Garima Bhatnagar

Civic Tech on Wheels:
The Role of Community-Based Car-Sharing Cooperatives in Reimagining Urban Mobility

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Supervisor: Prof. Dr. Anu Masso
Co-Supervisor: Ms. Mergime Ibrahimi

Presented by: Garima Bhatnagar
Steinfurter Straße 9, Münster, Germany
48149

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“We don’t have to engage in grand, heroic actions to participate in the process of change. Small acts, when multiplied by millions of people, can transform the world.”

Howard Zinn

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Abbreviations

ICT	Information and Communication Technology
EV	Electric Vehicle
REScoop	Renewable Energy Sources Cooperative
P2P	Peer-to-Peer
NGO	Non-Governmental Organization
API	Application Programming Interface
GDPR	General Data Protection Regulation
UI	User Interface
UX	User Experience
IoT	Internet of Things
AI	Artificial Intelligence
GPS	Global Positioning System
MaaS	Mobility-as-a-Service
IT	Information Technology

Abstract

Urban mobility is at a crossroads as cities worldwide seek sustainable, inclusive alternatives to private car dependence. This thesis investigates how community-based car-sharing cooperatives can serve as civic tech infrastructure that reimagines urban mobility through democratic governance and digital innovation. It presents a comparative analysis of three cooperative car-sharing networks in Germany, Belgium, and the Netherlands, each an umbrella organization supporting local member cooperatives across Europe. Methodologically, the research is grounded in qualitative interviews with cooperative founders, network coordinators, and mobility experts, alongside a cross-country survey of cooperative car-share users. These data provide multi-level insights from the neighborhood car-share experience up to the platform and policy level.

The findings highlight that cooperative platform, owned and managed by citizens, marry technology with commons-based governance to deliver mobility services in ways that differ fundamentally from corporate "sharing economy" models. The cooperatives studied have developed shared digital platforms that enable communities to co-own and co-govern fleets of vehicles. This structure empowers local stakeholders and prioritizes social value over profit. However, the research also identifies challenges, from scaling up operations to interfacing with public transit and municipal policies, that these cooperatives face as they grow. By comparing three distinct national cases, the thesis demonstrates both the versatility of the cooperative model and the context-specific factors influencing their success. Ultimately, the thesis contributes new understanding of participatory mobility innovation: it shows how community-led digital platforms can operate as public-oriented infrastructure, balancing local empowerment with the efficiencies of technology. In doing so, it offers practical and theoretical insights for urban planners, technologists, members and leaders seeking to foster more equitable and sustainable mobility systems.

1 Driving Change from the Ground Up

Cities today aren't just trying to understand how to move people, they're also asking who gets to decide how we move, what tools we use to get there, and who owns those tools in the first place. Beneath the buzzwords of "smart mobility" and "green transition" lies a quieter, slower approach: local communities building their own independent systems of movement collectively, and it is growing by the day.

Urban mobility is undergoing a critical transformation, accelerated by overlapping demands for sustainability, inclusion, and digital innovation. While sustainable mobility remains a pressing issue, especially in light of global climate targets such as the EU Green Deal and the Paris Agreement (European Commission, 2023) so does the question of how mobility systems are governed, and who gets to shape them (Banister, 2008; Gössling, 2018). Traffic congestion, ambitious climate commitments, and growing accessibility gaps are pushing cities to explore alternatives that are not merely efficient, but democratic, resilient, and participatory.

However, despite the surge in alternative mobility models, most research continues to focus on top-down smart mobility innovations led by public-private partnerships or large-scale platform economies like Uber and BlaBlaCar (Shaheen & Cohen, 2020; Jittrapirom et al., 2017). These approaches dominate the conversation, leaving a significant gap in the literature when it comes to models that emerge from the ground up. While shared mobility is widely discussed in terms of efficiency and emissions reduction, and civic tech often framed in the context of state-citizen interaction through tools like budgeting platforms or transparency apps, far fewer studies examine the intersection, where technology, democratic governance, and shared infrastructure converge in citizen-led systems of movement (Bauwens & Kostakis, 2014; Gurstein, 2011).

A growing number of scholars describe this intersection as "civic tech infrastructure": essentially described as public-facing systems that use digital tools not just for service delivery, but for co-governance and collective agency (Sheller, 2018; Goldsmith & Crawford, 2014). This thesis explores that very intersection through the lens of a specific, underexplored model; *community-based car-sharing cooperatives.*

Community-based car-sharing cooperatives refer to member-led initiatives in which a group of people collectively manage and access a shared fleet of vehicles, typically coordinated through a digital platform or scheduling system. Unlike commercial rental services, these cooperatives emphasize joint ownership, often emerging from grassroots contexts such as neighborhood clubs or local associations (Nobis, 2006; Katzev, 2003). Vehicles are not only shared but also co-managed, with responsibilities like maintenance,

fueling, and cleaning distributed among members. As Hartl and Hofmann (2022) note, this creates a commons-like dynamic grounded in trust, reciprocity, and collective accountability. These models are not simply about providing access to cars, but about building participatory governance over a vital urban resource. They challenge conventional roles of consumer and provider, inviting citizens to be co-creators of their mobility systems, investing their time, care, and decision-making energy into the service itself (Foth, 2017; Finn, 2020).

In the mobility domain, cooperative car-sharing models contest the dominant assumption that urban transport must be either privately owned or state-controlled. These initiatives reflect the principles of civic tech by enabling participatory access, management, and governance through modern digital platforms (Shayamunda & Bhanye, 2025). At the same time, they operate as infrastructure: long-lasting, scalable systems capable of integration and replication across diverse urban contexts.

This thesis positions community car-sharing cooperatives as a third model of urban mobility, alongside the conventional state-led public transport systems and market-driven mobility services like ride-hailing apps (Shaheen & Cohen, 2020; Jittrapirom et al., 2017). Through their hybrid structure, they blend technological infrastructure with cooperative governance and civic engagement. This research investigates the implications of civic technology that is not engineered from the top down, but instead designed, operated, and governed by the very communities it aims to serve. The question is made urgent by the increase in centralized mobility platforms and "smart city" technologies that often reinforce surveillance, data extraction, and inequity (Kitchin, 2015; Shelton et al., 2015). In contrast, umbrella cooperatives such as those studied in this thesis exemplify bottom-up digital infrastructures, owned and operated by those who use them.

The central research question guiding this thesis is:

How do community-based car-sharing cooperatives function as civic tech infrastructure, and in what ways do they contribute to reimagining more inclusive and sustainable forms of urban mobility?

To unpack this main question, two sub-research questions are posed:

1. What governance models and participation mechanisms define community-based car-sharing cooperatives, and how do they reflect or challenge conventional public mobility systems?

2. What kinds of innovation, technical, organizational, or civic, do community-based car-sharing models embody, and what factors shape their potential for scaling or replication across contexts?

These research questions were developed in close dialogue with the literature review, which mapped existing conversations across civic technology, commons governance, and platform cooperativism. The gaps and tensions identified there, particularly around participation, infrastructure, and scale, shaped the conceptual framing of this study and helped define its analytic focus.

Despite growing interest in public infrastructure alternatives, cooperatives remain underrepresented in both urban mobility and civic tech literature. Most studies focus on state-led or private-sector innovations (Jittrapirom et al., 2017; Shaheen & Cohen, 2020), missing its relevance to urban services. This thesis aims to fill that gap by synthesizing perspectives from civic tech, urban mobility, and cooperative governance. It contends that these initiatives can offer scalable, policy-relevant lessons for building digital public infrastructure that is inclusive, accountable, and collectively owned.

To explore this, the study investigates not only how these cooperatives operate, but also what strengths they bring, what challenges they face, and what potential they hold for future scaling. Focusing on three umbrella cooperatives, based in Belgium, Germany, and the Netherlands, this research offers a multi-scalar view of cooperative digital infrastructure and governance. In addition to mapping different operational models and user dynamics, this thesis frames community-based car-sharing cooperatives as civic infrastructures, systems that embed collective governance, public values, and community participation into everyday mobility. Drawing from civic tech theory and commons-based governance, it offers policy-relevant insights on how such cooperatives can be meaningfully supported, scaled, and sustained within public infrastructure planning and mobility design.

The empirical foundation is built through a multi-case, mixed-method approach across these three national contexts. Data collection included semi-structured interviews with cooperative founders, network organizers, policymakers, mobility experts, and end-users. Structured user surveys and document analysis of cooperative charters complemented these interviews. Additionally, the study developed evidence-based user personas to better understand the diverse needs, motivations, and behaviors of end-users, a design and analysis method commonly used in user-centered policy planning (Pruitt & Grudin, 2003).

This thesis treats mobility not as a product or a privilege, but as a commons: a system that is co-created, co-maintained, and co-governed by those who rely on it. Drawing on Elinor Ostrom's theory of commons governance (Ostrom, 1990) and updated through the lens of civic tech and cooperative digital governance models (Bauwens & Kostakis, 2014; Scholz, 2016), it also aligns with mobility justice frameworks that emphasize not just access, but participation and control (Sheller, 2018; Martens, 2017).

The thesis proceeds as follows: Chapter 2 presents the theoretical framework and literature review, introducing the main conceptual building blocks that guide the analysis. Chapter 3 outlines the problem setting, identifying key gaps in governance, participation, and mobility systems. Chapter 4 describes the methodology, including the multi-case design, data collection tools, and analytical approach. Chapter 5 presents the case studies, detailing the histories, structures, and innovations of the cooperatives studied. Chapter 6 introduces evidence-based user personas derived from survey data and interviews. Chapter 7 presents the results of the research, structured around key themes in governance, participation, and digital systems. Chapter 8 engages in discussion and comparative analysis, highlighting implications, challenges, and contributions. Chapter 9 concludes the thesis with a synthesis of insights and policy recommendations, and suggests directions for future research.

2 Theory

This chapter brings together an interdisciplinary body of literature and theoretical work to ground the thesis both conceptually and empirically. It explores how community-based car-sharing cooperatives function as civic tech infrastructure and what that means for the future of inclusive and sustainable urban mobility. Because the topic cuts across public sector innovation, cooperative governance, digital infrastructure, and mobility transitions, no single disciplinary lens was deemed sufficient by the researcher. Instead, this chapter builds an analytical foundation through six thematic clusters and four interlinked theoretical frameworks, each selected to reflect both the empirical complexity and normative aspirations of this study.

The literature review component follows a structured, transparent process to ensure rigor and replicability, particularly important in interdisciplinary research (Tranfield et al., 2003; Petticrew & Roberts, 2006). A systematic search was conducted across academic databases such as Google Scholar, JSTOR, Web of Science, and Limo Libis using Boolean search strings that combined keywords like "community car-sharing," "platform cooperativism," "urban mobility innovation," "civic tech infrastructure," and "mobility justice." Studies were included if they were published between 2010 and 2024 in peer-reviewed journals or reputable policy platforms and dealt with themes like cooperative digital infrastructure, sustainable transport, or participatory governance. Foundational works by scholars such as Elinor Ostrom and Trebor Scholz were retained to provide theoretical continuity and depth.

The initial search yielded around 210 sources, which were narrowed down to 43 after applying exclusion criteria. Zotero was used to manage citations, annotate texts, and identify patterns in methodology, findings, and gaps. The reviewed literature is organized across six thematic areas:
(1) urban mobility and the shifting infrastructure paradigm,
(2) platform cooperativism as a digital governance alternative,
(3) civic tech and participatory infrastructure,
(4) commons theory and value-centered governance,
(5) participatory governance in mobility contexts, and
(6) gaps and opportunities in the existing literature, that is discussed in the next section

These themes are not just descriptive categories, they also serve as a conceptual bridge to the theoretical frameworks underpinning the thesis. The theoretical section draws on four key lenses: **civic tech infrastructure, platform cooperativism, commons theory**, and **participatory governance**. Each offers a way to make sense of how the cooperatives

studied here function, not only in terms of what they do, but how they reimagine ownership, governance, and public value.

Crucially, these are not just abstract ideas existing only in academia. They are brought to life in the operational logic of the cooperatives themselves, whether through shared software and ownership (as in Belgium), everyday democratic practices (as in the Netherlands), or federated governance and networked scaling (as in Germany). The frameworks help interpret these real-world configurations and assess their potential for replication, their limitations, and their broader relevance for digital public infrastructure.

The selected theories also mirror the values embedded in the research questions, participation, sustainability, equity, and collective agency. In a time when cities are grappling with the dual crises of ecological breakdown and social fragmentation, these cooperatives point toward a new governance logic, that is not only more inclusive but also more adaptable, ethical, and rooted in the public good.

2.1 Urban Mobility and Shared Infrastructure

As mentioned in the Introduction, Urban mobility has undergone a paradigm shift in the 21st century, driven by technological innovation, demographic changes, and environmental imperatives. Cities around the world are moving away from car-centric planning models toward more integrated, multimodal, and sustainable systems (Banister, 2008; Cervero, 2013). This transformation is not just about adding new modes of transport, it reflects a rethinking of the purpose, accessibility, and governance of mobility itself. At the crux of this evolution is the growing realisation that mobility doesn't have to limit itself in being just a service, it can also be a form of infrastructural citizenship, something that enables or constrains one's ability to participate fully in urban life (Sheller, 2018).

While traditional transportation systems have been largely designed through top-down public planning or commercial service provision, recent years have witnessed a surge in decentralized, citizen-oriented models that blend sustainability, digitalization, and democratic values. These include bike-sharing schemes, demand-responsive transit, and most relevantly, community-based car-sharing cooperatives. The rise of Mobility-as-a-Service (MaaS) platforms has further highlighted the importance of interoperability and user-centric design in shaping new mobility ecosystems (de Souza et al., 2019; Jittrapirom et al., 2017). These shifts suggest a broader systemic transformation, one that repositions mobility not only as a technical domain but as a socio-political space where questions of justice, equity, and governance are negotiated.

The challenge of climate change has also been a major driver for mobility innovation. With transportation accounting for nearly a quarter of global CO_2 emissions, cities are under pressure to transition toward low-emission alternatives (IEA, 2022). This has led to increased investment in electric mobility, active transport infrastructure, and smart mobility technologies. However, critics argue that many of these responses remain technocratic in nature, emphasizing efficiency and innovation without sufficiently addressing questions of access, equity, or democratic control (Gössling, 2018; Kitchin, 2015). The risk is that so-called "smart" mobility can reproduce or even exacerbate existing inequalities if not intentionally designed to be inclusive. Researchers and transport economists like Martinez, Pritchard & Christ (2024) have also written extensively about shared mobility (car-share, ride-share, etc) reducing vehicle use and emissions, contingent on its seamless integration with public transit, and if vehicle occupancy is maximized. However, it is important to recognize this has its pitfalls, Yates et al. (2021) finds that the environmental benefits from shared mobility are highly sensitive to local context and usage patterns. It was also noted in the same study that car-sharing can reduce private car ownership and emissions in some cities, but in others, the effect is negligible, so it is rather context dependent.

Scholars such as Martens (2017) and Sheller (2018) have introduced the framework of mobility justice to address these concerns. This framework extends beyond spatial accessibility to include procedural justice, who gets to participate in the decision-making processes that shape urban mobility systems. It draws attention to the structural and political dimensions of how mobility is organized and distributed, and it urges planners and policymakers to consider the wider implications of infrastructure design. However, much of this literature remains focused on evaluating state-driven systems or large-scale market platforms, with little attention to cooperative or community-led alternatives. As found by Clewlow & Mishra (2017), it was proven that ride-hailing services like Uber largely increased vehicle-miles travelled, and that 49-61% of ride-hailing trips would have otherwise been by transit, biking or walking. This does help view mobility innovation as the double-edged sword it has been, it can also undermine public transportation and sustainability.

This is where community car-sharing cooperatives offer a compelling counter-narrative. These models prioritize shared ownership, democratic governance, and ecological responsibility, values often missing in commercial car-sharing systems. Their innovation lies not only in their digital tools (e.g., booking apps, fleet management systems), but also in their socio-organizational structures. They represent a form of bottom-up mobility infrastructure that integrates technological efficiency with local control and civic participation (Bauwens & Kostakis, 2014; Scholz, 2016).

Moreover, the rise of cooperative mobility models challenges the dichotomy between public and private transport. Rather than operating under state control or corporate management, these initiatives function as commons-based infrastructures. They are embedded in communities, governed by members, and often supported by umbrella organizations that provide technological and administrative backbone (Schol et al., 2016). As such, they offer an opportunity to reimagine urban mobility as a shared public resource, one that is not only environmentally sustainable but also socially inclusive and democratically accountable. The high-level EU policy report (2021) also highlights the 'mobility divide' and calls out the clear need for more overarching inclusive governance models, and better data-sharing for mobility planning.

Yet, despite their promise, community car-sharing cooperatives remain marginal in policy discourses and underrepresented in academic research. Most literature on urban mobility innovation continues to focus on high-tech, centralized models, autonomous vehicles, AI-powered traffic systems, or private MaaS providers. This thesis aims to fill this gap by placing cooperative mobility at the center of inquiry, evaluating its potential to serve as both a civic and digital infrastructure in the context of evolving urban challenges.

2.2 Platform Cooperativism

While *platform cooperativism* is often rooted in social movements and digital labor activism (Scholz, 2016), this thesis does not adopt it as its central anchor. Instead, it draws selectively on its principles, such as collective digital governance, co-ownership, and value redistribution, as one among several relevant frames for understanding community-based mobility platforms. The concept, coined by Scholz (2016), refers to digital platforms that are owned and governed by the people who rely on them, workers, users, or community members, offering an alternative to traditional platform models like Uber or Airbnb that extract value from local ecosystems. Rather than positioning the cooperatives in this study as part of an activist tradition, this section uses platform cooperativism to highlight how their governance structures and digital infrastructures resonate with cooperative values described in that literature. As such, it serves as a useful theoretical bridge alongside civic tech, commons theory, and participatory infrastructure in analyzing the governance and potential of cooperative urban mobility systems.

At the heart of platform cooperativism is the idea of democratic ownership. Instead of investors, it is the users, workers, or members of a community who own and govern the platform. This structure isn't merely symbolic, it shapes everything from how data is handled to how revenues are distributed and how strategic decisions are made (Scholz & Schneider, 2017). In this sense, platform co-ops become not just technical systems, but political ones. They challenge the norms of platform capitalism by embedding solidarity into digital architecture. The rise of platform cooperativism has been catalyzed by

growing concerns around the gig economy, algorithmic management, and the erosion of labor protections. Scholars and activists argue that platform capitalism often exacerbates precarity by decoupling responsibility from service provision and minimizing worker agency (Srnicek, 2017; Morozov, 2019). In contrast, platform co-ops aim to offer not just a technical alternative but a structural one, redefining how digital infrastructure is designed, managed, and owned.

While the movement initially gained traction in the context of labor platforms, such as worker-owned delivery or freelance services, its principles have since been applied to other domains including media, housing, and mobility. In the realm of urban mobility, platform cooperativism presents a way to combine the operational efficiency of digital tools with the ethical and social commitments of cooperative organizing. While co-ops face steep challenges scaling up, they can "engender change from the margins" (Atanasova et al., 2025) by helping decentralize markets, further increase the bottom-up approach, and help influence the industry by serving niche demands for ethical services.It allows for flexible, localized, and responsive mobility systems that are not extractive but regenerative, economically, socially, and ecologically (Bauwens & Kostakis, 2014; Pazaitis et al., 2017).

In the mobility sector, this approach holds particular promise. Car-sharing and ride-sharing apps are often celebrated for their efficiency, but they are also infamous for exploitative labor practices and opaque governance structures. By contrast, community-based car-sharing cooperatives operate under a platform cooperative logic, where technology is used to empower, rather than disempower, the people it connects. Many of these initiatives, such as Coop A in Belgium or Coop B in Germany, operate using shared digital infrastructure to manage bookings, fleet usage, and member communication. Its software is developed collectively and is made available to dozens of local co-ops across Europe, enabling coordination without centralizing control.

As OECD (2023) points out in their policy report, the platform co-ops "operate from the grassroots" with long-term vision and reinvest in local communities. They also help mitigate the negative effects of gig work by offering better labor conditions, and keeping profits local. The difference lies in who owns and governs these platforms: instead of being built for profit-maximization, they are designed to meet community needs and prioritize democratic control (Schor et al., 2016). What makes platform cooperativism particularly relevant for this research is its compatibility with the principles of the commons. In many ways, it operationalizes commons theory for the digital age, that we talk about later in this section. Rather than treating users as consumers, platform co-ops treat them as co-creators and stewards of shared infrastructure (Bauwens & Kostakis,

2014). This not only improves trust and transparency, but also creates more resilient systems, ones that are rooted in collective responsibility rather than market-driven growth imperatives.

Despite the growing interest, platform cooperativism still faces numerous challenges. These include issues of technical capacity, financial sustainability, and visibility in a marketplace dominated by venture-funded competitors. Yet, its significance lies in the fact that it proposes not just an app or service, but an entirely different socio-technical paradigm. It asks who controls the means of digital production, and to what ends. In doing so, it contributes directly to debates around digital sovereignty, public digital infrastructure, and the re-democratization of the internet (Morozov, 2019; Scholz, 2016).

For this thesis, platform cooperativism does provide a key theoretical and empirical touchpoint. It links the governance models of community car-sharing cooperatives to a broader political economy of digital infrastructure, one that values equity, inclusion, and long-term sustainability. Through this lens, cooperatives are not only mobility actors but also digital institutions with the power to shape civic participation and infrastructural citizenship in the digital age. Additionally, platform cooperativism helps make visible the often-hidden labor and knowledge embedded in urban mobility systems. Maintenance work, route optimization, and community organizing are not outsourced or devalued; they are brought into the center of platform operations. In this way, value creation becomes more transparent, and labor is recognized not as a cost to be minimized but as a core input into a thriving mobility commons (Restakis, 2010).

Lastly, the relational nature of platform cooperatives makes them particularly well-suited to cities facing complex social transitions. As urban areas attempt to grapple with climate change, inequality, and mobility justice, cooperative platforms offer a scaffold for participatory experimentation. They can be spaces where technological and social innovation co-evolve, not through top-down smart city logics, but through bottom-up civic ingenuity.

2.3 Civic Tech and Participatory Digital Governance

Civic technology (or civic tech) refers to digital tools and platforms that enable greater public participation, accountability, and transparency in governance and community life. Like Bhanye & Shayamunda (2025) describes Civic Tech as the “range of digital tools/platforms” that help enable transparency, participation, while leveraging technology. It encompasses a wide range of innovations, from open data portals and participatory budgeting apps to citizen feedback systems and digitally-mediated public

services. At its core, civic tech is about empowering people to co-create, co-govern, and co-maintain public value using digital means (Goldsmith & Crawford, 2014; Bria, 2015).

