and corrected for language errors before being inductively coded into themes (Appendix D of Supplementary Materials) through thematic analysis (Braun & Clarke, 2006), using NVivo 14. The material was then qualitatively analyzed and deductively structured according to the conceptual framework. Although ethical clearance was not deemed necessary, as the interviews did not address sensitive information, all interviewees signed a consent form that assured anonymity and restricted use of the material (Table 1).

Case-study context

The multi-level planning system of Västra Götaland Region

In Sweden, spatial planning is executed at the municipal, regional, and national levels and is governed by democratically elected political assemblies. The Planning and Building Act (PBA) grants Sweden's 290 municipalities a monopoly over land-use planning, including the preparation of indicative comprehensive plans covering the entire municipal territory and legally binding detailed development plans for urban areas. Municipal planning under the PBA is supervised by 21 County Administrative Boards representing the state.

Above the municipal level are also 21 regions responsible for preparing indicative regional development strategies. Although these strategies do not directly regulate land use, they address issues related to demographics, business development, transport, and other regional development aspects. The regions are also responsible for providing public transport and preparing regional transport plans as a basis for the national transport plan. At the national level, the Swedish Transport Administration (STA) is responsible for the planning, expansion, and maintenance of Sweden's national road and rail infrastructure and for preparing the national transport infrastructure investment plan every six years. The STA is organized into regional divisions that collaborate with regions and municipalities.

Given its large number of municipalities (49), the Västra Götaland Region (VGR) is divided into four municipal associations, with the Gothenburg Region (GR) being the most populous. These municipal associations are governed through political collaboration among the member municipalities and constitute a sub-regional planning level. Since 2008, the GR's spatial development has been guided by an informal, politically negotiated "structural image". This indicative conceptual plan suggests that urban development should occur along regional rail lines radiating from Gothenburg, making station-adjacent areas along these lines important in order to achieve regional development and sustainable accessibility.

The GR municipalities of Ale, Lerum, and Stenungsund (Table 2, Figure 4) were selected for case studies based on their interest and participation in the longstanding, primarily informal Urban Station Communities knowledge process in the GR (Ranhagen, 2020). This initiative constitutes a prominent example of the institutionalization of both formal and informal collaborative multi-level interfaces, for which the VGR and the GR stand out in Sweden (Paulsson et al., 2016). The selected cases also represent small urban areas with potential for TOD.

Applying the USC-PSS in three swedish TOD cases: Results and discussion

In this section, we first present the combined findings from the actor analysis, interviews, and staged planning process in relation to the concept of institutional capacity (Healey, 1998) and the conceptual framework (Figure 1) and discuss them in relation to the literature review. Subsequently, we examine the role of the USC-PSS in greater depth.

Institutional factors that hinder or enable the realization of TOD

Initiation: Mapping the prerequisites

The staged planning process began with GIS mapping of the current place–node potential for station areas in the Västra

Table 1. List of interviewees (anonymized).

Label in results chapter	Interviewee / position	Organization
A	Strategic urban planner	Swedish Transport Administration
B	Regional transport planner	Västra Götaland Region
C	Community development planner	Västtrafik
D	Transport planner	Municipality 1
E	Transport planner	Municipality 1
F	Sustainability strategist	Municipality 1
G	Land and development engineer	Municipality 1
H	Urban planner	Municipality 1
I	Transport planner	Municipality 1
J	Strategic urban planner	Municipality 2
K	Strategic urban planner	Municipality 2
L	Urban planner	Municipality 2
M	Architect, project leader	Municipality 3
N	Urban Planner	Municipality 3
O	Sewage and water infrastructure engineer	Municipality 3
P	Facilities strategist	Municipality 3
Q	Land and development engineer	Municipality 3
R	Transport planner	Municipality 3

Table 2. Case study characteristics.

