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# The role of co-production in a conflictual planning process: the case of Haga station in Gothenburg, Sweden

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## Abstract

This paper draws on the intersection of the themes of co-production, knowledge use, and planning that are relevant for urban transformation debate. In theory, co-production is seen to have the potential to facilitate conflict resolution, and thereby contribute to inclusive governance and transformative change. However, critical voices argue that these theoretical aspirations have limited effects in practice. Here we analyze the role of co-production in urban planning to better understand its role in conflict resolution and its potential to contribute to urban transformation. We provide a knowledge-based analysis of the possibilities and limitations of institutional and participatory co-production as it is conceived, designed, and applied in a specific conflictual strategic planning process in a case of Haga station which is a part of complex infrastructure development project, the West Link, in Gothenburg, Sweden. Through conducting an in-depth qualitative empirical analysis of the knowledge use practices in the planning of Haga station, we bring the discussion of co-production from theory to practice and take a critical look at its limitations. The results show that co-production worked well within and among the participating governmental organizations, even across distinct organizational boundaries. However, it was more limited between the public organizations and informal opposition actors, despite formal structures and processes aimed specifically at these types of participation. The analysis of knowledge use practices shows how the conflict was exacerbated due to the conflation of incommensurable knowledge claims by the institutional and oppositional actors, leading to a crisis of legitimacy for the involved public agencies.

## Highlights

- Institutional CP can facilitate better solutions and decisions in a situation of complex conflictual planning.
- Participatory CP can have limited impact on decision-making and conflict resolution, e.g., in strategic planning.
- An analysis of knowledge claims can enable identification of the specific grounds for conflict escalation.
- Knowledge use practices may be used as a lens to better understand conflicts within strategic planning processes.



**Keywords:** Co-production, Infrastructure planning, Conflict, Knowledge use, The West Link project (Västlänken), Sweden

### Policy and practice recommendations

- Raise awareness of eventual incommensurability of knowledge claims between public and formal institutions.
- Create mechanisms to link institutional and oppositional actors when goals or criticism are aligned.
- Public participation in strategic planning should be carefully designed to promote meaningful participation.
- Avoid creating ungrounded expectations with the public as it promotes conflict escalation.

### Introduction

The planning process to build a railway station Haga as a part of an underground railway project called the West Link in the center of Gothenburg, Sweden, became a highly disputed, long-lasting conflict with high visibility in the local media and political debates. This process followed lengthy and in-depth procedural and statutory regulations and participatory requirements. There were participatory meetings between interest groups and the Swedish Transport Administration (STA) responsible for the underground planning and construction. There were formal dialogue processes that gave input to the detailed plans by the City planning office responsible for the street level planning. There were inter-agency meetings with the County Administrative Board (CAB), the regional regulative arm of the national government. Despite these participatory processes, the opposition raised numerous appeals that were rejected in the Environmental Court.

It is well known that conflicts are at the center of planning debates (McGuirk 2001; Hillier 2003; Mouffe 2005; Stepanova et al. 2020). Planning's complexity is characterized by the presence of multiple organizations and actors with unequal power, multiple knowledges, and different priorities and visions of desired futures (e.g., Stepanova and Saldert 2022). Participatory and collaborative elements of planning are usually meant to help overcome tensions and, to a degree, promote conflict resolution. However, despite following well-developed participatory and regulatory processes, urban development projects continue to be arenas of severe disputes and conflict (e.g., Gualini 2015; Eraydin and Frey 2019a,b; Legacy et al. 2019).

In the case of Haga station planning, these disputes found expression in the media and judicial processes regarding the feasibility and legality of the proposed project. Some of the most contentious questions included: Is the project socio-economically effective? Does it match the current/future needs of the area? Does it adhere to laws and regulations regarding the protection of the environment, citizen rights, cultural history? Has it taken the residents' perspectives and needs into account? All of these questions stem from differences in specific interests and goals, both present and future, of the involved stakeholder groups, and how they felt that their interests were represented and integrated in the process.

Planning (e.g., Rydin 2007; Roth et al. 2020), co-production (e.g., Petts and Brooks 2006; Albrechts 2012; Patel et al. 2015) and urban transformation literatures (e.g., Palmer et al. 2020; Buyana et al. 2021) discuss how decision-making complexities may be dealt with. In such studies, there is a clear emphasis on the importance of more open, participatory, inclusive and democratic practices where knowledge, its use, production and integration into decision making is seen as a key prerequisite to better dealing with complexity and conflicts (Stepanova 2014). For example, Cash et al. (2006) suggest that knowledge integration may improve the credibility, legitimacy, and saliency of knowledge used for decision making and thus contribute to conflict resolution. However, there is also criticism of a theoretical over-reliance on these approaches, because of their contextual limitations (e.g., Wolfram 2018; Jagannathan et al. 2020). We base our study on the tension between the theoretical promise of participatory and collaborative knowledge production for complex decision making, and its limitations in practice. We discuss this in light of the potential of collaborative knowledge production to contribute to urban transformation towards sustainability through conflict prevention and resolution. The debates we draw on are presented below.

Despite the outlined potential of collaborative and participatory planning to bridge conflicts and disagreements, critical voices have been raised about the deficiencies and limitations of participatory planning practices (Hillier 2003; Purcell 2009, 2016; Legacy 2017). For example, Legacy (2017) points out that there are “numerous limits” to the transformative potential of citizen participation when it meets with government decision-making within the formal institutional processes of planning (Legacy 2017, p.427). Legacy (2017) further argues that “critiques of these processes draw attention to the ways in which these participatory channels form only part of the planning and decision-making environment” (ibid. p.427). Maginn (2007) and Legacy (2017) further specify that participation, and conversely knowledge integration, is allocated to “formal engagement spaces”, where it is used to create legitimacy for decisions that may have already been predetermined, rather than really transforming how decisions are made (Legacy 2017, p.428). Other studies also find that participation may co-opt potential opposition and through this legitimize already made decisions (Silver et al. 2010).

