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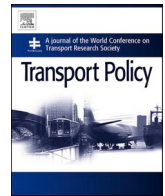
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Uncovering culture: An exploratory review and conceptual framework for culture in public transport governance

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ABSTRACT

This paper explores the underexamined role of culture in the governance of public transport. Using a structured review methodology, we analysed a select body of literature across the domains of governance, public transport, collaboration, uncertainty, and culture. We identify how culture is conceptualised, the methodological approaches used, and how cultural dimensions become visible in moments of uncertainty. Based on this analysis, we identified six sensitising factors that influence the cultural layer of governance: geographical location, duration, external pressures, alignment of values and goals, and the degree of regulation and integration, which we will use to support future empirical research. Our findings reveal a gap in the transport governance literature and point to the need for a systematic treatment of culture as a shaping element in the outcomes of public transport systems.

1. Introduction

For the provision of public transport services, various public and private organisations interact to contribute to the final performance, that performance depending on effective coordination and governance. In Europe, the regulation of those interactions is often addressed as a classic market regulatory problem. From that economic perspective, actors in the sector are assumed to have rather specific characteristics. This assumption serves as the starting point for evaluating or designing incentive structures and governance models, such as regulatory regimes or contracts. A great deal of research aligns with this perspective, evaluating performance given a governance model framed on that economic perspective, for example, [Finger and Messulam \(2015\)](#). That literature neglects what others, such as [Guihaire and Hao \(2008\)](#) and [Gwilliam \(2008\)](#), put first: the challenges of rail service and network design aimed at technical (logistics) or financial (patronage) performance, with some outliers including how governance structures those design questions (e.g. [Van de Velde, 2005](#)). Related to that there is a growing body of empirical research evaluating how governance differences affect day-to-day operations and its consequent performance in public transport (e.g., [Hrelja et al., 2020](#)). An emerging field of research studies collaboration in public transport governance beyond formal structures like regulation and contracting, looking at the influence of informal institutions, often also with the aim to improve outcomes (e.g.,

[Hirschhorn et al., 2020](#); [Hrelja et al., 2017](#); [Rye et al., 2018](#); [Sorensen et al., 2023](#); [Sorensen and Pettersson-Lofstedt, 2025](#)).

This public transport research overlooks how culture, comprising the norms, values, and attitudes of those involved, shapes the behaviour of actors managing the interactions between the multiple organisations in one governance system. The cultural layer of governance, defined by [Williamson \(1999, 2000\)](#) as social embeddedness, informal institutions, customs, traditions, norms, and religion, changes slowly, often spontaneously, and has not been systematically understood in its relation to other layers of governance (laws, arrangements, and transactions) that are more malleable in Williamson's governance framework ([Veeneman, 2021](#)). Our premise, based on [Erez and Gati \(2004\)](#) and [Weick and Sutcliffe \(2001\)](#), is that culture manifests itself constantly at every governance level. In addition, culture is permanently changing in response to dynamics at these other levels, especially events that create uncertainty. For example, ongoing contract negotiations might shift existing norms and practices.

Culture is often seen as a residual category. This neglects how different cultural contexts matter for the functioning of specific governance designs, while we expect it to offer quite some explanatory potential. We want to understand the effect of culture on the workings of the broader governance, using Williamson's governance framework. We consider culture a missing link in understanding how governance functions in complex technological systems, like public transport,

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telecommunications, energy, and water systems (Koppenjan and Groenewegen, 2005), as these systems are embedded in society and their governance consequently does not exist in a vacuum.

In public transport systems, particularly rail-based public transport like trains, trams and metros, public and/or private actors manage the system together, with separate and overlapping responsibilities, and sometimes competing objectives. They need to coordinate their actions and/or collaborate to produce the final services. Simply put, great rails alone do not make good train services for society. This makes the cultural aspect of public transport governance inherently interorganizational. Culture sets informal rules in this context of deep interdependencies and the need for coordination, to prevent the system from failing.

We define culture in our approach as: “a set of beliefs and values shared by members of organisations cooperating in a system, shaping collective behaviours and decision making”. This definition is based on Schein and Schein (2017), but adapted to organisations within a complex technological system instead of one organisation. We define governance as: “the rule sets that condition the interactions between actors with a diverse set of interest while making shared decisions”. A governance system is set up to deal with a wide range of values and interacting actors that change over time and are not always aligned with each other (Veeneman, 2021). As stated before, most literature is about the **explicit** rules. Culture, however, sets **implicit** rules when actors with a diverse set of interests are required to make decisions together, and these rules are derived from their beliefs and values. These interests can be their own and/or refer to the interests of other actors in the governance system.

This paper aims to systematically explore how culture can be empirically observed within public transport governance. Our goal is to develop a theoretical foundation to make culture and the different factors that develop or sustain culture visible. A literature review has not yet been done on this topic. The primary questions of our analysis are:

1. How has culture been studied in research on the governance of public transport systems?
2. What does existing research reveal about the cultural factors that shape governance outcomes in public transport governance?
3. In what way can an analysis of interorganizational decision-making serve as a basis to create a theoretical framework for studying culture in the context of the governance of complex technological systems, with a specific focus on public passenger transport?

