Behind the Scenes of Coproduction of Smart Mobility: Evidence from a Public Values' Perspective

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Abstract. The advances in information and communication technology (ICT) have extended the applicability of citizen coproduction in government service delivery and have entailed transformative changes, especially at the city level. City governments around the globe increasingly rely on the private sector to set ICT-based urban innovations, like initiatives to involve citizens in the coproduction of smart mobility. Although there are many benefits of ICT-based coproduction, there is nevertheless the potential for tension between private companies and the government with whom they are cooperating. Those tensions are built on the differences in interests and values of private and public actors, and the way of realizing them, and they can compromise the vision and duty of the government. We, therefore, aim to understand the potential impact of private companies' involvement on the expectations and perceptions of coproducing actors towards social-oriented and service-oriented public values. We conducted an exploratory in-depth case study of the smart bike-sharing system in one of the major cities in Flanders, Belgium. Data were collected through official documents and 27 semi-structured interviews with key coproducing actors. These data were then qualitatively analyzed using Nvivo software. Our exploratory case study indicated that the private actor upholds the realization of values such as efficiency, reliability, and ease of access by bringing in resources and expertise to coproduce smart mobility. However, certain social-oriented values like citizen empowerment and engagement, and (digital) inclusiveness are not part of the private partner's vision. The study highlights the potential assets and risks for the realization of public values when dealing with conflicting interests between coproducing actors, and in this way considers a different angle on private companies' involvement in the coproduction of public services.

Keywords: Coproduction · ICT · Public values · Smart mobility · Private actors

1 Introduction

ICT-based coproduction of public services is alleged to improve the realization of public values in the city, as it allows citizens and non-state actors to be more actively engaged with the delivery of public services [1, 2]. As a result, this leads to a more collaborative and open government, e.g., users can have more control over the services

and greater fulfillment of their needs [3]. Specifically, in the so-called 'smart city', governments need to involve private companies due to the technological and financial complexities behind smart services. This ideally encompasses a sustainable cooperation, sharing risk, and resources [4].

Nevertheless, the role of the government runs the risk of becoming ambiguous with the increasing involvement of private companies, who can act as intermediaries between the government and its citizens. Because of their technological and financial capacity, private companies could end up assuming government's tasks and functions. The end result could be the private sector obstructing the vision and duty of the government while prioritizing profitability over a wide range of public values [5–7].

In order to explore the challenges involved in the coproduction of smart mobility, we use the coproduction theory, digital government (smart cities), and public values perspective. We aim to step back from the normative perspective that highlights only the potential 'good outcomes' and promises of ICT-based collaborations and to look into the black-box [2, 3]. Our study is guided by the following research question: to what extent does the involvement of private companies in ICT-based coproduction affect the expectations and perceptions of the coproducing actors (i.e., governmental actors, private actors, citizen-users) towards public values being realized or obstructed? To address the research question, we conducted an exploratory in-depth case study on ICT-based coproduction of smart mobility.

The next section briefly deals with the definition and context of the coproduction of smart mobility. Section 3 outlines the potential and challenges of ICT-based coproduction's ability to realize public values. Section 4 summarizes our methodological approach towards the case study. Section 5 provides a discussion of the findings and limitations. Finally, Sect. 6 delivers our conclusions, implications, and avenues for future research.

2 Coproduction of Smart Mobility

The conception of coproduction fits in the New Public Governance paradigm that recognizes the provision of public services as a model based on networks and inter-organizational relationships. It is understood as the collaboration between 'regular producers' and 'citizen producers' in different phases of service management. The 'regular producers' are the professional coproducers working directly (e.g., government employees) or indirectly (e.g., private actors) with the government. The 'citizen producers' are lay actors who voluntarily coproduce (individually or collectively) as citizens and/or customers [8–10].

Technological advances have led to an increased ability to perform coproduction activities [3, 11–15], and have entailed transformative changes, especially on the city level [16, 17]. These initiatives came with new promises. ICT is claimed to empower service users, enhance the speed and reach of communications, and promote multilateral and rich information exchange without time and space constraints [12, 15]. Smart mobility is an example of adopting ICTs to coproduce, as the sharing aspect implies the involvement of multiple stakeholders and the 'crowd', while the 'smartness' entails a reconfiguration of the interactions between the actors involved and their

surrounding environment [3, 5, 18]. The main premise behind these smart systems is to offer an accessible and inclusive alternative mobility solution. Specifically, when examining city bike sharing, this solution also involves the innovative movement from private ownership of vehicles to 'usership', and a redefinition of the citizen-users role, since they become both recipient and source of the services' information, and they bring in their resources to shared platforms [19].