In another growing body of literature, collaborative knowledge production (CP) is seen as an effective and alternative way to address the complexity of urban development and other sustainability related projects that engage a wide variety of interests (Petts and Brooks 2006; Patel et al. 2015; Taborj and Ramaswami 2020). CP is often operationalized as knowledge being integrated across the science-policy or science-civil society divides (Polk 2014; Buyana et al. 2021). In many CP approaches, the integration of diverse knowledges, knowing and/or know-how are seen as central mechanisms for enabling better understanding of a joint problem and creation of more relevant and legitimate processes and acceptable solutions (Albrechts 2012; Patel et al. 2015; Perry et al. 2018). By creating a more holistic and inclusive understanding and knowledge of the issues at hand, CP processes are seen to contribute to better informed and democratically anchored decision making (Muñoz-Erickson 2014; Frantzeskaki and Kabisch 2016; Dunn et al. 2017; Hansson and Polk 2018; Lux et al. 2019; Palmer et al. 2020). Recent studies, however, take a more critical look at CP, especially regarding its theoretical aspirations and actual outcomes in practice. For example, Jagannathan et al (2020) review

recent studies of CP in the area of climate change adaptation to examine aspirations and outcomes of CP. They find that CP appears to improve knowledge use and integration in practice, but to a limited degree. CP is said to be able to generate enhanced and shared understandings, and facilitate transformative change in policy (Wyborn et al. 2019), however such goals are rarely met in practice. Recent studies also show that, although expanding in use in the past decades, CP often becomes routine consultation in practice (see Galende-Sánchez and Sorman 2021 for a systematic review). There is a need for more thorough attention to the actual practices and outcomes of CP (Jagannathan et al. 2020).

The intersection of the themes of knowledge use, co-production and planning has also been actively discussed in the growing literature on urban transformation towards sustainability (Wolfram 2016, 2018; Frantzeskaki et al. 2018; Peris and Bosch 2020). There, knowledge co-production and integration is seen to contribute to the societal transformation of practice and evidence-based policy making through meaningful collaboration and participation, which in turn promotes empowerment, mobilization and activation in strategic urban planning (Frantzeskaki et al. 2018; Buyana et al. 2021). Some studies suggest that co-production may be one of the tools or mechanisms to promote lasting transitions to urban sustainability as it can bring different actors together, help reframe problems, find new solutions, and reimagine sustainable urban futures (Tabor and Ramaswami 2020). Within urban transformation research, some studies investigate the connections between CP, knowledge use and urban development. For example, Buyana et al. (2021) investigate relationships between power and knowledge co-production. They focus on the forms of power that are navigated by actors when co-producing knowledge and solutions for urban sustainability in examples in African cities.

Even in this strain of literature, there are critical studies that call for more attention to the actual practices of CP processes and their contextual limitations (Wolfram 2018; Jagannathan et al. 2020). For example, Peris and Bosch (2020) draw attention to the fact that planning is normative and conservative; it strongly supports existing regimes and tends to resist radical change (Peris and Bosch 2020, p.5). Frantzeskaki and Collier (2021) confirm that: “it remains however to be examined and conceptualized in which ways not only outputs of co-production process but the process itself impacts ways of thinking, organizing and doing and in which ways it impacts urban transformations”. They also call for a more thorough investigation of CP’s premises, politics and limitations.

In sustainability science and transdisciplinary research traditions, CP is often operationalized as knowledge being integrated across the science-policy or science-civil society divides (Patel et al 2015; Pohl and Wülser 2019; Buyana et al. 2021). In such examples, the CP process studied is initiated externally, often by researchers not by planning organizations themselves (Lang et al. 2012; Westberg and Polk 2016). Other approaches to CP focus on the state-society relationship for example in social movement-initiated CP and in different types of service provision (Watson 2014; Nabatchi et al. 2017; Galuszka 2019). However, studies of CP in the context of urban transformations point out that urban sustainability transitions are most effectively promoted by the meaningful engagement of different actors and users from different groups that include a wider variety of inter-actor interactions beyond state-civil society or science-policy (Polk 2015; Perry et al. 2018; Palmer et al. 2020). These groups include research, policy, civil society,

industry, and the public and their interactions when dealing with urban complexities, and engaging with different knowledges and visions of desirable future (e.g., Patel et al. 2015; Frantzeskaki and Kabisch 2016; Tabory and Ramaswami 2020).

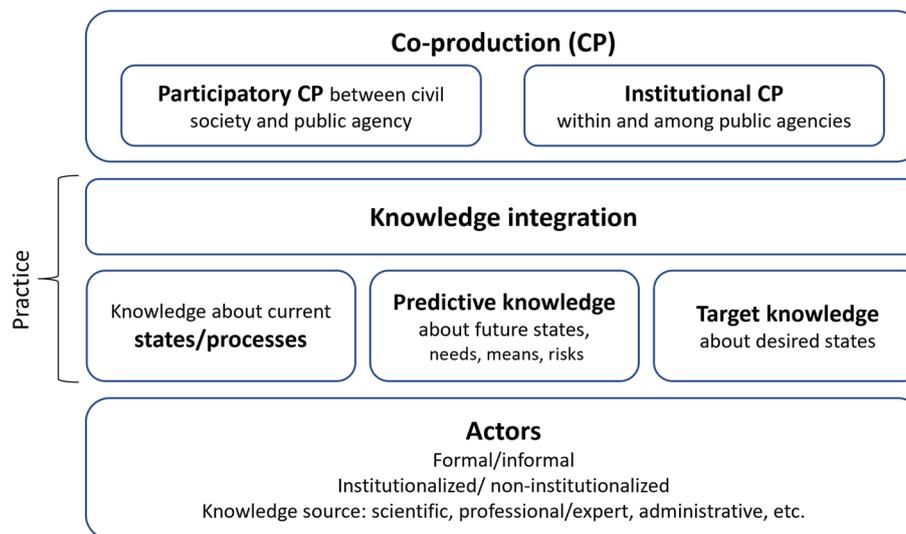
In this article, we widen the use of CP to include not only state-civil society but also inter-public agency interactions. We motivate this by the fact that current urban conflicts occur around complex societal problems, that engage not only different stakeholder groups, but also a variety of diverse public agency actors, representing different sectors and regulatory levels with their respective mandates, goals and requirements. The ability of public agencies to work together and integrate different types of knowledge, not only from civil society, but also from different agencies, is crucial for their ability to manage this complexity and fulfill the statutory requirements of planning processes (Cash et al. 2002; Polk 2011; Saldert 2021; Stepanova and Saldert 2022). We thus take a step from the widespread scholarly focus on CP across the state-society divide, to also include a focus on the specific roles that CP has within and among actors from the public sector (Wilder et al. 2010; Bremer and Meisch 2017).

In order to reach the aim of better understanding the role of co-production in strategic planning contexts, we operationalize participatory and institutional CP by analyzing knowledge use practices in the planning process of the Haga station, in Gothenburg, Sweden. Our research questions are: How do knowledge use practices affect co-production in a conflictual planning process? Particularly, what types of knowledge are being used and integrated? What can our analysis say about the role CP can play in lessening conflict escalation? This study utilizes qualitative methodology and is based on the analysis of planning documents, semi-structured interviews with planning professionals and representatives of opposition groups, and an analysis of debate articles in the local newspaper.