Civic tech gained traction in the early 2010s through the work of civic hackers, open government advocates, and urban technologists who sought to make governments more responsive and data-driven. However, recent years have seen the concept evolve beyond service optimization to include democratic infrastructure, digital tools that support deliberation, equity, and public co-ownership (Eaves & McGuire, 2020). This more expansive vision links civic tech to social innovation, cooperative governance, and urban resilience. Peixoto & Sifry (2017) in their paper review dozens of civic tech platforms worldwide, and found the most successful cases to combine technology with offline community organizing and supportive policy. An important takeaway implied was that the tools alone cannot create engagement in siloes; fostering trust and user buy-in goes hand-in-hand.

Parallel to this, the concept of public digital infreastructure has emerged in response to the increasing privatization of core digital services. Scholars and institutions like the United Nations and European Commission have begun emphasizing the need for digital infrastructures that are open, inclusive, interoperable, and governed in the public interest (UNDP, 2021; EU Commission, 2022). This includes not only platforms and protocols, but also the institutional arrangements, governance frameworks, and social norms that underpin their use and evolution. The integration of civic tech and public digital infrastructure is especially relevant for mobility systems, which are increasingly shaped by digital interfaces, like trip-planning apps, payment platforms, data analytics tools, etc. Another important trend that was highlighted in the paper by Peixoto & Sifry (2017) was cities opening their data and APIs to enable third-party mobility apps like route checkers/trackers,etc. In many cities, these tools are controlled by private actors, raising concerns about data sovereignty, exclusion, and extractive business models. Civic-oriented alternatives, such as those developed by community mobility cooperatives, offer a different approach. They design and manage digital infrastructure to be transparent, participatory, and anchored in community values.

Each of the case studies in this research reflects civic tech in action. Coop A’s shared infrastructure enables smaller cooperatives across Europe to operate efficiently while keeping decisions local. Coop C in the Netherlands showcases grassroots organization, neighbors sharing cars, costs, and responsibilities. Coop B, in Germany, representing a structured umbrella model that combines operational rigor with community orientation.

Within this framing, community-based car-sharing cooperatives can be understood as civic tech infrastructure. They use digital tools not just for efficiency, but to enable new

forms of local governance, social accountability, and infrastructural stewardship. These aren't just green alternatives to car ownership. They are working models of how people can come together, use digital tools, and run public services differently, with transparency, trust, and mutual accountability (Schrock, 2018). Kluge et al (2024) found that citizens are more willing to engage when they perceive tangible impact on policy, when the process is user-friendly, and when they trust the organizers. The digital platforms they build are not neutral, they embed and operationalize cooperative principles such as user control, democratic participation, and long-term sustainability (Schor et al., 2016; Bauwens et al., 2019).

That said, civic tech is not immune to co-optation. Scholars have pointed out that governments or corporations often adopt the language of participation without redistributing any real power (Milan & Treré, 2019). These cooperatives, by contrast, build power from the bottom up. Their technical systems reflect their values. That is what makes them so relevant for this research.

Understanding car-sharing cooperatives as civic tech infrastructure allows this thesis to explore not just whether they are successful or scalable, but whether they are shifting the narrative on what public service innovation looks like. It reframes mobility as a collective, participatory act rather than a transactional service. And in doing so, it points us toward a different future for cities, built not just on efficiency, but on care, community, and shared control.

In recent years, civic tech has also become a space for rethinking how infrastructure itself is defined. Traditionally, infrastructure has been viewed as physical like roads, bridges, cables. But scholars like Mattern (2015) and Crawford (2016) argue that infrastructure is also social and informational. It includes the systems we rely on to coordinate, to care, to decide. In this broader sense, civic tech projects, especially those that are cooperatively owned and governed, become a kind of 'sociotechnical commons' not only useful but meaningful, embodying values and norms that shape public life.

Car-sharing cooperatives, then, are not just logistics platforms. They are community governance infrastructures, tools for managing not just mobility, but trust, responsibility, and shared risk. They require people to make decisions collectively: about pricing, about vehicle maintenance, about scaling. And they do this while embedding technological systems that automate operations, facilitate transparency, and allow decentralized control.

A useful comparison here might be the distinction between 'technology for governance' and 'governance of technology'. Many public sector tech projects use technology to improve existing governance mechanisms, e.g., digital ID systems or city dashboards.

But civic tech infrastructure, especially when driven by communities, flips this: the technology itself is governed by the people who use it. This inversion is particularly visible in car-sharing cooperatives, where platform rules are co-written by users, and usage patterns inform feature design and service distribution.

Moreover, by positioning mobility platforms as civic tech, we can better understand the political nature of movement. Mobility is not just about getting from point A to point B, it is about who gets to move, under what conditions, and with what agency. In many cities, private transport remains the domain of the affluent, while public systems are underfunded and rigid. Civic mobility systems, like these co-ops, attempt to fill the gaps with values-first infrastructure: adaptive, responsive, and mutually accountable.

The design of digital infrastructure in these cooperatives is also telling. Coop A's software stack is open-source and collectively maintained. This not only reduces costs but creates a technical commons that others can build upon. Similarly, Coop C's minimal-tech model reflects a philosophy of keeping things simple and locally adaptable, a digital lightness that avoids overengineering. These examples reinforce the idea that civic tech isn't about flashy interfaces, it's about the values coded into the architecture.

Finally, the civic nature of these cooperatives is also shaped by how they understand 'scale'. Unlike corporate startups that seek exponential growth and market domination, civic tech initiatives often pursue modularity and replicability. They don't aim to scale up, but to scale out, to be adopted by more communities in context-sensitive ways (Manzini, 2015). The cases in this thesis reflect this logic: Coop A supports local co-ops rather than replacing them; Coop C empowers neighborhoods rather than expanding into markets; and Coop B's network enables federated governance without monopolization. Moreover, these platforms operate as public digital infrastructures to the extent that they prioritize public value creation over profit extraction. In this sense, they challenge the dominance of proprietary mobility solutions and offer a test case for how digital infrastructure can be collectively designed and governed. This thesis positions such cooperatives as part of a broader movement toward civic-oriented infrastructure, where the digital meets the democratic to support more inclusive and resilient urban futures.

2.4 Commons Theory and Shared Governance

Commons theory offers a powerful lens for analyzing how communities manage shared resources, especially in contexts where neither market nor state models fully suffice. Originating from the work of Elinor Ostrom (1990), the concept challenges the long-standing belief that common-pool resources are destined for overuse and degradation without external regulation. Instead, Ostrom's research demonstrated that communities

can, and do, develop sophisticated, self-organized systems to govern shared assets. These systems are built on principles of trust, mutual monitoring, collective decision-making, and locally crafted rules.

In recent years, commons theory has extended beyond traditional environmental domains like fisheries or forests to encompass digital and urban commons. Uchiyama (2025) has also introduced ‘cosmolocalism’, a framework where shared digital resources (global commons) are combined with local production/management. In the paper, Uchiyama uses ridesharing as a case study to show how open-source software and data commons can enable local cooperatives to challenge Uber-like incumbents. Scholars such as Bollier and Helfrich (2015) and Bauwens et al. (2019) have advanced the notion of the “urban commons”, spaces, tools, and infrastructures co-produced and co-managed by communities. This shift reflects a broader desire to reclaim urban and digital resources from both market extraction and bureaucratic control. In this framing, commons are not just goods, they are processes and institutions of co-governance.

Community-based mobility systems fit well into this broader notion of the commons. By offering shared access to transportation assets, vehicles, software, parking, and maintenance infrastructure, these systems challenge the individual ownership model that has long dominated urban mobility. Car-sharing cooperatives, in particular, provide a compelling model of commons-based governance. This becomes particularly visible when looking at umberella structures like Coop A, Coop B or Coop C. These aren’t just platforms, they’re meta-commons, enabling smaller, local cooperatives to plug into shared infrastructure, digital systems, and legal frameworks, while still maintaining their autonomy. What Ostrom (2005) calls 'nested enterprises' is playing out in real time here, where governance is layered and responsibility is shared across scales.

Their users are also their members, who collectively make decisions about service models, pricing, fleet growth, and investment. This form of organization transforms mobility from a transactional service into a participatory infrastructure, inviting citizens to become co-stewards of the systems they rely on.

A key contribution of commons theory to this thesis lies in its emphasis on governance diversity. Rather than advocating a one-size-fits-all approach, Ostrom’s Institutional Analysis and Development (IAD) framework encourages the study of governance arrangements that are contextual, adaptive, and polycentric (Ostrom, 2005). This is especially relevant for cooperative mobility, where models vary from hyper-local, volunteer-run operations to larger umbrella platforms that provide technical and administrative support. Commons theory helps explain how these diverse systems are able to maintain coherence and accountability even without centralized control.

Furthermore, the literature on the digital commons provides additional insight into how governance principles apply to platform-based systems. Authors like Benkler (2006) and Scholz (2016) argue that online platforms can operate as commons when designed to support peer production, transparency, and modularity. This intersects with the civic tech and platform cooperativism discourses, positioning mobility platforms not just as technical systems but as institutional arrangements capable of sustaining participatory governance. Such platforms must balance openness with accountability, flexibility with rules, and innovation with long-term stewardship, traits commonly explored in commons-based frameworks.

Critically, commons theory also introduces the idea of value plurality. In cooperative mobility, value is not generated through pricing optimization or market expansion, but through the collective well-being of members, environmental sustainability, and social cohesion. This is a radical departure from extractive models of platform capitalism, where data, time, and labor are monetized in service of shareholder profit. Commons-based models instead create what Bauwens (2016) calls “cosmo-local production”—local communities building and using shared resources, supported by global knowledge and infrastructure networks.

Despite its strengths, the commons literature is not without critique. Some scholars note that many empirical cases of commons governance remain relatively small in scale and face difficulties in sustaining engagement over time (Harvey, 2012). Others question the scalability of such models in highly fragmented urban environments. Still, these critiques do not undermine the relevance of the commons as an analytical tool. Instead, they point to the need for hybrid models, such as federated cooperatives or platform-supported commons, That combine local accountability with shared infrastructure and broader institutional support.

In this thesis, commons theory serves as both a descriptive and normative framework. It describes how car-sharing cooperatives function in practice, through participatory decision-making, shared resource management, and collective accountability. At the same time, it offers normative metrics for evaluating these systems: Do they democratize access? Do they support long-term ecological sustainability? Do they create space for genuine civic participation? By applying these benchmarks, the research aims to highlight both the transformative potential and the operational challenges of cooperative urban mobility as a form of commons-based infrastructure.

What this also implies is that we cannot study the commons without studying the cultures that sustain it. The cooperative ethos, mutual support, slow growth, reinvestment, sits in sharp contrast to the speed and scale of venture-backed models. And this is often invisible

in the policy literature around urban mobility. In reframing car-sharing not just as a market alternative, but as a form of participatory infrastructure, we expand the vocabulary of what counts as innovation in urban policy. There is also increasing urgency to this reframing. As cities contend with overlapping climate, affordability, and equity crises, the ability of citizens to shape the systems they rely on is no longer a 'nice to have' it's fundamental. Commons theory offers the tools to theorize and support such efforts. It aligns closely with democratic innovation models, but emphasizes more localized and sustained governance, often with hybrid forms of membership, leadership, and funding.

In conclusion, commons theory allows us to read these cooperatives as more than isolated transport experiments. It situates them in a broader effort to reclaim the governance of essential infrastructure, from energy to housing to mobility. For urban mobility to be sustainable, it must be democratically governed, socially embedded, and collectively shaped. Community car-sharing co-ops, in this sense, are rewriting the blueprint.

2.5 Community-Based Mobility Models

Community-based car-sharing cooperatives are typically member-driven initiatives where a group of people share access to one or more vehicles, jointly owning or managing the fleet. Building on established definitions (Nobis, 2006; Katzev, 2003), car sharing can be defined as a service enabling a group of users to collectively access a fleet of vehicles on a short-term, as-needed basis.

In cooperative models, the vehicles are owned by the members or the co-op rather than a corporation, and usage is organized through a sharing platform or schedule. These co-ops often arise at the grassroots level, for example, a small neighborhood car-share club. and emphasize community benefit over profit. Hartl and Hofmann (2022) describe community car-sharing as a commons-like arrangement where individuals benefit from car access without full ownership responsibilities. Importantly, such arrangements rely on trust and mutual responsibility: all members are expected to contribute to the care of the shared car (e.g. refueling, cleaning, maintenance) and use it considerately, which distinguishes true community sharing from purely commercial car rental models (Hartl & Hofmann, 2022). In sum, a community car-sharing cooperative is not just an access service, but a form of collective ownership and management of a mobility resource. Participatory mobility models represent a growing shift in how mobility services are designed, governed, and experienced. Unlike top-down infrastructure planning or market-driven platforms, these models embed users directly into the governance, maintenance, and innovation of transport systems. They challenge the binary of 'provider' and 'consumer' by allowing citizens to act as co-creators, investors, and decision-makers in their mobility ecosystems (Foth, 2017; Finn, 2020).

The concept of organized car-sharing originated in Europe several decades ago. The first formal car-sharing organizations were established in Switzerland and West Germany in the 1980s, motivated by energy costs and environmental concerns. These early efforts were often structured as cooperatives or non-profits. By the early 2000s, car-sharing had expanded significantly. In Switzerland, the cooperative Mobility Car Sharing (the successor to early co-op experiments) grew to about 60,000 members sharing 2,000 vehicles at over 900 location sacross the country. Germany saw around 75 car-sharing organizations serving ~40,000 members by the same period. Other countries such as the Netherlands, Austria, Sweden, and France also developed local car-share groups during this time. Many of these European initiatives were explicitly community-oriented. For instance, in Sweden and Germany, neighborhood car-sharing clubs formed with volunteer member labor and simple reservation system. Mobility Carsharing Switzerland itself began as a merger of two cooperative schemes, and to this day operates with a cooperative ethos (it is a member-based company). European co-ops like Autopartage Switzerland, StadtteilAuto in Germany, and newer ones like Som Mobilitat in Spain or Partago in Belgium focus on locally-rooted sharing, often with sustainability missions such as integrating electric vehicles. These cooperatives contrast with corporate car-sharing services by grounding mobility in local community ownership.

These models are particularly visible in cooperative and community-led transportation initiatives, where decisions about fleet size, vehicle type, pricing structures, and service coverage are made collectively. Rather than treating transportation as a product to be sold, participatory models frame it as a public good to be co-managed. This reframing opens up new possibilities for inclusion, especially in areas underserved by traditional public transit or commercial operators (Shaheen & Cohen, 2020).

Participatory governance is a crucial lens through which to examine the democratic potential of community-based car-sharing cooperatives. Unlike traditional top-down models of urban planning or public service delivery, participatory governance emphasizes the co-creation and co-management of systems by those most affected by them. It involves not just consultation but actual influence over decisions, and in some cases, ownership of the means of provision. Within the context of shared mobility, this framework allows us to evaluate who holds decision-making power and how these decisions are made and enacted.The concept of ‘participatory mobility infrastructure’ proposed in this thesis builds on this tradition. It sees community-run car-sharing cooperatives not just as service providers, but as democratic infrastructure, systems that foster civic agency and allow users to shape the rules, technology, and direction of urban mobility. This framing offers a powerful counterpoint to the highly centralized and corporate-dominated models of platform capitalism. Where Uber or Bolt may optimize

for speed and monetization, cooperatives strive to embed values of inclusion, sustainability, and local autonomy into their platforms.

Additionally, participatory mobility is not limited to institutional cooperatives. It also includes grassroots innovations such as community bike-share programs, volunteer ride-sharing networks, and neighborhood-based transport forums. These efforts often rely on high levels of social capital, local knowledge, and volunteerism. While sometimes informal, they demonstrate the viability of decentralized mobility management and offer valuable insights for more formalized systems (Manzini, 2015). It includes practices like member voting, shared ownership, rotating leadership, and open budgeting. In some cases, users also participate in the design and evaluation of digital interfaces, ensuring that platforms reflect local needs and capacities (Morozov & Bria, 2018). These practices echo broader movements in participatory urbanism, where residents are increasingly seen as producers of city life, not just consumers of urban services (Seltzer & Mahmoudi, 2012). Importantly, participatory mobility models also reshape the social meanings of mobility. They emphasize relational values like trust, mutual aid, and collective responsibility. These values contrast sharply with dominant narratives of convenience, speed, and hyper-efficiency that characterize most mobility-as-a-service (MaaS) platforms.

In the case of umbrella cooperatives like in Belgium or Germany, participatory governance often exists in tiered forms, from local co-op boards where decisions about pricing and fleet are made, to cross-national assemblies that debate broader strategic direction. This kind of ‘federated participation’ complicates simplistic readings of cooperative governance. It shows how scale and participation are not necessarily at odds, but can be designed to reinforce each other (Michels, 2011). Another example is the use of community assemblies in planning transport interventions in cities like Barcelona, where citizens help co-create shared mobility corridors and determine infrastructure priorities (Bria & Morozov, 2018).

Digital participation is an increasingly vital component of this landscape. Smith (2009) argues that participatory mechanisms in democratic innovations must be contextually embedded to be effective. This becomes particularly important in civic tech platforms used by cooperatives like voting systems, governance portals, shared budgeting tools, which act as infrastructure for deliberation and co-decision-making. When built transparently and with user education, they increase perceived legitimacy and activate longer-term engagement.

This approach also draws on existing literature that stresses the importance of inclusive decision-making in shaping resilient urban systems. Foth (2017) describes how digitally

mediated participation in urban tech ecosystems can foster 'networked civic innovation,' while Seltzer and Mahmoudi (2012) argue that participatory planning leads to stronger civic capacity over time. In the mobility context, this means not just allowing users to comment, but building systems where they help shape allocation of resources, design of features, and policy decisions.

Participatory mobility also intersects with gender and equity issues. Research has shown that women, elderly people, and those from marginalized groups often have distinct mobility patterns and needs that are poorly addressed by one-size-fits-all models. By engaging these groups in decision-making processes, participatory mobility models are better positioned to ensure inclusivity and justice (Greene & Kern, 2022).

However, the literature also points to challenges in participatory mobility. These include issues of time intensity, decision fatigue, and uneven participation. Not all members are equally resourced to participate in governance activities, and some initiatives struggle to maintain engagement over time. Moreover, in digital contexts, participation may be shaped by platform design and technical literacy, raising concerns about digital exclusion (van Dijck et al., 2018).

One of the key theoretical debates in participatory mobility revolves around scale. Can deeply participatory systems scale beyond neighborhood-level initiatives without losing their democratic character? Some scholars suggest that federated models and networked cooperatives may offer a promising solution, combining local accountability with platform-level support and resource sharing (Bauwens et al., 2019). Others warn that upscaling may lead to bureaucratization or the dilution of participation into mere formalities.

Despite these challenges, participatory mobility models remain vital to rethinking transportation in ways that are just, inclusive, and resilient. They provide real-world laboratories for testing alternative governance arrangements, and their insights can inform more equitable policies at scale. For this thesis, participatory mobility offers both an empirical phenomenon to be studied and a normative benchmark for assessing cooperative car-sharing initiatives.

2.6 Cultural Contexts of Cooperativism in Mobility

Understanding the cultural meanings and historical associations of cooperatives is crucial to any serious exploration of community-based mobility initiatives, to be able to address and understand the nuances behind the word better. While cooperatives are often framed

as universally participatory, inclusive, and democratic, their reception and perceived legitimacy can vary widely based on regional and cultural context.

In Western Europe, especially in countries like Belgium and Germany, cooperatives tend to enjoy a relatively high degree of institutional legitimacy. They are often associated with sustainability, grassroots democracy, and economic resilience. These countries have a long history of cooperative movements tied to labor unions, social welfare, and renewable energy transitions. Car-sharing cooperatives in these contexts are generally viewed as pragmatic, values-driven alternatives to both state and private transport providers (Pape et al., 2021).

In contrast, in post-socialist countries such as Estonia or parts of Central and Eastern Europe, the term 'cooperative' may carry more ambivalent or even negative connotations. Here, cooperatives are sometimes associated with forced collectivization and state-controlled economic structures from the Soviet era. As a result, contemporary cooperative efforts may struggle to gain traction or trust, particularly among older generations (Kasmel & Lember, 2011). Even when the organizational models are democratic and citizen-led, the cultural baggage attached to the word 'cooperative' can hinder participation and legitimacy.

This contrast underscores the importance of semantic framing and local cultural history in shaping how mobility initiatives are received. A cooperative model that works seamlessly in Flanders might face resistance in Tallinn, not because of its technical inefficacy, but due to collective memory and cultural perception. This thesis takes such contextual variation seriously and aims to explore how these perceptions are navigated by practitioners on the ground.

Outside of Europe, the reception of cooperatives also varies. In parts of the Global South, cooperatives often emerge as informal or semi-formal solutions to state absence or market failure. They may be highly localized, operating under hybrid governance models that blend tradition, necessity, and modern digital tools. In India, for example, cooperatives have historically played a role in agricultural and credit sectors, but digital mobility cooperatives are still nascent. Their emergence depends not just on technical capacity, but on how trust, ownership, and participation are culturally configured (Mukherjee & Singh, 2020).

Scholars such as Vieta (2020) and Birchall (2013) argue that cooperative legitimacy is often shaped less by formal structure and more by affective and symbolic factors, whether people see the initiative as 'theirs,' whether it aligns with collective identities, and whether it evokes empowerment or bureaucratic burden. These factors are essential when

considering the potential scalability of cooperative mobility models across diverse socio-political settings.

This chapter highlights the need for any study of cooperative urban mobility to move beyond structure and functionality. It is equally critical to interrogate meaning, identity, and place. Cultural framings matter, not just in the adoption phase, but in shaping the long-term sustainability, governance dynamics, and user experience of cooperative platforms.

3 Problem Setting

Despite a growing body of work on mobility innovation, cooperative economics, platform governance, and digital infrastructure, significant gaps remain, particularly in how we understand, theorize, and evaluate community-based car-sharing cooperatives. This chapter lays out six key challenges that this thesis addresses, offering a more grounded picture of how cooperative mobility operates and what it might offer for the future of urban systems.

To begin, the first point is that most academic and policy attention in the shared mobility space continues to center on corporate-led models or municipal partnerships (Shaheen & Cohen, 2020; Docherty et al., 2018). This has left cooperative initiatives, especially those enabled by digital platforms, largely underexamined. As a result, their distinct institutional logics and civic implications are often overlooked. Yet these models are more than random innovations, existing around the fringes. They represent a democratic alternative to dominant paradigms, rooted in local accountability, collective ownership, and participatory design. This thesis does not romanticize these initiatives as perfect solutions but treats them as compelling and under-theorized counter-narratives worthy of deeper investigation.

Second, while mobility justice literature has made critical contributions to debates around equity and access (Martens, 2017; Sheller, 2018), it often overlooks the question of governance: who gets to decide how mobility systems are built, managed, and evolved. As transport increasingly becomes mediated by data and digital platforms, questions around procedural justice become urgent. Platform-based mobility services have been critiqued for opacity, surveillance, and profit-driven logic (Slee, 2016; Srnicek, 2017). Yet alternative governance models, such as cooperatives, have rarely been examined in the mobility context, despite their potential to offer more democratic, user-driven approaches to decision-making.