	Floda/Lerum	Stenungsund	Älvängen/Ale
Inhabitants, municipality	43,400	28,000	31,000
Inhabitants, local urban area	9000	14,000	6500
Planning conditions	Daytime train departures are increasing from four to six per hour. The railway area is a barrier in a narrow valley. The near-station area is exposed to landslides and flooding. There is limited space for near-station densification. The need for commuter parking is estimated to double. The outer parts of the town are expanding.	Some 2500 new apartments are being planned. A new travel center will connect to Gothenburg with 15-minute train departures. A detailed plan for near-station development has been stalled by appeal.	Fifteen-minute train departures during peak time. A structural plan for the central area, planning for a new turnaround track, and several detailed plans are ongoing. Challenges include flooding, transport noise, demand for commuter parking, and a need for more efficient transport networks. Land ownership is fragmented.
Strategic development and planning aims (selection of relevant planning aims)	Continued growth and maintained function as a municipal sub-center is targeted. The town center is planned for densification and mixed functions near public transport nodes. Everyone should have access to natural, leisure, and sports areas. Barriers should be minimized and central areas should be walkable.	Continued growth is forecast. Almost all new housing establishments should be near public transport nodes. There should be a modal shift toward more sustainable modes of travel. Strong connections exist between land use (built structures) and the developed transport system.	Connect central parts of Älvängen that are now divided. The station should be an attractive and central node. City center should be easily accessible and walkable. Urban development should mainly occur in municipal urban centers and with higher concentrations around stations.

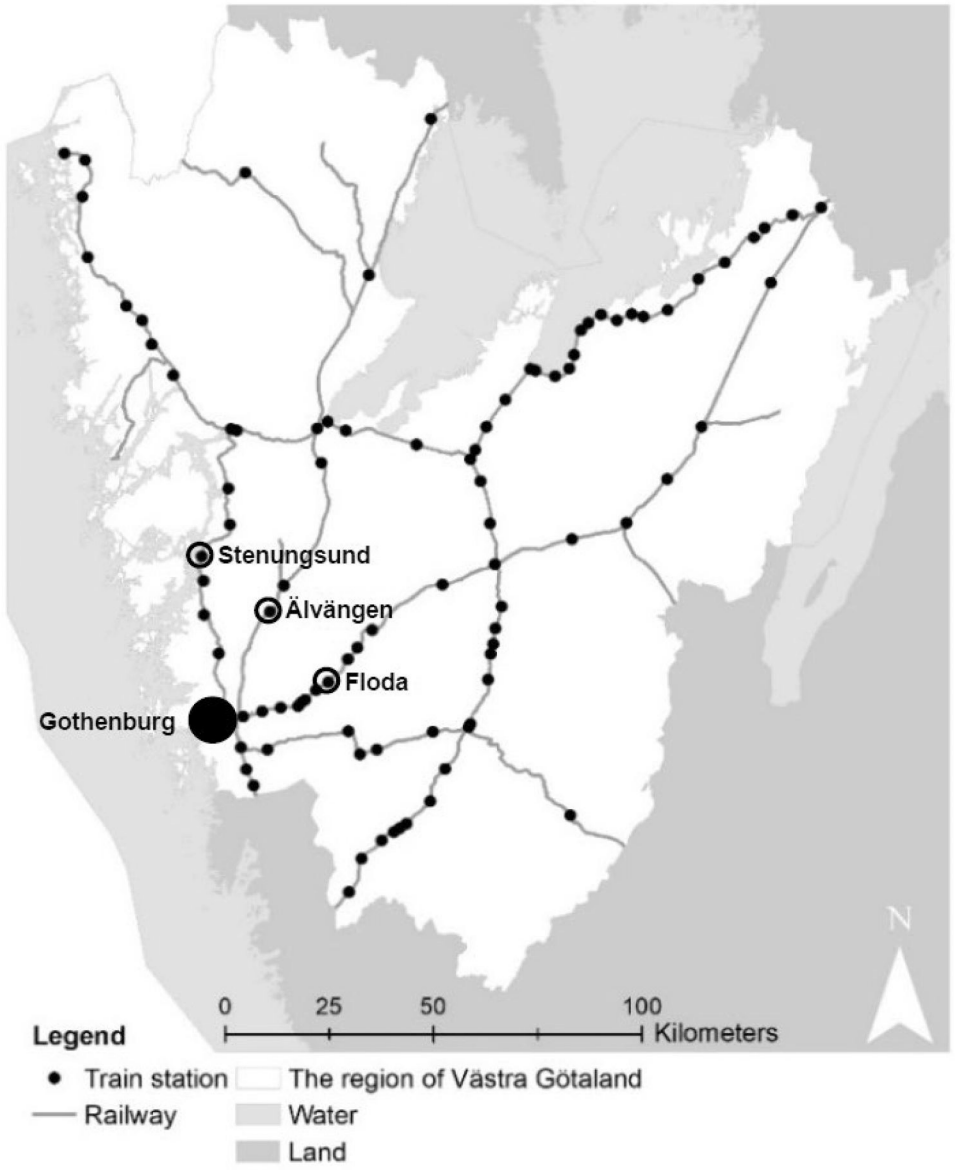

Figure 4. The Västra Götaland region and the three station community cases.