This article is a starting point to fill the knowledge gap about the way culture influences the governance and outcomes of public transport systems. Therefore, we develop an exploratory framework derived from the literature. This will constitute the central outcome of this review. This paper also opens a new dimension to the study of public transport. Incorporating cultural dimensions into the analysis of public transport governance can help explain why actors in otherwise similar governance settings adopt different approaches, leading to different outcomes. This will also be relevant to policy and decision-makers designing or implementing legal, policy, and contractual changes to either create incentives for desired policy outcomes and/or to comply with regulations. That allows them to consider the influence of culture on the desired outcomes of public transport systems and to better assess the feasibility of policy changes and governance reforms. It can also have practical value in helping explain variance in governance systems that is otherwise perceived as irrational or the result of personal preferences and leadership.

2. Culture and governance: A theoretical foundation

The culture of governance of public transport systems is a new area of research. To scope our exploratory search and build a theoretical basis, we build on foundational works on culture. The work of Hofstede et al. (2010), Schein (2017), Weick and Sutcliffe (2001), and Williams

(2022) provides a robust background theory.

Geert Hofstede (2010, p. 6) defines culture as: “The collective programming of the mind that distinguishes the members of one group or category of people from others”. Since he wrote the book “Culture’s consequences” in 1980, a lot of research on culture has focused on identifying the core cultural values that differentiate cultures and their implications for work behaviour. Hofstede has defined five cultural dimensions: power distance, uncertainty avoidance, individualism-collectivism, masculinity-femininity and short vs long-term orientation. Even though these cultural dimensions were set up to define the national cultures, which corresponds with the first level of governance as described by Williamson (1999, 2000). Hofstede et al. (2010) expanded his theories to also be applicable to study cultures within organisations, by explaining how organisational cultures differ from national ones and how they can be managed.

Schein and Schein (2017) introduced a model to study culture that reflects the level of its visibility, ranging from the most visible to the least visible elements of culture. He uses the metaphor of an iceberg. The most external level (top of the iceberg) consists of visible and audible behaviour patterns, and the constructed visual and social environment. A deeper level is that of values reflecting convictions about the nature of reality, and the necessary actions to successfully deal with this reality. The deepest and most invisible level is that of basic assumptions and beliefs. These are unconscious thoughts and feelings. Schein defines culture by six formal properties: “(1) shared basic assumptions that are (2) invented, discovered, or developed by a given group as it (3) learns to cope with its problem of external adaption and internal integration in ways that (4) have worked well enough to be considered valid, and therefore, (5) can be taught to new members of the group as the (6) correct way to perceive, think and feel in relation to those problems” (Schein and Schein, 2017; Weick and Sutcliffe, 2001, p. 121). Basic assumptions have become so ‘taken for granted’ that there is little variation within a social unit. If a basic assumption becomes strongly held in a group, members will find behaviour based on any other premise inconceivable (Schein and Schein, 2017). Based on that, we posit that uncovering basic assumptions is necessary to understand the culture of a governance system. This is because culture makes implicit rules and behaviour visible, shedding light on which governance options align with the shared culture and are feasible for the actors involved.

A group invents, discovers, or develops culture when responding to an impactful, unexpected event or situation (Schein and Schein, 2017). Weick and Sutcliffe (2001) explore the close relationship between organisational culture and the management of the unexpected, noting that culture is essentially built on shared expectations of how things are supposed to be done. (Weick and Sutcliffe, 2001, p. 122). Because an organisational culture emerges from a set of expectations or values that matter to people, culture can both unify a group and constrain it. On the one hand, shared values, norms, and perceptions provide a common basis for collective action; on the other hand, they can create blind spots, producing a similarity of approach that narrows the range of possible responses. For this reason, Weick and Sutcliffe (2001) emphasise that to change organisational responses to the unexpected, one must be aware of organisational culture because expectations, rooted in organisational culture, drive responses to unexpected events that create uncertainty.

The handbook of research methods for organisational culture refers to cultural strength as to how deeply entrenched the values, norms, and assumptions are within the organisation, and the extent to which they guide the behaviour of actors. A strong culture (with shared and aligned values) can help achieve goals. It can also be problematic, because a strong culture may restrict the adaptation to change (Williams, 2022).

The literature reviewed above offers definitions of culture and insights into how culture shapes the behaviour of actors. Although these works do not focus on public transport, they provide a useful theoretical lens for this exploratory review. Culture is conceptualised as the informal, collectively held cognitive and normative framework through which actors interpret governance arrangements and enact them in

practice.

3. Methodology

We conducted a structured literature review to create insight into the relationship between culture and governance in public transport systems. We have included studies on the culture of governance in public transport systems, methods for researching the culture of collaborating organisations in public transport systems, and the relationship between culture and the management of uncertainty. This review was conducted according to the PRISMA checklist, a tool for conducting systematic reviews of the literature (Liberati et al., 2009). This review adopted an exploratory approach, given that the literature on culture in public transport governance is limited and fragmented, providing a relatively narrow evidence base. The search strategy evolved iteratively, allowing for the identification of relevant conceptual and methodological contributions from adjacent fields where appropriate. Initial searches indicated that studies explicitly addressing the culture of governance in public transport systems were scarce.