In the context of the evolution of the public service provision, the public sector outsources most of the technological solutions to the private sector [20, 21]. This means that city governments collaborate with private companies to provide their citizens with smart solutions, like bike-sharing systems. As the digital government paradigm proposed, the role of non-state actors in the policy design and provision of public services has been spreading-out, leading to a more open and collaborative government. This collaboration between private and public actors can lead to each adopting new roles, engaging in different types of interaction, and navigating changing accountability dynamics. Based on the coproduction literature, it is assumed that the coordination of expertise, knowledge, resources, technology, and processes leads to better results than when working independently [1].

Nevertheless, it comes with further challenges in terms of private companies assuming tasks and responsibilities traditionally performed by the government [5–7]. There is a risk of 'disintermediating government', characterized by private companies providing public services directly to citizens and the government relegated as a supporter. For instance, private companies become responsible for not only the infrastructure of smart services, like bike-sharing systems, but also the operation and the interaction with citizens. Despite the dangers of unequal distribution of responsibility, information asymmetry can positively contribute to the collaboration process between the public and private sector when it exists in a complementary form. Data are one of the most valuable commodities behind smart mobility that allow governments to support the realization of public values. Yet the private sector is displacing the government as a principal source of data, becoming 'data landlords' instead of 'data tenants' [19, 22].

Although the private sector opens the door to innovation, "the social values inherent in public services may not be adequately addressed by the economic efficiency calculus of markets" [23]. The involvement of private companies in smart services brings in a market logic, a 'corporate storytelling', while it is necessary to prioritize the social and political aspect within a value system [24]. In this respect, the government not only needs to focus on the technological and managerial side of these innovative collaborations and economic growth, but also on the contributions of coproduction of smart services to realize other values, such as inclusion, equity and citizen engagement [22, 25].

3   Public Values

Public values theory is considered one of the most significant subjects in public administration and policy [26], and it has been gaining particular interest in the so-called 'smart cities' context [25, 27]. It refers to "the procedural ethics in […] and

outcomes made possible by producing public services" [28], and it is understood as a concept used to give direction to public action or legitimize it [29]. Bozeman [30] defines public values as:

> (1) The *rights, benefits, and prerogatives* to which citizens should (and should not) be entitled; (2) the *obligations* of citizens to society, the state, and one another; and (3) the *principles* on which governments and policies should be based[1].

Bozeman's [30] definition focuses purely on the citizen-side, whereas society and 'the public interest' involves further actors, such as non-profits and private companies. This distinction is particularly relevant in the context of coproduction, where public values are expected to be upheld through collaboration among diverse stakeholders.

ICT-based coproduction initiatives are expected to enhance the realization of better and more democratic public services [1, 2] through collaboration with external stakeholders, including citizens. Bearing this in mind, we clustered the expected public values in the context of ICT-based coproduction into two categories [31, 32]. First, *social-oriented values* illustrate the democratic quality of the service delivered, for instance, the level of inclusiveness, equal treatment or citizen empowerment [31, 33, 34]. Digital democracy studies highlight that internet-based practices may improve democratic values by bringing dispersed populations closer, allowing for more citizen participation [35]. ICT-based coproduction could potentially increase inclusion [36] and equity [37] as it promises to provide the same opportunities to different actors [38], foster local activism, unleash social innovation and reinvigorate democracy [13, 39].

Second, *service-oriented values* refer to service quality, responsiveness, effectiveness, among others. Coproduction is expected to improve the quality as well as increase the quantity of public services [40–42] through expertise and information provided by citizens/users, not available otherwise [43]. The advances of ICT in coproduction provide unique means for real-time, community-wide coordination, "presenting tremendous opportunities for data-driven decision-making, improved performance management, and heightened accountability" [13]. These initiatives can improve the efficiency of processes, speed up response times, and make them more secure/reduce human errors [38].