Götaland Region (VGR), actor analysis, and co-creative identification of institutional factors (Figure 3, step 1).

Regarding *relational resources*, the actor analysis, in accordance with Ibraeva et al. (2020), shows that TOD planning and implementation in the three selected cases are initially dominated by public actors. Sustainable transport and urban development constitute shared objectives, although, according to interviewees A, K, and Q, the actors also have *diverging interests*. For example, the STA manages its own infrastructure projects within the national investment plan, and if the process is "… optimal, it should be connected, but it's more or less decoupled [from the municipal land-use planning]" (A). Consequently, *TOD planning in a multi-level formal organization* can initially be challenging if, as identified by Ibraeva et al. (2020), *institutional coordination is insufficient*. Moreover, *informal networks* play an important role in the VGR (B, C), as also noted by Paulsson et al. (2016).

The transport infrastructure planning preceding TOD projects follows both formal and informal procedures across multiple levels. As described by interviewee C, the municipality typically begins by identifying needs and deficiencies. After that, a mandatory but indicative Strategic Choice of Measures study is conducted by the STA jointly with the municipality, the VGR, the County Board, and Västtrafik (A, C). During this stage, investment projects are further specified through internal municipal preparations undertaken by senior officials and through informal negotiations among local and regional politicians (C, K). To support prioritization, sub-regional strategic documents prepared by Västtrafik, the VGR, and the municipalities define strategic orientations based on the identified municipal needs, deficiencies, and informal sub-regional political dialogue. The Gothenburg Region (GR) and the other municipal associations subsequently prioritize which infrastructure projects within the VGR should be included in the regional investment plan and proposed for inclusion in the STA's national investment plan (C, I). Within this chain of governance and politics, *responsibilities are distributed and the networks between officials and planning levels are not always synchronized* (A, J, K).

The VGR, encompassing 49 municipalities, has no formal mandate for regional planning. Although the GR submits coordinated requests to the VGR, municipalities within the GR may still hold conflicting views when railway lines compete for prioritization, and "GR's structural image is indicative sub-regionally, but it is old and somewhat questioned" (J). Adding to this institutional complexity, the STA outwardly appears as a single authority but internally consists of several operational and geographical divisions in which the STA planners serve as interfaces with municipalities and regions while lacking an actual negotiation mandate (A). Altogether, these conditions complicate the planning and implementation of TOD projects even in the earliest stages.

Regarding *knowledge resources*, the actor analysis further indicates *a need for site-specific knowledge* in the three municipal cases. It reveals *differing perceptions of urban attractiveness*, particularly concerning planning preconditions such as risk issues (J, M), identified by Pojani and Stead (2014) as uncertainties for developers. The analysis also highlights limited competence regarding implementation and management, as several officials are new to their positions (N, Q), reflecting Braun et al. (2022). Locally, *politicians' perceptions of attractiveness* and *a general "say-yes attitude"* are emphasized. According to interviewee J, "everything is on the wish list". The actor analysis identifies a positive attitude toward involving market actors as long as single-family housing and proximity to nature remain in demand. These aspects compete with the ambitions to densify the station-adjacent areas, particularly in the municipalities of Ale and Lerum. Simultaneously, there is broad agreement that TOD is associated with higher density and that proximity to stations is attractive. These differing perceptions, together with the absence of a shared TOD vocabulary, recalling the findings of Lee et al. (2024) and Searle et al. (2014), are described as generating tensions among officials, on one hand, and among politicians and developers, on the other (J, N). They also generate uncertainty about political intentions—among officials in our cases, rather than among developers—as identified by Bolleter et al. (2021).