3.1. Screening and selection process using databases

We started this literature review using Scopus and Web of Science. No language restrictions were applied. We limited the search to articles, book chapters, and conference papers. We excluded unrelated subject areas such as medicine and computer science. The initial search string

combined the keywords *public transport*, *culture*, *governance*, *uncertainty*, and *collaboration*. This string yielded only a limited number of relevant results. The search strategy was expanded by introducing additional keywords, informed by the terminology used in publications identified during the initial screening stage. In a subsequent step, broader search strings were constructed using Boolean operators to capture studies addressing either culture or collaboration within governance contexts. This approach enabled the identification of literature from adjacent subject areas that addressed governance culture and collaboration. A limited number of these studies were included where their conceptual approaches or research methods were considered relevant for analysing culture in public transport governance. Our final search string used in the review was:

("public transport" AND governance AND collaboration) OR ("public transport" AND governance AND culture) OR (organizational AND culture AND values AND narratives AND practices AND collaboration) OR (cultural theory AND governance AND organizational culture)

We screened all records based on title and abstract. Reasons for exclusion were papers and articles that had no substantive relation to governance and public management, belonged to other unrelated scientific fields, such as medicine and public health, or focused on topics outside the scope of this review, including: procurement, project management, spatial planning, innovation, sustainability, scenario planning, Artificial Intelligence, or gender studies. Studies focusing on mobility

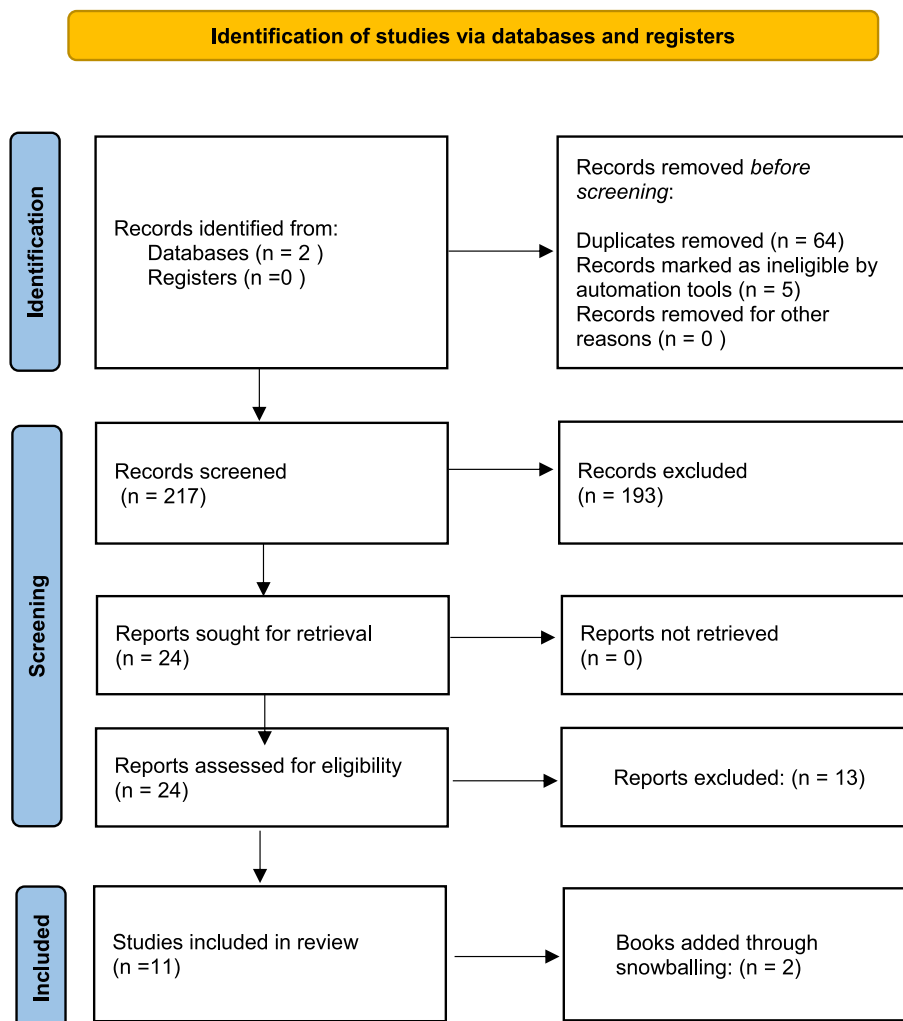


Fig. 1. PRISMA flowchart identification of studies via databases.

from the passengers’ perspective or about roads and automobility were also excluded. In addition, publications that only mentioned organisational culture as a factor without further conceptual or empirical elaboration were excluded. Studies addressing collaboration in public transport governance that did not engage with either culture or uncertainty were also removed from the final sample. Our search process is outlined in the PRISMA flowchart in Fig. 1.