In the context of New Public Management driven reforms, service-oriented or business-like values have been the primary drivers of ICT use in the public sector, while democratic values have been relegated [44, 45] or even trampled [46]. As Bannister and Connolly [30] claim, values such as citizens' information privacy, equal access, and social inclusion have a high potential of being negatively affected by ICT. ICT is not value-neutral but instead has the potential for positive or negative impact on public values. Whereas technology can "follow its own logic", ICT's users are also responsible for the value embedded on the technologies and its applications [46].

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[1] Scholars such as Alford [53] and Osborne et al. [54] discuss the co-creation of 'public *value*' (singular), which Moore [55], representative of this line of thought, refers to as an appraisal "on behalf of the public" of the outcome of public service delivery. Nevertheless, this study will provide insights from the Bozeman [30] strand of thought, as "these public values can serve as reasons or reference points for valuing the 'public value' created" [56].

The involvement of external coproducers, such as private companies, can account for variations in public values expectations. Since ICT-based coproduction allows the government to combine non-state actors' resources with its own, it is seen as a way to enhance government cost savings and deliver better-personalized services [13, 39]. The involvement of private actors can also be considered a method to advance market values such as efficiency, innovation, and flexibility [47]. Reynaers [48] found that service's quality expectations increase with the involvement of the private sector. Although the private and public sector may hold common core organizational values (e.g., expertise, accountability, reliability), "the extent to which an organization belongs to the public or private sector strongly determines values preferences". For instance, profitability scored high for private sector expectations [49]. However, other public values such as citizen empowerment and innovation can be hampered by private companies when they hold the data and do not release it openly and make it accessible [50], restricting evidence-based decision making [18].

The potential impact on public values shows the relevance of disentangling the promises and assumptions behind ICT-based coproduction, and of identifying the actual possibilities and limitations behind the different expectations and interests of the coproducing actors.

4   Research Approach

4.1   The Case: Smart Bike-Sharing System

The presented research is based on a qualitative in-depth case study of a dock-based smart bike-sharing service coproduced in one of the major cities in Flanders, Belgium, hereafter referred to as *Smart-Bike*. A case study allows us to deeply understand a real-life phenomenon while considering the contextual conditions, even with a limited number of observation units. In this way, we can gain insights into complex social phenomena [51], such as smart mobility systems. These can be defined in the frame of technological transition as a "set of connected changes, which reinforce each other but take place in several different areas, such as technology, the economy, institutions, behavior, culture, ecology and belief systems" [52].

The Smart-Bike public service was launched in 2011, led by the city's Department of Urban Development. The primary provider is a private company which offers this service internationally, although Smart-Bike responds to both the city and the private partner. The service is part of the city's efforts to introduce smart solutions and innovations in different public services, specifically in mobility.

The smart bicycle system aims to offer an alternative mobility service that is available 24/7 and provides a solution to the 'first/last mile problem'. It is one of the most successful public smart bike-sharing systems in Belgium in terms of the growing number of active users, with 172% more active users than in 2012. It offers a mobile application which allows users to report service-related issues (e.g., bikes malfunctioning, empty stations, software problems), helping the provider to improve and optimize the service. Although the mobile application and the website are the means to do the reporting, citizens can also help by turning the saddle 180°, which is a signal for

the technicians that something is wrong with that bike. The citizen-users have the right to choose how active they want to be, as the reporting-service is not specified in the rules.

4.2   Data Collection and Analysis

Our qualitative data collection included two sources: documents and semi-structured in-depth interviews [n = 27], which took place from October 2017 to February 2018. First, we conducted two face-to-face pilot interviews with two public servants involved in the project from its beginning, as well as with the Smart-Bike's operational manager. They provided us with official documents, including promotion materials, policy documents, the contract, and KPIs' and research reports. We also consulted relevant online texts like the official website, the city's open data platform, and news articles to acquire a complete overview of the project and its context. For our second step, following a snowball approach, the interviewees recommended other potential respondents from both the city and the private partner who are/were actively involved. We interviewed all the key actors, such as senior managers, operational managers, coordinators, and IT analysts/experts from the private company and the city Department of Urban Development. In this way, we were able to gather feedback from a wide range of perspectives. The contact with the citizen-users was made through a public call sent by Fietsersbond[2], which is an independent association with more than 23,000 members and 500 volunteers that advocates for all cyclists from Flanders and Brussels. The final selection resulted in 8 interviews with public servants and 5 with private actors [n = 13], followed by 14 interviews with citizen-users[3]. The interview questions were tailored to the roles of individuals. On the regular producers' interviews, the first questions were on the role of the respondents in their organization and the project. Then respondents were inquired about the project in general, relevance and their motivations and expected outcomes. Specific questions were asked about the collaboration with other stakeholders and the challenges and advantages; and finally, about the overall impact of technology on (coproducing) public services. Citizen-users were asked about their experience with the service and the reporting system, their expected and perceived outcomes and their motivations for using the service. The interview ended with questions about their experience with the service's technology (e.g., mobile application). The interviews lasted between 45 and 70 min and were recorded, transcribed, and kept confidential. The representatives of the city were identified by the letter "A", the representatives of the private partner by the letter "B", and the citizen-users by the letter "C", all followed by an identification number.