## **Theoretical and analytical framework**

### **Co-production (CP)**

The overall focus of this article is on the different types of co-production that come into play in an urban planning conflict. Since diverse knowledges and their use are at the center of effective transformations towards sustainability, we operationalize co-production through our analytical framework and empirical focus on knowledge types and their use in a conflictual planning process (Scoones et al. 2020). CP is a broad term that is used in a number of different academic and practice-based traditions from within science and technology studies, urban planning, sustainability science and natural resource management (Healey 2003; Jasanoff 2004; Stepanova and Bruckmeier 2013; Wyborn 2015; Bremer and Meisch 2017). In this paper, we focus on two types of CP. The first includes the most common use of CP, namely the interactions and knowledges exchanges that occur across science-policy and state-society divides, in our case between civil society and public agencies, which we refer to as *participatory* CP (Polk 2015; Hemström et al. 2021). Building upon a recent review article on the use of CP in climate change research by Bremer and Meisch (2017), the second focus is on CP within and among public agencies, or *institutional* CP (Bremer and Meisch 2017). In the present paper, institutional CP refers to the capacity of public agencies to work together, both across and within organizational boundaries, to co-produce adaptive governance through their ability



**Fig. 1** Analytical framework used for the analysis of CP in a planning conflict

to make use of or integrate applicable knowledge from different formal stakeholders (Bremer and Meisch 2017, p. 9–10).

In this paper, we define CP overall as interactions in the planning process where different actors, both formal and informal, influence the outcome of the formal planning process through meaningful exchanges. Following Groth and Corijn (2005), we distinguish between formal or institutionalized actors (e.g., city planning authorities and decision-making organizations), and informal actors (e.g., citizen networks, informal organized opposition groups). This distinction reflects the mandates and influence that formal and informal actors have in urban planning and decision making.

Our use of CP thus focuses on how formal public organizations, involved in the planning of the Haga Station, identified and integrated different knowledge claims from both formal and informal actors, in the processes leading up to the start of the construction of the station. Our analytical framework distinguishes between both *who* is involved in the CP as well as *what* is being co-produced. The former entails distinguishing where CP occurs through the involved actors and processes (Palmer et al. 2020), for example institutional CP occurs within and between public organizations, and participatory CP through collaboration with the public.

Regarding the *what*, CP can refer to a variety of activities, purposes and goals, including learning, building trust and relationships, exchanging experiences, knowledge integration, jointly designing and carrying out activities, and increasing understanding and legitimacy (Bremer and Meisch 2017; Hemström et al. 2021). In this paper we trace CP in planning practice through instances of knowledge integration (Fig. 1).

### Knowledge types and claims

The definition and distinction of knowledge types applied in our analysis builds upon the knowledge typologies suggested by Rydin (2007) in planning, and Pohl and Hadorn (2007) in transdisciplinary science. These typologies were later integrated by Stepanova et al. (2020) to form an interdisciplinary knowledge typology to identify

possible mechanisms of conflict resolution. This typology was further refined in Stepanova and Saldert (2022) where it was applied as an analytical tool to an empirical study of two planning conflicts. Stepanova and Saldert (2022) demonstrate how a knowledge-based analysis of planning conflicts both sheds light on the roots of conflicts and clarifies the possibilities and limitations of knowledge integration for conflict resolution.

In our operationalization of knowledge integration, we first identify what knowledge types are used in the course of conflict development. For methodological clarity we define *knowledge* as both a *type*, linked to a specific context and actor, and as a practice-based *claim* to understanding certain causal relationships, for example, relationships between action and impact (Rydin 2007, p. 53). Here, claims are not “facts”, they are socially constructed statements used by the actors as a basis for their arguments and ability to influence decision making. Claims can be empirically identified in documents, debates, and interview transcripts. Through conceptualizing knowledge as a claim, it is possible to empirically identify and analyze what specific knowledge is used in planning and where it is used. We draw on the work by Stepanova et al. (2020) and Stepanova and Saldert (2022) and see knowledge types as linked to the *role* of the actor in the process (formal, informal). Based on the *source* of knowledge we further distinguish other types of actor-based knowledge that includes, for example, local, administrative, expert/professional, and scientific knowledge. Local knowledge refers to experience and observation within a community. Administrative knowledge denotes knowledge of formal procedures, regulations, legislation and the like used in formally organized decision-making in public administration. Expert/professional knowledge refers to expertise or experience obtained through practical experience, training or education within planning fields (e.g., architecture, urban planning). Scientific knowledge refers to disciplinary and interdisciplinary formal academic knowledge, e.g., scientific findings that the actors refer to.

Drawing on the work with knowledge typologies as analytical tools presented by Stepanova et al. (2020) and Stepanova and Saldert (2022), we use the following categories of practice-based knowledge claims (Fig. 1):

1. Knowledge claims about *current states* and processes: Knowledge about what we know now, how things are, “the present” system. This includes current interpretations of the problem at hand by different actors; “what we disagree about” regarding the present state.
2. Knowledge claims about *future states* and processes to get there: *Predictive* knowledge can be further categorized as i) knowledge about the *need* for change, ii) knowledge about means for change, and iii) knowledge about *risks*.
3. Knowledge claims related to *desired goals* to be achieved or *desired states* to be reached. *Target* or normative knowledge is related to claims regarding future political goals. It answers the questions: “Where do we want to go from here?” “What are our desired futures?”

To summarize, in this paper the integration of different knowledge claims by the participating organizations is seen as a proxy for CP in the planning process. Such

integration is identified through the documented change of claims used by the actors, which for example, underlay changes in actions/decisions, positions or goals. Operationalizing CP in this way allows us to see the “results” of knowledge integration and thus address our overall aim regarding the role that CP related processes have or do not have and infer their contribution to conflict development.

### **Materials and methods**

The study is based on a qualitative analysis of data from three main sources: planning documents (including court issues, meeting protocols, detailed plans, and assessment reports from authorities), 17 semi-structured interviews with key informants that represent different organizations and activist groups, and debate articles from *Göteborgs Posten*, the local newspaper.

Planning documents constitute the main body of data. The timeframe for document collection stretches between 2006 when public consultations began, until 2020 when the conflict was formally settled in court. The main bulk of documents are from between 2013 and 2020 when a majority of the planning, consultations and opposition activities occurred. Seven core planning documents that present detailed plans and summarize public consultations and court decisions, approximately 980 pages, were analyzed in detail with help of Atlas.ti software. The documents were coded using the knowledge claims categories presented above and include: “knowledge about current states”, “knowledge about future states”, predictive knowledge about needs”, “predictive knowledge about means of change”, “predictive knowledge about risks”, and “target knowledge about desired goals”. Other codes identify the role of the actor in the process: “formal”, “informal”, and their associated expertise: “local”, “expert/professional”, “administrative”, “scientific”. The analysis focuses on documents where the positions of actors that are central for the Haga conflict development are clearly articulated. These central actors are defined as those who raised concerns over time, for example in formal public consultation and legal processes.