4. Literature analysis

After screening the literature, we retained 11 articles and added 2 books through snowballing, which we organised into two classification tables found below. Each source was assessed for its relevance to five key dimensions: culture, governance, uncertainty, collaboration, and public transport. To be included, all selected articles had to demonstrate relevance to at least one and at least limited relevance to three of these five dimensions. Two articles did not mention culture but were included because they describe the behaviour of actors in public transport systems when collaborating or under uncertainty, thereby providing examples of how culture manifests itself without explicitly labelling this behaviour as cultural. Relevance was categorised on a four-point scale:

1. Subject – the dimension is the central focus of the study (highest relevance)
2. Yes – the dimension is substantially addressed, though not as the main focus
3. Limited – the dimension is mentioned or briefly discussed
4. No – the dimension is not meaningfully present

The resulting included literature is grouped into two categories, discussed below:

- a) Culture, governance, collaboration, and uncertainty
- b) Public transport, culture, and governance

The classification tables are presented at the start of each paragraph that discusses a category.

4.1. Culture, governance, collaboration, and uncertainty

The literature search identified two key publications addressing culture, governance, collaboration, and uncertainty outside the public transport domain; these are summarised in Table 1. We included them because of their strong conceptual frameworks that relate to uncertainty. The first paper by Quigley and Mills (2016) draws on the work of Douglas and Wildavsky (1983, 2002) to examine the culture of Canadian Seaports. We included this study because of the strong theoretical framework, practical application, and potential for use in public transport research. This is because public transport systems are also multi-actor systems, governed by several public and private entities that provide public services. The second article by Hubeau et al. (2019)

studies the role of culture in the transformative capacity and continuation of agri-food networks in Belgium. This article is included because of its strong focus on collaboration and its study of collaboration under uncertainty.

To sharpen uncertainty as a concept, we draw on Douglas. Douglas argues “that what a person thinks constitutes risk to oneself or one’s community is determined by who or what gets the blame when things go wrong” (Douglas, 2002; Quigley and Mills, 2016, p. 193). She shows that risk perception is a moral and cultural matter, and institutional culture shapes what people consider risky or uncertain. Douglas uses ‘risk’ in a colloquial sense, referring to a form of uncertainty. By understanding what is perceived as a ‘risk’, underlying assumptions about how things should be and what behaviour is expected can become visible. An illustrative example comes from Quigley and Mills (2016), who apply cultural theory developed by Douglas with the grid-group framework as a conceptual backbone, to study responses to uncertainty in the governance of Canadian seaports. Cultural theory measures the amount of regulation (grid) and integration (group). Grid measures the strength of (externally imposed) rules and social norms. High-grid cultures rely on formal rules and hierarchical control, while low-grid cultures allow more individual autonomy. Group measures the strength of group membership and collective identity. High-group cultures emphasise collective identity, whereas low-group cultures favour individual independence (Douglas and Wildavsky 1983; Douglas 2002). These two axes produce a matrix that characterises four types that can be used to classify the tendencies of a culture: hierarchy, egalitarianism, individualism and fatalism. These types have their own preferred governance arrangements, blind spots and vulnerabilities. The tendencies to one of the four types are especially visible in the aftermath of a perceived failure (Quigley and Mills, 2016). The case study by Quigley and Mills (2016) examines how culture shapes institutional responses to uncertainty in complex, multi-actor governance systems, such as seaports. The authors identify four governance approaches rooted in Douglas’ “cultural types,” and show how cultural orientations constrain or enable policy effectiveness. Their findings show that making organisational culture visible can provide a basis for understanding that can be used to propose measures to improve alignment between formal governance, desired policy outcomes, and culture.

A Belgian case study on the role culture plays in the transformative capacity and the continuation of agri-food networks showed that a shared culture affects the development and continuation of these innovative networks (Hubeau et al., 2019). Networks with a shared, aligned interorganizational culture are more likely to persist. Hybrid types of culture have the highest potential to create change in the dominant “conventional” agri-food systems, thereby shifting the regime. Managing transitions means responding to external pressure to adapt to changes in the dominant societal culture. That makes the relationship between interorganizational culture and transitions relevant for future studies. In this study, the alignment of the actors’ organisational culture had a significant effect on the outcome. The alignment of organisational cultures can be both a strength and a weakness, because it can help

Table 1
Literature categorised for the relationship with culture, governance, collaboration and uncertainty.

Article or book title	Authors	Year	Relevance to Culture	Relevance to Governance	Relevance to Uncertainty	Relevance to collaboration	Relevance to Public transport
Risk and culture: an essay on the selection of technological and environmental dangers	Douglas, M	1983	subject of study	no	subject of study	no	no
Risk and blame: essays in cultural theory	Wildavsky, A Douglas, M	1992 (reprint 2002)	subject of study	no	subject of study	no	no
‘Set Adrift’: Fatalism as Organizational Culture at Canadian Seaports	Quigley, K Mills, B	2016	subject of study	subject of study	yes	yes	no
Sharing is caring: The role of culture in the transformative capacity and continuation of agri-food networks	Hubeau et al.	2019	Subject of study	Subject of study	subject of study	yes	no

achieve goals and ensure continued existence. But it can also hinder the adaptation to change. This is a relevant insight for public transport systems, which are also evolving over time in response to changing societal demand (Pel, 2022).