Challenges related to *mobilization capacity* are also evident, particularly concerning *vague planning documents* and the *absence of regional planning*. Several interviewees emphasized the complexity arising from the interaction between multi-level formal procedures for early infrastructure planning and associated informal network activities (A, B, C, I, J), recalling the findings of Paulhiac Scherrer (2019). Despite the existence of the structural image for the GR, its municipalities argue that regional planning remains insufficient: transport issues are addressed regionally, whereas spatial land-use planning is managed locally (I). Both municipal comprehensive plans and non-statutory plans are identified as valuable planning arenas, but they are considered too vague regarding TOD to provide clear guidance (J).

Considering these challenges, there is a need to integrate perspectives, visions, and goals for TOD, as emphasized by Hrelja and Rye (2024), together with a multi-level perspective (Staricco & Vitale Brovarone, 2018; Tan et al., 2014; Thomas & Bertolini, 2015) and a stronger regional framework for integrated land-use and transport planning (Lee et al., 2024). Although trust is emphasized in several studies, it is not explicitly reflected in our empirical material. Still, informal arrangements, negotiations, and agreements, which the literature associates with a level of trust (Switzer et al., 2013), are emphasized. Furthermore, previous research does not clearly address the mismatch between state and municipal levels. Our findings indicate that municipal needs, shaped by local attitudes and vague conceptions of TOD, are frequently filtered through STA instruments to align with the needs of other municipalities, as well as through informal multi-level coordination and complex negotiations required to attract STA attention.

Planning: Exploiting the place potential

In the *planning phase*, the staged planning process included GIS analyses of current local conditions for the PEA

indicators and densification potential (Figure 3, step 2). Municipal goals were compared with the indicators to assess correspondence. TOD scenarios were co-created and evaluated, using municipal goals and a second round of GIS analyses to identify the scenario that best fulfilled the objectives for further development.

Regarding *relational resources*, the *interplay between formal planning and informal collaboration* as well as *conflicting interests among external stakeholders* become prominent at the local level. As identified by Hrelja and Rye (2024), local contexts and perspectives strongly influence the process. Once an infrastructure project has been prioritized by the VGR, comprehensive and detailed land-use planning under the PBA is undertaken by the municipal planning office. Beneath these formal procedures, however, lie complex informal relational dynamics. A prominent example noted in the interviews is that, while decision-makers are considered influential (B), in small municipalities, "personal opinions get a lot of space—everyone knows everyone and things can change very quickly" (P). Political committees often operate with a sectoral focus, making holistic thinking difficult (P). Consequently, the unit managers become an important intermediary between politicians and planners. Gaps between these actors may create confusion: "It is a lot about how people work with each other and where decisions are made, and who knows what is going on and if someone has decided something" (N). To manage this complexity, the municipalities rely on direct contact among involved units (E, J). Developers, in contrast, are perceived as drivers of change (M) as well as contributing to a sense of tension regarding planning outcomes, making collaborative arrangements important. Developer involvement may increase feasibility (H), yet also generate expectations concerning land availability, financing, and rapid processes that the municipalities struggle to accommodate (K, N). The municipalities maintain dialogue with the STA regional planners, who often adopt a narrowly defined object focus (I, J, K) centered on time, costs, and railway crossings (A). Västtrafik places particular emphasis on commuter parking, which may conflict with municipal ambitions to create attractive station environments (J, M). Consequently, local-level competition may emerge, reinforcing the findings of Paulsson et al. (2016) that cooperation may support implementation more effectively than competition does. Such dynamics among stakeholders caused by conflicting interests contribute to uncertainty regarding the demarcation of responsibilities (Q). Collectively, these conditions appear to create inertia and pressure on municipal planners, sometimes resulting in lock-in effects and stalled TOD implementation.

Concerning *knowledge resources*, the actor analysis indicates a need for expertise due to *directional uncertainty* arising from political shifts, citizen perspectives, changing policies (M), and the divide between *regional node-oriented thinking* and *local place-oriented thinking*. National and regional actors are perceived to prioritize regional accessibility, whereas municipalities focus more strongly on local values (J). Consequently, vague concepts and visions must be translated into detailed plans and legal frameworks (N), consistent with the findings of Hrelja and Rye (2024) and Thomas and Bertolini (2015). Inertia appears to result from the gap between visionary ambitions and practical realities, as well as from sectorization and "downpipe thinking", which limit the integration of perspectives. Clarity of mission is therefore regarded as important (N), as also noted by Hrelja and Rye (2024). Private actors often enter the process with a clear mission, while the municipality assumes a more reactive role because comprehensive plans are perceived as overly vague, whereas detailed plans are expected to regulate too many issues (M).