From the official documents, we were able to gather insights on the expected public values expressed in the mission, vision, and goals of Smart-Bike's project. We also identified the main stakeholders involved and their responsibilities. The information deployed in the open data platform allowed us to get data on the service, e.g., location of the stations. Users' information and details on the reporting system were provided by

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[2] https://www.fietsersbond.be/.

[3] Detailed information on the respondents and interview protocol can be provided upon request.

the private partner. All these documents allowed us to gain a holistic understanding of the project and its context, as well as to delimit the interview protocol.

The resulting data from the interviews were analyzed with the support of qualitative analysis software NVivo 12. In the first round of coding, the interviews were divided into segments wherein different variables are discussed and labeled following the theoretical framework on coproduction, public values, and digital government. Next, sub-codes for every variable were added through open coding (e.g., public values sub-coded as 'realized' vs. 'obstructed'). Second, a round of axial coding was executed to identify relationships connecting the open codes. Detailed findings from our analysis of the smart bike-sharing system are presented below.

5   Findings

5.1   The Involvement of Private Actors

Public servants highlighted the importance of having an external partner to coproduce smart mobility because of their lack of technological and personnel capacity, and due to the high operational costs. The private partner provides the city with more flexibility to start new projects as they share the risks. The company's operations manager claimed that their risk-sharing partnership is strongly defined by the contract and its rules: "*you have a contract, and you have to follow the contract that they give you. So, it is a relationship based on the contract*" (B9). Still, public actors experienced issues relating to accountability. Although the private sector's actors claimed it is a relationship based on the contract, that contract did not always seem to be strictly followed.

The city is challenged not only by a lack of capacity to analyze data about users and service performance, but also by a lack of accessibility. Public servants point out that requesting data is an arduous process since it takes time to get it, and sometimes they need to move the request to higher levels (i.e., political level).

Even though the collaboration between the private and public parties is characterized by the contract-based dynamics, three other factors were identified as affecting the collaboration, and thereby the potential realization of public values. These factors are communication, trust, and shared understanding.

All respondents mentioned that communication is the key in Smart-Bike's partnership: it is essential to speak the same language as a way to achieve their goals. Despite sharing this belief, communication issues still arise. For instance, the public servants find it difficult to translate the issues to the private actors, whereas the private partner perceives the demands from the city as unrealistic. Although there is room for communication improvement, much has been accomplished based on mutual trust. Trust between the parties allows for a more flexible, open, and innovative interaction. This kind of open dynamic avoids the need to hold meetings every month. A respondent explained that "*if you do not have to discuss every little detail, every comma… that reflects we can trust each other, and that is very important*" (A3). The private actors perceive the city's trust as a benefit and advantage, "*if there is no trust between the municipality and the private partner, we would not be here anymore*" (B7). They pointed out that trustworthy cooperation was essential to overcome operational issues.

According to the public sector's professionals, they have to let go of control because there is no room for distrust as there are "no open books" (A5). Another challenge was to align the diverse expectations of politicians, administration, company, and citizen-users. Private actors accentuated the need of having a common vision, "*we need to be aware and informed about where the city is going so that we can adapt, prioritize correctly or adjust our operations and strategy so that we are aligned with theirs*" (B7, also B8).

5.2 Co-producers' Public Values Expectations and Perceptions

In order to pinpoint the challenges that might arise due to private actors' involvement, we discuss perceptions of public values realization or obstruction following the two sub-clusters outlined in Sect. 3: service-oriented values (i.e., service quality and business-like values) and socially oriented values (i.e., democratic quality of the service delivered).