In summary, our findings suggest that recognising the cultural dynamics shaping organisational responses to uncertainty is essential for a deeper understanding of governance practices. Our findings also suggest that culture is not static. It is invented, consolidated, or developed when responding to impactful, unexpected events. These responses influence organisational development and may even affect the long-term viability of collaborating organisations. Organisational culture can constrain change and transitions or act as a driver for transformation.

4.2. Public transport, culture, and governance

Our literature search suggests that the relationship between public transport, governance and culture is understudied. The articles we found, summarised in Table 2 are in majority based on research in Sweden and/or linked to a research project into the culture of Swedish public transport systems (Hansson, 2013; Paulsson et al., 2016, 2017, 2018; Hrelja et al., 2018). We found a Swiss study (Wegelin and Von Arx, 2016) and a study comparing Amsterdam and Milan (Agostino et al., 2014). All the included studies are about the governance of public transport systems. The two studies by Paulsson et al. (2016, 2017) relate to the cultural aspects of governance and its influence on the behaviour of the actors involved. One study from Paulsson et al. (2018) and a conference paper from Dementiev and Alexandersson (2024) explicitly study the beliefs about collaboration of actors in public transport systems, they touch upon the relation with uncertainty, but not culture. Eight papers have limited or no relevance for the study of responses to uncertainty, only the conference paper from Dementiev and Alexandersson (2024) explicitly goes into this.

The study of alternative governance forms of regional public rail transport in Switzerland by Wegelin and von Arx (2016) claims that the existing governance of a public transport system can be changed by introducing competition as an alternative. This study focuses on the transaction costs associated with managing the system in Switzerland

and Germany. They argue that introducing the same model of competition that exists in Germany through the Verkehrsverbünde (regional transport associations) that organise tendering of railway concessions) into Swiss railway governance would be highly challenging and entail substantial one-time reform costs. Such a change would also amount to a radical cultural shift, requiring clear redefinition and redistribution of responsibilities to safeguard system services and prevent discrimination. Building up the knowledge to do this would take time. The parties in the Swiss public system would need this time to get used to the new governance and redefine their relationships. In Switzerland's current cooperative model, the existing informal, trusting culture of cooperation reduces transaction costs. Changing the governance, by introducing competition would very likely influence the culture of the public transport governance system, because all parties would have to redefine their relationships, values, priorities and goals.

Hansson (2013) studied the existence of different steering cultures, here defined as the values, norms, rules and actions that shape the way organisations that are working towards a joint result collaborate, in an empirical study about the procurement of public transport in Sweden. She identified different steering cultures found among councils, regional cooperation bodies, and municipalities, which make up the principals in the public transport system. The steering cultures between the principals and the agents (here the operators who bid to deliver services) are not the subject of this study. The different steering cultures came together in a procurement organised by a public transport authority, set up as a 'metagovernor'. The public transport authority designed the planning process and formulated a procurement that satisfied the principals (council, regional cooperation body and municipalities). The way this planning process was designed brought together parties with different steering cultures. The metagovernor formulated a procurement document that satisfied the principals. This procurement is seen as successful by the principals because it met high environmental and safety standards at a relatively low cost. The way in which the public transport authority took the culture of collaborating parties into account when planning for this process and formulating a procurement made the outcome possible, despite the hybrid of steering cultures present. This article shows that it adds value to understand organisational cultures

Table 2
Literature categorised for relationship with public transport, culture and governance.

Article or book title	Authors	Year	Relevance to Culture	Relevance to Governance	Relevance to Uncertainty	Relevance to collaboration	Relevance to Public transport
Workshop 2A report: Public transport governance via contracting, collaboration, and hybrid organizational arrangements	Dementiev, A Alexandersson, G	2024	no	subject of study	yes	subject of study	subject of study
How to create efficient public transport systems? A systematic review of critical problems and approaches for addressing the problems	Hrelja, R et al.	2020	yes	subject of study	limited	yes	subject of study
Collaboration in public transport planning – Why, how and what?	Paulsson, A et al.	2018	no	subject of study	limited	subject of study	subject of study
Partnerships between operators and public transport authorities. Working practices in relational contracting and collaborative partnerships	Hrelja, R et al.	2018	yes	subject of study	no	yes	Subject of study
One for all, or all for oneself? Governance cultures in regional public transport planning	Paulsson, A et al.	2017	subject of study	subject of study	no	yes	subject of study
The impact of alternative governance forms of regional public rail transport on transaction costs. Case evidence from Germany and Switzerland	Wegelin, P, Von Arx, W	2016	yes	subject of study	no	limited	subject of study
What Culture does to Regional Governance: Collaboration and Negotiation in Public Transport Planning in Two Swedish Regions	Paulsson, A et al.	2016	subject of study	subject of study	no	yes	subject of study
PMS development in local public transport: Comparing Milan and Amsterdam	Agostino, D et al.	2014	yes	yes	no	limited	Subject of study
Hybrid steering cultures in the governance of public transport: A successful way to meet demands?	Hansson, L	2013	yes	subject of study	no	yes	subject of study

and to use this knowledge to create desired (policy) outcomes.