Third, the role of digital technology in cooperative mobility remains underexamined too. While the concept of platform cooperativism (Scholz & Schneider, 2017) provides a vision for democratic digital tools, few studies have empirically examined how cooperative mobility platforms are built, governed, and maintained. This includes questions around technical infrastructure (e.g. booking apps, IoT-based tracking, user dashboards), trade-offs between scalability and local responsiveness, and platform governance. Drawing on literature from civic tech and public digital infrastructure (Bria, 2015; UNDP, 2021), this research contributes a sociotechnical analysis of these systems, treating platforms not just as tools but as political and institutional artefacts.

Fourth, the cultural and historical meanings of cooperatives vary significantly across contexts. In Belgium and Germany, they are often associated with ecological responsibility and social trust, while in the Netherlands, cooperative traditions are more strongly rooted in neighbourhood-level pragmatism and informal trust. This research situates cooperative mobility practices within their civic and geographic contexts, offering a comparative reading that resists overgeneralization and acknowledges the embeddedness of cooperativism.

Fifth, there is a lack of comparative research on the governance models that exist within the cooperative mobility landscape itself. Some cooperatives operate as federations or umbrella entities, offering centralized services and infrastructure. Others maintain hyper-local autonomy. Yet few studies map these differences or evaluate their implications for sustainability, participation, or policy relevance. This thesis adopts a multi-case comparative approach to examine how structural variation shapes both internal dynamics and external outcomes.

Sixth, the literature has underrepresented the experiences and motivations of end-users. Much of the research emphasizes institutional structure or technical capacity, but rarely investigates why people join cooperatives, how they experience shared governance, and what everyday participation looks like. This study brings those voices to the center through interviews and surveys and integrates evidence-based user personas (Pruitt & Grudin, 2003) as an analytic and design tool.

At the same time, as cities turn to "smart" solutions to solve urban challenges, many such efforts risk reinforcing technocratic or extractive logics, centralizing data, promoting surveillance, and prioritizing efficiency over equity (Kitchin, 2015; Shelton et al., 2015). Cooperative mobility offers a grounded counter-example. Local, democratically governed, and tech-enabled, these systems reflect a bottom-up logic of civic tech infrastructure: built by the community, for the community, with governance embedded into the digital fabric. By studying cooperatives that operate as digital public infrastructure, this research argues for a broader and more democratic vision of smart urban innovation.

Community car-sharing cooperatives, often dismissed as too small or too local to matter, are reframed here as real-world experiments in participatory infrastructure, where mobile apps and shared vehicles become tools for democratic practice. The significance of this research lies in its interdisciplinary contribution: it connects civic tech with cooperative governance, and injects a governance lens into the field of mobility justice. It also extends platform cooperativism into the understudied space of urban service provision, offering

grounded insights into what it means to build shared systems that are both digital and democratic (Bauwens & Kostakis, 2014; Scholz & Schneider, 2017).

Geographically, the research focuses on three cases across Belgium, Germany, and the Netherlands, each representing a different structure of cooperative governance and civic engagement. These ecosystems were selected for their diversity in institutional frameworks and digital infrastructure maturity, enabling a nuanced comparative study within a limited timeframe. The umbrella cooperatives studied here function as coordination hubs for smaller local initiatives, exemplifying different models of digital public infrastructure from the ground up.

Ultimately, this thesis investigates whether cooperative car-sharing can serve as a viable and scalable model of civic infrastructure, resilient, locally accountable, and digitally enabled. This thesis understands the strengths and weaknesses of the said cooperatives, and barriers for large-scale adoption. Through a multi-case, mixed-method study and a grounded analysis of governance mechanisms, user experience, and technological tools, it aims to expand the conversation around what urban mobility could be: not just efficient or green, but inclusive, participatory, and collectively owned.

4 Methodology

This chapter talks about the methodological framework adopted in this research to investigate how community-based car-sharing cooperatives operate as civic technology infrastructure. The research follows a mixed-method design, leaning primarily on qualitative inquiry, but also has included complementary quantitative elements through user surveys. This combination allows for a deeper understanding of how these systems are governed, experienced, and imagined across different contexts.

Rather than isolate variables, the research aims to understand how governance, innovation, and participation co-evolve, particularly in systems where the technological interface is interwoven with collective ownership and decision-making. To that effect, it is in an interpretivist paradigm, the research treats cooperative platforms not as neutral tools but as socially constructed systems that encode specific values, governance practices, and cultural dynamics.

To explore this complexity, a triangulated method was employed: ten semi-structured interviews were conducted with cooperative founders, civic technologists, mobility experts (both public and private), and end users in Belgium, the Netherlands, and Germany. These were supplemented by user surveys distributed internally by partner cooperatives in Belgium and the Netherlands. In Germany, user perspectives were gathered indirectly via a cooperative board member with deep operational insight. Thematic analysis was used to code and interpret interview data, guided by sensitizing concepts from the literature. Survey results were analyzed descriptively, helping surface patterns around participation, trust, and cooperative engagement.

A targeted literature review also informed the research design and framing. Using databases such as Web of Science, Google Scholar, and Limo Libis, 43 relevant peer-reviewed sources were curated to map key conversations at the intersection of platform design, shared mobility, participatory governance, and commons theory. To supplement this, AI-supported discovery tools like Connected Papers and Research Rabbit were used to trace conceptual clusters and find adjacent literature. OpenAI's ChatGPT (GPT-4) was also employed in a limited capacity to organize text segments, refine phrasing, and were used primarily in the writing process.

The structure of this chapter is as follows: Section 4.1 outlines the research design and strategy; Section 4.2 explains the case selection logic; Section 4.3 details interview protocols; Section 4.4 describes the user survey process; Section 4.5 outlines data analysis methods; and Section 4.6 discusses ethical considerations and limitations.

4.1 Research Design and Strategy

The research design for this thesis is deliberately stratified, and grounded in a mixed-method strategy. It builds on the recognition that mobility systems are not merely infrastructures or services, but deeply embedded socio-technical arrangements. Studying community-based car-sharing cooperatives as civic tech infrastructure demands a design that captures both the material mechanisms and the lived experiences shaping these systems. Rather than viewing governance, participation, and innovation as discrete variables, this research treats them as interwoven phenomena, informed by institutional structures, cultural narratives, and digital interfaces alike.

This study takes an interpretivist approach, centering the meanings and lived realities that participants attach to their experiences within cooperative models. Since co-ops can look quite different, in how they're structured, what they aim for, and who they serve, this approach offers the flexibility to make sense of those differences without flattening them. That nuance matters, especially when the 'infrastructure' in question isn't just technical, but also collective, civic, and constantly evolving. At the same time, the research stays clear of becoming too anecdotal by grounding itself in structured methods, including interviews, surveys, a targeted literature review, and document analysis.

The central strategy relies on triangulation, drawing from multiple data types, actors, and methods to develop a fuller understanding of how community mobility cooperatives function in different contexts. The project covers three European countries (Belgium, the Netherlands, and Germany), selected for their policy diversity, maturity of cooperative ecosystems, and relevance to civic tech debates. Each national case offers a different governance model and technological architecture, enabling cross-case comparisons that are not only geographic but also institutional.

Semi-structured interviews form the core of the empirical strategy. These were complemented by user surveys, both to validate themes emerging from interviews and to surface broader patterns in usage, participation, and perception. Where user interviews were not feasible (notably in the German case), platform actors with customer-facing roles were included to approximate user insights. This reflects a pragmatic understanding of data access in cooperative settings, where transparency, capacity, and volunteerism can affect who is reachable and when.

The research strategy also centers scale, not in terms of metrics, but in terms of narrative. While cooperative mobility systems are often portrayed as 'small' or 'local', this thesis explores how they enact forms of infrastructure that scale differently: through trust, replication, platform design, and normative influence. To trace these patterns, a method

was needed that could pick up on both structural features and the more subtle dynamics of influence, and a qualitative approach offered the best way to do that.

Finally, the research design maintains room for inductive sense-making. Though thematically structured, the data collection allowed new insights to surface organically, especially as some early assumptions were challenged by field realities. This openness is consistent with the spirit of the cooperatives themselves, many of which prioritize adaptability and democratic feedback loops. The result is a design that aims not to impose fixed categories but to understand cooperative mobility as an unfolding civic experiment.

4.2 Case Selection and Rationale

This section outlines the logic and reasoning behind the selection of case studies used in this research. Given the nature of the research questions, focused on governance, innovation, and participatory structures in community-based car-sharing cooperatives, a multi-country, comparative case study design was deemed most appropriate. The objective was not to offer universal generalizations, but to understand how cooperative mobility infrastructures operate within specific political, cultural, and institutional environments. This approach is particularly useful for investigating how cooperative mobility systems function as civic tech infrastructure, phenomenon inherently shaped by local context and governance structures.

In line with ethical research practices and to account for evolving internal policies across the cooperative organizations studied, the names of all three case study cooperatives have been anonymized. They are referred to as Coop A (Belgium), Coop B (Germany), and Coop C (Netherlands) throughout this thesis. This choice enables a more focused cross-case comparison while ensuring the emphasis remains on thematic insights and governance models, rather than on individual organizational identities.

The comparative strategy employed in this research recognizes that civic innovation is not evenly distributed across geographies. Contextual differences in policy frameworks, historical relationships with cooperatives, levels of digital readiness, and public trust in shared governance all shape the adoption and sustainability of community-based car-sharing initiatives. Accordingly, the research selected three national contexts: Belgium, the Netherlands, and Germany. While these countries are geographically proximate, they represent contrasting traditions of cooperative organization, technological adoption, and public policy related to mobility and sustainability.

Belgium was selected as one of the cases due to its extensive cooperative ecosystem and the presence of a cross-national cooperative platform, Coop A. Coop A provides technical, legal, and infrastructural support to a growing number of local EV-sharing

cooperatives across Europe. This model reflects a layered form of governance: centralized in terms of platform infrastructure but decentralized in how individual cooperatives operate on the ground. Interviews with Coop A's leadership, along with representatives from affiliated cooperatives, provided multi-level insights into the balance between autonomy and standardization, as well as the challenges of scaling trust-based systems. Notably, one initially shortlisted case, Partago, was excluded following its bankruptcy during the research period. This development highlights the financial and operational vulnerabilities that can affect even well-regarded cooperative initiatives.

The Netherlands was chosen for its contrasting cooperative profile. The car-sharing cooperatives are typically small in scale, highly localized, and community-driven. Coop C, based in Amersfoort, exemplifies this model, built by residents for residents, it operates independently without the backing of a central platform. This offers a unique lens to examine bottom-up civic innovation, where users are also co-creators and decision-makers. The Netherlands also benefits from a high level of digital engagement and cycling culture, both of which complement and inform the development of shared mobility initiatives.

Germany was selected as a third case due to its structured and formalized approach to cooperativism. Unlike the more fluid models in Belgium and the Netherlands, German cooperatives often follow legally codified structures and operate within defined regulatory parameters. Coop B, a national umbrella cooperative in Germany, provided access to this institutional perspective. Though user-level data was limited, the strategic insights gained from Coop B's board helped illuminate issues around financial sustainability, insurance models, risk mitigation, and user governance dynamics. Germany also brings comparative depth given its strong policy engagement with the energy transition (Energiewende) and growing debates around digital sovereignty in the mobility sector.

Together, these three cases do not aim to represent a statistical sample, but a conceptual spectrum. Belgium's coordinated ecosystem, the Netherlands' hyperlocal experimentation, and Germany's regulatory maturity each contribute distinct insights into how mobility cooperatives emerge, stabilize, and evolve. This combination allows the study to analyze not just what cooperative mobility looks like in different places, but how different structures support or constrain innovation and participation. It also enables an exploration of how civic tech infrastructure scales, not only through replication, but through policy recognition, platform design, and community legitimacy.

The selection was further informed by access feasibility, language considerations, and prior relationships within the cooperative network. For instance, the inclusion of Coop C

in the Netherlands was facilitated by early positive contact with its founder, while Coop A and REScoop connections provided inroads into Belgian cases. Germany, while more difficult to access at the user level, remained essential to include for its platform governance insights. Each case thus emerged from both analytical logic and practical fieldwork realities, reflecting a balance between ideal design and grounded research constraints.

This case selection strategy ultimately supports a more multidimensional understanding of cooperative mobility as a civic and digital infrastructure. By capturing institutional variation across context, the study contributes to ongoing conversations in e-governance, platform cooperativism, and public sector innovation. It also sets the foundation for the analysis of how these systems not only operate but influence, and are influenced by, broader socio-political conditions.

4.3 Interview Process

Semi-structured interviews formed a core component of this research's data collection strategy. The format was selected for its ability to balance consistency across cases with the flexibility to adapt to local context, interviewee expertise, and emergent themes. Given the exploratory nature of the study, and its aim to understand civic, technological, and governance dynamics from multiple standpoints, interviews were instrumental in generating nuanced, context-rich insight.

A total of ten interviews were conducted between February and May 2025. These included cooperative founders, board members of umbrella cooperatives, representatives from EU-level organizations, end-users, and mobility experts working in or adjacent to the space. The diversity of this sample allowed for a grounded exploration of how different actors perceive, shape, and experience community-based car-sharing cooperatives. Each group offered a distinct vantage point, founders and umbrella platform leads provided insight into governance and scaling, while end-users helped ground the analysis in lived experience. Policy actors and EU-level experts offered a broader institutional context, linking these cooperatives to shifts in digital public infrastructure and civic tech discourse.

Most interviews were conducted via video conferencing platforms, five over MS Teams and three through Google Meet, with two conducted in a follow-up Zoom session. Each interview lasted between 25 to 30 minutes, and was guided by a semi-structured protocol designed to explore themes such as governance models, participation mechanisms, technological interfaces, and local context. The interview guide was flexible enough to

allow new ideas to surface, while maintaining enough structure to ensure comparability across different stakeholder types and national contexts.

To reduce bias and strengthen the credibility of the findings, several strategies were employed. First, interview questions were crafted to be open-ended and non-leading, encouraging participants to frame responses in their own words. Second, the diversity of interviewees, spanning local actors to EU-level representatives, provided a natural check on overly narrow interpretations. Third, the researcher maintained a reflexive journal throughout the process, noting key impressions, emerging themes, and points of ambiguity that required further clarification.

Transcription and note-based documentation formed the basis for the data analysis. A pragmatic thematic coding approach was adopted, using inductive analysis to allow themes to emerge from the data itself. Transcripts and detailed notes were reviewed line by line and tagged with relevant codes. This iterative process enabled the researcher to identify recurring categories, surface patterns, and build a thematic structure without relying on pre-defined analytical frames. Codes were grouped into clusters, such as governance structures, barriers to scaling, digital platforms, and civic participation, which later informed the results and discussion chapters. All interview participants were anonymized to protect privacy and encourage candour, while organizational names, where already public-facing, have been retained for clarity. This approach allowed for transparency in reporting while ensuring ethical integrity.

The decision to conduct ten interviews was guided by a balance between thematic saturation and practical feasibility. While a larger sample might have yielded additional insights, the range of perspectives across the selected participants, and the depth of responses elicited, enabled the research to meet its analytical goals. Follow-up interviews were offered in cases where clarification or elaboration was needed, ensuring that the data was both accurate and sufficiently detailed.

Some limitations were encountered in the interview process. In a few cases, scheduling constraints reduced the number of potential interviews, particularly at the local policy level. Language barriers also emerged in select contexts, although care was taken to ensure mutual understanding. Despite these challenges, the interviews yielded a rich dataset that spans multiple levels of the cooperative ecosystem, from ground-level usage to strategic infrastructure design. They form the backbone of this study’s qualitative inquiry and set the stage for drawing broader lessons about civic innovation, platform governance, and mobility systems.

4.3.1 Sample Strategy

This study employed a **purposeful and strategic sampling approach**, drawing on principles outlined by Suri (2011), to ensure a diverse yet analytically meaningful representation of stakeholder perspectives across three national cooperative ecosystems. Purposeful sampling was particularly suitable for this research, as the goal was not to generalize across populations, but to select "information-rich cases" that could illuminate key dimensions of cooperative governance, civic participation, and digital infrastructure in context.

The sample was deliberately constructed to include a range of actor roles—cooperative founders, platform developers, active end-users, and policy experts—each offering distinct insights into how community-based car-sharing cooperatives are structured, experienced, and sustained. This **maximum variation strategy** ensured coverage of both technical and social perspectives, as well as local and cross-national insights.

Given the comparative multi-case design of this thesis, interviews were also strategically distributed across the three country contexts: Belgium, the Netherlands, and Germany. The intention was to capture variation in governance models (federated vs. hyper-local), technological infrastructure (centralized vs. informal), and policy environments (national and EU-level).

Below is an overview of the sample distribution:

Overview of Sample Distribution in Interviews

Country	Number of Interviews	Primary Roles Represented
Belgium	3	Board member, EU cooperative advisor, end-user
Netherlands	3	Cooperative founder, private MaaS expert, end-users
Germany	3	Cooperative board member, platform developer, policy-maker, end-user

Table 1: Overview of sample distribution. Source: Own figure.

In total, ten interviews were conducted. Participants were categorized by stakeholder function:

Participants Categorized by Stakeholder Type

Type of Role	Number of Participants
Cooperative Founders	2
Board Members	3
End-Users	3
Third-Party Experts	3

Table 2: Table of participants categorized by stakeholder type. Source: Own figure.

Interviewees were identified through a mix of purposive and snowball sampling. Initial outreach targeted individuals who held relevant roles in the cooperative mobility ecosystem, using publicly available networks such as LinkedIn and cooperative directories. Snowball sampling was employed to reach deeper into cooperative networks once rapport was established with early participants, a method particularly useful in relatively niche or close-knit research fields.

Importantly, this sampling strategy sought **conceptual depth**, not statistical representativeness. As Suri (2011) notes, strategic sampling in qualitative inquiry focuses on the richness of contextualized understanding, especially when studying under-examined systems like civic tech cooperatives. The inclusion of both grassroots voices and institutional actors allowed the research to triangulate between different levels of operation—from hyper-local member experiences to broader policy discourses.

While demographic data such as age and gender were not systematically collected (to preserve anonymity and focus on role-based insights), participants broadly represented mid-career professionals and active community members, with varying degrees of civic engagement and technical familiarity. Together, this diverse set of voices provided the foundation for a robust, multi-scalar analysis of cooperative mobility as civic infrastructure.

4.4 User Survey Design

To complement the interview-based insights and introduce a broader user perspective, a structured user survey was designed and deployed as part of this study. The survey aimed to gather practical, behavioral, and attitudinal data from users of community-based car-sharing cooperatives, with a focus on how these initiatives shape daily mobility patterns, civic engagement, and perceptions of inclusivity and accessibility.

The survey was designed as a short, bilingual questionnaire, in English and Dutch for the Netherlands and Belgium, and in English and German for the German context. It included a mix of Likert-scale questions, multiple choice responses, and open-ended prompts. The design emphasized accessibility, aiming for a completion time of under five minutes. This was to ensure participation from a wide range of users, without creating survey fatigue or drop-off. The structure was kept intuitive to encourage responses across varied age groups and digital literacies.

Core areas of inquiry included: how often participants use the cooperative's services; their primary reasons for using the cooperative; and how their mobility behavior has changed since joining. Questions were designed to surface shifts in transportation habits, for instance, whether users had reduced personal car usage, accessed new areas of the city, or perceived changes in access to employment and social spaces. Several Likert-scale items assessed ease of use, affordability, convenience, and satisfaction levels. These were complemented by open-ended prompts inviting personal reflections or experiences not captured in closed-form questions.

To align with the research focus on civic tech infrastructure and participatory governance, additional questions were included to probe users' relationship with the cooperative beyond transportation. Respondents were asked whether they felt the cooperative fostered a sense of community, whether they had opportunities to participate in decisions (or would like to), and whether the digital platform enabled meaningful civic engagement. This type of questioning was important to explore the cooperative's role not just as a service provider but as an infrastructure that could support democratic participation in mobility systems.

Survey distribution was coordinated through the leadership of each cooperative. In the Netherlands, Coop C forwarded the form to its user base of approximately 450 members, yielding 20 completed responses. In Belgium, another local cooperative facilitated dissemination, resulting in 10 responses. In Germany, a similar request was made however, it could not be accommodated due to the changing policies for their end-users

at that time. Despite this limitation, the resulting data enabled some basic comparative analysis and reinforced themes that emerged from the interviews.

All survey responses were anonymous, and participation was voluntary. No identifying information was collected, and data was stored securely. To minimize bias, the survey was framed neutrally, as a study interested in everyday mobility behaviors rather than explicitly emphasizing community governance or cooperative ideology. This encouraged candid feedback even from users who may not view themselves as civically engaged. The survey was hosted on Google Forms, ensuring mobile compatibility and low technological barriers for filling out the survey and its completion.

Although the survey response rate was modest, it reflects an intentional design choice: a lightweight, low-effort survey more likely to reach everyday users. While the results are not statistically representative, they offer useful insight into trends and shared experiences. Responses were coded and grouped to identify segments such as high-frequency users, newer members, or those living in transport-poor areas. Preliminary themes were mapped across countries to observe how local context might shape perceptions of value, participation, or barriers.

The user survey plays a complementary role in this study's overall research design. It serves not as a standalone dataset but as a supporting underlayer that grounds and tests some of the interview findings. Quantitative responses offer broad validation, for example, when multiple users in different countries reported improved access to job opportunities, while open responses enrich qualitative depth. Triangulating survey and interview data strengthens the study's credibility and offers a more holistic picture of how community car-sharing cooperatives function in real life.

4.4.1 Dissemination of the Survey

Cooperative leaders in each country were contacted in advance and asked if they would be willing to circulate the survey among their members. All three responded positively and expressed interest in supporting the research effort. In two cases, the surveys were shared via internal communication channels such as mailing lists, messaging groups, and digital community platforms. These leaders also informally encouraged participation, helping ensure that responses reflected a broad range of voices from within their ecosystems. However, one cooperative, though supportive in principle, was unable to circulate the survey due to a recent tightening of privacy rules concerning member outreach. This was communicated transparently to the researcher and reflected a broader shift in their internal data policies.

Given the highly specific and community-rooted nature of the research topic, internal dissemination through cooperatives proved to be the most viable, and ultimately the only effective, approach to reach relevant respondents. Public circulation (specifically done through public facebook groups, and on x) yielded low engagement or off-target responses. Through this targeted strategy, the study was able to gather 31 responses from cooperative users across two countries.

Interestingly, in several instances, individual members who came across the survey reached out expressing curiosity about the study and a willingness to share more. Upon the cooperative leaders' request, and with prior consent from the members, these individuals' contact information was shared with the researcher for potential follow-up interviews. This organic interest not only added depth to the qualitative dataset but also underscored the value of conducting research through trusted, community-rooted channels. Overall, this method of dissemination fostered a more grounded and ethically sound engagement, surfacing context-rich, lived insights from within the cooperatives themselves.