Service-Oriented Values

Service Quality. The 'waiting list' refers to the periods when no additional citizens were allowed to subscribe to the service. The quality and effectiveness were put above the inclusiveness of the service. "*It's not so nice for the political level either to say we have a bike sharing system for everybody but 'oh, by the way, sorry, there is a waiting list and we don't know when this waiting list will be cleared.' We didn't have another choice*" (B7). Citizen-users expected to have better quality bikes. Users that have had a subscription from the beginning stated that, when the service started, the quality of the bikes was inferior, but by now it has improved. Nevertheless, they agreed that due to the low price of the service, they do not expect to get the best bikes.

Ease of Access. The company expects to deliver an accessible service: "*ease of access is vital for us. So, no need to fill out 10 forms and write 20 emails before you can use the system*" (B7). The dense network of stations and the 24/7 availability allow a high rate of accessibility to the service. Therefore, they monitor the service continuously. This also relates to the digital side of the service. The mobile application is the bridge between the location of the stations and the citizen-user, completing the experience of the user. As the city's coordinator states, "*everybody who has a smartphone wants to know everything right now and make it possible to order something right now*" (A3). However, challenges emerge when citizen-users do not have a smartphone or digital literacy, which are both necessary in order to use the mobile app or website. For them, the perceived value – accessibility – is the opposite as they are not able to look for that information in advance.

Responsiveness. The city has no direct interaction with the citizen-users. All communication happens via the private partner, who receives the data from the users and takes the information they believe to be pertinent to the meetings with the city. The private actor claimed that it is essential to consider user's feedback for decision-making, "*it has to do with raising awareness about what is bike-sharing so that the users know what is expected from them and what they can expect from us*" (B7).

The user-friendliness of the mobile app is important for the private actor so that users can reach them easily, to report broken bikes or technical issues. Yet the company's intentions are mainly about their image: "*If there is a complaint or suggestion, you have to do something with it. You cannot ignore it. If you ignore it, you will get bad publicity*" (B9). This is reflected in the users' perceptions; they agreed that the efforts of getting citizen-users feedback and use it are far from reality. As some users described: "*once I filled in a long question list with more than 100 questions, and for example, there were only one or two questions about the technical condition of the bikes*" (C24); "*they are always friendly, but they do nothing about the problem"* (C23).

Innovation. For the managerial level of the city's department, innovation is crucial: "*you must have an open mind, an eye for innovation in different aspects of society and be aware of innovations, having a broad network with people in the sector*" (A5). They have concerns about the innovative capacity of their private partner, and not about financial means: "*my perception is that [the private partner] is not a very market player, an innovative player. Our system is 7, 8 years old*", states the director of the urban development department (A5). This clarifies the private actor's perceptions of innovation: "*one of the most difficult things is managing expectations of the city versus the budget you have to do things. Sometimes it is hard to find the funding to be able to innovate*" (B10). Priorities differ, as a respondent explained: "*better technology is the second step. It's like you are a person who needs to drink, who needs to eat, but if you already have all this, you will want something extra. From the moment that the basics needs are met, then we have to go for that little extra*" (B8). It is also related to the contract-based relationship. City actors believed that having a more open contract or work with more partners would allow more room for innovation. The company, on the contrary, believed that the city's expectations should be better managed: "*[h]ow can you innovate, how can you get budget to do new things when it is not part of the tender, and that really depends on where the request is coming from*" (B10).

Social-Oriented Values

Citizen Empowerment. Empowerment does not seem to be a relevant value for the project, based on the interviewees' responses. A private actor stated that "*the more you give them the ability to do things on their own, the more they can do things on their own. But of course, there are always people that might not be able to, and that's why we always have a front-office where you can go and get help if needed*" (B10). The citizens' voice is taken as a part of the service, but sometimes it is merely a formality, as the suggestions need to be "good and right" to get discussed (A2). The citizen-users of this sample believe that they do not have a genuine voice in the process, although they expect to have it. "*I made a suggestion to [Smart-Bike], and they accepted it: 'Oh, that's a nice thing, we will take it'. But they don't do anything with it*" (C1). In general, citizen-users claimed that individual efforts are worthless; rather, they need to act as a group or through non-profit organizations to get their voices heard.