Paulsson et al. (2016, 2017) explore how governance cultures shape public transport planning in Sweden, offering valuable insight into the role of culture in fragmented governance settings. In line with broader European trends, Swedish public transport responsibilities are distributed across multiple public and private actors, producing varied institutional settings. Their comparative case study of Västra Götaland and Stockholm reveals that even under a uniform legal framework, regional planning cultures diverge: Västra Götaland exhibits a collaborative culture, while Stockholm operates under a negotiation-oriented governance culture. These findings underscore how identical policy instruments acquire different meanings and effects depending on the regionally embedded culture. Further work from Paulsson et al. (2018) demonstrates the importance of collaboration as both a practical necessity and a cultural process. Across three studied regions in Sweden, actors consistently emphasised that effective public transport hinges on collaboration between authorities, operators, and municipalities. Collaboration in network-like arrangements at the level of civil servants can result in better understanding each other's values and underlying assumptions. As such, collaboration both requires and reinforces cultural alignment among participating organisations.

A study that explores the role and function of partnerships as a way of supporting well-functioning public transport networks and services in fragmented institutional settings, documents a culture change in public transport in regions in England and Sweden (Hrelja et al., 2018). The authors observed the prevailing perception that the current system is insufficiently focused on passenger needs, particularly in terms of a high-quality, integrated product, and that partnership working is necessary to deliver this. They observed a shift in public transport culture from a more production-oriented to a more customer/service-oriented one. Despite substantial differences in regulatory environments, the characteristics of effective partnerships appeared similar in both contexts. The observed cultural change, and the effectiveness of the partnerships more generally, depended on the development of trust between participating organisations, built through ongoing working relationships and collaborative practices. This paper demonstrates that governance culture and a shift in cultural focus can develop in parallel, despite different institutional settings.

A study by Agostino et al. (2014) examining the development of Performance Measurement Systems (PMS) in the local public transport sector in Milan and Amsterdam reveals the influence of governance culture in similar institutional settings. Both Amsterdam and Milan implemented the same EU-level guidelines, but their PMS development processes diverged significantly. PMS design and use are shaped by the local governance structures in which they are embedded. Cultural notions such as “masculine” and “feminine” national cultures (Hofstede et al., 2010) are used by the researchers to explain differences in governance approaches and, consequently, in PMS development. Both countries have complex, multi-layered governance systems. But, within this fragmented structure, Milan adopted a top-down PMS approach aimed at maximising formal compliance, while Amsterdam developed a PMS centred on dialogue and organisational learning. This Amsterdam approach aligns with the Dutch “feminine” culture and its tradition of horizontal governance. Milan's approach reflects the more hierarchical and “masculine” Italian governance culture (Agostino et al., 2014). This paper exhibits that governance culture can influence process design, use, and development of PMS, even when the institutional settings are alike.

A recent workshop paper by Dementiev and Alexandersson (2024) offers valuable insights into public transport governance via contracting, collaboration and hybrid organisational arrangements. Although this paper does not explicitly address culture, it highlights the dynamics of interaction between authorities, operators, and corporate actors, especially when contractual governance reaches its limits under uncertain conditions. In such cases, a need emerges for adaptive collaboration beyond formal agreements. The paper distinguishes between calculable risks and fundamental uncertainties, noting that the latter often require

coordination mechanisms based on trust and long-term relationships rather than strict contractual enforcement. In highly uncertain environments, even detailed contracts prove incomplete, leading to closer cooperation, renegotiation, and sometimes a meta-governance role for public transport authorities (Dementiev and Alexandersson, 2024). These insights underscore the importance of uncovering and understanding informal institutional dynamics rooted in culture, which shape how actors interpret uncertainty, interact, and assess which responses to uncertainty are feasible or legitimate.

A systematic literature review by Hrelja et al. (2020) highlights how the perceived difficulties in implementing measures for more efficient public transport are often institutional in nature. They rise from the design of the legislation and the organisation of public transport, leading to a complex governance setting involving numerous public and private actors. To implement new measures, organisations usually choose one of two approaches: adapting the organisation or increasing collaboration with others. Their study indicated that this second option was used the most. They aim for better results by overcoming the division of responsibilities and improve collaboration between themselves (Hrelja et al., 2020). A deeper understanding of informal institutional dynamics, rooted in culture, can be relevant for evaluating working practices and improving public transport.

In summary, these studies show that culture shapes how public transport governance systems function, though the limited number of included studies limits the generalizability of these findings. These studies demonstrate that collaboration, steering practices, and the interpretation and use of policy instruments are deeply influenced by shared norms, values, and attitudes among actors. They also confirm that this relationship is not studied extensively or in some cases at all. Where cultural aspects are addressed, they tend to appear indirectly, for example, in discussions of collaboration practices or differences in governance arrangements across countries. Together, these studies indicate that governance culture affects outcomes, the collaboration processes needed to achieve them, and the way similar or identical policy instruments are understood and applied across countries and regions. Collaboration functions both as a governance mechanism and as a culturally embedded practice. Incorporating cultural dimensions into the study of the governance of public transport systems can therefore help explain why actors in otherwise similar governance settings adopt different approaches, leading to different outcomes.