Regarding *mobilization capacity*, *numerous statutory and informal instruments* are available, including comprehensive plans, in-depth comprehensive plans, knowledge bases, and informal master plans, all identified as strategic steering tools. The detailed plan functions as a negotiation instrument among municipalities, developers, and the STA (N). Non-statutory planning programmes, which precede formal plans, are considered particularly valuable because they can address broad and integrated holistic contexts at early stages (L). This echoes Curtis (2012), on the importance of clear planning strategies, and Rongen et al. (2022), on the alignment between plans and strategies. At the same time, planning is described as an opinion-based expression of intent, making consistent implementation difficult (M). *The transition from comprehensive to detailed planning* is regarded as particularly challenging (L, M, N). In one case, extensive work was devoted to an in-depth comprehensive plan, yet "when we now look at the detailed plan, it does not match very well. The planning as it is structured does not work very well when we must deal with questions that are comprehensive … and during the step to building permission, additional things are very often lost" (M).

Conflicting interests appear to require institutionalized collaborative interfaces, as identified by Björling and Capitao Patrao (2024). However, whereas previous research has primarily emphasized formal instruments, this study highlights the importance of informal governance. Extending previous findings, the cases demonstrate several forms of institutional uncertainty and inertia linked to gaps between planners and politicians, political shifts, changing directions, insufficiently integrated perspectives, and transitions from guiding comprehensive planning to binding detailed regulations. The ability to manage the interaction between formal and informal institutional frameworks and instruments therefore appears central to successful implementation.

Implementation: Procedural arrangements for realization

In the staged planning process, implementation factors were addressed by examining local key projects, implementation pathways, actors, and responsibilities for TOD realization (Figure 3, step 3). Both literature and empirics emphasize the need for policy consistency (Thomas & Bertolini, 2015), process continuity, and effective handovers from planning to implementation (Abdi & Lamíquiz-Daudén, 2022; Maulat et al., 2021; Searle et al., 2014).

Regarding *relational factors*, the empirical material reveals *infrastructure dependency*, *ambiguous responsibilities*, and *a*

need for continuity, which are also reflected in the literature. The municipalities, the STA, and Västtrafik hold primary responsibility (B), but municipal planners typically transfer responsibility internally to land and exploitation engineers, who continue cooperating with developers (Q, R). This entails a shift from informal visioning and design toward more formal technical, financial, and managerial principles, where continuity may be lost as processes become lengthy (G, M). Nevertheless, the project is generally perceived as a joint undertaking to which all actors contribute expertise (Q). Divergent perceptions among actors sometimes emerge concerning priorities and financing models for commuter parking, station-adjacent public spaces, public transport provision, and investment prioritization (J, M), underlining the need for flexibility concerning such matters (Searle et al., 2014; van Lierop et al., 2017). In practice, infrastructure expansion often constrains development: different financiers may operate with separate budgets within the same area (B, J, M), thereby delaying implementation (B, I). If its facilities are affected, the STA must implement the measures. This shifts the issue from municipal planning to the STA's internal processes, creating mismatched planning horizons (A). Still, the municipalities tend to bear certain costs because of the STA's investments, for example, for handling increased barrier effects (A). Similar ambiguities may arise between municipalities and private actors regarding functions, exploitation, and investments (N).

The need for *knowledge resources* in the implementation stage concerns practical coordination competence and *stronger horizontal and vertical integration*, recalling Ibraeva et al. (2020), Paulsson et al. (2016), and Mu and de Jong (2016). Horizontal integration concerns the transfer of intentions from planning units to land and exploitation units. In some cases, dedicated project management or property development units are also involved in implementation, during which intentions may be reformulated (G). Vertical integration concerns tensions between the STA's and Västtrafik's focus on accessibility and the municipalities' mandate to develop local living environments (A, C).