4.5 Data Analysis Methods

The analysis phase of this research followed a hybrid strategy combining qualitative thematic coding with quantitative interpretation of user survey responses. Given the study's mixed-method approach, this allowed for both deep contextual exploration and cross-case pattern identification. While being faithful to the lived experiences and narratives that participants provided, the goal was to make linkages across stakeholder kinds, geographical locations, and format types.

The qualitative component was based on ten interviews conducted with stakeholders across three countries. These interviews were manually transcribed and subjected to inductive thematic coding. An open coding strategy was used first, allowing emerging insights to shape the analytical framework. Codes were then grouped into broader thematic clusters, including 'governance and participation', 'scaling and digital platforms', 'community belonging', and 'barriers to use'. This iterative process was supported by re-coding and re-clustering to account for nuance and interdependence between themes.

All ten expert interviews were first transcribed and thematically coded to support a structured analysis of the aforementioned clusters. Microsoft Teams' automatic transcription feature was used, and in Zoom & Google Meets Meeting, Tactiq was used to get an accurate transcription. This served as a preliminary step, but the transcripts were later manually verified and edited for accuracy while simultaneously listening to the original audio recordings. Transcriptions did follow a denaturalized process, emphaziing

the conveyed meanings over the exact linguistic delivery. (Oliver et al., 2005). Transcripts were then imported into nVivo, a qualitative data analysis software, to conduct a systematic thematic analysis. This approach, based on Braun and Clarke's (2006) framework, was selected for its flexibility and ability to surface both semantic patterns and latent meaning in rich qualitative datasets.

To preserve anonymity while ensuring analytical clarity, each interviewee was assigned a unique code based on their stakeholder role. These codes are referenced throughout the results chapter when integrating interview quotations. The coding system follows a simple structure (I01–I10), ordered in reverse chronological sequence based on when interviews were conducted. This approach enables both confidentiality and traceability in qualitative analysis. The table below outlines the interviewee roles and corresponding codes used during transcription and thematic analysis.

Overview of Interview Participants

Assigned Code	Interviewee Role	Location	Description
I01	Policymaker, ReScoop & Mobility Expert	Belgium	Senior advisor at REScoop.eu, the European Federation of citizen energy cooperatives
I02	Founder and Board Member, Coop A	Belgium	Board member of Coop A, a Belgian umbrella platform supporting EV co-ops across Europe
I03	Board Member & Representative, Coop B	Germany	Board member & cooperative lead at Coop B, a tech-focused car-sharing federation in Germany
I04	Founder, Coop C Cooperative	Netherlands	Co-founder of Coop C, a hyper-local car-sharing

			collective based in the Netherlands
I05	Private MaaS Expert	Netherlands	Mobility-as-a-Service expert with industry experience across smart urban transport
I06	End-user	Netherlands	Regular user of a grassroots community EV cooperative in the Netherlands
I07	End-user	Belgium	Long-term member of a local EV cooperative in Belgium
I08	End-user	Germany	Newer participant in a cooperative car-sharing initiative in Germany
I09	Policymaker – Mobility	Germany	Policy advisor working on sustainable mobility policy in Belgium
I10	Independent Tech Developer, Open Mobility Platform	Germany	Consulting developer contributing to open-source and interoperable tools

Table 3: Overview of Interview Participants. Source: Own figure.

Alongside interviews, data from user surveys offered a quantitative lens on cooperative engagement. Likert-scale responses were analyzed using basic descriptive statistics, such as response frequency, mean scores, and country-level comparisons, to determine how users perceived mobility access, platform usability, and cooperative involvement. Multiple-choice and binary responses were aggregated to explore usage frequency, travel purposes, and geographic context (e.g., proximity to city centers).

Open-ended survey responses were coded using the same thematic categories derived from interviews, using Excel and nVivo. This created alignment between data types and allowed the researcher to identify corroborations, such as recurring mentions of trust in local governance or dissatisfaction with vehicle availability, as well as thematic gaps. For instance, while platform friction was a dominant concern among users, it was less emphasized by founders and board members.To strengthen the study's reliability, data from interviews and surveys was triangulated with cooperative documents, public charters, platform use guides, and annual reports. This secondary material helped validate claims around platform structure, service scope, and decision-making processes. Triangulation was especially useful for understanding how platform cooperatives position themselves versus how they are perceived by users. Document analysis also clarified terms like 'membership', which varied subtly across contexts.

The analysis also included a comparative dimension. Data was organized by national context, Belgium, the Netherlands, and Germany, and mapped against cooperative type (local vs umbrella). This allowed the study to surface differences between countries where community mobility is centralized under a platform (e.g., Coop A) versus countries where initiatives are more locally embedded (e.g., Coop C). Similarities were also highlighted, for example, across all three countries, cooperatives struggle with fleet maintenance and volunteer fatigue.

Throughout the analysis, care was taken to stay aware of how the researcher's own background might shape interpretation. Coming from a public sector innovation and civic tech lens meant there was a natural interest in these models, but also a risk of reading them too optimistically. To counter that, interviewees were encouraged to openly reflect on what wasn't working, not just what was. Their candidness helped bring balance and texture to the findings. Special attention was also paid during coding to track how certain interpretations shift over time, and to stay honest about any possible bias.

Overall, the data analysis was designed not only to categorize responses but to trace the logics and tensions that shape community car-sharing cooperatives as civic tech infrastructure. This process illuminated how people relate to these services, not just as

tools for getting from point A to B, but as participatory infrastructures embedded in broader urban systems and social imaginaries.

All interviews conducted as part of this research adhered to ethical guidelines for qualitative data collection. Informed consent was obtained from all interview participants, either verbally or digitally, before the start of each session. Participants were informed about the purpose of the study, the voluntary nature of their participation, and the intended academic use of the data. Two of the participants requested anonymity, and permission to use direct quotations was implicitly granted during the informed consent process. For survey responses, anonymity was preserved by design. No personal or identifying information was collected, and respondents were not asked to disclose demographic or contact details. This helped minimize response bias and ensured privacy protection. All survey data and interview transcripts were securely stored in a password-protected iCloud folder accessible only to the researcher.

4.6 Evidence-Based End-User Personas:

To bridge the quantitative and qualitative sections of this research, this section presents three evidence-based user personas grounded in survey data, interview transcripts, and interpretive synthesis. Personas have long been used in design research and user-centered innovation to humanize data and inform service design (Pruitt & Grudin, 2003). In this thesis, personas also serve an analytical function: they offer an accessible yet nuanced representation of cooperative car-sharing as a civic technology, shaped not just by metrics, but by lived experience.

These personas are not fictional amalgamations, they are ethnographically grounded, triangulated from user quotes, cooperative descriptions, and survey responses. They do not claim statistical generalizability but instead reflect archetypes that reveal patterns of behavior, value orientation, and digital engagement within the ecosystems of the Netherlands, Belgium, and Germany.

Together, these personas map out a spectrum of cooperative engagement, from relational (Jan), to integrative (Sofia), to optimized (Leon). They reflect different stakes, speeds, and structures of participation. Importantly, they offer a human-scale complement to policy, governance, and design decisions.

The personas also align with Habermas's theory of communicative action (1984), where legitimacy arises through mutual understanding, not instrumental outcomes. Jan's street-level trust, Sofia's forum participation, and Leon's demand for transparency are all

situated within different modes of civic expression. What they collectively show is that cooperativism is not one thing, it is a negotiation between people, technologies, and time.

These profiles serve as narrative distillations of user needs, helping identify future interventions: low-tech onboarding, flexible engagement formats, and real-time feedback tools. They also humanize what often becomes a conversation about infrastructure scale or platform affordances, reminding us that behind every car booked is a person negotiating identity, intention, and inclusion.

5. Comparative Case Study

This chapter offers a comparative study of the three community-based car-sharing cooperatives that form the predominant backbone of this research: Coop A (Belgium), Coop B(Germany), and Coop C (Netherlands). While each cooperative operates within a distinct national and cultural context, they all share a common vision, to offer mobility that is more democratic, sustainable, and locally governed. Together, they form a powerful lens through which to examine how governance structures, platform infrastructure, and civic participation operate across different geographies.

The selection of Coop A, Coop B, and Coop C as case studies is owing to their prominence and pioneering roles within the cooperative car-sharing landscape of their respective countries. Coop A represents one of the most expansive cooperatives in Europe, offering a shared IT platform and legal infrastructure to local mobility cooperatives across Belgium, Spain, Germany, and the Netherlands. Coop B, meanwhile, operates as a federation of car-sharing cooperatives in Germany, supporting 23 local initiatives with centralized technical and legal services. Coop C stands out for its distributed grassroots model in the Netherlands, with 10 independent cooperatives and roughly 50 shared vehicles, making it a leading example of hyper-local cooperative innovation (Coop A Report, 2024).

Practically, these organizations responded positively to outreach and were open to interviews and collaboration. All the case-studies mentioned form umbrella organisations, but each represent a different typology of cooperative organization: Coop A, as a pan-European umbrella enabling local co-ops through a shared platform; Coop B, as a national-scale finance and tech support body; and Coop C, as a hyper-local initiative rooted in a community-first mindset. This diversity enables a more nuanced understanding of how cooperative mobility unfolds in practice, and allows us to interrogate the role of scale, governance, and technical mediation in shaping their impact.

These organisations, as mentioned before in the research, were also taken owing to their ability to provide insight for multiple several cooperatives under their band, optimal for the short time-frame of the thesis building.

At a broader level, the selection of Belgium, Germany, and the Netherlands is grounded in their shared leadership in urban mobility innovation and cooperative governance. These three countries consistently rank among Europe’s top performers in sustainable urban transport, shared mobility, and civic participation. According to the European Commission’s Urban Mobility Scoreboard (2022), the Netherlands and Germany lead in cycling infrastructure and shared vehicle adoption, while Belgium scores high on citizen

satisfaction with urban mobility and low-emission zones (European Commission, 2022). Additionally, all three countries support dense networks of cooperative organizations, not only in energy and housing, but increasingly in transport. Coop A, Coop B, and Coop C are among the most mature community-based car-sharing initiatives in Europe, with established user bases, technical infrastructure, and multi-level governance structures (International Transport Forum, 2021). The variation in cooperative models across these countries further strengthens their value as comparative cases: Belgium exemplifies a federated, platform-based model rooted in energy cooperativism; Germany offers a regulated, institutionally embedded approach aligned with its cooperative (Genossenschaft) tradition; and the Netherlands represents a bottom-up, hyper-local model enabled by a high-trust, decentralized civic culture. Together, these cases offer a robust lens for exploring how cooperative mobility infrastructure interacts with questions of scale, governance, and pgarticipatory design.

Each cooperative is presented here with a narrative case summary followed by a comparative synthesis. The narrative format allows for a more holistic understanding of the cooperative's history, governance model, values, user base, and digital infrastructure. The synthesis highlights both convergences and divergences across the cases, particularly around themes of democratic participation, technical and organizational innovation, and governance. This allows us to explore how these systems function as both mobility providers, and civic infrastructures.

This chapter seeks to set the stage for deeper thematic analysis in the discussion chapter. By understanding the unique DNA of each cooperative, we can better understand the mechanics, and limitations, of civic tech infrastructure in the urban mobility space. It also allows for early observations about what scales well, what remains deeply contextual and requiring hyper-local execution, and where common patterns of governance or innovation might point to broader trends.

5.1 Case 1: Coop A (Belgium)

This case study draws from a combination of semi-structured interviews with Coop A stakeholders, user survey responses from affiliated Belgian cooperatives, and publicly available strategic documents, including the Coop A website and annual reports. The narrative and analysis presented here are based on a synthesis of these sources, filtered through the conceptual lens of civic tech and cooperative infrastructure.

Coop A represents one of the most sophisticated and collaborative experiments in cooperative car-sharing across Europe. Based in Belgium but with a pan-European reach, Coop A is a secondary cooperative that offers a digital and legal infrastructure for dozens

of smaller local cooperatives to operate electric car-sharing services. Its structure, governance, and technical orientation provide a compelling lens through which to explore the nested nature of civic infrastructure and distributed innovation.

Coop A was included as a case study for two key reasons. First, it offers a federated platform setup: while the digital infrastructure is shared and centrally managed, each local cooperative remains self-governed and context-specific. This blend of structure and autonomy makes it a strong example of how cooperative systems can scale without losing their local roots. Second, Coop A doesn't just talk about democratic design, it builds it into how the platform runs. The team was also highly engaged throughout this research, offering both rich insights and aid in broader context setting, which made it a natural fit.

Coop A originated in response to the fragmented efforts of local energy cooperatives that sought to diversify into mobility. While these early efforts were promising, they struggled with scalability, compliance, and technological complexity. In 2018, several cooperatives came together to form Coop A as a shared service platform that could streamline operations, reduce duplication, and build collective capacity (Coop A, 2021). It is now structured as a cooperative of cooperatives, with members across Belgium, Spain, Germany, Netherlands, and beyond, including various local cooperatives in Belgium. In this way, it offers not just a technical foundation, but a living infrastructure through which insights and innovations circulate across multiple geographies, including the chosen countries for this case study.

As a cooperative, it operates through a member-based model where each cooperative has a vote in the General Assembly. Governance is consensus-oriented, with key strategic decisions taken through deliberative consultation. Importantly, it does not serve individual users directly but supports member cooperatives who interface with end-users. This multi-tiered governance model allows for both scale and subsidiarity. It also introduces complexity: not all local cooperatives have the same capacity or priorities, leading to varying levels of engagement with local governance.

Coop A's technological stack includes a shared booking platform, API integrations with fleet hardware, cooperative accounting tools, and a custom-developed dashboard that tracks usage, emissions, and cooperative performance. Crucially, this tech infrastructure is open to all member cooperatives but not imposed. Local entities can choose which tools to adopt and adapt. This modularity makes Coop A an example of what Beaulieu and Schönberger (2021) term "platform commons," where technological systems are co-governed and customized rather than centrally dictated.

Coop A's narrative framing is explicitly political. It positions itself as part of a broader ecosystem of democratic innovation, linking the energy and mobility transitions through citizen ownership. Its branding, communications, and public talks often emphasize values like autonomy, resilience, and sustainability. This values-first positioning differs markedly from commercial mobility platforms that emphasize speed and convenience. As one stakeholder from Coop A shared during an interview, "We're not just solving a transport problem. We're building a different kind of economy."

Despite its strengths, Coop A faces several challenges. First is the issue of uneven adoption: not all member cooperatives have the same technical literacy or human resources to fully leverage their platform. Second, they operates in a policy grey zone, where regulations for cooperative mobility vary across municipalities and are often outdated, which often require customized solutions. Third, there is a subtle tension between their ambition to scale and its commitment to localism. Some members worry that increasing institutionalization might compromise agility or local distinctiveness.

Their case offers a rich example of cooperative infrastructure that operates not through market logic or state mandate, but through federation, modularity, and shared governance. It illustrates how cooperatives can scale not just through replication, but through platforms that embed cooperative values into technical systems. The case also foreshadows key themes explored in the discussion chapter: particularly the tension between standardization and autonomy, and the role of platform design in shaping democratic participation.

5.1.1 End-User Evidence-Based Persona: Sofia Lemaire

"It's more than transport. It's my way of being part of the change."

Sofia Lemaire

Age: 35
Location: Belgium
Occupation: Freelance Graphic Designer

DESCRIPTION

Sofie is self-employed and lives with her partner and teenage daughter in Ghent. She chose WilBee not just to cut down on costs, but because it aligned with her views on climate justice and cooperative ownership. She votes in co-op assemblies, attends picnics when she can, and sometimes volunteers her design skills for community newsletters. Sofie represents the "middle layer" of participation, active, intentional, and values-first.

DIGITAL FLUENCY

Moderate

MOBILITY MOTIVATION

Affordability, sustainability, and democratic ownership

PARTICIPATION STYLE

Votes in general assemblies, volunteers for events, engages in Slack/forum

TECH USE

TMF booking app, online dashboard for cooperative activity

WHAT GROUNDS THEM

Anchored in practicality and adaptability. Her cooperative use is less about ideology and more about efficiency, but she stays because it works, it's local, and it makes sense for her family's rhythm.

NEEDS

- Reliable car access
- Easy booking and info
- Low-effort participation

PAIN POINTS

- Car not always available
- Tech can feel clunky or unclear
- Misses out on co-op updates

Figure 1: Persona - Sofia Lemaire, Belgium. Source: Own figure.

Sofia is a 35-year-old freelance designer based in Ghent and a long-time member of the WilBee cooperative. She's the kind of person who brings a reusable tote to vote in a general assembly. Her cooperative journey is fueled less by utopia and more by alignment, climate values, democratic ownership, and the basic dignity of shared infrastructure that doesn't treat people like data points. She's the person who will design the community newsletter, but please don't ask her to chase members about crumbs in the backseat.

Digitally, Sofia's competent but not a tinkerer. She uses Coop A's platform because it works, not because she's in love with it. She's active on Slack, not because she wants to chat, but because it helps coordinate logistics and events without forty email chains. Her engagement is driven by what Cardullo and Kitchin (2019) term "meaningful smart citizenship" intentional, values-based, and bounded by real-life bandwidth.

But she HATES clunky tech, passive users, and the subtle mental load of collective logistics. "I love the values," she once wrote in a survey comment, "but I didn't sign up to be the fleet janitor." She believes deeply in the cooperative model, but she also believes in boundaries. If systems aren't designed for efficiency, even the most aligned member will quietly ghost the next volunteer call.

Sofia's persona represents the growing demographic of value-aligned, time-poor urban residents who don't want to choose between participation and peace of mind. She doesn't need more features, she needs smoother existing ones. Her case pushes us to think about how platform cooperatives can respect participation thresholds while still cultivating meaningful belonging.

5.2 Case 2: Coop B eG (Germany)

This case is built primarily on qualitative interviews with Coop B board members and affiliated stakeholders, alongside publicly available organizational materials and secondary sources. As end-user surveys could not be conducted due to data-sharing restrictions, the analysis centers institutional insight and thematic triangulation with findings from the other two cases.

Coop B eG presents a distinct yet complementary model of cooperative mobility infrastructure. Based in Germany, Coop B operates as a national umbrella organization, providing centralized legal, technical, and administrative support to a growing number of local EV-sharing cooperatives. What sets Coop B apart is its deep integration of cooperative governance with professionalized finance and operations management,

making it a model for understanding how cooperatives can scale responsibly in complex regulatory environments.

Coop B was selected as a case study because it represents a national-level cooperative platform grounded in the German cooperative tradition, where institutions like Volksbanken and housing co-ops have long shaped local economies, historically. Along with that, Coop B provides a strategic contrast to the other two cases: while Coop A emphasizes digital interoperability and the cooperative in Netherlands centers hyper-local community logic, Coop B focuses on financial risk mitigation, user support, and backend operational resilience. Interviews with board members and stakeholders revealed rich insight into the trade-offs between standardization, community sense, and institutional legitimacy.

Founded in 2018, Coop B was built to address the logistical challenges faced by fledgling co-ops trying to navigate Germany's complex transportation laws, insurance schemes, and fiscal regulations. It functions as a centralized support body, with member cooperatives owning shares in the umbrella structure. Decision-making takes place via a general assembly, with weighted voting reflecting cooperative contribution and capacity.

Unlike Coop A, Coop B does not offer a modular platform model. Instead, it provides a standardized set of backend services, like billing systems, maintenance coordination, and fleet management, that all members are required to adopt. This approach prioritizes unfiorm operational coherence and regulatory compliance over local customization

Its tech infrastructure is robust but objectively less open than Coop A's. It contracts with third-party providers for its booking software and analytics dashboards, optimizing for reliability and security. The organization also manages a centralized customer service line, handling inquiries and breakdowns on behalf of its member cooperatives. This arrangement ensures professional support but can distance users from the cooperative's community feel.

Coop B presents itself as a pragmatic enabler rather than an activist network. Its communications emphasize reliability, legal clarity, and scale readiness. While values like sustainability and equity are present, they are framed in institutional rather than grassroots terms. This is reflective of a broader cultural dynamic in Germany, where cooperatives are often seen as stable civic institutions, and not just countercultural experiments.

Coop B's biggest challenge lies in maintaining democratic accountability across a growing network of relatively passive member co-ops. As operations scale, concerns have

emerged about whether smaller cooperatives can meaningfully participate in governance. Additionally, the uniformity of the technical infrastructure, while efficient, may limit local innovation or experimentation.

What also stood out in the cooperative's design logic is its approach to end-users: Coop B frames them primarily as customers rather than cooperative members. This distinction has implications for engagement, accountability, and community-building. Unlike Coop A or Coop C, where users often see themselves as co-owners or active participants, Coop B's model prioritizes service reliability and institutional professionalism over relational governance. While this means user trust isn't the defining characteristic within its broader platform functionality, it does also risk flattening the participatory feature that typically goes with cooperative systems. It aligns with what Borghi and Fernandez (2021) describe as "cooperative managerialism," where democratic form is retained, but the civic affect and horizontal agency that define member-driven governance begin to erode under scale pressures.

Nevertheless, their model is well-positioned to scale across other German-speaking regions and offers a compelling proof of concept for how professionalized cooperative infrastructure can thrive without commercial compromise. It provides an important reference point for this thesis' broader discussion of governance design, federation, and the infrastructural affordances of scale.

5.2.1 End-User Evidence-Based Persona: Leon Köhler

"It works. That's all I need."

Leon Köhler

Age: 26
Location: Germany
Occupation: Data Analyst

DESCRIPTION

Leon lives in Berlin, works remotely, and uses the co-op car primarily for weekend trips or to visit family. He found the service through an app and signed up within minutes. He doesn't engage with the cooperative beyond using the platform, but he values the low cost and reliability. Leon doesn't see himself as part of a community—but he appreciates the fact that this isn't just another corporate product.

DIGITAL FLUENCY

High

MOBILITY MOTIVATION

Convenience, affordability, seamless digital access

PARTICIPATION STYLE

Low – primarily uses app, doesn't attend meetings

TECH USE

Vianova's integrated mobility platform

WHAT GROUNDS THEM

Thrives on innovation. He's grounded not by tradition, but by possibility. For him, the cooperative is a prototype for a better digital society.

NEEDS

- Transparent data access
- Ways to co-create features
- Fast feedback loops

PAIN POINTS

- Feels shut out of backend decisions
- Slow platform updates
- Limited tech-minded peers in co-op

Figure 2: Persona – Leon Köhler, Germany. Source: Own figure.

Leon is 26, lives in Berlin, works remotely as a data analyst, and signed up for his local car-sharing cooperative through Coop B's sleek platform in under five minutes, faster than it took him to choose a pizza topping last Friday. He's not anti-community, but he's definitely anti-chaos. For Leon, a cooperative should be efficient, clean, and preferably not involve a group WhatsApp full of emoji reactions, or a long message chain.