5. Discussion and the factors that influence the cultural layer of governance

Culture shapes collective behaviours and decision-making. Beliefs and values do not exist in a vacuum. They are influenced by contextual conditions and informal institutions and can change over time. The reviewed studies were analysed for recurring explanatory elements related to culture to identify factors that shape the cultural layer of governance. During our literature review, we examined how authors framed culture and the factors they attributed to cultural differences. These factors emerged inductively from recurring themes across the reviewed studies. Certain patterns appeared consistently enough to categorise them as a foundation for a framework of factors that shape the culture of a public transport system. These patterns were subsequently grouped into broader analytical categories that capture structural and relational influences on the governance culture. This inductive analysis of the literature resulted in the identification of six sensitising factors: geographical location, duration, external pressures, alignment of values and goals, and the amount of ‘regulation’ and ‘integration’, summarised in Table 3. We refer to these factors as sensitising because they are not mutually exclusive deterministic variables. Together, these factors form an exploratory framework that can provide a structured way to examine how governance cultures vary across contexts.

The first three factors capture **contextual conditions** that influence the cultural layer of governance. Several studies show that governance

Table 3
Sensitising factors that influence interorganizational culture.

Factor	Description	Influence on culture
1. Geographical Location	National or regional cultural context	Shapes underlying values and norms; introduces contextual variation
2. Duration	Time actors have shared a governance arrangement	Time builds a shared legacy and strengthens cultural cohesion
3. External Pressures	Legal changes, societal expectations and innovation	Forces cultural adaptation and reveals underlying assumptions
4. Alignment of values and goals	Compatibility of values and goals among actors	Affects goal coordination, trust, and conflict resolution mechanisms
5. Degree of Regulation	Extent of formal rules and institutional constraints ("grid")	Influences conformity, control, and behavioural expectations
6. Degree of Integration	Strength of inter-organisational cohesion and identity ("group")	Affects collaboration, communication norms, and collective response strategies

cultures differ among countries (Hofstede et al., 2010; Agostino et al., 2014; Wegelin and Von Arx, 2016; Hrelja et al., 2018) and regions (Paulsson et al., 2016, 2017). Similar governance and policy instruments can have different meanings and outcomes in different countries and regions. The **geographical location** of a governance system, therefore, shapes the broader cultural context in which actors operate. A second recurring theme is the **duration** of the actors' involvement in the same governance system. Studies indicate that the longer actors cooperate, the more likely shared norms and practices become institutionalised (Hubeau et al., 2019; Williams, 2022). Finally, **external pressures** that actors experience (due to, among others, innovations, changing policies and regulations, societal expectations) were identified as triggers for cultural adaptations and shifts in governance practices (Wegelin and Von Arx, 2016; Hrelja et al., 2018; Hubeau et al., 2019).

The remaining three factors capture **informal institutional arrangements**. Several studies highlight how the **misalignment between actors' values and goals and their steering cultures** can hinder the development of mutually beneficial solutions, and alignment can aid this development (Hansson, 2013; Hubeau et al., 2019). This is relevant because it influences the level of trust between the actors, the ease with which common goals are defined, and how the actors organise themselves. To further conceptualise these informal institutional dimensions of the cultural layer of governance, we draw on Douglas' **grid-group theory**. This influences how actors interpret uncertainty, allocate blame, and coordinate action, making grid-group theory a valuable tool for analysing governance cultures in complex technological systems, such as public transport (Douglas and Wildavsky, 1983; Douglas, 2002; Quigley and Mills, 2016).

We believe that incorporating these six sensitising factors in research on the governance of public transport systems and further exploring

them can increase understanding and comparability across different governance settings. But studying these factors is only useful when there is an understanding of the broader governance setting's culture. We aim to explore whether this can be achieved by systematically studying collective responses to unexpected events that create uncertainty, and by building a theoretical model that uses these responses as a proxy for revealing this often-invisible cultural layer. These six factors can then provide insight into why culture can lead to different behaviour and outcomes in similar formal governance settings.

Fig. 2 illustrates how contextual conditions and informal institutional arrangements together shape the cultural layer of governance in public transport systems. Governance culture is implicit; it becomes observable through collective responses to unexpected events that create uncertainty. Because culture is present on every level and is changeable, it is difficult for the researcher to grasp. But that should not be a reason not to try, because understanding culture can help explain contextual and institutional variances that are otherwise overlooked in the study of public transport systems.

6. Conclusions

Our findings demonstrate that the cultural layer of governance in public transport systems remains largely understudied. We argue that understanding culture is valuable for understanding variations in the functioning and outcomes of public transport governance. While governance in this field has typically been approached through economic and technical lenses, these perspectives overlook the cultural norms, values, and belief systems that fundamentally shape how actors behave, make decisions, and respond to uncertainty. The literature reviewed shows that culture matters for the outcomes of governance systems, even though it is rarely the explicit object of study. Literature conceptualises culture as the informal, collectively held cognitive and normative framework through which actors make sense of governance arrangements and enact them in practice. The literature studied suggests that collaboration, and the way it is enacted, functions simultaneously as a governance mechanism and a culturally embedded practice. Shared norms, trust, and expectations enable coordination in fragmented systems, reducing transaction costs and guiding joint effort. Even studies not explicitly focused on culture point to the importance of informal institutional dynamics, particularly under conditions of uncertainty where formal contracts and/or procedures prove insufficient (Dementiev and Alexandersson, 2024).