Inclusiveness. For private actors, efficiency is more valued than inclusiveness. For example: "*you might say that there is no waiting list, but then you get under-capacity, and you risk failing completely, then the system is not adopted anymore by the users*

because it does not offer a solution anymore" (B7). They are aware of the difficulties of aligning different visions, "*sometimes, the decisions are hard to take for the city; even more when different organizations have something to say in the story*" (B8). The low level of inclusiveness is reflected in the digitalization of the services. A citizen-user argued: "*they skip a group of people who are not digital. They can't use it because they can't get an account or they don't know how to use the app or the screen. We are a forgotten group, and they should take care of us*" (C1, also C2, 3, 5, 6, 10, 12). This is seen again in the numbers behind the mobile application's reports from 2016 to 2018. Whereas 47% of the users are younger than 35 years old, more than 70% of the reports via the mobile app came from this group. Moreover, both private and public actors accept that the 'offline' experience is not the same as the 'digital' one. As a user stated: "*you can use the system without a mobile phone, but for me, it feels like half a system*" (C6). The city claims to not have enough data to understand who is included and who might be left behind, digitally and in terms of language and cultural aspects. The company is aware of this problem, yet inclusiveness is not prioritized: "*you also have people who get angry because they can't give us a paper, but it's too expensive to have offices and people everywhere*" (B8).

Privacy and Security. Private actors showed more concern in terms of privacy and security policies and regulations than the city. With new regulations like GDPR, the company needs to change procedures: "*we had to change what we ask. We also had to implement a procedure if people want to delete their personal data*" (B8). It was striking that – despite the involvement of private companies – the users interviewed did not have any concern about privacy and security regarding their data since they understood that the city is behind the service and believed that their personal information would not be compromised. As some users claimed: "*Because the city is backing up the project, it feels more reliable*" (C3); "*if they are more commercial the risk that they will spread the data around is bigger. And if it's more government-oriented or social profit, I don't believe they misuse it*" (C6). On the other hand, a MaaS expert (Mobility as a Service) of the city (A6) pointed out that no privacy and security policy on smart services has yet been defined in their regulations. The expert highlighted that the interest of the city is now put on opening the data and creating projects interesting enough for MaaS providers, as a "political game".

6   Discussion

The private sector has been insourcing most of the technological solutions in the public sector, playing a pivotal role in initiatives such as ICT-based coproduction of smart – sharing – services. Still, private actors' expectations regarding the service tend to diverge from the public actors. Although this might not be striking, the significant aspect lies in the public nature of the coproduced service, and therefore, the importance of public values being realized through the coproduction process. This paper aimed to unveil the impact that the involvement of private actors has in the delivery and coproduction of smart mobility on the realization of service-oriented and social-oriented public values. The findings advance our understanding of the public values

expected or aimed for, in how far these values are actually being realized, and which factors enhance the realization of public values.

In the context of Smart-Bike, the city's shortage of specific expertise, skills, staff, financial resources, and technology required to set up the smart mobility project made it necessary to involve a private company. This involvement is determined by a contract-based collaboration between the parties. All the actors, both public and private, agree that the project's primary motivation is its effectiveness as a real solution and an alternative for improving mobility in the city. However, from that point on, the actors tend to differ in what they value most.

The private actors prioritize the realization of public values such as efficiency, reliability, and ease of access, whereas social-oriented values like citizen engagement and (digital) inclusiveness are not part of their core vision. They do highlight values like responsiveness or empowerment but in a 'defensive way'; the main concern is to protect the company's image. As citizen-users manifest, there are no genuine opportunities to give feedback and be heard. Moreover, the company sustains that the service is inclusive, although the digital limitations of certain groups of the society are not taken into consideration. The users need digital skills and resources to fully enjoy the smart service fully, which might hamper not only equal access (a fundamental value of public service) but also the effectiveness of the service.

Concerning innovation, it is expected that the private partner fosters and facilitates venues to develop new smart solutions. Nevertheless, our case study reveals that the private partner points to the budget and contract-based dynamics as an obstruction to innovate, while the public actors believe that the issue is related to the company not being up to date on the market's innovations. In contrast, the private actors show a higher concern about values such as privacy and the security of citizen-users' data. However, while Smart-Bike is presented as a city's service, the users may hold mistaken perceptions of their privacy and security of the data they share.