He fits the "civic hacker" typology coined by Scholz (2016) deeply invested in the system architecture, but vastly uninterested in performative participation. Leon isn't showing up to the neighborhood potluck. He's filing a bug report because the app froze when booking a car. He believes in the principles, decarbonization, anti-monopoly structures, user control, but if the car's late or it requires too much talking, you've lost him.

His pain points are crystal clear. He's tired of backend opacity, frustrated by slow feature updates, and doesn't understand why so few of his peers in the co-op are as digitally proactive. He doesn't want co-op life to feel like group therapy (that he doesn't believe in). He just wants it to work.

Leon's persona surfaces a structural blindspot in platform cooperativism: the assumption that all members want to be socially or emotionally engaged. He doesn't. He wants clean data, fast loading times, and the freedom to participate on his own terms. His loyalty lies not in the mission statement, but in the logic of digital sovereignty, no data exploitation, no corporate creep, no fuss.

His presence in this ecosystem is proof that democratic platforms must build for varied participation styles. Not everyone's a joiner. Some, like Leon, just want to help build a better system, and get to IKEA on time.

5.3 Case 3: Coop C (Netherlands)

This case draws on interviews with Coop C's founder and active members, as well as user survey responses and public-facing documentation where available. Observations and thematic analysis reflect a blend of stakeholder perspectives, community practices, and direct user input, interpreted through the broader framework of civic participation and localized digital governance.

Coop C is a grassroots car-sharing cooperative based in the Netherlands that exemplifies the deeply local and community-embedded approach to cooperative mobility. Unlike the other two cooperatives, which operate at broader structural levels, Coop C's model is hyper-local: founded by neighborhood residents, governed through direct democracy, and

oriented around mutual trust. Its simplicity is not a limitation, but a strategic decision that informs how it builds civic relationships and maintains operational agility.

The decision to include Coop C as a case study was rooted in its distinctive governance character. Coop C does not rely on umbrella infrastructure or external investment. Instead, it operates with minimal technical overhead and maximal community input. Interviews with its founder and members revealed a rich picture of participatory decision-making, informal trust networks, and pragmatic experimentation in shared urban mobility.

Founded in Amsterdam by a small group of residents, Coop C began with a single electric car parked in a shared lot. It has since grown into a micro-network of neighborhood cells, each coordinating access through WhatsApp groups and informal agreements. While it now uses a basic booking platform, much of the coordination still happens through low-tech social tools. This bottom-up growth model makes Coop C quite an interesting example of civic tech without the tech-first mentality.

Governance within Coop C is intentionally flat. There is no central board or CEO. Instead, decisions are made at the neighborhood level through monthly gatherings, consensus discussions, and digital polls. Trust is both the currency and the infrastructure: as one member shared, “If I break something, I pay for it. If someone’s late, we talk about it.” This relational model reduces enforcement costs and fosters a sense of shared responsibility.

Technically speaking, Coop C is minimalist. It uses an off-the-shelf calendar app for booking, a shared payment system through local banks, and simple tracking of car maintenance. This allows Coop C to avoid the costs and complexity associated with formal fleet management software, while also increasing transparency among members. However, it does limit scalability and introduces potential coordination bottlenecks.

Their public framing is also more muted than its counterparts. It rarely engages in advocacy or broader civic campaigns. Instead, its emphasis is on the everyday: keeping cars clean, solving problems quickly, and making sure that everyone has access. This micro-focus enables flexibility but can also obscure its broader civic potential. Nevertheless, users repeatedly emphasized how Coop C made them feel more connected, even a sense of belonging, and more responsible as urban residents.

Coop C’s constraints are also part of its strength. The lack of external oversight allows it to innovate quickly, adapt to hyper-local needs, and retain a strong sense of ownership among users. At the same time, the reliance on informal systems makes it vulnerable to

turnover, scale limits, and coordination challenges. The absence of legal or technical buffers means that conflict resolution depends entirely on social cohesion.

As the smallest and most informal of the three cases, Coop C highlights the possibility of civic infrastructure without scale. It shows how car-sharing can be a site of social negotiation, place-making, and localized innovation. Their example challenges dominant narratives of growth and suggests that in some contexts, resilience can also come from depth, slowness, and community trust.

5.3.1 End-User Evidence-Based Persona: Jan De Vries

"We don't need apps when we have each other."

Jan de Vries

Age: 64
Location: Netherlands
Occupation: Retired Teacher

DESCRIPTION

Jan lives on a quiet street in Utrecht and has been part of DEEL since its founding. He doesn't own a smartphone, prefers biking when he can, and only uses the shared car for errands or hospital visits. What keeps him loyal isn't the convenience, it's the neighborly trust, the WhatsApp chats, and the shared responsibility. Jan isn't interested in apps or data dashboards; he just wants a system built on kindness and community.

DIGITAL FLUENCY

Low

MOBILITY MOTIVATION

Community trust, shared responsibility, climate values

PARTICIPATION STYLE

Informal, attends meetups, helps organize cleaning, uses WhatsApp group

TECH USE

Google Calendar + WhatsApp, no app usage

WHAT GROUNDS THEM

Finds strength in familiarity. He's grounded by trust, not tech, and believes systems thrive when built on kindness and mutual care.

NEEDS

- Simple, low-tech coordination.
- Personal connection & trust.
- Informal community participation.

PAIN POINTS

- Struggles with apps and tech
- Gets left out of digital decision-making
- Limited support beyond WhatsApp

Figure 3: Persona - Jan de Vries, Netherlands. Source: Own figure.

Jan is a 64 year old community-rooted Dutch user and one of the original members of Coop C's earliest neighborhood groups. A retired schoolteacher, Jan doesn't own a smartphone and prefers biking to most places unless he absolutely needs the shared car for errands or hospital visits. He's been part of Coop C since its founding and views the initiative not as a "mobility service" but as a living system of mutual trust. Jan represents the value-driven elder member who exemplifies the term "relational infrastructure", used time and again in this research paper, and also used by scholars like Simone (2004) to describe social systems held together by trust, reciprocity, and informal coordination. He does not wish to indulge in the painstaking process of going through steep learning curves to be able to borrow a car, especially when he can video-call with his grandson with that same time!

Jan doesn't care for digital dashboards or fancy interfaces. What he values is kindness, neighborly chats, and keeping things running with minimal fuss. He's the guy who brings

stroopwafels to meetings and insists that everyone contributes in small ways, watering plants near the parking lot, taking turns with cleaning, and voting on car-related decisions with consensus, not clicks. His cooperative is more than a service, it's part of his moral geography, his version of shared civic life.

Jan hates being left out of digital discussions. He's aware that more and more coordination is happening on apps or digital forms, and while he isn't opposed, he's just not built for that. He gets anxious when decisions are made in Slack channels or apps that he's never heard of. Also, when younger members want to scale too fast or add overly complex digital tools, Jan pushes back. Not because he's resistant to change, but because he doesn't want to lose the intimacy that made Coop C work in the first place.

Jan represents the "relational steward" persona in civic infrastructure, someone who grounds innovation in trust, care, and long-term reciprocity. In policy discussions, he's the reminder that not everything has to scale. Sometimes, the best tech is no tech at all, just a neighbor who shows up on time.

5.4 Comparative Table of Key Features

The following table synthesizes key comparative features of the three cooperative models examined in this study. It highlights differences and similarities in governance, technical infrastructure, participation, and operational logic. This synthesis offers a reference point for understanding how each cooperative navigates the balance between scale, community, and democratic values.

Comparative Table of Key Features of the Case Studies

Feature	Belgium Coop	Germany Coop	Netherlands Coop	Comparative Insight
Scale of Operation	Pan-European umbrella	National umbrella	Hyper-local neighborhoods	Three tiers of cooperative scale
Governance Model	Cooperative of cooperatives; federated	Centralized with weighted voting	Flat, consensus-based, informal	Decentralization vs. centralization spectrum

Tech Infrastructure	Modular and customizable	Standardized, closed stack	Minimal, low-tech tools	Technology reflects governance logic
User Participation	Indirect, via member co-ops	Low, mostly through governance rep	High, everyday coordination	Participation is shaped by governance proximity
Civic Orientation	Strong narrative framing around sustainability and democracy	Pragmatic, regulatory focus	Community trust, less external narrative	Institutional vs. relational framing
Scalability	Designed for replication	Strategically scalable	Locally constrained by design	Tensions between growth and depth

Table 4: Comparative table of key features around the studied case-studies. Source: Own figure.

The comparative analysis of Coop A, Coop B, and Coop C reveals three distinct cooperative archetypes, each shaped by their institutional positioning, technical choices, and governance logic. These differences are not only operational, they reflect competing interpretations of what cooperative mobility infrastructure should look like in practice.

Coop A exemplifies the logic of federation. As a cooperative of cooperatives, it balances decentralised local control with a shared digital backend. This interwoven structure enables scale without sacrificing autonomy. The interviews with Coop A stakeholders highlighted the platform's commitment to values like democratic ownership and sustainability, values that are not just stated, but coded into its technological design. The emphasis on customizability reflects an ethic of subsidiarity, allowing local cooperatives to tailor their experience without abandoning collective coherence.

In contrast, Coop B operates with a different orientation. Built for legal coherence and operational efficiency within Germany's regulatory landscape, it provides a more standardised technical and governance structure. Unlike Coop A, it imposes backend

systems across all members, prioritising system integrity over local flexibility. Interviews with board members surfaced recurring themes of liability, trust through regulation, and scalability via procedural alignment. This makes Coop B an archetype of institutionalised cooperativism, pragmatic, streamlined, and geared for national expansion.

Interestingly, while Coop C is often described as a single cooperative, it operates more like a constellation of neighborhood groups, semi-autonomous clusters coordinated through shared values and informal tools. While this structure lacks legal or technical formalization, it mirrors, in spirit, the federated design of Coop A, albeit with a radically minimalist footprint. The cooperative is also different from both of these models. It is small, informal, and deeply relational. Its low-tech infrastructure and peer-based governance system reflect a hyper-local, trust-dependent grounding. What it lacks in scalability, it makes up for in cohesion and adaptability. The Coop C transcript and survey results reinforced the sense of community as infrastructure, where human relationships, not digital platforms, are the glue holding the system together.

These three models collectively map out a spectrum of cooperative mobility: from platform federation (Coop A), to institutional backend (Coop B), to neighborhood commons (Coop C). Importantly, they reveal that civic tech is not one-size-fits-all. The tension between scale and participation, between standardisation and flexibility, recurs across the board, but what's interesting is that each cooperative, even when they're essentially solving the same problem through similar means, resolves it differently.

6. Results

This chapter presents the core findings of the study, based on both qualitative interviews and quantitative survey data collected across Belgium, the Netherlands, and Germany. It explores how community-based car-sharing cooperatives operate as civic infrastructure and examines their governance models, platform logics, and perceived impact among users. Drawing on interview material from cooperative leaders, platform developers, policymakers, and end-users, as well as user survey responses, the chapter offers a holistic comparative view of how cooperative mobility is practiced and imagined across three distinct national contexts.

Each piece of the analysis talks about a specific set of dynamics across a wide set of bucket themes; governance and participation models, platform design and technological infrastructure, cooperative identity and social engagement, and last but certainly not the least, the everyday experiences of users themselves. These themes emerged through a hybrid coding process using manual methods (via Excel), complemented by NVivo to align with best-practice standards for thematic analysis.

Germany plays a central role in the thematic sections, particularly in the analysis of platform-based models and regional scaling. However, due to shifting policies within the partner cooperative, the user survey could not be circulated there. As such, survey-based insights are drawn from Belgium and the Netherlands only, offering a two-country comparison on user motivations, perceived accessibility, value alignment, and reported barriers.

This chapter intentionally starts with survey-base findings to set the tone with everyday user perspectives before turning to the more structural and design-based insights from interview data. This helps us remember the end-users as a core center section, and not just an afterthought. In doing so, the chapter provides a stratified understanding of cooperative car-sharing, not just as a transport solution, but as an evolving public digital infrastructure.

6.1 Survey-Based Insights into User Experiences

This section draws on user-level data from community-based car-sharing cooperatives in the Netherlands and Belgium to offer a grounded view of how such systems shape everyday mobility, participation, and values. The survey was designed to complement interview findings with broader user feedback, though the sample size remains modest by design. In total, 31 respondents participated: 20 from Coop C, and 11 from two sub-cooperatives affiliated with Coop A in Belgium. While Germany was originally included

in the research design, user outreach was not feasible at the time of survey dissemination due to shifting internal policies within the cooperative regarding data-sharing and member engagement.

These constraints reflect a broader challenge in researching a niche and decentralized field. Community-based car-sharing remains a relatively underrepresented phenomenon, with small and dispersed user bases, minimal public visibility, and operational models that often rely on volunteer coordination. As a result, survey participation was contingent on each cooperative's capacity and willingness to circulate the survey, leading to a self-selecting sample. While not statistically representative, the responses offer valuable narrative anchors to interpret usage patterns, user values, and cooperative governance in practice. The visualizations that follow synthesize these insights across both countries—highlighting key dimensions such as usage frequency, perceived accessibility shifts, social participation, and motivational priorities.

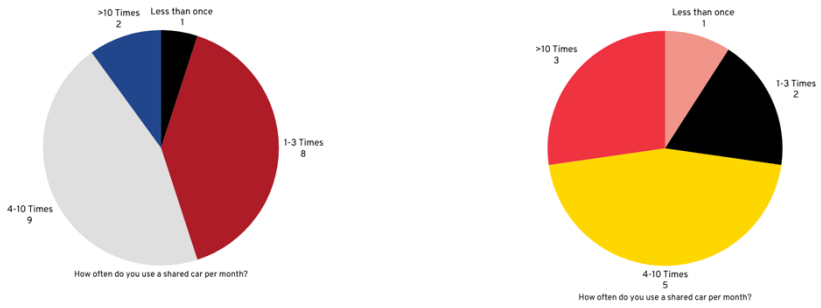

Figure 4: Responses to the question 'How often do you use a shared car per month?' to the cooperative end-users, in Netherlands (left) and Belgium (right). Source: Own figure.

Figure 4A and 4B illustrate the monthly frequency of shared car use among respondents in the Netherlands and Belgium. In the Netherlands (Figure 4A), 8 out of 20 users reported using a shared car 1–3 times per month, while 9 used it 4–10 times. Only 2 reported using it more than 10 times monthly, and 1 user indicated using it less than once per month. This distribution suggests that for most Dutch respondents, cooperative car-sharing is a consistent, mid-frequency part of their mobility routine, integrated into everyday commuting or errand patterns without necessarily replacing all transport needs.

In Belgium (Figure 4B), the pattern shifts slightly. Out of 11 respondents, 5 reported using a shared car 4–10 times monthly, 3 used it more than 10 times, 2 used it 1–3 times, and 1 respondent reported using it less than once a month. Compared to the Netherlands, this indicates a slightly higher proportion of high-frequency users in Belgium, which may reflect closer proximity to shared vehicles, smaller user pools per car, or more community-based coordination that encourages frequent usage.

In both contexts, the data confirms that cooperative car-sharing is not limited to trial use or novelty, but forms a stable and repeated part of users' monthly transport behavior.

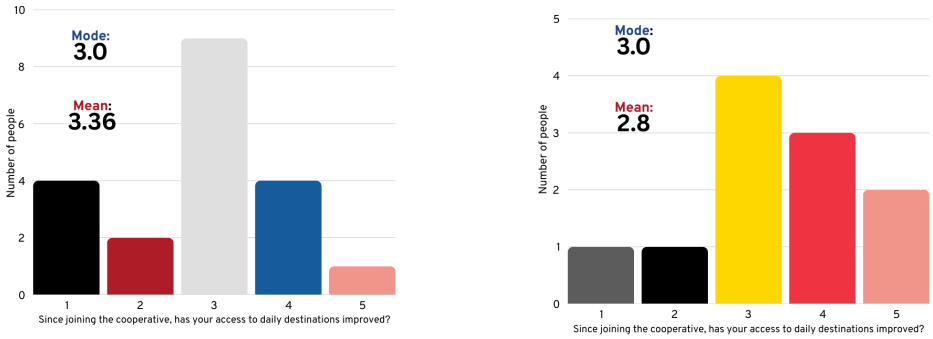

Figure 5: Responses to the question 'Since joining the cooperative, has your access to daily destinations improved?' to the cooperative end-users, in Netherlands (left) and Belgium (right). Source: Own figure.

Figure 5A and 5B focus on a core functional dimension of cooperative mobility: whether users felt that their access to daily destinations improved after joining. In the Netherlands, users gave moderate feedback, with a mean score of 3.36 and a mode of 3 on a 5-point scale (Figure 5A), suggesting that while some improvements were felt, they were not universal. Belgian users, however, reported slightly lower perceptions of improvement, with a mean of 2.8 and a mode of 3 (Figure 5B). This indicates that although shared mobility filled some gaps, users in both contexts experienced only modest shifts in their perceived daily accessibility. Factors such as existing transport infrastructure, service area coverage, or user expectations likely influenced these scores. These mean scores, however, only tell part of the story. A closer look at the standard deviations reveals deeper variation in user experience. In the Netherlands, the standard deviation is **2.76**, suggesting a broad spread of responses, some users experienced significant improvement, while others did not. In Belgium, the standard deviation is **1.17**, indicating a narrower distribution and more consistent, albeit moderate, feedback. This contrast may reflect the impact of differing cooperative models: Coop C's hyper-local flexibility versus COOP A's federated structure.

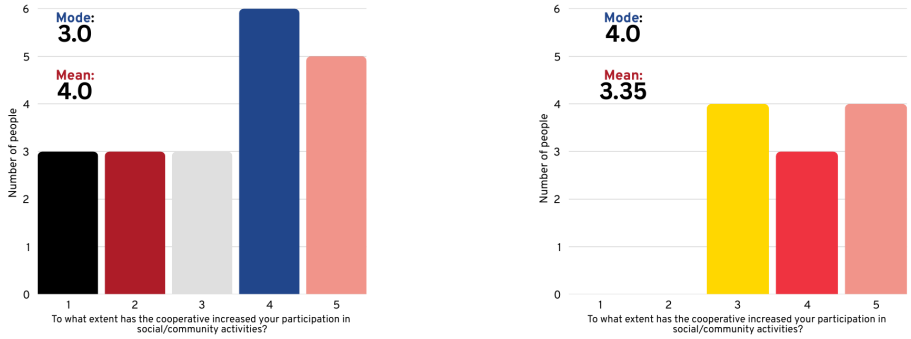

Figure 6: Responses to the question 'Since joining the cooperative, has your access to daily destinations improved?' to the cooperative end-users, in Netherlands (left) and Belgium (right). Source: Own figure.

Figure 6A and 6B offer a more affective register, probing whether cooperatives have increased participation in social or community activities. Netherlands' users once again clustered around the mid-range: a mean of 3.35 and a mode of 4. Belgian responses, however, showed a more significant positive tilt, with a higher mean of 4 and a mode of 3. This difference might hint at a deeper civic or community logic embedded in the Belgian cooperatives, which are often more tightly interwoven with local initiatives. It also supports the hypothesis that car access in contexts of transport scarcity unlocks not just logistical mobility, but social belonging. The standard deviation helps contextualize these findings further. While Belgium's mean is higher at **4.0**, the standard deviation of **1.83** indicates a wider range of experiences. This could mean that while some members feel deeply engaged, others may not participate as actively. By contrast, the Netherlands' lower mean of **3.35** is paired with a tighter standard deviation of **1.26**, suggesting more uniform, though slightly less enthusiastic, participation. This reinforces qualitative insights that Belgian cooperatives may foster stronger social bonds, but not uniformly across all members.

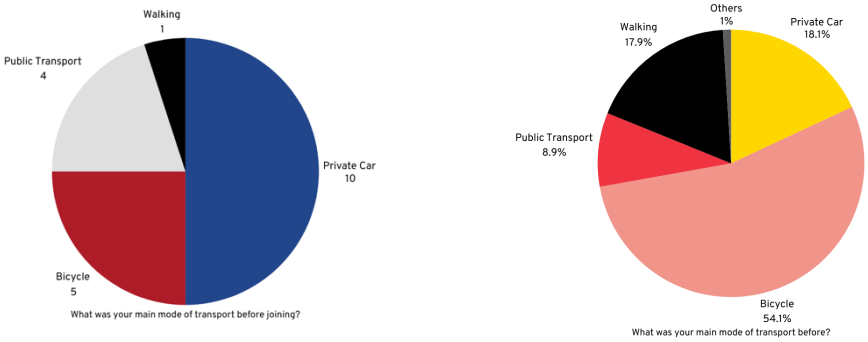

Figure 7: Responses to the question 'What was your main mode of transport before?' to the cooperative end-users, in Netherlands (left) and Belgium (right). Source: Own figure.

Figures 7A and 7B provide insight into the primary modes of transport used before joining the cooperative in the Netherlands and Belgium, respectively. In the Netherlands (Figure 7A), private car usage dominated, with 10 out of 20 users reporting it as their main transport mode. This was followed by bicycles (5 users) and public transport (4 users). These figures suggest that for many Dutch respondents, joining the cooperative marked a significant modal shift, from individually owned vehicles to a shared, community-managed system. The cooperative model here appears to serve as a viable alternative to car ownership, offering benefits in terms of cost savings, ecological impact, and logistical simplicity.

In Belgium (Figure 7B), the pattern differs notably. Bicycles were the most common mode, reported by 6 out of 11 users, followed by private cars and walking (2 users each), and public transport (1 user). This distribution reflects the deeply embedded cycling culture present in many Belgian towns and implies that cooperative car-sharing may have been adopted more as a complementary or contingency option rather than a transformative mobility shift.

This contrast is essential when interpreting broader findings on accessibility and satisfaction: in the Netherlands, cooperatives often replaced a high-cost, car-dependent model, whereas in Belgium, users were already relying on low-cost, sustainable transport options. As such, Belgian users may have been motivated more by community ownership and environmental values than by direct functional necessity.

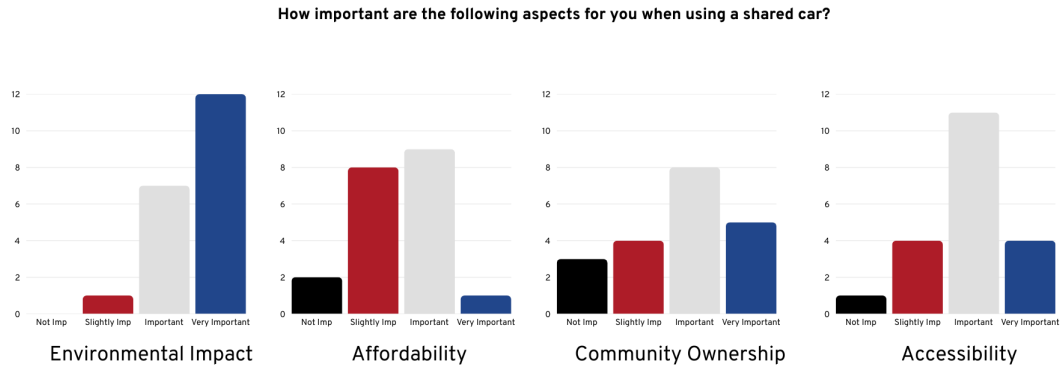

Figure 8: Responses to the question 'How important are the following aspects for you when using a shared car: environmental impact, affordability, community ownership or accessibility?' to the cooperative end-users in Netherlands. Source: Own figure.