Interviews with representatives of the main actors (formal and informal organizations and groups) with articulated positions within the WL and Haga station planning conflict complemented the document analysis. The respondents included planning practitioners, communicators, decision-makers, and representatives of the opposition groups. The interviews were conducted in two rounds between 2016 and 2020. 10 of the 17 interviews focused on planning and decision making within the WL project in general and aimed to provide a better understanding of the planning context. Seven interviews were conducted with the key actor groups and organizations that were active in the Haga station conflict. The informants were identified based on the planning documents and court decisions. These interviews targeted the arguments and claims that different groups put forward in the conflict. These seven interviews were transcribed and thematically analyzed. The themes included: actors in conflict, actors’ positions, knowledge claims used to support arguments expressed by different actors, resolution approaches, and the use of different claims to justify the decisions made. These documents are listed in Additional file 1.

Among the local media articles (from April 2006 – April 2020, 78 articles), we focused on the debate articles where the Haga case is discussed and where the actors formulated

their claims. The analysis follows the same coding used for the formal documents regarding knowledge claims, actors, and their background expertise. Though occurring in an informal context, statements and arguments articulated in the media are seen to have a semi 'formal' status, since speakers express their official positions and sign the articles with their names and affiliations. The media analysis is used to triangulate the positions/claims of the opposing sides, to double-check the central knowledge claims behind the arguments in the conflict in the formal documents, and to identify possible instances of CP occurring between the opposition groups.

### **Background: the West Link railway project and Haga station**

#### **The West Link—a railway connection in a tunnel under the center of Gothenburg**

West Link (WL) is currently the largest infrastructure development project in Western Sweden. It includes an eight-kilometer-long double track railway, with a six-kilometer railway tunnel underneath the center of Gothenburg (see Additional file 2 for more details). The active planning for the project started in 2011. In 2014, WL received *National Priority Project* status from the government and was included in the Swedish National Transport System development plan 2014–2025. Construction officially started in the fall of 2018, and the railway is expected to be finished and open for traffic in 2026. The planning followed routine statutory procedures that included formal public consultations, information meetings, advertisements, exhibitions and dialogues with concerned stakeholders and the public. Conflicts of priorities and interests were either addressed through routine planning procedures or taken to the court and formally resolved through court decisions.

Planning and construction of the WL is characterized by close collaboration between two key organizations: the Swedish Transport Administration (STA) and the City of Gothenburg (referred to as 'the City'), in particular its Planning Office. STA is the authority responsible for the realization of the project. In particular, it is responsible for planning and construction of the tunnel and the railway. The City works in parallel and in close coordination with STA. The City is responsible for detailed land use plans, monitoring and ensuring that the WL is regulated according to the Swedish Planning and Construction Law (Plan- och bygglag 2010:900). The City is further responsible for detailed land use planning around the stations on the ground. The County Administrative Board (CAB) is also involved in the project's planning as the regulatory authority with responsibility to make sure that national laws, legislation and regulations are followed.

Despite close collaboration and coordination between STA and the City, collaborative and consultation activities in the sub-projects are held separately. Importantly, STA and the City organize and hold separate formal public consultations and information and communication activities as part of their respective detailed planning. In some instances, STA and the City work in close collaboration with other actors, e.g., in planning for the construction and design of the stations. The status of a national priority project also shapes the timing and agenda for collaborative and participatory activities in the decision-making process.

### Haga Station planning conflict

The decision to build an underground station in Haga in the center of Gothenburg, with its historical and cultural values, is one of the most contested and highly debated conflicts in the WL.<sup>1</sup> The opposition groups question the motivation and justification for the station's location in this particular part of the city. STA motivates the decision to have Haga station as part of the Haga-Korsvägen tunnel route as the best alternative among the ones investigated in terms of capacity, costs and acceptable levels of impact on the surroundings (from environmental, historical and cultural values point of view). STA also points out that the chosen route was supported by a political majority in the City (STA 2011, p.5).

Conflicts in relation to the planning of Haga station became manifest in the routine process of formal public consultations held by the City in conjunction with the exhibition of the detailed plans for the area in 2014 and 2016. During these processes, 14 organized actors, organizations and a number of private persons (approximately 300) expressed their opinions and put forward arguments against the plan, in general, or against its parts. The two main decision-makers, STA and the City planning office, acted as respondents.

In 2014, the discussion addressed several major themes: i) preservation of valuable trees in the area (e.g., in the adjacent park, Kungsparken) that are either threatened by the construction plans or will have to be taken down; ii) compensatory actions to be taken to compensate for other negative environmental impacts of the construction work, such as air pollution, risk of ground water level drop; iii) construction timeframe, possible damage of buildings/property due to vibrations, and compensation for property owners; iv) insufficient or poor communication about the project and planning processes, lack of information and dialogue; v) safety and technical characteristics of the station (Environmental court 2019, Appendix 19, p. 4). Besides these themes, an overarching critique towards the WL was expressed by a majority of the involved opposition actors, who questioned its capacity, routes and purpose.<sup>2</sup>

During the public consultation held by the City in 2016, around 260 written statements from private persons came to the City planning office. Major concern was expressed regarding the negative impact the construction would have on the cultural environment, the park environment and, specifically, on the highly valued trees. The most debated themes were the negative environmental impact, negative impact on buildings, dwellers' health, social life and nature, preservation of trees and cultural values. The opposition network, *Trädplan Göteborg*, was the main actor articulating these concerns. Around 130 people submitted written opinions that were similar or identical to the opinions and positions expressed by this network. Other written opinions belonged to private property owners and individuals and criticized the WL project in general, and more specifically, its costs and risks.

A clear conflict developed around the decision to locate the station in Haga. Some actors were convinced that the station was irrelevant. The main themes addressed and

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<sup>1</sup> The overarching decision to build a railway corridor through the center of Gothenburg is the most highly contested decision in the WL project.

<sup>2</sup> We delimit the following discussion to station Haga only, leaving out the discussion of the WL project as a whole.