An understanding of culture broadens the scope of research on public transport systems. It can help explain the variance in governance practices and outcomes, which is now often attributed to factors such as personal preferences or leadership styles. We identified six sensitising factors that influence the cultural dimension of governance: geographical location, duration, external pressures, alignment of values and goals, and degrees of regulation and integration. Taking these factors

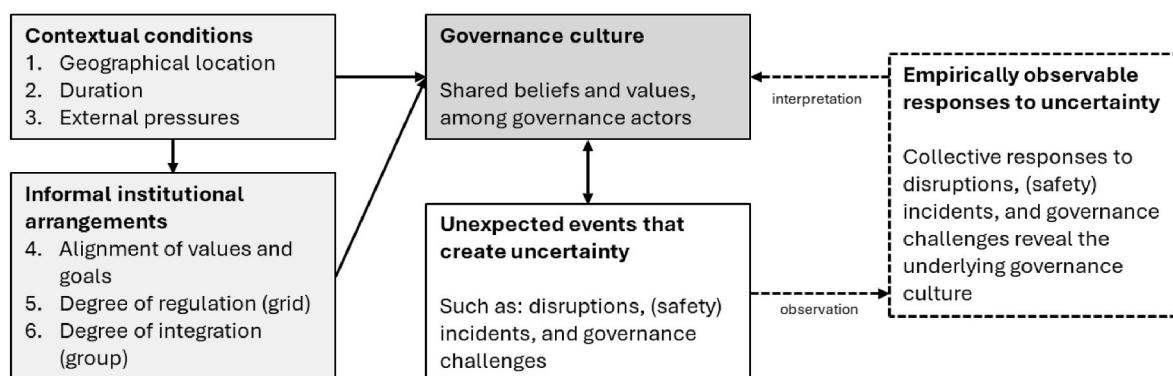


Fig. 2. Conceptual framework of six sensitising factors shaping the cultural layer of public transport governance.

into account when systematically studying the cultural layer of governance can increase comparability between different governance settings and provide a basis for future understanding of differences. Insights from literature point to the empirical observation of responses to uncertainty as a promising path to understanding culture. Uncertainty (for example, arising from regulatory change, performance pressures, or interorganizational friction) makes cultural norms, values, and attitudes visible, offering a practical entry point for a systematic analysis of interorganizational culture.

Consequently, this paper posits that the organisational culture that drives the behaviour of actors in a complex technological system, such as public transport, will manifest when those actors are forced to respond together to uncertainty. This is the case because the high level of uncertainty provides little external direction for a response, while external pressure excludes the option of not acting. The shared culture can be seen as the main driver of the direction of action, and the outcome as its manifestation. Obviously, this is highly likely to be not specific to public transport, but we developed the cultural perspective as it was brushed upon in governance literature on public transport.

Governance in public transport systems requires a continuous alignment between infrastructure managers, operators, regulators, and policymakers. This structural interdependence means that cultural elements such as trust, shared professional norms, and collaboration practices may play a more prominent role than in sectors where organisations operate more independently. Therefore, we expect that the cultural dynamics in public transport governance and other complex technological systems, such as water- and energy management, will deviate from those observed in sectors with weaker interdependencies or less technologically integrated operations. This implies that collective responses to uncertainty may provide a less meaningful proxy for understanding governance culture in sectors where organisational and technological interdependence are weaker.

Understanding governance culture is deeply underdeveloped in the broader governance literature on infrastructure-related sectors like transport and energy governance, on the edge between public and private. Obviously, cultural environments matter. The interaction between key stakeholders in these sectors is highly likely to be very different indeed in countries like South Africa or South Korea, China or India, Australia or Austria, Chile or Chad, even when technology and market mechanisms are quite similar. Still, much of the governance literature assumes a great deal of generalizability. The study of the governance of transport and energy, on this edge of public and private, requires a cultural anchoring in these diverse environments. Further research is relevant because governance culture not only influences the outcomes of legal, policy, and contractual changes. It also affects which governance and policy options are considered feasible or legitimate by actors, affirming the two-way relationship between culture and governance reform.

By introducing culture as a missing link in the study of the governance of complex technological systems, this exploratory review offers both theoretical and practical contributions. It introduces a new analytical dimension to public transport research and provides decision-makers with insights into how culture can affect the success or failure of policy and governance reforms. Uncovering the cultural assumptions that underpin governance practices can help develop more realistic and effective policy designs and explain variations in the outcomes of public transport reforms, even when formal structures appear similar.

CRedit authorship contribution statement

Marjolein Stamsnijder: Writing – review & editing, Writing – original draft. **Wijnand Veeneman:** Writing – review & editing, Methodology. **Didier van de Velde:** Writing – review & editing.

Data availability

No data was used for the research described in the article.

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