Figure 8 captures the priorities respondents associate with shared car usage, highlighting a strong emphasis **on** environmental impact, which emerged as the top-rated factor. This aligns with broader sustainability discourses already prevalent in several European contexts, where low-emission mobility choices are increasingly supported by both policy and public sentiment. The fact that nearly all participants rated environmental impact as either “important” or “very important” suggests that car-sharing cooperatives are seen not merely as transport alternatives, but as ethical and environmentally responsible practices.

Affordability and accessibility followed closely, revealing that users also approach shared mobility from a practical standpoint. The emphasis on cost-effectiveness and ease of use reflects how cooperatives are expected to reduce financial and logistical burdens while enhancing everyday mobility. For many respondents, especially those without personal vehicles, the cooperative model likely provides a middle ground between ownership and dependency on public transit, enabling flexibility without long-term financial commitments.

Interestingly, **co**mmunity ownership received moderately high ratings, though it was not the most dominant factor. This suggests that while users appreciate collective structures and value-driven models, these aspects may be viewed more as added benefits than core motivations. In interview data, this was echoed by members who described participation mechanisms like group decision-making or shared responsibility as meaningful, but not necessarily the primary reason they joined.

What emerges here is a multi-dimensional user logic: one that places environmental responsibility front and center, but remains grounded in individual utility and tangible benefits. Users appear to be engaging with cooperatives as both a moral and functional alternativem recognizing the social and environmental values embedded in the model while still prioritizing affordability, convenience, and performance.

Together, these insights help position car-sharing cooperatives as viable contributors to sustainable transport ecosystems. They are not only enabling greener travel but also meeting everyday needs in ways that are collectively governed yet individually responsive.

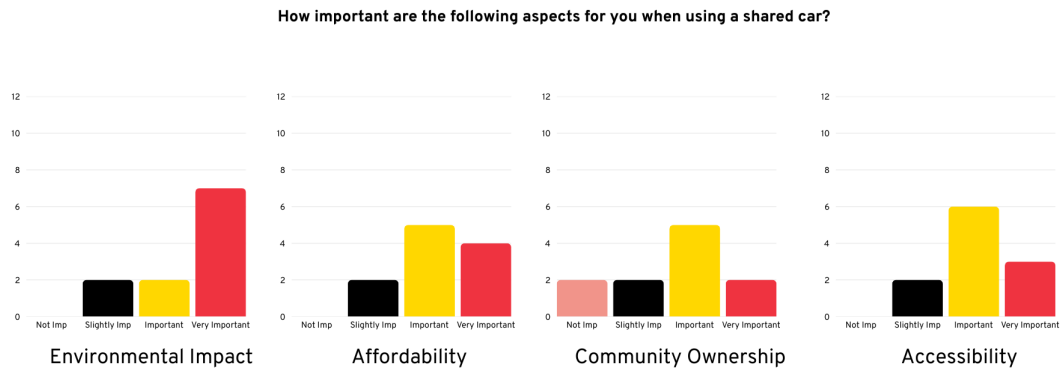

Figure 9: Responses to the question 'How important are the following aspects for you when using a shared car: environmental impact, affordability, community ownership or accessibility?' to the cooperative end-users in Belgium. Source: Own figure.

Figure 9, reflecting Belgian users' responses, reveals a similar prioritization of environmental impact, but diverges more sharply on secondary values. Belgian respondents placed greater weight on community ownership, indicating a stronger identification with the cooperative not just as a service, but as a community-driven initiative. This emphasis likely stems from the structure & values of Belgian cooperatives which actively foreground member participation and shared governance. While affordability and accessibility remained relevant, they trailed behind, pointing to a slightly different narrative: where the cooperative is valued not only for what it enables practically, but for what it represents socially and democratically.

In sum, user responses across both countries offer a complementary portrait of shared mobility as more than a convenience. They highlight how cooperative infrastructure can subtly reshape travel routines, enhance social connectivity, and invite members to frame mobility as a collective good. While the Netherlands demonstrates integration into existing sustainable mobility patterns, Belgian cooperatives appear to unlock deeper shifts for users accustomed to car-dependency. Together, these insights ground the broader governance and technological themes that follow in lived experience.

6.2 Governance and Participation Models

This section explores the governance architectures and participatory mechanisms of car-sharing cooperatives across Belgium, Germany, and the Netherlands. Drawing on interviews with cooperative leaders, technical developers, users, and policymakers, the analysis centers two key questions: how are decisions made within these cooperatives, and how does participation shape their operation and growth? While each country reflects a distinct institutional ecology, what emerges across the board is a creative tension between scale and autonomy, centralization and grassroots agency. Cooperative mobility, as these cases show, is not just about transportation infrastructure but about the democratic infrastructures that support it.

The community-based car-sharing cooperatives are characterized by participatory governance structures. Members are not just users but co-owners who can voice opinions and shape policies. As I07 notes: *"You can vote on things like car placements or budget allocation. It's small-scale democracy, and that's really empowering. It wasn't super formal, more like a town hall where anyone could speak up"* (Personal Communication, March 2025). Such processes allow members to shape operational decisions, fostering accountability. I06 extends this sentiment: *"Being able to drive to events, visit family, volunteer activities, even weekend markets has made a difference. Before, I'd sometimes skip those if I didn't want to deal with parking or emission."* (Personal Communication, March 2025), indicating how governance reshapes mobility behavior.

External observers recognize this model's uniqueness. I09 observes: *"These co-ops bring targeted benefits through including its users early on, especially in terms of participatory planning"* while noting *"When people feel they have a say, even a small one, in how their transport is managed, it gives you pride"* (Personal Communication, March 2025). Cooperative leaders echo this emphasis: all major decisions are subject to member votes, and leadership roles are filled through democratic processes. I09 further contextualizes this trust dynamic: *"In areas where trust in public systems is low, people respond better to familiar, cooperative structures"* (Personal Communication, March 2025). Members consistently reported that this democratic governance structure made them more invested in the cooperative's success compared to their feeling of powerlessness in commercial services.

Across all countries, participatory governance fosters more than operational input, it nurtures emotional investment and shifts user behavior. This suggests that when people co-govern services they rely on, their commitment to responsible use increases, leading to more sustainable engagement compared to passive consumer models.

Umbrella vs. Grassroots Governance

Belgium's Mobility Factory exemplifies a federated approach. I02 describes their philosophy: *"We see our role as a technology platform provider. We provide the tech so they can do their business, but all business decisions are made locally. We don't interfere; we just provide the platform and try to meet their demands"* (Personal Communication, March 2025). This hybrid model balances coordination with local control. I02 elaborates on operational tensions: *"It's always a trade-off between being too strict in allowing new features or not strict at all"* (Personal Communication, March 2025), highlighting the challenge of maintaining system integrity while respecting local autonomy.

Germany's model adds legal harmonization. I03 notes: *"Members influence the technical roadmap – they vote on new features annually, and we have a tech working group where co-ops can suggest updates"* while emphasizing that *"All members sign onto a charter that emphasizes democratic governance, local sustainability, and data privacy"* (Personal Communication, March 2025). This dual emphasis on democratic legitimacy and operational pragmatism allows small-scale co-ops to benefit from federation while maintaining agency.

The Netherlands' Coop C represents radical localism. I04 explains: *"We don't want to scale Coop C into a big enterprise; we'd rather support others to replicate the idea in their own towns"* (Personal Communication, March 2025). Governance occurs through WhatsApp coordination and monthly check-ins where *"even small things like where to park the car or whether to buy a new EV are community decisions"* (I04, Personal Communication, March 2025). This model offers deep local embeddedness and is built around a strong culture of trust and mutual respect.

Governance structures flex according to institutional maturity and cultural norms, but the consistent thread is the preservation of local agency. These models show that even with shared backend or legal infrastructure, democratic control at the community level is both viable and effective, especially when users are empowered to make real decisions.

Participation as Civic Infrastructure

What unites these models is the embedding of participation into operational DNA. I04 critiques top-down alternatives: *"Many smart city initiatives are very top-down. They focus on data and efficiency, but forget the social layer – people don't want to be reduced to data points. They want to feel seen, engaged, and involved"* (Personal Communication, March 2025). This ethos transforms users into co-creators, I10 observes: *"Adoption is steady, not viral, but it's real. What's more important is*

retention. Because we build with them, not just for them, these communities stick around. They don't churn, they're not customers, they're co-creators" (Personal Communication, March 2025). Importantly, participation also builds retention. In a digital economy where user trust is fragile and data exploitation common, cooperative models offer an alternative governance logic rooted in stewardship, not surveillance.

Participation here operates as a form of civic infrastructure that directly affects cooperative durability. Especially in environments with public sector distrust or fragmented transport planning, co-ownership models can build local legitimacy and a sense of shared stewardship that commercial apps fail to offer.

Scale vs. Autonomy: The Governance Spectrum

Each model negotiates the tension between growth and democratic integrity. I01 conceptualizes this through the "*strawberry model*": *"Our way of seeing growth is what we call the 'strawberry model' – the mother plant isn't covering the entire field; it's the runners that do that. It's a metaphor for how the energy community movement should develop"* (Personal Communication, March 2025). Belgium and Germany address this through modular federation, while the Netherlands relies on organic replication. I09 contextualizes the appeal: *"In areas where trust in public systems is low, people respond better to familiar, cooperative structures"* (Personal Communication, March 2025). Ultimately, these cooperatives show that governance isn't an external layer juxtaposed onto mobility innovation, it is the innovation. By designing participation into their DNA, these platforms don't just move people; they reconfigure how people move together.

These cooperatives redefine what meaningful scale looks like in civic innovation—not just more users, but more nodes of ownership. Rather than chasing network monopolies, these models "scale through replication," showing that trust-based, decentralized approaches can still produce regional impact without diluting democratic values.

6.3 Platform Design and Technological Aspects

This section explores the underlying digital architecture of cooperative car-sharing, with a focus on platform infra, data practices and design decisions that shape how users engage with mobility services. Across Belgium, Germany, and the Netherlands, technological choices are not merely operational, they are ideological, expressing commitments to openness, trust, and collective governance. While user-facing technology may appear seamless, interviews with cooperative directors, technical developers, and policy advisors reveal a more complex infrastructure of trade-offs: between open-source ideals and

practical interoperability, between centralized support and modular flexibility, and between intuitive design and democratic control.

I01 underscores scaling economics: *"One of the key challenges now is making sure that we connect as many cars as possible to the network. You need to scale up to make the unit cost as low as can be"* (Personal Communication, March 2025). A robust yet accessible digital platform underpins each cooperative's operations, from booking vehicles to managing memberships. The cooperatives face the challenge of building tech infrastructure that serves their community values and limited budgets. One interviewee, a technology developer for mobility cooperatives, explained that "it's tech that isn't just for the public – it's of the public", designed to "give people the tools to self-organize". He likened the open-source platform to "digital plumbing" – essentially invisible when working but vital for empowering the whole community when done right (I10, Personal Communication, March 2025). This civic-tech philosophy means the platform infrastructure prioritizes transparency, privacy, and local customization over glossy bells and whistles. In practice, many co-ops collaborate through umbrella organizations to share and improve platform technology. As one cooperative leader described, "we provide… software tools, insurance bundling, and even guidance on legal formation" to new car-sharing initiatives (I05). By pooling resources in this way, federations of cooperatives (such as Coop A in Europe) help local co-ops access a professional-grade platform without each having to reinvent the wheel. This cooperative approach to platform development ensures that even small, volunteer-driven car-shares can utilize reliable booking systems and databases aligned with their values. Another challenge commonly faced by smaller cooperatives or energy communities is developing their own digital architecture to base their operations out of, as I01 mentions, 'it would be very hard for a smaller community to set up the business, managing everything by yourself' (I01, Personal Communication, March 2025) and the bigger umbrella coops tackle this exact issue, by providing them a fully equipped (ranging across cooperatives) technological interface that they can simple use to power their operations.

I05 critiques fragmentation: *"A big problem I see is every municipality tries to build their own app. In Belgium alone I've seen 4–5 cities do this. That's money wasted when it could've been centralized"* (Personal Communication, March 2025).

Platform Infrastructure: Federation vs. Customization

Belgium's Mobility Factory exemplifies a federated infrastructure model. Local cooperatives plug into a shared backend platform that handles fleet management, billing, insurance, and booking tools. As described by I01, "It's like having a skeleton, you can dress it how you want, but the bones stay the same." (Personal Communication, March

2025) This model allows for standardization of legal and technical margins while enabling branding and community engagement to remain local. The key is modularity: cooperatives choose what to activate, customize language and features, and co-develop plugins with Coop A's tech team.
This federated logic also addresses a broader critique raised by I05, a private MaaS expert, who flagged a "big problem" in how cities handle mobility infrastructure: "*The money taken by different municipalities/cities to build their own mobility systems is already more than what it would have taken if the solution was centralized to begin with*" (Personal Communication, March 2025). In this context, shared platforms like Coop A's offer a more sustainable alternative to fragmented digital ecosystems.
In Germany, our case study's approach shares similarities but adds more emphasis on legal harmonization and backend consolidation. A board member noted that backend stability is essential for "reducing admin friction, especially for co-ops just starting out." Their shared architecture handles GDPR compliance, database management, and integrated driver vetting, creating consistency across member co-ops.

I04 emphasizes data sovereignty: *"One big reason people prefer us to commercial car-sharing apps is that we don't sell or harvest data. The platform is hosted locally, and members know exactly what's being collected"* (Personal Communication, March 2025).

From the user perspective, the digital experience, while functional, has room to grow. Several participants appreciated that the co-ops' apps were improving steadily. One survey respondent observed that "the app started out pretty basic; it's still low-tech compared to big companies, but it's evolving" (S01). This reflects a common trade-off: the platform may lack the polish of corporate competitors, yet it adapts to community needs over time. Indeed, cooperatives tend to roll out features gradually, for example, adding multi-language support or community forums as member feedback dictates, rather than pursuing growth at all costs. Members generally accept a simpler interface knowing that it comes without the downsides of profit-driven platforms (no intrusive ads or data selling). Still, reliability is critical. As one member pointed out, the system must be easy and dependable to retain users; if the booking platform falters, people will "drop off" in usage. Cooperative managers are keenly aware of this and thus focus on core functionality and responsive tech support. In summary, the platform infrastructure of these car-sharing co-ops is a collectively developed asset: it embodies the cooperatives' public-interest values and, despite modest beginnings, it steadily improves to meet members' needs.

The infrastructural strategies reflect different responses to the same question, how to scale digital systems without undermining autonomy. The insight here is that cooperative tech isn't a one-size-fits-all model but a spectrum of modular architectures that accommodate

local governance while minimizing technical debt. This suggests federated platforms can act as enablers of democratic tech, not inhibitors.

Designing for Trust: Openness, Data, and Stewardship

Technology in cooperative mobility is not neutral, it carries assumptions about control, ownership, and risk. One recurring theme across interviews was the role of data governance in cultivating user trust. In Belgium, user data is not monetized, and each cooperative has access to its own usage metrics. The platform is built on an open-source base, enabling external auditing and co-development. Their staff emphasized that "transparency in code is as important as transparency in governance." In Germany, the cooperative can be seen attempting balances openness with legal robustness. The platform itself is proprietary, but member co-ops have guaranteed access to analytics and clear channels for raising technical concerns. As one developer noted, participatory design is "baked into the architecture" updates are piloted with a subset of cooperatives before being rolled out network-wide. This iterative co-development reflects a civic tech orientation, where tools are not just built for users, but with them. And in Netherlands, their model, while minimalist, foregrounds data sovereignty by default. There is no centralized server or analytics dashboard. Coordination happens peer-to-peer. While this limits long-term performance insights, it also minimizes surveillance concerns. As a Coop C member shared, "No one's tracking when I drive, I can simply let them know after" This approach illustrates that trust can be considered infrastructural, even when the tech is simple.

These findings affirm that trust is not just a cultural norm, it is an embedded design principle. In cooperative mobility, data governance becomes a site of ideological expression. The platforms show that ethical tech infrastructure can support robust participation, especially when users have visibility into how systems function and confidence that their information won't be monetized.

Interoperability and Innovation: Constraints and Possibilities

While ideals of openness and customization dominate discourse, technical limitations are ever-present. For umbrella models, interoperability across hardware, payment gateways, and mapping APIs remains a challenge. As one civic tech expert explained, "A co-op might want to use a cheaper lock or integrate with a local transit app, but that breaks something upstream." This requires constant trade-offs between flexibility and system stability.

Coop A navigates these constraints by maintaining a suite of tested hardware options and encouraging co-development with vendors. Coop B enforces stricter standards, vetting

new devices centrally and requiring technical approval before integration. Despite these controls, both platforms maintain spaces for experimentation: Belgium's cooperative hosts hackathons with its member co-ops, while Germany is piloting open APIs that allow third-party integrations within strict data governance parameters. I10 acknowledges the challenge: *"Working in this space feels like building a community garden next to a massive shopping mall. We're not here to scale up to millions of users; we're here to scale deep, to help small cooperatives do big things"* (Personal Communication, March 2025).

Innovation in cooperative tech is not about disruption but about coherence. These cooperatives show that meaningful innovation emerges not from constant novelty, but from aligning system design with user values and operational durability. The lesson here is that infrastructure in civic tech must evolve with care, balancing usability, adaptability, and community governance.

6.4 Cooperative Identity and Community Engagement

This section explores how cooperative car-sharing platforms cultivate a shared sense of identity and foster community engagement, both essential yet often intangible dimensions of civic infrastructure. While previous sections outlined governance and technology as structural pillars, this section turns to the cultural, emotional, and symbolic aspects that hold these systems together. Drawing from user survey responses, interview narratives, including those from cooperative leads, platform developers, and policy stakeholders, and cooperative histories, the analysis uncovers how members and decision-makers collectively shape cooperatives as mobility services, and also as bigger social collectives, value-driven projects, and community institutions.

Perhaps the most striking finding is the strong sense of identity and community that members associate with their cooperatives. Unlike commercial car-sharing services, which users often see as purely transactional, these co-ops foster a feeling of participation in a shared project. Members repeatedly mentioned that they feel part of a like-minded community. "I've met neighbors I'd never spoken to before through the cooperative," said a participant from the Netherlands, adding that this unexpected social connection was "surprisingly heartwarming" (I06, Personal Communication, March 2025). I08 captures the affective dimension: *"It has this 'local fabric' feeling – like you're part of a patchwork solution grounded in where you live"* (Personal Communication, March 2025). This sense of local community ownership, knowing that the cars and the platform are managed by fellow members, creates bonds between people. Members encounter each other at vehicle pick-up points or meetings, turning a simple mobility service into an opportunity for social interaction. As a result, the cooperative model

delivers not just transportation, but also a subtle strengthening of neighborhood ties and mutual trust among participants.

Cooperative mobility services, when embedded in daily life, do more than facilitate movement, they weave new social linkages. Even lowkey interactions around shared cars evolve into moments of recognition and relational trust. This reveals how civic tech platforms can function as soft community-building tools, deepening everyday urban belonging.

Values and trust emerged as core elements of the cooperative identity. Many participants are drawn to these initiatives out of a desire for an ethical, transparent alternative to corporate mobility platforms. One survey respondent explained that they "trust the cooperative more than a commercial car-share platform because it's run by members of the community, not a big corporation" (I07, Personal Communication, March 2025). This highlights how the cooperative's not-for-profit, member-driven structure builds credibility. Members know where their money goes – any surplus is reinvested into the service or the community rather than taken as profit – and they often have insight into decisions. Several interviewees emphasized this transparency and shared purpose. "With commercial apps, it's very transactional," one member noted, "but with the cooperative, I feel like I'm part of something" meaningful (I08, Personal Communication, March 2025). I04 reveals the relational foundation: *"Honestly, the relationships we've built are our biggest achievement. That's not measurable in carbon saved or rides given, but it's the glue that makes Coop C work. We trust each other"* (Personal Communication, March 2025). Indeed, the cooperative's identity is intertwined with a mission of local sustainability and service rather than growth for its own sake. Participants spoke of feeling pride and accountability as co-owners, which in turn motivates them to promote the cooperative and adhere to its principles (for example, treating the shared cars respectfully and driving sustainably).

In an ecosystem flooded by extractive platform models, cooperatives gain an edge by turning users into active stakeholders. Transparency becomes more than a principle, it becomes a retention strategy. Trust isn't abstract; it is continuously built through visibility, accountability, and mutual care.

Finally, members conveyed that being part of a car-sharing cooperative has subtly shifted their perspective on mobility and agency. In contrast to the passive consumer role fostered by conventional services, the cooperative model empowers individuals to be contributors. As one German interviewee passionately put it, "it's not just about the car. It's about community, shared values, even hope… a system where your voice still matters" (I03). I06 notes emergent community benefits: *"You don't join for the community, but it*

becomes a nice side effect. It's comforting to know there's a shared mindset around sustainability" (Personal Communication, March 2025). This statement encapsulates how members see the co-op as more than a way to rent cars – it is a vehicle (figuratively and literally) for practicing collective values and hopeful innovation in their cities. Knowing that their feedback or volunteer efforts can influence the direction of the service gives people a sense of ownership and efficacy that traditional companies rarely offer. In sum, the cooperative identity that has developed in these car-sharing initiatives is one of community and trust. Members identify as part of a movement redefining mobility on a human scale, where practical benefits (convenient access to a car, cost savings) go hand in hand with intangible rewards like solidarity, empowerment, and aligning transit with one's values. This distinctive identity is a key factor in the cooperatives' ability to attract and retain members, even when competing against larger commercial operators.

This shift from user to contributor highlights the political potential of cooperative platforms. They transform infrastructure into an arena for everyday participation. In contrast to mobility-as-a-service, cooperative mobility is mobility-as-a-civic-practice, where movement is layered with meaning, responsibility, and co-creation.

Emotional Infrastucture

Beyond tools, rules, or tech stacks, what binds these cooperatives together is emotional infrastructure, an often-overlooked yet critical theme. Trust, pride, and mutual care are not supplementary; they are foundational. They shape who joins, who stays, and how conflict is resolved. This is especially visible in informal cooperatives like in Netherlands, where there are few formal enforcement mechanisms, and yet the system works, precisely because of strong interpersonal norms. What's notable is that these emotional currents are sustained not by charismatic leadership or marketing campaigns, but by recurring contact and low-friction rituals: sharing the car key, coordinating on a group chat, helping fix a flat tire. These micro-moments reinforce commitment and build a quiet sense of belonging. I04 notes the significance of rotating responsibilities: *"We rotate some tasks. One month someone takes care of cleaning the car, another manages the schedule. It's light-touch, but that ownership is important"* (Personal Communication, March 2025).