**Table 1** Main actors and knowledge they use in Haga planning conflict, a summary. For details see Additional file 3

Actor	Position in conflict	Dominant knowledge types and sources
The Swedish Transport Administration (STA)	Formal actor. Key respondent and decision-maker. Pro-Haga station	Target knowledge, knowledge about current states and processes. Administrative, expert/professional
The City planning office	Formal actor. Key respondent and decision-maker. Pro-Haga station	Target knowledge, knowledge about current states and processes, predictive knowledge about risks. Administrative, expert/professional, scientific
The County Administrative Board (CAB)	Formal regulatory actor. Decision-maker. Is concerned with similar issues as the Haga opposition activists	Knowledge about current states, predictive about risks. Administrative, expert/professional, scientific
Different administrations in the City of Gothenburg	Formal actors. Concerned with negative effects of the construction	Predictive knowledge about risks. Administrative, expert/professional knowledge
Trädplan Göteborg (The Tree plan network)	Informal actor. Most active opposition group. Concerned with negative effects on conservation, environmental values. Claim that the station is irrelevant and unnecessary	Knowledge about current states and processes, predictive about risks. Scientific, administrative knowledge
Nej till Västlänken (Association "No to West Link")	Informal actor. Opposition group against the WL in general. Critical of the planning process	Knowledge about current states and processes. Scientific, expert/professional knowledge
Stoppa Västlänken nu ("Stop the West Link now" group)	Informal actor. Opposition group. Against the WL in general. Concerned with negative impact of the station on natural and cultural values. Critical to how scientific and administrative knowledge is used in decision making	Knowledge about current states and processes, predictive knowledge about risks. Administrative, expert/professional, scientific knowledge

Source: Authors' own compilation based on the analysis of empirical data collected for the study

used by the opposition actors to support their arguments included: the station's capacity (questioned the motivation of the need for the station to be built), prospective risks (negative or irreversible damage of natural, cultural, historical values in the area, and biodiversity), and construction costs. Technical issues were also of major concern in terms of negative impacts and risks, such as noise levels, air pollution, and lowering of ground water levels (Environmental court 2019, Appendix 19, p. 4).

## Results

### Knowledge claims used in the formal documents of the Haga station conflict

All of the participating actors, both formal and informal, use *expert/professional* knowledge to argue and motivate their positions in the official documents (see Table 1 and Additional file 3). All of the knowledge claims are thus based on different types of planning expertise. A clear trend can be distinguished between the formal decision makers, STA and the City planning office, and the opposition actors around the use and interpretation of expert-based knowledge. The opposition builds their arguments against Haga station based on their assertion that professional knowledge used by the decision makers is incorrect and therefore cannot be considered as a justifiable ground for

planning. The central debate revolves around knowledge claims about current states and processes. These include claims about planning processes, modelling, regulations and priorities, among other. This knowledge is further questioned in regard to its perceived quality (e.g., “the figures are wrong”), and the way it is used in decision making (e.g., how it is used and for what purposes). The debates about current states and processes are closely connected with predictive claims about needs, means and, importantly, risks related to construction. Knowledge claims about risks are used by the opposition actors to make arguments against Haga station. Knowledge claims about current states and processes dominate the debate and are one of the most contested issues in the Haga station conflict. The various knowledge claims about current states and processes are further employed by different actors to construct and support arguments about risks, and to question the needs and means related arguments used by the decision makers to motivate the station. Overall, all of the claims the opposition actors make are based on administrative knowledge about planning procedures and expert/professional knowledge from e.g., planning, architecture, engineering, environmental protection, used to motivate and support their common goal to terminate the planning and construction of the Haga station.

Knowledge claims related to desired future goals is the least used claim in the debates. The different opposition actors have different, often multiple goals in relation to Haga station development. For example, some are positive to the WL in general, but want to stop the construction of Haga station; others want to stop both. In other cases, claims regarding target knowledge concern issues related to Haga station planning, not the station itself, such as damage on specific houses and cultural heritage. In the later stages of the conflict, target knowledge comes in more often, for example when the activist groups argue that the target of the City planning office to protect valuable natural and cultural environment is insufficient, that it will not make any difference because the damage has already been done (Environmental court 2019). At the same time, the City planning office, together with the Environmental Court, decided that the conservation and protection plan for trees and other values is adequate, which is further supported by the regional planning authority, CAB.

While not explicitly debated, it is clear that different actors operate with different target knowledges that are sometimes in conflict with each other. For example, for the two main decision makers STA and the City planning office, knowledge claims related to future states refer to the development of the most sustainable (from economic, environmental and social points of view) transport infrastructure. Importantly, “most sustainable” is not equal with “the best”. The project’s sustainability, and sustainability of its different alternatives, is judged based on and in relation to the existing contextual preconditions: regulations, laws, national priorities, urban space, natural preconditions, time and costs etc. For CAB, knowledge claims related to desired future goals are defined by the regulative role of this regional planning authority – it has to control and manage urban development plans’ compliance with the existing regulations, laws and national and public interests.

For the opposition actors, such as Trädplan Göteborg, the ultimate target is to terminate development of the area which they deem inappropriate due to high risks and irreversible damage on cultural and natural environments. On a more instrumental level,

the target here is to protect old trees (some of which are 100–200 years old), and the natural and cultural environments of the area through changing or rejection of the detailed development plan. It is noteworthy that CAB and the opposition activists express the same concerns regarding the considerable damage made during the construction phase. They both claim that the construction will negatively affect national interests in valuable cultural and natural environments (trees and park environment) as well as undermine the protection and conservation of valuable archaeological relics (Environmental court 2019).

All of the opposition actors employ the same type of expert-based knowledge. They engage professionals, ground their arguments in professional investigations, and utilize professional knowledge claims. Several members in the opposition groups are themselves professional planners, engineers and architects, though they are not formally engaged in the Haga station project. Their background allows them to focus on administrative issues in claims regarding regulations, laws, legislation and planning and decision-making processes. In this regard, all of the involved actors discuss and operate on a very professional level with arguments that are grounded in “facts”. The veracity of these “facts” is the core of the conflict. It is precisely in the interpretation of “facts” and the subsequent use of expert/professional and administrative knowledge that the conflict develops. These processes of knowledge use directly affect conflict development, through the way in which different knowledge claims are accepted or dismissed, and how and on what ground decisions are made.

#### **The role of institutional and participatory co-production in formal processes**

Our analysis shows that there is a well-developed role for institutional CP between the different regional and local authorities and governmental organizations. Planning is done in continuous collaboration and dialogue between the core, formal actors in the region (STA, the City, CAB). The results of this dialogue can clearly be seen in the ways in which the detailed plan gets revised according to specific criticisms, thereby changing over time through multiple processes of formal collaboration as well as public consultation. For instance, in 2019 the City planning office revised and changed their plans to include a “Trees management and protection plan” for which a working group was created. The plan describes protection areas and actions in more detail with the goal to, as much as possible, protect the trees, e.g., “The trees should not be taken down and should be protected during the construction work on the ground... Risk trees should be replaced” (Environmental court 2019, p. 9).

The changes and revisions are reported in detail in every public consultation report both for STA and for the City planning office. CAB is one of the most critical actors in this process. On several occasions CAB demanded better and more in-depth investigations of the effects on the environmental and cultural values in the area, development of action plans regarding the tree protection, and transparency in planned development processes working with tree conservation from STA and the City. After numerous revisions and complementary investigations made by the City planning office, CAB was finally satisfied with the detailed plan for the station including the plans to address the most central issues of cultural heritage, natural environment and archaeological relics

protection (Environmental court 2019, p.9). The plan was approved by the City Council in 2019.