In the case studied, four specific factors of the coproduction's collaborative process play a role in the realization (or obstruction) of public values: contract-based dynamics, communication between the stakeholders, building trust, and shared understanding of the interests, goals, and vision of the different involved parties. The evidence suggests that contract-based collaboration might foster efficiency, while innovation, citizen empowerment, and privacy and security aspects are hindered due to the restricted access of the city to the service's data and system. Communication has been a problem between the private and public actors, mainly because of the disparities in the perceptions of the role that each party has in the decision-making process and in their various ways of achieving goals. Furthermore, the private partner being solely responsible for the interaction with citizen-users entails barriers to advance social-oriented values. However, mutual trust helps to balance those issues by providing more flexibility and openness within the collaboration. At the same time, trust is fundamental in terms of efficiency (e.g., time and flexibility), and accountability. Although the city has no direct and open access to all the facts and data from the service, trust has been playing a crucial role in the sustainability of the project. Another influential factor is the shared understanding in working together that facilitates the alignment of different motivations and priorities, even if they do not share all their expectations. For instance, the private actors aim to line up their plans with the city's priorities (e.g., political

level), while public professionals also include the citizens' visions as part of the bigger picture. Shared understanding also facilitates the pooling of key resources and common values. To sum up, the evidence suggests public actors need to correctly align the resources, expertise, legal frameworks, and goals to balance public values priorities when involving external partners in the coproduction of smart public services.

7 Concluding Remarks

This paper provides evidence consistent with existing research on ICT-based coproduction, smart services, and conflicting interests between private and public actors. Additionally, it highlights how important it is to understand private actors' involvement in coproduction through a public values' lens. This study offers a new angle on the conflicting interests among different coproducing actors and the long-standing tension between social-oriented and service-oriented values. It also pinpoints some factors of the coproduction process that may help to detect possible venues to handle the differences in public values' priorities. Overall, the identified factors reveal that the collaborative process may be more relevant than the actual coproducing actors' resources and expertise when it comes to upholding public values.

An early thinking on the potential downside and risks behind future ICT-based coproduction projects will broaden the possibilities of developing innovative and efficient solutions in the field of smart mobility while safeguarding the social aspect of public services. Our study offers some suggestions for such collaborative projects. First, attention should be given to the contract and the legal framework behind the initiative. The potential power asymmetry between the cities and private companies at the time of coproducing smart services underpins the relevance of a well-defined legal framework. In Smart-Bike, the lack of regulations in terms of data access has become an obstacle to improving the service, evaluating the level of inclusiveness, fostering innovation, and assessing the general performance of the private partner. In particular, our analysis points at the need for clear approaches in terms of data and information sharing that protect and uphold the realization of public values. It also stresses the importance of clearly defining the tasks and responsibilities between the parties to manage expectations. Second, transparency can be a significant factor in the collaborative process, mainly towards citizen-users who need to be aware of the parties involved in the service, e.g., who is handling their data and how. Finally, future research on ICT-enabled coproduction and realization of public values should incorporate insights from public-private partnership literature and public-private innovation networks. For example, it would be useful to look into power asymmetries between principal and agent, the government's ability to adequately prepare the contract, and the competencies needed for purchase and procurement. In contrast to the first factor (i.e., the contract), the other three identified factors (i.e., communication, trust, shared understanding) link more with insights from collaborative governance theory and the more 'soft' side of inter-organizational collaboration.

Our research is not without limitations. The reporting conclusions are based on a small-scale single case study of a smart mobility public service in one of the major cities in Flanders, Belgium. The resulting conclusions are case-specific and cannot be

generalized to other cases. Yet the insights derived from our case study might be relevant to other cities coproducing smart services in related conditions or with similar characteristics. Future research could examine initiatives from different policy fields (e.g., health care, social care) which may shed light on other public values being upheld or obstructed due to collaboration with private actors. As the involvement of private actors will remain necessary for ICT-based coproduction initiatives, more research is needed to further reflect on the potential trade-offs between delivering a better service and fostering democratic quality. We also need studies to show how to successfully deal with the tensions that arise due to different public values being prioritized in a context of power asymmetry, where the private sector seems to orchestrate the changes behind the government ICT-based projects.

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