In a policy and research landscape that often privileges quantifiables, like mileage, emissions saved, revenue, these findings remind us that it's the qualitative fabric that often sustains systems over time. Cooperative mobility isn't just about getting from point A to point B. It's about embedding care into infrastructure and reconfiguring mobility as a civic experience, not just a transaction. I08 articulates this transformative potential: *"I think more people would use it if they realized it's not just about the car. It's about community, shared values, even hope. In a world of algorithms and endless choice, here*

your voice still matters. That counts for something" (Personal Communication, March 2025).

Emotional infrastructure is not a soft add-on, it is a system-critical. From retention to resilience, it fuels continuity in cooperative models. In contexts where formal enforcement is minimal, it is these emotional norms that function as governance. For public sector innovation, this is a powerful lesson: scale doesn’t always require tech, sometimes it requires trust.

7. Discussion

This chapter revisits the central research question:
How do community-based car-sharing cooperatives function as civic tech infrastructure, and in what ways do they contribute to reimagining more inclusive and sustainable forms of urban mobility?

Building on this, the analysis was guided by two sub-questions:
1. What governance models and participation mechanisms define these cooperatives, and how do they reflect or challenge conventional public mobility systems?
2. What kinds of innovation, technical, organizational, or civic, do these models embody, and what factors shape their potential for scaling or replication across contexts?

This research contributes to both theoretical and practical understandings of civic infrastructure, digital governance, and cooperative models within urban mobility ecosystems. It situates community-based car-sharing not merely as a service alternative, but as a form of civic technology—locally anchored, value-driven, and socially negotiated.

Drawing on theoretical frameworks in platform cooperativism (Scholz, 2016), Commons Theory (Ostrom, 1990), and infrastructural studies (Star, 1999; Larkin, 2013), this research frames cooperatives as dynamic systems where governance, technology, and participation are co-constructed through everyday use and shared values. It extends a growing body of literature exploring how digital systems can be governed as public goods, expanding the scope beyond digital labor and data justice to hybrid models that blend physical assets, digital platforms, and participatory governance.

Empirically, findings from Belgium and the Netherlands reveal diverse configurations of cooperative infrastructure. Coop C, the Dutch cooperative, thrives on low-tech, trust-based coordination using tools like WhatsApp and community accountability. In contrast, Belgian cooperatives under Coop A leverage digitized infrastructure while still foregrounding democratic values. Despite structural contrasts, both models are anchored in local ownership, emotional buy-in, and civic culture. This disrupts binary framings of centralized vs decentralized infrastructure, revealing a textured middle ground.

Methodologically, this thesis introduces a persona-driven lens to enrich conventional stakeholder analysis. Personas like Jan, Sofia, and Leon are grounded composites, crafted from survey responses and interview transcripts. They reflect a spectrum of motivations, frictions, and behavioral logics, offering a user-centered way to interpret cooperative design and participation.

Practically, these findings offer policy-relevant insight for platform designers, urban planners, and cooperative federations. Sustainable civic tech design requires not just efficient tools, but inclusive pathways for participation. Designing for trust, flexibility, and symbolic meaning emerges as essential to building cooperative infrastructure that scales meaningfully without eroding its democratic character.

The thesis draws on qualitative interviews and user surveys conducted across Belgium, the Netherlands, and Germany, offering a comparative perspective that captures both system-level structures and lived experiences. By placing democratic governance, platform design, and emotional infrastructure at the center of analysis, this study interprets cooperative car-sharing not simply as a mobility service, but as a civic institution in motion.

The sections that follow interpret the key findings in light of these research questions. **Section 7.1** synthesizes the results across governance, design, and user experience. **Section 7.2** explores how cooperatives operate as participatory civic infrastructures. **Section 7.3** analyzes how platform design, data practices, and trust co-produce the cooperative experience. **Section 7.4** discusses the balance between decentralized control and the need for infrastructural scaling. **Section 7.5** then addresses the limits and frictions that cooperative models face—both culturally and operationally, in broadening adoption or reaching new user bases.

Together, these sections argue that the core contribution of this study is not a model for cooperative mobility per se, but an invitation to reimagine how we design, govern, and inhabit infrastructure. If infrastructure is, as Susan Leigh Star (1999) reminds us, "that which becomes visible upon breakdown," then cooperatives, both fragile and generative, offer a critical site for interrogating what urban systems are built for, and whom they are built by.

7.1 Governance and Participation

This section responds to Sub-question 1: *What governance models and participation mechanisms define these cooperatives, and how do they reflect or challenge conventional public mobility systems?*

The findings illustrate that community-based car-sharing cooperatives are not only mobility providers but also political experiments in distributed governance. Across Belgium, Germany, and the Netherlands, democratic participation is embedded into the operational DNA of these platforms. Members are not just end-users—they are active stakeholders who help decide everything from car placements to technology roadmaps.

This is not incidental. As the Results chapter showed, such participation fosters trust, accountability, and user retention.

More strikingly, these participatory structures often fill a void left by fragmented or impersonal public systems. In contexts where traditional institutions struggle to maintain citizen engagement, cooperative mobility steps in as a relational and responsive alternative. In Belgium and Germany, federated platforms balance centralized infrastructure with localized agency, offering a model of "coordinated autonomy." Meanwhile, the Netherlands' radically local approach shows how deep participation can thrive even in minimal formal structure—relying on social norms, mutual trust, and emotional infrastructure to sustain itself.

These governance models challenge the dominant logic of public mobility systems, which often prioritize scale, efficiency, and top-down control. Instead, cooperatives scale differently—through replication, member stewardship, and federated knowledge-sharing. They function not as singular providers but as civic micro-institutions that experiment with new forms of democratic infrastructure. In this way, cooperative governance is not just a technical feature, but a normative intervention. It reclaims mobility as a site of co-creation, blurring the line between user and citizen.

7.2 Cooperatives as Participatory Civic Infrastructures

This section delves into how community-based car-sharing cooperatives function not simply as mobility solutions, but as participatory civic infrastructures, democratically governed systems that embed collective values into the very design and delivery of public life. Returning to the thesis's main research question: *How do community-based car-sharing cooperatives function as civic tech infrastructure, and in what ways do they contribute to reimagining more inclusive and sustainable forms of urban mobility?* The analysis here foregrounds the civic dimension. It highlights how infrastructure, when shaped by community participation and embedded trust, becomes a medium through which citizenship, care, and co-ownership are enacted.

Across both the Netherlands and Belgium, this study found that cooperatives serve not only as technical platforms for mobility access, but also as civic institutions in which members become active contributors to the systems they rely on. Participation is not limited to periodic voting or symbolic gestures. Instead, it manifests through layered, often informal practices, group chats, maintenance rotations, ad hoc coordination, and everyday acts of stewardship. In the Netherlands, Coop C's low-tech, relational structure encouraged ongoing micro-participation. Booking a car via WhatsApp, for instance, also meant being part of a living thread of accountability, humor, updates, and decision-

making. As one user shared in an interview, “it’s not just about when I drive, but how we talk about the car, it’s a shared thing, like a garden.”

This notion of shared infrastructure resonates with Ostrom’s (1990) insight that commons-based systems thrive when users have both voice and stake. Rather than treating the car or platform as a service to be consumed, members often referred to it as “our car” or “our group,” signifying a co-owned social object. Even in more formalized cooperatives in Belgium, the backend support from Coop A was designed to preserve this sense of local ownership. Each sub-cooperative retained control over decisions, participation models, and community engagement strategies, reinforcing the idea that civic infrastructure must be adaptable, situated, and locally governed.

The civic logic of these platforms also shows up in how mobility itself is reimagined. Rather than privileging speed, individual convenience, or algorithmic optimization (as seen in commercial mobility-as-a-service models), cooperatives emphasized care, fairness, and shared value. In interviews, several users spoke about how cooperative use shifted their sense of mobility from something extractive or transactional to something communal. “You’re not just booking a car,” one Belgian user noted, “you’re participating in a system that you also maintain, that you also explain to new people.” This embodied form of engagement reflects what Light and Miskelly (2019) call *infrastructures of engagement*—systems designed not only for use but for relationship-building and collective meaning-making.

Moreover, these cooperative structures offer a response to exclusionary dynamics found in traditional smart city infrastructures. In Coop C, for instance, low-tech participation was an intentional strategy, one that allowed digitally less-savvy or time-constrained users to still meaningfully engage. This contrasts with commercial apps, where participation is often pre-structured and narrowed to UX flows. Civic infrastructure here means designing for ambiguity and flexibility, allowing members to opt in at different levels, at different times, and through different modalities.

From a theoretical standpoint, this challenges the notion that digital civic tech must always mean sensors, dashboards, or algorithmic efficiency. Instead, cooperatives show that civic technology can also be soft, relational, and emotionally intelligent. Governance in these systems is not confined to constitutions or votes; it emerges through habits, norms, and small acts of mutual accountability. The fact that many cooperatives thrive on volunteer labor and operate without financial incentives underscores the depth of their civic character: these are platforms where belonging, not monetization, is the primary logic.

Importantly, these findings extend the scope of *platform cooperativism* (Scholz, 2016) by showing that it is not only labor platforms that can be included, but also public infrastructures like mobility. The case of car-sharing cooperatives expands the civic tech imaginary, proving that infrastructure itself can be participatory, value-driven, and emotionally resonant. They offer a rare glimpse of what public digital infrastructure might look like when built from the bottom up, not retrofitted from the top down.

In sum, the cooperatives studied in this thesis illustrate that participation is not a layer added onto infrastructure, it is infrastructure. Civic tech, in this framing, is not just about building smarter tools, but about creating systems that are co-designed, co-stewarded, and co-lived. As cities grapple with the dual pressures of digitalization and decarbonization, these cooperative models remind us that truly inclusive and sustainable urban futures will be built not just with code or capital, but with community.

7.3 Platform Design, Data Practices, and the Politics of Trust

If community car-sharing cooperatives are to be understood as civic infrastructures, then platform design and data practices cannot be treated as neutral or technical concerns. They are central to the politics of how trust is built, how power is distributed, and how civic participation is either enabled or constrained. This section addresses both sub-research questions, with a particular emphasis on the second: *What kinds of innovation, technical, organizational, or civic, do these models embody, and what factors shape their potential for scaling or replication across contexts?* The findings demonstrate that platform design is not just a backdrop for cooperation, it actively co-produces the cooperative experience. It carries political weight, encodes governance decisions, and either invites or inhibits user agency.

The comparative cases in this thesis, Coop C in the Netherlands, Coop A-affiliated cooperatives in Belgium, and a national federation in Germany, offer divergent approaches to platform design. Yet all reveal the same core insight: infrastructure reflects ideology. Coop C operates with a low-tech, decentralized model: users coordinate via WhatsApp, rotate responsibilities like car cleaning or scheduling, and rely on interpersonal trust rather than digital enforcement. The absence of formal interfaces is not a gap, but a feature. It allows users to interact informally, accommodate each other's needs, and cultivate a social contract that cannot be hardcoded. As one user described, "it's the messages between bookings that make it work—like, hey, I filled the tank, or hey, don't forget the kid seat."

This kind of relational infrastructure challenges dominant narratives in civic tech, where innovation is often conflated with digital sophistication. Coop C's system instead

highlights what Light and Miskelly (2019) term “the infrastructural qualities of care.” Here, trust is not secured through blockchain or biometric access, it’s built through small gestures, mutual recognition, and consistency over time. Participation is fluid and ambient, not structured through forms or dashboards. This model privileges flexibility and social cohesion, but it comes with trade-offs: minimal auditability, difficulty in onboarding new users, and challenges in scaling without replicating its informal culture.

In contrast, the Belgian case shows how technical infrastructure can enable federation without enforcing uniformity. Coop A’s shared backend provides cooperatives with a professional-grade digital skeleton, handling booking, payments, insurance, and analytics, while allowing each cooperative to tailor the interface to its local needs. As one Coop A developer put it, “we build the bones, they choose how to dress them.” This modular design supports scale through interoperability, without stripping co-ops of their agency. It also allows technical resources to be pooled, reducing individual burdens on small cooperatives. However, this shared infrastructure can introduce a subtle form of standardization. While members retain control over branding and some feature toggles, key technical decisions are made at the federation level. Interviewees described tension around who gets to decide which plugins are developed or when system updates are implemented, echoing larger questions about the locus of control in commons-based tech systems.

Germany presents a third model: centralized but civic-minded. The cooperative federation provides a tightly integrated backend system, complete with GDPR-compliant data practices, real-time performance monitoring, and robust legal frameworks. While users benefit from professional stability, they also experience a more transactional interface. Several German members reported high usability but low emotional connection, describing the system as “clean” but “distant.” Participation was often reduced to pre-set options: feedback forms, app ratings, or occasional surveys. As one interviewee put it, “I support the mission, but it feels like a service—not something I’m really part of.” This reinforces Eubanks’ (2018) critique of well-intentioned platforms that risk flattening participation into procedural engagement—check the box, but don’t touch the structure.

Data governance emerged as a key axis along which trust was either fortified or eroded. In Coop C, there was virtually no formal data collection, coordination happened via peer-to-peer messages and mutual updates. This offered high privacy but low traceability. Belgian cooperatives, by contrast, used data to inform decisions and monitor use, but they retained a strong culture of transparency. Interviewees emphasized that members knew what was being tracked and why. One cooperative even piloted a dashboard where

members could see monthly financials and usage patterns, not just as a transparency tool, but as a prompt for conversation and co-decision-making. This contrasts with commercial platforms where data is typically opaque, extractive, and used to optimize for corporate outcomes. By making data legible and dialogic, these cooperatives reframe it as a civic asset, not a surveillance tool.

German cooperatives fell somewhere in between. While backend systems were secure and professionally maintained, they were also less transparent to end users. A few members mentioned not knowing what data was collected, or how decisions about the app's interface were made. This ambiguity, while not malicious, subtly reduced the sense of collective governance. It points to a deeper insight: transparency isn't just about disclosures or open-source code, it's about cultivating a shared understanding of how systems function, and who gets to shape them.

Importantly, the platform isn't just where trust happens, it's how it happens. Design choices signal values. Whether that means letting users suggest app changes, showing them where fees go, or simply allowing for informal interactions, the platform becomes a stage on which civic agency is rehearsed. Where design is closed, participation contracts. Where it is open, experimental, and locally responsive, participation grows.

Ultimately, the findings suggest that innovation in cooperative mobility does not stem from technological novelty. It stems from alignment—between platform logic and cooperative values, between user needs and system flexibility, and between data practices and democratic trust. Whether federated or grassroots, analog or digitized, these cooperatives demonstrate that platform design is civic design. And in a digital era where most infrastructure is extractive by default, that civic intentionality is the real innovation.

7.4 Scaling and Structural Coordination

As community-based car-sharing cooperatives mature, the question of scale becomes unavoidable. But unlike traditional platforms that equate scale with market capture, these cooperatives approach growth as a negotiation between grassroots control and infrastructural consistency, between local trust and regional reach. This section explores how different cooperative models across Belgium, the Netherlands, and Germany are navigating this tension, offering distinct trajectories for balancing decentralization with system integrity.

The Netherlands' Coop C exemplifies a radical localism where scale is not pursued through expansion, but through replication. Rather than growing the cooperative itself, Coop C encourages others to copy its model and adapt it to local conditions. This is not a

scale-up strategy, but a *scale-out* one. Coop C's founder described this as a "patchwork philosophy" not one uniform system spreading across cities, but many self-managed, trust-driven collectives popping up where the soil is right. This kind of horizontal scaling relies heavily on social capital and local commitment rather than institutional backing or external funding. While deeply participatory, it also makes knowledge transfer and technical consistency more difficult. There is no central protocol or data collection, which limits broader systemic integration but enhances local resilience.

Belgium's Mobility Factory takes a hybrid approach, offering a federated infrastructure that local cooperatives can plug into. Coop A provides the backend technology, legal templates, and operational support, while each cooperative retains control over branding, governance, and member engagement. This model enables "coordinated autonomy": cooperatives benefit from shared systems and economies of scale without sacrificing their identity or independence. Yet, tensions still emerge. As one Coop A staff member noted, "It's always a trade-off between letting co-ops be fully free and needing some baseline coherence so the tech and operations don't break down." This tension is not accidental — it is constitutive of the federation model. The challenge lies in keeping the core flexible enough to accommodate local variation, but stable enough to function as shared infrastructure.

Germany's cooperative ecosystem reflects a more centralized route to scale, where standardization and legal harmonization take precedence. The umbrella cooperative there emphasizes backend stability, professional administration, and clear compliance protocols. This allows smaller member co-ops to focus on community-building while the central organization handles regulation, insurance, and tech upgrades. The trade-off, however, is reduced autonomy and sometimes weaker emotional attachment to the cooperative. As one member shared in an interview, "It works well, but it doesn't always feel like ours." In this model, the cooperative starts to resemble a utility service, efficient and reliable, but less participatory. That may be a necessary compromise in contexts where legal frameworks are strict and liability concerns are high, but it also risks flattening the cooperative ethos.

Together, these three models illustrate that scaling cooperative mobility infrastructure is not about copying and pasting successful formats. What works in one cultural and regulatory context may fail in another. Local governments, legal frameworks, and mobility cultures all shape what forms of scaling are viable. The "strawberry model" referenced by Belgian interviewees, where growth occurs through runners that extend organically from the original plant, captures this ethos.

This has significant implications for public sector innovation. It suggests that cities and mobility planners must rethink what scalability means. Instead of asking, “How can this model go national?”, the better question might be, “How can we support the conditions for this kind of model to take root elsewhere, with its own shape, logic, and pace?” It also underscores the value of *modularity* in infrastructure design: building platforms, governance systems, and financial models that can adapt without collapsing.

In this light, cooperative mobility scaling becomes a question of *distributed stewardship*, not vertical control. It is less about optimizing the system, and more about enabling each node in the system to thrive on its own terms while remaining connected. That requires infrastructural generosity, shared tools, open standards, and trust-based interdependence.

Ultimately, the most powerful insight here is that scale and decentralization are not opposites, they are co-produced**.** When scaling is done with respect for local agency, and when decentralization is supported by interoperable infrastructure, cooperatives can grow *without losing their soul*. This redefinition of scale, from domination to distribution, may be one of the most radical contributions cooperative mobility makes to the civic tech and urban governance conversation.

7.5 Financial Challenges in Cooperative Models

One of the most underexamined aspects of cooperative mobility is the financial model that undergirds its daily operations. While many cooperatives prioritize democratic ownership and ecological sustainability, their ability to sustain themselves often rests on precarious financial scaffolding. This sub-section explores how economic sustainability is both a constraint and a defining characteristic of cooperative mobility systems, drawing on insights from user surveys in the Netherlands and Belgium, interviews across all three countries, and relevant secondary literature.

In both the Dutch and Belgian user surveys, affordability was frequently cited as a central motivator for joining a cooperative. The quantitative data placed it among the top three values, especially in the Netherlands, where cost-consciousness often intersected with environmental motivations. However, qualitative responses revealed deeper tensions. I01 identifies scaling economics as critical for viability: *"One of the key challenges now is making sure that we connect as many cars as possible to the network. You need to scale up to make the unit cost as low as can be"* (Personal Communication, March 2025). In the Netherlands, for instance, users described a delicate balance between shared responsibility and uneven participation. One respondent explained, "If member numbers fluctuate, costs become unstable and you sometimes get extra fees. Not a big deal, but not ideal either." Given the cooperative's small operational scale, this meant that a single

departure could significantly impact monthly costs. In Belgium, while the federated structure offered more robust infrastructural support, some users still expressed uncertainty around where their fees went, highlighting a lack of transparency in local chapters.

These findings reflect broader challenges observed in platform cooperativism, where mutualization of costs is a key design principle, but not without trade-offs (Scholz, 2016). Unlike commercial mobility providers, cooperatives rarely benefit from venture capital or cross-subsidization, instead relying on volunteer labor, user fees, and public funding. The risk here is twofold: first, financial strain may reduce long-term commitment; second, a high reliance on unpaid labor may exacerbate burnout or uneven workload distribution. As seen in the Netherlands, where maintenance and cleaning are often informally rotated, the invisible labor of upkeep creates friction and fatigue.

Germany's case adds a valuable institutional contrast. The national cooperative studied provides backend legal and technical infrastructure, which reduces some operational burdens on local entities. However, this standardization comes with its own complications. Interviews revealed that smaller German cooperatives occasionally struggle to remain solvent during periods of reduced usage or unexpected vehicle maintenance. I03 argues this stems from regulatory misalignment: *"If I could change one thing in public mobility regulation, I'd simplify fleet licensing for small cooperatives. Right now it's too bureaucratic, especially for grassroots initiatives"* (Personal Communication, March 2025). This is compounded by Germany's strict insurance and liability laws, which create fixed costs that are difficult to redistribute. As one cooperative administrator noted, "You cannot improvise with liability. Standardization protects us, but it also limits experimentation." These structural constraints make financial resilience less about ideology and more about navigating the realities of regulation.

Belgium's federated model attempts to address these challenges through modularity. Local cooperatives can adopt digital services and backend tools at their own pace, which helps control costs. Yet even within this flexibility, member cooperatives remain responsible for their own solvency. Public grants and local subsidies can provide occasional relief, but volunteer labor and self-funding remain the backbone of operations. As van der Waal and de Roo (2021) observe, "cooperative infrastructure thrives on shared vision, but survives on pragmatic resource pooling."

In all three contexts, a recurring theme was that financial design is never just an operational matter, it is a governance issue. Who decides how risk is distributed? Who has access to budgeting decisions? And how is financial transparency managed across different levels of the organization? Some cooperatives have begun exploring new tools:

participatory budgeting, sliding scale fees, and transparent dashboards showing real-time costs and revenues. While promising, these are far from standardized practices.

Moreover, financial models shape the public narrative of cooperatives. In Belgium, for example, cooperatives often brand themselves as agents of democratic infrastructure, yet they must still negotiate with municipalities that prioritize KPIs and return-on-investment metrics. In Germany, the professionalization of cooperative management helps secure grants but sometimes distances users from governance. In the Netherlands, the grassroots model invites strong emotional investment, but its minimal structure struggles to scale. This reveals a gap between economic realities and cooperative ideals, what Bauwens and Kostakis (2014) have called an "economic imaginary gap."

What emerges, then, is a paradox. Financial precarity is not only a limitation, but also part of what makes cooperatives socially meaningful. They absorb risk not through distant institutions, but through community effort. And that vulnerability, while challenging, is also what binds users together. The path forward lies not in eliminating this tension, but in designing infrastructures, technical, financial, and emotional, that acknowledge it. Transparency, co-decision-making, and mutual care must become as embedded as the software that runs the booking platforms. Only then can cooperative mobility begin to sustain itself, not just financially, but civically.

7.6 Barriers to Wider Adoption

While community-based car-sharing cooperatives show promising pathways for inclusive and sustainable mobility, their growth is not without friction. This section outlines the key operational, cultural, and infrastructural constraints that limit these models' broader adoption and long-term sustainability. These frictions do not negate their value. Instead, they highlight the structural adjustments and ecosystem support required for cooperative mobility to scale responsibly without losing its foundational ethos.