In contrast, participatory CP works less well when it comes to integration between the STA and the City planning office, and the public and activist groups. While rarely acknowledged by the opposition groups, there are numerous instances when the opinions expressed in public consultations, e.g., regarding technical issues, were taken into consideration even though they concerned minor changes, revisions or clarifications of the plan. For example, Trädplan Göteborg was not satisfied with how the City plans deal with the negative consequences for the cultural environment, although this was revised after criticism from CAB and input from the public consultations (Environmental court 2019, p. 9).

In regard to the revision of the plan and inclusion of the detailed plan for trees management, Trädplan Göteborg argues that the proposed protection actions are insufficient and will not remove the risks of irreversible damage or even lead to destruction of natural and cultural environments.

*These revisions and additions do not imply any improvements in the conservation and protection of the valuable environment. On the contrary, the plan now enables major irreversible interventions in the cultural environment and the impact on the natural and residential environment. The management plan for trees has largely already been implemented and several trees that according to the plan were to be moved have instead been felled. (Environmental court 2019 p. 9–10).*

Despite objections from the opposition, CAB as one of the most powerful actors and decision makers in the planning process, approves, stating that the revised plan satisfies the CAB's demands and complies with the regulations, and national and public interests. This decision is an important milestone on the way for approval by the City Council. Approval by CAB is also used by the Environmental court<sup>3</sup> as a base to reject the appeals from Trädplan Göteborg:

*When examining an appealed plan, the assessments made by the County Administrative Board weigh heavily and the Environmental court finds that there is no reason to deviate from the County Administrative Board's assessment.*

*Furthermore, a special management plan for trees has been developed for the area. The court considers that the issues concerning the park and avenue environment are sufficiently elucidated and handled in the detailed plan and do not constitute grounds for revoking the municipality's adoption decision. (Environmental court 2019, p. 31).*

Overall, the analysis of formal documents shows the importance of institutional CP in the planning process. For example, communication, collaboration, knowledge exchange and integration occur between the different departments within the City. Communication and collaboration between STA, the City planning office and CAB is an example of

<sup>3</sup> It is important to understand that in case of appealing the approved detailed plan to the Environmental court "The examination does not refer to whether the municipality has chosen the most optimal solution, but only if the chosen solution meets the requirements of the law" (Environmental court 2019, p. 29).

successful knowledge exchange between professional organizations. Critical points and demands for more knowledge from CAB were met by the City planning office and STA through formal processes of public consultation and in continuous dialogues between these three actors. Institutional CP between these actors resulted in better informed and adjusted plans that CAB deemed satisfactory in relation to national and regional priorities, interests and goals and, therefore, allowed the planning to proceed.

In contrast, participatory CP worked considerably less well and had limited impact on decision making. Although oppositional groups were not satisfied with the outcomes of either consultation processes, nor the decisions made by the City and the Environmental Court, some of the concerns brought up by the opposition were used by the planners and the CAB, and adjustments were made. For example, the tree management plan, was a direct result of participatory CP between the City office, CAB and the opposition. It is important to note that the interests and claims used by the main oppositional actors (i.e., the need to protect environmental, biodiversity and cultural values, the trees) coincide with the interests and demands of the regional authority, CAB. The interests and demands of the latter were satisfied by the decision makers through adjustments of the plans, clarifications and additional investigations. Nevertheless, the results of these knowledge integration processes were deemed insufficient by other oppositional actors who continued to raise their dissent in formal conflict resolution through the court. In 2019, all of the opposition claims to Haga detailed plans were dismissed by the court in favor of STA and the City planning office.

#### **Knowledge claims used in newspaper debate articles on Haga station**

As noted above in the formal documents analysis, close to all of the opinions raised in media articles in the local press are expressed through and based upon what the involved actors promote as 'better' or 'more accurate' professional or expert-based knowledge claims. All of the oppositional actors, both organized and individual, use different types of professional expertise to support their positions. In the media discussions, these experts include city and transport planners, civil engineers, architects, environmental specialists and a few transport related researchers. There are also a number of debate articles by STA, Västra Götalands Region, the City, and the political parties that are against the project (Piratpartiet, Demokraterna). The main groups of oppositional actors who are active in the debate articles in the local press include organized groups (Trädplan Göteborg, Stoppa Västlänken nu, Sköna Göteborg, Nej till Västlänken) some smaller semi-organized groups (Gårdagruppen), and individuals. All of these categories base their arguments on some type of professional planning expertise.

As seen in the formal documents, the knowledge claims used in the debate articles are a combination of expert and administrative knowledge about current states and processes, future states and the processes needed to get there. The media debates sharpen the contours of the conflicts starting with disagreements over what 'facts' are more or less 'correct', developing into accusations of incompetence when the disputed 'facts' remain unresolved, and ending up, in some instances, in charges of corruption. Overall, knowledge claims, or more specifically, what is perceived as being 'true' or the 'wrong' interpretations of the background reports and prognosis for future use, are the central areas of contestation. The knowledge used in the media debates, like

the formal processes, is dominated by expertise-based claims about current conditions and the future outcomes and risks stemming from different infrastructure choices. There are no noteworthy examples in our empirical material where local knowledge is used to argue against the Haga station.

At the end of 2014, planning experts and representatives from Trädplan Göteborg summarize their views of the West Link, including the Haga station. They bring up three main points which are visible in the following quotes and used consistently through the years:

*The West Link's impact on the city's national interests is alarming, especially with the marginal societal benefit Haga station provides. Only 1% of all public transport passengers have Haga as their direct destination. The city center and fortification and remains from the 1620 s are of national interest and will be affected. ... The corridor by Rosenlund and Haga church square results in huge open construction sites for at least seven years. According to the experts, the high cultural and environmental values of this areas of Haga are exposed to extensive negative impacts (Debate article by Lindell et al. 2014).*

*At least 500 trees will be felled or subjected to potentially harmful relocation. Large healthy trees worthy of protection at Haga church square... and several other places, must be removed. Each large, mature tree needs to be replaced with 500 -1,000 new trees to compensate for the loss of carbon dioxide conversion. This is not included in the plan (Debate article by Lindell et al. 2014).*

Overall, the opposition arguments used in the media debates against Haga station include: it is the wrong infrastructure solution and is not adequately motivated; it will destroy the natural and cultural environments in the area; and it has serious negative impacts during its seven-year construction. There are numerous examples of similar uses of experts and expert knowledge claims to undermine the official planning process.