Mobilization capacity appears to require *diverse project work forms* and *steering tools*, recalling Maulat et al. (2021) and Searle et al. (2014). Processes according to the PBA are replaced by projects governed through their own formal and informal arrangements. At this stage, TOD projects primarily become arenas for implementation by private developers and consultants rather than for strategic change, whereas municipalities mainly emphasize follow-up and handover (H). The actor analysis highlights several steering tools, including land allocation instruments, land policy, and checklists. However, such tools and municipal policies are often insufficiently clear (O). Exploitation agreements are considered particularly important because they compel actors to make decisions through both formal negotiations and informal discussions (O).

Overall, the literature provides only limited descriptions of implementation challenges and responses. This study contributes insight into local and regional implementation factors, particularly emphasizing informal arrangements. We identify mismatches in planning horizons resulting from handover issues between municipalities and the STA as well as unclear divisions of responsibility associated with these processes.

Maintenance

Empirically, the interviews and actor analysis reveal very little concerning maintenance (Figure 3, step 4), although *limited connections between maintenance and early phases* are acknowledged (G). In one municipality, maintenance staff were invited to contribute knowledge during the initiation phase, although this has not been formalized as a routine practice (G). This reflects *limited knowledge resources within project organizations* and *insufficient knowledge transfer between phases*. Participants considered it important to integrate operational and management knowledge earlier in the process to reduce reworking of plan, lower costs, and address unrealistic positions. However, based on participants' accounts, few measures have been implemented to ensure such knowledge transfer.

Potential for enhanced handling of institutional factors by the support of the USC-PSS

Again drawing on the conceptual framework, we present and discuss interviewees' views of how the USC-PSS contributed to managing institutional factors across the different process phases.

In the initiation phase, the USC-PSS is regionally perceived as supporting the provision of evidence on TOD qualities to present to the STA and Västtrafik, when comparing alternative investment locations (F, K). Relationally, it is considered to facilitate agreements among municipal associations and other actors regarding necessary investments: "It is about having the right information in time in the long planning processes" (C). Locally, the USC-PSS is expected to support improved localization studies, inter-stakeholder dialogue, diagnosis of current conditions, and impact assessment for early localization decisions (C, M). This is deemed to result in improved detailed plans later in the process (O) and a clearer basis for decision-making (Q). The USC-PSS is also considered suitable for strengthening comprehensive planning and useful for politicians or developers when purchasing land (N).

In the planning phase, the USC-PSS scenario techniques are described as providing holistic overviews and shared visions (O), improved cross-sectoral focus, the creative development of shared ideas, and alternative perspectives at an early stage (D). They are also considered to provide opportunities to compare scenarios and options, challenge established ideas, encourage unconventional thinking (L), and better utilize municipal goals (E, J). This bolsters knowledge resources through improved understanding from a multi-actor perspective and enhances mobilization capacity by supporting the production of more substantiated detailed plans (O). The USC-PSS is also said to help bridge the gap between strategic and detailed planning (H) and to facilitate

assessments of whether measures help fulfill goals or scenarios: "You can make a forecast about what a policy might mean or an impact assessment of individual projects, but also an evaluation of municipal goals to make them more feasible and realistic" (G). GIS analyses are further considered to provide greater legitimacy to specific proposals and facilitate discussion (G). The workshop format itself also advances knowledge development by providing an arena for broader discussions (L).

At the regional level, the USC-PSS is considered to bring together different perspectives and competences (C). It thereby strengthens relational resources through supporting a multi-level perspective, bridging administrative and geographical boundaries, and highlighting regional connections (B), all of which are claimed to facilitate regional political processes (C). It is also regarded as helping the STA planners better understand municipal planning and facilitating internal communication with colleagues responsible for designing appropriate measures (A).

Regarding the *implementation phase*, participants perceived the USC-PSS as more useful during the first two phases of the process. Nevertheless, it may still support mobilization capacity in the implementation phase, as tools are needed to "loop" between phases (K). It is also argued that the USC-PSS helps illustrate the effects of different scenarios for developers (G). Furthermore, workshop participants highlighted its potential use for evaluating the costs and benefits associated with different implementation pathways.

Concerning *maintenance*, workshop participants suggested that USC-PSS could be used to follow up implemented projects and assess the degree of goal fulfillment for the PEA indicators.

Overall, the participants emphasized the importance of combining analytical tools with co-creative methods involving professional knowledge orchestrated within a structured process (B). The USC-PSS was also claimed to make soft values more concrete and comparable to "hard" variables such as costs or travel time. However, the USC-PSS did not address all identified institutional factors and barriers. For the implementation and maintenance phases, its benefits were viewed as more limited, despite arguments concerning follow-up possibilities, continuity throughout the process, and the potential for early USC-PSS use to facilitate work in later phases.