First, a core challenge lies in visibility and public awareness. Most cooperatives in this study operate in hyper-local settings, often with minimal external communication. Survey responses indicated that many users joined through word-of-mouth or community introductions, suggesting that these systems remain largely invisible to the broader public. While this intimacy builds trust, it also narrows reach. Without concerted outreach or strategic alliances with public institutions, cooperatives risk remaining niche solutions for already-engaged citizens rather than expanding to more diverse or underserved user bases.

Second, logistical complexity and uneven capacity limit replication. Running a cooperative requires more than just goodwill. Interviewees repeatedly flagged the administrative burden of coordinating members, maintaining vehicles, ensuring insurance compliance, and managing software platforms. While umbrella cooperatives like Coop A provide technical support, individual co-ops still rely on volunteer labor or limited staff. This creates bottlenecks in onboarding, maintenance, and service expansion. The time and expertise needed to keep the system running, let alone grow it, can overwhelm smaller teams, especially in the absence of funding or institutional partners.

Third, legal and regulatory frameworks often lag behind. **In** Germany, shifting user data regulations and vehicle insurance policies created uncertainty for local cooperatives, which affected survey distribution and member participation during the study period. In both Belgium and the Netherlands, cooperative leads described the challenge of fitting their governance structures into legal categories designed for either corporations or nonprofits, but not hybrids. This regulatory grey zone makes long-term planning and cross-border interoperability difficult. Without more agile policy instruments that recognize cooperative tech infrastructure, growth will remain stunted by bureaucratic friction.

Fourth, cultural assumptions about ownership and convenience pose deep barriers. While some users embraced shared car models out of ethical commitment, others expressed concerns about availability, cleanliness, or flexibility, often comparing their experience to the convenience of private cars or dominant commercial apps. These perceptions, captured in both survey results and interviews, underscore the difficulty of shifting mobility mindsets. Cooperative models demand a degree of patience, coordination, and shared responsibility that many users, especially in urban environments conditioned by on-demand services, may find burdensome. Without cultural shifts in how mobility is framed, not just as personal freedom but as collective infrastructure, adoption will likely plateau.

Finally, emotional infrastructure, while powerful, is difficult to standardize. As Section 6.4 showed, trust and belonging are central to why users stay engaged. But these feelings are hard to scale and even harder to replicate across different communities. The informal rituals that build cooperative identity, helping fix a flat, sharing group chats, rotating responsibilities, depend on specific interpersonal dynamics. Transplanting them into new contexts requires not just protocols, but care. This raises a key paradox: the very qualities that make cooperatives unique may also make them less transferable.

Taken together, these frictions reveal that cooperative mobility is not a plug-and-play solution. It thrives in certain civic cultures and under specific enabling conditions, but

faces resistance when these are absent. Addressing these limitations requires a multi-pronged strategy: policy frameworks that recognize hybrid models, funding mechanisms for operational support, public campaigns to normalize shared mobility, and digital platforms that balance usability with democratic control.

More fundamentally, these constraints remind us that infrastructure is always cultural. Cooperatives are not just about mobility, they are about reimagining how services are built, shared, and governed. Their limits, then, are not failures, but indicators of where deeper transformation is needed. For cooperative mobility to move from margin to mainstream, we must not only scale the model, we must also shift the systems it seeks to change.

Together, these insights demonstrate that community-based car-sharing cooperatives are not just service providers but living experiments in civic technology. They offer a compelling alternative to extractive mobility platforms by embedding democratic governance, ethical tech design, and emotional infrastructure into everyday systems. While their small scale can be a strength, enabling trust and local control, it also introduces limits around replication, visibility, and resourcing. The research suggests that cooperatives thrive when supported by federated infrastructures, policy alignment, and a culture of co-ownership. Ultimately, they challenge us to rethink not just how we move, but how mobility itself can be governed. In answering the core research question, this thesis shows that cooperatives are more than mobility providers—they are civic infrastructures in motion, pointing toward a different future of public service design rooted in participation, stewardship, and shared agency.

7.7 Summary of Key Findings

This thesis uncovered a series of laminated, intersecting findings that reframe how we understand the role of cooperatives in urban mobility. Rather than positioning themselves as reactive alternatives to the private sector, the cooperatives studied here operate as civic laboratories, spaces where infrastructural values, participatory norms, and socio-technical innovation are actively tested and recalibrated.

Their significance lies not in their novelty, but in their normative depth: they foreground questions of agency, care, and equity within the everyday task of mobility provisioning.

The first core finding relates to governance. In Belgium, cooperatives operate within a federated model supported by a shared digital and legal backbone, which offers stability, technical capacity, and opportunities for cross-cooperative learning. However, this structure also raises concerns around autonomy, standardization, and platform

dependency. In the Netherlands, by contrast, the cooperative studied reflects a hyper-local, informally governed model. Its informal, community-anchored setup fosters tight-knit relationships and a strong sense of shared responsibility, but also makes it harder to track usage patterns, coordinate at scale, and plan for long-term growth.

A second key insight concerns participation, not as a checkbox metric, but as a relational and emotionally situated experience. Participation here meant everything from voting in annual meetings to chatting on WhatsApp about maintenance issues. The research showed how participation scales sideways: through informal rituals, affective labor, and small gestures of mutuality. These findings echo contemporary scholarship in civic technology and urban studies (Le Dantec & DiSalvo, 2013; Light & Miskelly, 2019), which highlight how governance is often embedded in invisible practices.

Third, this thesis foregrounded the politics embedded in platform design. The Belgian cooperative's backend system enabled traceability, oversight, and performance tracking, features that streamlined coordination and helped standardize participation across member co-ops. Yet this came with trade-offs. Several users described the interface as overly structured or distant, reinforcing what Irani (2015) and Eubanks (2018) have cautioned: that civic platforms, when overly rationalized, can quietly entrench hierarchy or reduce engagement to checkboxes. In contrast, the Netherlands' cooperative's lightweight tech stack, centered around tools like WhatsApp and shared calendars, enabled spontaneous, decentralized coordination. It allowed flexibility but lacked auditability, which introduced challenges around maintenance, equity, and scaling. These comparative insights confirm that infrastructure is not neutral, and reflects governance priorities and redistributes agency differently depending on design.

Fourth, scale emerged not as an endpoint but as a contested and strategic practice. The federated model in Belgium allowed cooperatives to access pooled digital infrastructure while retaining local autonomy, echoing Beaulieu and Schönberger's (2021) vision of "platform commons." Meanwhile, the Netherlands' example pursued scale through narrative and community uptake rather than formal replication. The German cooperative used professionalized backend services to mitigate legal and financial risk, but in doing so, flattened opportunities for everyday participation. These divergent paths reinforce that cooperative scaling is not about frictionless expansion but about negotiating values, resources, and capacities at multiple levels.

Finally, this research surfaced what might be termed an infrastructural re-positioning of identity. Across the dataset, there was clear evidence that users moved from identifying as 'consumers' toward more participatory roles involved in active co-creation. The personas of Jan, Sofia, and Leon illustrate distinct but representative attitudes toward

shared infrastructure. Their experiences echoed themes in recent literature on commons governance and civic technology (Hess & Ostrom, 2007; Scholz, 2016): that shared ownership only works when users also feel collective responsibility. As highlighted in 6.1 and 6.4, users referenced pride, frustration, and trust, emotions tied to platform design and local governance. But these weren't abstract feelings. They shaped participation rates, upkeep behaviors, and even retention. In the Netherlands' cooperative, for instance, high relational density correlated with higher usage frequency (Figure 2A) and stronger co-ownership narratives.

In sum, the cooperatives examined here remind us that infrastructure is more than pipes and platforms. It's a stratified system where technical affordances, emotional stakes, and governance design constantly interact. Their success, and their fragility, stems not from flawless implementation, but from how well they reflect the civic realities of the people they serve. In doing so, they offer an evidence-backed, grounded alternative to platform logics that too often abstract users out of the systems they depend on.

8. Conclusion

This thesis began with a deceptively technical question: *How do community-based car-sharing cooperatives function as civic tech infrastructure, and in what ways do they contribute to reimagining more inclusive and sustainable forms of urban mobility?* But the answer, as it unfolded across field sites, interviews, user narratives, and platform comparisons, revealed something far more complex, and far more human.

At their best, these cooperatives are not simply alternatives to private car ownership or commercial platforms. They are living civic infrastructures, systems that embed public values into the very code, rules, and relationships that shape everyday mobility. Across the Netherlands, Belgium, and Germany, each cooperative offered a distinct blueprint: some formal and federated, others informal and trust-based, but all rooted in a shared ambition, to build mobility systems that reflect both efficiency and agency.

The first sub-question examined governance and participation. Here, the thesis showed that these cooperatives aren't defined by one governance model, but by a shared ethic of co-creation. In Belgium's federated networks, governance was formalized yet flexible; in the Netherlands, it was informal, relational, and emotionally anchored.

The second sub-question unpacked innovation. What emerged was a tiered spectrum, technical, organizational, and civic, with cooperatives adapting open-source platforms, rotating tasks, or building backend legal structures that reflect their principles. Importantly, innovation wasn't always sleek or efficient. It was slow, situated, and shaped by friction, by the tensions between autonomy and scale, between trust and standardization.

Methodologically, this study made a deliberate move: to see civic infrastructure not just through systems or dashboards, but through lived experience. It paired interviews with cooperative founders and tech architects with user surveys, persona building, and narrative analysis. These tools did not just extract data, they surfaced **emotional truths**: fatigue, pride, ambivalence, joy. They revealed how infrastructure isn't just used, it is felt, negotiated, sometimes resented, and often reshaped.

The purpose is to not glorify. The thesis has been honest about the limits: governance can exclude, digital platforms can frustrate, and financial models can strain. Not everyone gets heard equally. Not every tool fits every context. But these imperfections are instructive. Because unlike polished private platforms, cooperatives don't pretend to be frictionless. They hold space for discomfort, iteration, and disagreement, and that makes them rare.

What his research ultimately contributes is a reframing of what counts as infrastructure in a civic future. It shows that mobility is not just about **moving through space**, but about reshaping the systems that define who gets to move, how, and with what voice. It argues that civic tech is not just a digital interface, it is a political terrain, where public values are encoded, contested, and sometimes quietly defended by the people most affected. These cooperatives, in their modest yet radical way, push us toward a different paradigm: where mobility is not engineered *for* communities, but with them. Infrastructure here isn't just something to consume, it's a way of belonging. Participation isn't reduced to a button in an app, but becomes a habit, cultivated daily through shared cars, neighborhood meetups, and collective decision-making.

This thesis concludes not with a clear universal model ready for export, but with evidence that cooperative mobility thrives through contextual adaptation, and not replication. As demonstrated across Belgium, the Netherlands, and Germany, hyperlocal conditions, social, regulatory, and infrastructural, are non-negotiable prerequisites for success. Rather than prescribing solutions, this work issues a call: to reimagine infrastructure as a civic practice, urban systems as sites of ongoing negotiation, and modest interventions, and a shared vehicle, a participatory assembly, as potential catalysts for institutional change.

The path forward remains emergent. Yet if democratic and equitable mobility is our goal, it will materialize not through top-down disruption, but through grounded, collective action. It will be shaped by everyday actors, like Jan, Sofia, and Leon, who embody the thesis's core finding: that moving together begins with deciding together.

8.1 Implications for Policy and Practice

Building on insights from civic technology and commons-based governance (Ostrom, 1990; Scholz, 2016), this thesis positions community-based car-sharing cooperatives not as peripheral alternatives, but as civic infrastructures, value-driven systems that embed participation, transparency, and co-governance into the everyday fabric of urban life. Structured around four core civic tech principles, this section transforms empirical findings into actionable directions for policymakers, cooperative leaders, and platform designers.

1. Participatory Governance and Civic Engagement: Community-based car-sharing cooperatives should institutionalize participatory governance, treating members not just as users but as co-creators of the service. This reflects the civic tech foundation of empowering citizens through infrastructure. In practice, that means democratic decision-making processes (assemblies, member votes, co-designed rules) that give stakeholders real influence over policy and operations. As

Ostrom's commons governance principles note, inclusive participation in rule-making is vital for sustainable management. Empirical findings show that co-ops thrive when rooted in local engagement: for example, Coop C in the Netherlands guides neighborhood groups to form their own car-sharing cooperatives, ensuring local needs and knowledge drive each project.

This participatory infrastructure approach builds community ownership, legitimacy, and trust in the cooperative. To scale this participatory ethic, urban policy must formally incorporate cooperatives into strategic mobility planning allocating municipal grants for democratic infrastructure, offering technical assistance to new co-ops, and mandating participatory design reviews in mobility tenders. Participation also requires institutional support: stipends for elected cooperative board members, leadership training for volunteers, and accessible legal templates. In short, participation must be resourced, not romanticized.

2. Integration Into Mobility Infrastructure: Make community car-sharing part of the public transit family. Governments should actively support cooperative car-sharing as a public-good service. Concretely, provide funding and favorable policies: offer grants or low-interest loans for co-ops to buy electric vehicles and develop their apps, and allocate dedicated parking spaces or charging stations to them. Include these co-ops in city mobility plans, for instance, let users access shared cars via the same smart cards or apps used for buses and trains, so that co-op cars seamlessly integrate with buses, trams, and bikes as one unified network.

   For example, cities can create "Civic Mobility Incubators" that provide microgrants, legal support, and mentorship to emerging co-ops. Public transit agencies can adopt hybrid service models, where cooperatives operate feeder services or integrate shared vehicles into last-mile networks. Also, adjust regulations (like parking minimums and zoning) to favor shared cars over private cars; for example, reduce parking requirements for new housing if a co-op car-share is available, freeing up street space. Bottom line: give community car-shares a public infrastructure status, funding them, integrating them, and including them in policymaking. This will accelerate the shift toward sustainable transport while keeping mobility democratically owned and locally accountable.

3. Flexible Open Platform Design for Cooperatives: Develop and adopt modular, open technology platforms that are cooperatively owned, allowing local car-sharing co-ops to tailor and scale their services without sacrificing their autonomy. The thesis findings emphasize that digital platform design is a critical arena of

commons-based governance: rather than using off-the-shelf corporate software, co-ops are co-creating their own tools as shared infrastructure. This aligns with Scholz's concept of platform cooperativism, which calls for "cloning the technological heart" of platform services and embedding cooperative. A leading example is Coop A, a second-level cooperative based in Belgium that is collectively owned by dozens of local co-ops across Europe. Coop A's IT platform for e-car sharing is built to be flexible and configurable to each cooperative's needs, and importantly the co-ops jointly own the software – its intellectual property can never be sold off.

Members participate in the platform's development by democratically deciding on new features and improvements, ensuring the technology evolves as a true commons. This modular design (e.g. open APIs, plug-in modules for booking, billing, fleet management) lets co-ops integrate local innovations or public transit linkages without reinventing the wheel each time. In short, a cooperative digital infrastructure under shared governance empowers communities to innovate while pooling resources. It preserves data sovereignty and adaptability, the platform serves the cooperative, not the other way around. Policy support for open-source development, interoperability standards, and knowledge exchange can further reinforce this civic tech approach to platform design.

4. Transparency: Ensure that the governance and operations of car-sharing cooperatives are transparent and easily understood ("legible") to both members and external stakeholders. The research underscores that transparency is a cornerstone of commons-based governance, fostering trust, accountability, and more effective participation. Practically, this means open books (clear budgets, pricing, and use of funds), accessible data on usage and impacts, and visible decision-making processes. When rules and outcomes are transparent, members can monitor the commons, going back to Ostrom's insight that communities need accountability mechanisms for sustainable management. In the cooperative context, legibility also refers to making the system user-friendly and comprehensible: members should understand how pricing works, how decisions are made, and how they can be involved. A cross-country finding is that co-ops which actively share knowledge strengthen their community. For instance, Coop A's model explicitly emphasizes that all data and know-how generated by the platform belong to the cooperative community, not a private vendor. This kind of openness would also empower members and differentiates co-ops from opaque commercial operators. Similarly, cooperatives in the study held regular info sessions and published impact reports to make their activities legible to city

officials and the public. The theoretical framing of civic tech highlights legibility as a form of accessibility and trust, when people can see under the hood of the service, it invites civic collaboration. Thus, robust transparency practices, coupled with simple and clear communication, should be standard policy in cooperative car-sharing governance.

Policy and practice must move beyond digital feature sets to support the relational underpinnings of infrastructure. This includes funding time, not just tools. Budget lines for community managers, conflict mediation, cooperative onboarding workshops, and neighbourhood storytelling initiatives are all valid components of mobility infrastructure. Additionally, public-private partnerships can include social cohesion metrics, such as retention, mutual aid frequency, or co-produced problem-solving, as indicators of system success, not just ridership or revenue.

These recommendations challenge dominant innovation logics in urban mobility. Cooperatives show us that infrastructure can scale through trust, not throughput; adapt through modularity, not monoculture; and endure through stewardship, not automation. If policymakers, funders, and civic technologists take this seriously, they will not just support cooperatives, they will redefine what it means to build just, resilient, and democratic urban systems.

8.2 Limitations

As with any research conducted under constrained timelines and in a rapidly evolving field, this thesis is shaped by several methodological, empirical, and contextual limitations that merit acknowledgment.

First**,** the most immediate limitation was the inability to disseminate the user survey in Germany. Midway through the research process, internal changes to data-sharing policies within the cooperative prevented outreach to their end users. While interviews with German cooperative staff and developers offered valuable perspectives on governance, legal scaffolding, and platform structure, the absence of user-level survey data meant the German case could not be triangulated in the same way as the Dutch and Belgian cases. This created an imbalance in the empirical dataset, particularly relevant given that this study places user participation and lived experience at its analytical core.

Second**,** the field itself remains relatively niche, with a small number of active cooperatives, especially those operating at scale. Many actors occupied hybrid roles, platform developer, founder, board member, and user, making for rich, layered narratives but also complicating clear distinctions between perspectives. In some contexts, this

created challenges for maintaining anonymity or critical distance, particularly within smaller, tightly knit cooperatives.

Third**,** the modest sample size of survey respondents, 31 users from the Netherlands and Belgium, also presents limitations. While the survey emphasized depth over breadth, the limited pool reflects both the decentralized nature of these cooperatives and their minimal public-facing infrastructure. Moreover, the overall sample size of both interviewees and survey respondents remains small, limiting the generalizability of findings. While the study deliberately employed a purposeful sampling strategy, targeting individuals with deep contextual knowledge or direct involvement in cooperative mobility (Suri, 2011) this strength in relevance comes at the expense of statistical representativeness. The selected cases and participants offer rich, embedded insights, but their perspectives should not be extrapolated to speak for all cooperative models or national contexts. Future research would benefit significantly from larger, more diverse datasets, ideally combining qualitative depth with broader-scale survey efforts. This would allow researchers to draw more robust generalizations, test for cross-case variation, and support comparative policy design.

Fourth**,** the absence of ethnographic immersion constrained the texture of the findings. While interviews and surveys allowed for rich narrative reconstruction, the research design did not permit extended field presence or follow-up cycles that could have revealed more about informal norms or evolving dynamics over time.

Fifth**,** language and translation posed subtler limitations. While surveys and communications were offered in Dutch and English, much of the documentation from Belgian and German cooperatives was in the native language. Despite careful translation, some interpretive nuance may have been lost, especially in capturing civic tone or culturally embedded practices.

Finally**,** the compressed timeframe of this thesis, shaped by academic semester schedules, was not just a practical constraint but a substantive challenge. The original research aim had to be pivoted based on early fieldwork findings, shifting the focus from spatial equity to civic governance and platform infrastructure. This pivot demanded not only rapid reframing but the development of new data collection tools and frameworks under pressure. Consequently, some promising analytical avenues, like deeper regulatory analysis or EU-level cooperative comparisons, had to be bracketed to preserve thematic clarity.

Taken together, these limitations reflect not a flaw in the research design, but the real-world constraints of studying emerging, decentralized, and community-rooted civic

infrastructures. They underscore the need for humility when interpreting the findings, while also reinforcing the relevance of the research: in a field marked by experimentation, informality, and situated know-how, the act of documenting, interpreting, and theorizing from partial views is itself a meaningful contribution.

Ultimately, the central insight from this thesis, that mobility systems are civic systems, should guide future research across methods and contexts. Whether through in-depth case studies, cross-country comparisons, or design interventions, the goal should remain the same: to build systems that reflect the plural realities, values, and ambitions of the communities they serve.

8.3 Future Research

While this thesis offers grounded insights into the civic potential of cooperative car-sharing, it also opens the door to new research pathways that could deepen, broaden, and diversify this emerging field.

First, there is a clear need for longitudinal studies that trace the lifecycle of cooperatives over time. Questions around trust, participation, governance fatigue, and digital adaptation can only be fully understood when observed across years, not months. Following a single cooperative, or a cluster, through funding shifts, leadership changes, or user turnover would provide critical insight into how civic infrastructure evolves, adapts, or unravels.

Second, future research would benefit from a broader comparative lens**.** While this thesis focused on Western European contexts, cooperatives in cities across Latin America, South Asia, or Africa may operate under very different socio-political and infrastructural constraints. These settings could offer alternative models of relational governance, informal coordination, or resilience strategies that challenge Global North assumptions about what ‘scalability’ or ‘innovation’ looks like in mobility systems.

Third, there is significant scope to explore the emotional and invisible labor that sustains cooperatives, from volunteer coordination and conflict mediation to the everyday care work of maintaining trust. These often-overlooked dimensions deserve analytical focus as key infrastructural forces. Ethnographic and feminist research approaches could help surface the lived experiences, labor imbalances, and tensions that don’t always show up in metrics or minutes.

Fourth, future inquiry could work toward building new evaluation frameworks for civic infrastructure. Current indicators in mobility often prioritize scale, efficiency, or user volume. Yet cooperatives function according to different like trust, local legitimacy, or

relational density. Developing metrics that account for these values would support both academic rigor and policy relevance, helping to assess what 'success' looks like outside conventional innovation paradigms.

Lastly, there’s room for more design-led or action research interventions, where researchers work alongside cooperatives to co-develop tools, improve platform governance, or experiment with new participatory mechanisms. Such collaborations could yield both theoretical and practical contributions, while staying grounded in community needs.

Taken together, these directions reflect a shared premise: that mobility is never just about movement. It is about belonging, agency, and infrastructure that holds space for collective life. Research that takes this seriously, across contexts and methods, can help imagine and build systems that don’t just move people, but move power.

Declaration of Authorship

I hereby declare that, to the best of my knowledge and belief, this Master Thesis titled "Civic Tech on Wheels: The Role of Community-Based Car-Sharing Cooperatives in Reimagining Urban Mobility" is my own work. I confirm that each significant contribution to and quotation in this thesis that originates from the work or works of others is indicated by proper use of citation and references.

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