*We in Gårdagruppen have hired perhaps Sweden's foremost expert on traffic forecasts and traffic calculations, a civil engineer, and a professor to review the figures. They come to the conclusion that 6,000 travellers will have their final destinations in Haga. Furthermore, during informal conversations with the city planning office, the same figure has emerged, independent of the above experts. It is not reasonable to build a railway with a station in Haga for so few (Debate article by Friberg et al. 2015).*

The claims of 'right' and 'wrong' decision-support are based on disputes both regarding claims about potential users of the station, and different claims regarding the risks connected to the construction of the station. The opposition, for example, argues that: "West Link is and will continue to be a political project that lacks support in sound traffic planning... they put a station in Haga that does not have sufficient users. It does no good for the people of Gothenburg" (Debate article by Cedermark 2015). This civil engineer continues by exemplifying how ineffective Haga station will be for the entirety of the future transport needs in the city. This is a dominant

position in the debate articles against both Haga and the entire West Link project. Through expert knowledge claims, the opposition argues that the station will not have enough users to reach future goals and to justify the costs and environmental damages incurred through the building process.

The STA and the City planning office claim that they picked the solution that, according to their analysis and wider political goals and environmental requirements, caused the least damage to the city and was the most cost-effective and feasible to build. Some of these reasons include that Haga station is planned near a park, therefore causing much less damage to surrounding buildings; it will be built in more rock than clay (which would have been extremely costly) and is located in a part of the city that has no current train facilities, thereby linking up the western side of the city with a train station, and increasing proximity for commuters. All of these knowledge claims are based on planning or construction expertise from the formal agencies (STA 2011).

A majority of the disputed claims are related to how cost-effectiveness is delimited in time, and the risks that different scenarios pose. Both are clear examples of predictive expert-based knowledge claims. These are embodied in statements regarding the veracity of positions, for example which risk analysis is the most likely or true. The media analysis shows that the conflict is about what claims are seen as most accurate by the different involved groups, and why, what arguments they use to promote the credibility of their chosen claims, or in many cases here, their alternative interpretation of the available data. Expert opinion on each side are the means by which this credibility is established. The opposition establishes credibility by using expert planners and civil engineers from both other cities in Sweden and from the local agencies being criticized.

### **The role of institutional and participatory co-production in newspaper articles**

There is no visible participatory CP between the formal and informal actors in the media debates about the conflict. This debate forum leads to an escalation of the conflict and undermining of the formal planning organizations. As noted in the formal document analysis, the arguments used in this escalation are based on the same sources of expert and administrative knowledge that are given different weight and meaning by the respective positions. One reason for this escalation is the different starting points that these groups have in how they think planning processes should proceed.

The involved civil servants from the STA and City planning office, frame the Haga station project in terms of target knowledge, as a political project, as part of a goal of the city to reach its long-term planning targets for a sustainable transportation system. Haga station is part of the foundation for a larger vision to increase commuting in the entire region, far beyond this contested station. The predictions and overall basis of choosing Haga are built upon this political goal and a long formal process of investigating the best transportation solutions for the region.

Most of the criticism of Haga station, as expressed by the opposition in the debate articles, describe the planning process as deficient because it does not extrapolate from present commuter patterns to future needs, a traditional model-based forecasting, based on predictive knowledge claims. Here the ability to reach another sort of understanding, given these diametrically different approaches to the role of knowledge within a planning process, failed. Since the formal actors based their arguments on target knowledge

claims, and the opposition on predictive, their claims were not comparable, even though they all dealt with Haga station. This misunderstanding is clear in the argumentation developed in the debate articles. This additional analysis of knowledge claims enabled a wider understanding of how the opposition groups and governmental organizations understood how such planning processes should be conducted than was visible in the formal documentation. We also found that the media is not a productive forum for participatory CP. Rather, the media debates exacerbated the conflicts between different understandings, values, knowledges, claims and visions of the future among the conflicting actors. The comparison of incommensurable knowledge claims was a key factor in the escalation of the conflict.

## Discussion

The aim of this paper is to explore the roles of CP in the context of decision making within urban planning. We do so through an analysis of how different types of knowledge are used and integrated in a conflictual infrastructure development project. The results show how different sources and types of knowledge claims get integrated through the process of formal public consultation in planning. This integration happens in different degrees depending on where it occurs and who is involved. In formal institutional processes, knowledge integration led to better informed solutions and decisions (e.g., between and within institutional actors and formal organizations), in others—such as between institutional actors and the informal opposition groups and the general public—instances of knowledge integration were identified but their effects were limited. In some places, such as media forums, knowledge integration between the public agencies and the oppositional groups was non-existent. Moreover, in the media debates the comparison of knowledge claims that had different practical focus, such as present risks and future visions, exacerbated conflict development.

The most common way of discussing CP in planning conflicts, focuses on bridging the gaps between lay and expert knowledge (Petts and Brooks 2006; Roth et al. 2020). “Effective public participation will be fundamentally affected by the responsiveness of experts and their institutions to the more structured input of lay knowledge to decisions and to the coproduction of knowledge” (Petts and Brooks 2006, p. 1046). Some studies show the lack of participatory CP to be due to a lack of interest on the sides of the professionals responsible for the processes (ibid.). Others show clear gains in quality and effectiveness of planning and decision-making due to high quality interaction between diverse groups (Yearly et al. 2003; Patel et al. 2015). The informal knowledge of local actors is often seen to capture valuable knowledge and experiences that are not otherwise available to experts (Petts and Brooks 2006). In the Haga station conflict case, there is no local knowledge of this kind.

Regarding our research question on knowledge use practices, we find that almost all of the actors operated with expert/professional knowledge of different kinds. Expert and administrative knowledge was at the center of contestation. Questions of “more and less accurate” professional knowledge and expertise, lack of adequate expert knowledge in decision making, interpretation of facts and constructions of future visions on “flawed” premises were at the core of the conflict. The use of “appropriate” knowledge, expertise and expert knowledge in disputes and conflicts has been intensively discussed in the field

of science and technology studies and sociological research on boundary work (Nelkin 1975; Lamont and Molnár 2002; Tironi 2015). The work of Nelkin (1975), for example, problematizes the role of expertise in public decisions and states that technical knowledge is often seen as a source of power (p.36). Importantly for the discussion of our findings, Nelkin (1975) gives a useful account of the complexity of public decisions using two strategic planning conflicts in which “experts” were used by both project developers and critics. Disputes among experts, or expert knowledge as in our case, become a major source of confusion for policy makers and the public (ibid. p 40). Our findings confirm much of these concerns. The contestation of the same types of expert knowledge by both sides of the conflict in the Haga station case contributed greatly to the complexity and escalation of the conflict.