Conclusion

Main findings

This article presents a study of institutional factors influencing TOD implementation in three small-scale Swedish planning cases, addressing a research gap concerning the processual dimensions and institutional conditions of TOD implementation. The research questions concerned: i) what institutional factors hinder or enable TOD realization, particularly in small and medium-sized urban areas; and ii) how the USC-PPS can support the management of these institutional factors across different phases of the TOD implementation process. The main findings relate to both the conceptual framework and the literature review, highlighting theoretical contributions to address the research gap and demonstrating how the USC-PSS can support the management of several identified institutional factors.

The literature review identifies important themes, institutional factors, and knowledge gaps concerning process phases and institutional capacity. It demonstrates that most studies do not explicitly analyze process-related institutional conditions, and none explicitly addresses the differences between process phases. Only one study focuses on PSSs for TOD, and it does not address institutional factors. Most studies concern large urban areas, whereas relatively few examine small-scale or low-density contexts (e.g. Björling & Capitao Patrao, 2024; Hrelja et al., 2022; Hrelja & Rye, 2024). Although substantial differences exist between large- and small-scale urban contexts regarding the institutional conditions for TOD implementation, several studies also identify multi-level interdependencies between local and regional TOD contexts. In line with Björling and Capitao Patrao (2024), we therefore argue that small-scale institutional TOD conditions should be understood as part of a multi-level system, making them also relevant in larger urban and regional TOD contexts.

Regarding the "processual dimensions" (Paulhiac Scherrer, 2019), the results indicate that different institutional factors assume different roles across process phases. Throughout the process, however, formal and informal systems—and the actors operating within them—appear interdependent, continuously influencing and adapting to one another. Both the absence and abundance of formal structures seem to generate a need for informal agency (as indicated by Hrelja & Rye, 2024), which may subsequently become institutionalized as new formal structures that, in turn, generate additional informal arrangements. This dynamic recalls the conceptualizations of institutions proposed by North (1991) and Tan et al. (2014).

The findings address the knowledge gap concerning transitions between phases, for example, from conceptual planning to site construction. This is touched upon by Paulsson et al. (2016) as a challenge, while Maulat et al. (2021) suggested that transitions could be managed using diverse incentives. Adding to this, our study also demonstrates the importance of actor involvement, the presence of complementary forms of knowledge, and mobilization capacity in terms of steering instruments and implementation arenas that support continuity and trust-building across process phases. Furthermore, our findings align closely with previous studies emphasizing the need for structured, multi-level processes with clearly defined mandates and policies (Mu & de Jong, 2016), as well as the importance of actors having shared perceptions and goals (Hrelja & Rye, 2024). At the same time, the case studies extend the literature in several respects (see Appendix A of Supplementary Materials). They particularly highlight the importance of informal institutional factors across the three categories of institutional capacity defined by Healey (1998), particularly during the initiation and planning phases, whereas previous research

lacks studies addressing mobilization capacity factors in the initiation phase and knowledge-resource factors in the planning phase. Early institutional design and knowledge transfer in the initiation phase thus emerge as critical. We find from the interviews, but also from observations of the staged planning process with USC-PSS application, that establishing informal actor networks and coordinating informal collaboration from the outset are decisive for integrating transport and land-use planning—an emphasis less developed in previous research. Regarding implementation, previous studies primarily address institutional factors related to formal aspects of relational resources and mobilization capacity, while informal relational or knowledge-related dimensions of institutional capacity are largely neglected. In contrast, such aspects were strongly emphasized by participants in all three cases in the present study. Insights concerning the maintenance phase remain limited, however, because participants had little experience of this phase.

Our findings thus confirm the importance of informal cross-disciplinary collaboration found in previous studies but further demonstrate how informal arenas continuously shape formal structures, generating reciprocal and co-evolutionary dynamics only partly addressed in earlier research. We further show that tools such as the USC-PSS can bridge formal and informal dynamics in TOD planning by providing continuity across process phases and planning levels, supporting scenario development and analysis, and facilitating the formation of shared visions—functions that go beyond the analytical role typically attributed to PSSs in the literature (Ibraeva et al., 2020; Silva et al., 2017). However, in line with Björling and Capitao Patrao (2024), we find that the informal use of tools and process models such as the USC-PSS requires institutionalization and alignment with existing institutional frameworks to be effective.

Many of these findings appear linked to the small-scale TOD context. However, their relevance to large-scale TOD contexts lies in their interdependence and mutual influence. For example, the absence of formal large-scale regional planning may stimulate the development of informal networks, forums, and forms of action in local small-scale contexts. It is therefore important to consider TOD within a multi-level institutional system and to recognize that small-scale contextual conditions, which may complicate generalization, are central to understanding the complexity of TOD implementation.

In addition to the findings of Silva et al. (2017), we conclude that the USC-PSS can support implementation and institutional capacity-building, particularly during the initiation, planning, and implementation phases, especially regarding relational and knowledge-related resources. In line with Healey (1998) and Rădulescu et al. (2023), these resources appear to advance the development of mobilization capacity. One aspect of this capacity-building is that the USC-PSS appears to increase planners' awareness of the importance of institutional factors in planning and implementation processes, an effect that could be strengthened using the USC-PSS in cross-sectoral and multi-level collaborative arenas. Notably, the combination of analytical and generative process tools within USC-PSS facilitates co-creation, communication, and concretization, supporting the development of more robust visions, goals, and plans. The integration of explicit analytical knowledge and tacit professional knowledge through co-creative workshop processes is regarded as especially beneficial.

Finally, we conclude that the conceptual framework developed for structuring the literature review and analyzing the empirical results proved to be useful in highlighting knowledge gaps and emphasizing important dynamics and relationships between different institutional factors influencing TOD planning and implementation. We therefore regard it as a contribution from this study for further development and application in both research and in early phases of TOD projects.

Limitations and need for further research

Our study represents only a limited subset of possible TOD situations, so its results cannot be directly generalized. However, comparison with previous research indicates substantial institutional similarities across contexts, supporting the transferability of the findings. Although the focus on Swedish small-scale TOD situations may appear to limit global generalizability, it contributes to the limited body of European studies of small-scale TOD, as VGR and GR are likely representative of regions characterized by European planning traditions. Nevertheless, contextual differences will always exist, and the degree of informal structure and agency may be greater in Sweden and VGR due to established traditions of informal arrangements and processes (Paulsson et al., 2016). The transferability of many findings may still be significant, since several studies emphasize the importance of informal institutional arrangements. Staricco and Vitale Brovarone (2018), for example, advocated the importance of a context-specific approach to understanding TOD challenges and success factors, while Abdi and Lamíquiz-Daudén (2022) concluded that many factors are shared across scales and contexts, indicating the broader relevance of small-scale and case-specific findings such as those presented here.

Further research should examine the application of USC-PSS in additional practical settings to evaluate and further substantiate the present findings. More research is also needed on other TOD planning situations and examining variations in small-scale urban contexts and regions to broaden the empirical basis and support stronger generalization. The conceptual framework developed for analyzing institutional factors affecting TOD implementation across process phases also creates opportunities for further research into the processual dimensions of TOD, clarifying the relationship between formal and informal structure and agency across different phases. However, the framework requires further validation through application in studies conducted in other contexts. It is also important to investigate the perspectives and influence of additional actors, such as politicians, private actors, and the public, to corroborate and

complement the findings presented here and provide a more comprehensive understanding.

Acknowledgements

The authors acknowledge the financial support of the Swedish Energy Agency, and the contributions of non-author collaborators within the USC project from the Gothenburg Region, Wexsus Urban Futures, and the municipalities of Ale, Lerum, and Stenungsund.

Author contributions

CRediT: **Tony Svensson**: Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Visualization, Writing – original draft, Writing – review & editing; **Job van Eldijk**: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Validation, Writing – review & editing; **Meta Berghauser Pont**: Conceptualization, Funding acquisition, Methodology, Validation, Writing – review & editing; **Ulf Ranhagen**: Conceptualization, Funding acquisition, Methodology, Validation, Writing – review & editing.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Funding

This work was supported by the Swedish Transport Administration (grant number TRV2021 127588). The funding source has no involvement in study design; in the collection, analysis and interpretation of data; in the writing of the report; and in the decision to submit the article for publication.

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