Regarding our second research question, the potential of CP to contribute to conflict resolution was hampered by the changing use of and disputes around different types of knowledge claims as the conflict developed. The early disputes were about current states and processes. As the process developed, the opposition responded to their inability to influence the process by shifting their use of knowledge claims, from current states, to risks, and then to desired states. One important factor in these shifts was the fact that the opposition and public agencies understood the role of knowledge in the strategic planning process in different ways. When the planning organizations started arguing that this was a *political* project stemming from political goals, (using target knowledge), they paradoxically *depoliticized* the disputes about what knowledge claims were most ‘true’. The political dimension, reflected in knowledge claims related to future desired states, is important in strategic planning as it shapes the conditions, timing and extent of participation and collaboration through unequal power relations between the decision makers and other actors (Metzger 2017; Eraydin and Frey 2019a; Legacy et al. 2019). In our case, the political dimension of strategic planning was central for the choice of arguments presented by the planning authorities and the possibility for knowledge integration among the actors. Consequently, the room for in-depth participatory CP was determined by the national priority status of the project. The centrality of the political dimension in the Haga station conflict shows the need to better understand the role of the wider political context and its effects on knowledge use practices in the more detailed phases of strategic planning processes.

The preconditions of a project of national priority status both enable and disable CP in this case. On the one hand, institutional CP is stimulated by these conditions. Governmental agencies have to collaborate to fulfill the task from the government. On the other hand, participatory CP becomes quite limited because of the temporal mismatch between the public focus and needs, and decision-making in the formal planning process. These contextual factors exacerbated the conflict since the opposition wanted to influence and change things that had already been decided. The mismatch of decision-making and participation also explains why the groups developed such contested disputes regarding the role of knowledge claims in the planning process. The hidden character of the political dimension, due to the temporal mismatch, and the specific context of this strategic planning conflict, further exacerbated the “always potentially conflictual” participatory practices in the post-political planning (Swyngedouw 2009; Eraydin and Frey 2019a, p. 3).

Finally, the use of the same highly credible expert knowledge by all of the actors centered the disputes on 'true and false' and 'right and wrong' interpretations of the same background material. This shifted focus from the credibility of the 'facts' to the credibility and legitimacy of the public actors and the planning process itself. There was no common ground upon which to reconcile differences or come to a better, more holistic understanding of the problem. As Roth et al (2020) note in their analysis of the use of knowledge in two environmental planning processes in the Netherlands: "In its symbolic and political dimension, knowledge wraps facts, values, interests, and power relations together" (ibid., 2020, p.3). This is clear in our case as well. The shift of arguing from specific knowledge claims to contesting veracity, and casting aspersions on the opposition, moved from substantive differences of 'right and wrong' regarding knowledge claims, to severe critiques of professional actors and actions. A better understanding of how legitimacy and credibility are both enabled and undermined within knowledge use practices in planning conflicts is an important theme for further investigation (Saldert 2022).

## Conclusions

In literature, CP is seen to have the potential to facilitate complex conflict resolution, contribute to collective decision making, inclusive governance and transformative change. However, critical studies of CP practice argue that the transformative effects of CP in planning are limited (Legacy 2017; Wolfram 2018; Jagannathan et al. 2020). In this paper we provided an analysis of the practices of institutional and participatory CP to better understand their role in a conflictual planning process.

Using knowledge integration as a proxy for CP, we conclude that two types of CP exist in our example of a formal strategic planning process, but in different degrees. Institutional CP that takes place within and between formal organizations is embedded into the context of formal public consultation; it is clearly visible and goes smoothly due to formal procedures and more equal power relations among the actors. Institutional CP facilitates better solutions and decisions in a situation of complex and conflictual decision making.

In contrast, the role of participatory CP between formal organizations and the public/informal opposition is less evident. Participatory CP, although contributing to changes in plans and inspiring additional investigations, has limited impact on the decision-making process and conflict resolution. This finding correlates with concerns expressed by Peris and Bosch (2020) and Wolfram (2018) and their conclusion that planning is conservative, supports existing state of the art and tends to resist change. In line with Legacy (2017) we find that participatory planning, and strategic planning in particular, is a political act, where participatory CP does not seem to have enough transformative potential and influence. This finding is also supported by the results reported by Jagannathan et al (2020) and Wolfram (2018), who draw attention to the fact that CP practices have contextual limitations, e.g., in the context of strategic planning where important planning decisions are often made before public consultations.

In this situation, what role can CP then play in lessening conflict escalation? In the present case, both institutional and participatory CP contribute to better informed decision making. However, our conclusion is that the specific approach to participatory CP conceived and applied in this case did not have any effect on conflict

resolution, as it did not facilitate the ability of informal actors to influence planning decisions of national interest. This since the decision to build the West Link and the Haga station was decided before the participatory process started. The opposition could have been made aware of the limitations of the process from the beginning, so that they could be engaged as much as possible in the parts of the planning that could be changed. The finding that in the case of Haga station participatory CP did not have any effect on conflict resolution does not preclude the possibility that if different strategies and approaches to designing participatory CP had been adopted the outcomes may have been different. Participatory CP is influenced by windows of opportunity that appear within political planning processes; however, they need to be designed in a meaningful way. Through an analysis of the basis of the conflict itself, an awareness of the incommensurability of the knowledge claims that were evoked and equated, could have been used to help both sides of the conflict understand their respective positions, increase communication, and reduce conflict escalation.

The analysis presented in this paper investigates the role that participatory and institutional knowledge co-production play in urban transformation. This is done through a focus on knowledge use practices which are used as a lens to gain a more detailed understanding of the specificities of the interactions that happen within specific planning contexts. By understanding more precisely how formal and informal actors operate with different knowledges to support, compromise or undermine opposing positions, we can design more meaningful and inclusive participatory processes that could contribute to better knowledge integration in the different stages of strategic planning processes. Participatory and institutional CP are both important preconditions for the development of the transformative capacity of actors and institutions, and their ability to manage and productively deal with planning conflicts. Our findings point to the need for further research and experimentation in the types of participatory CP that might improve outcomes in similar conflicts that occur in strategic planning processes.

#### Abbreviations

CP	Co-production
TDR	Transdisciplinary research
STA	The Swedish Transport Administration
CAB	The County Administrative Board
WL	West Link

#### Supplementary Information

The online version contains supplementary material available at <https://doi.org/10.1186/s42854-023-00050-2>.

**Additional file 1.** The core documents analyzed.

**Additional file 2.** Background: the West Link - underground railway tunnel, in central Gothenburg, Sweden.

**Additional file 3.** Knowledge types used by the key actors with formally articulated positions in Haga station conflict.

#### Authors' contributions

XX and YY designed the study, collected and analyzed the data, and wrote the paper. The author(s) read and approved the final manuscript.

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**Availability of data and materials**

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

**Declarations****Competing interests**

The authors declare that they have no competing interests.

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