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PUBLIC VALUE CREATION POTENTIAL OF MICROTRANSIT

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Master's dissertation presented to the COPPEAD Graduate School of Business, Universidade Federal do Rio de Janeiro, as part of the mandatory requirements in order to obtain the title of Master in Business Administration (M.Sc.).

Supervisor: Prof. Marie Anne Macadar, D.Sc.

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RESUMO

WIENER-BRODKEY, Gabriel Seth. **O potencial de criação de valor público em microtransporte**. Rio de Janeiro, 2021. 110f. Dissertação (Mestrado em Administração) - Instituto COPPEAD de Administração, Universidade Federal do Rio de Janeiro, Rio de Janeiro, 2021.

O presente trabalho investiga o potencial de criação de valor público através de projetos-piloto de microtransporte que envolvem a colaboração entre operadoras convencionais de transporte público e parceiros de inovação do setor privado, no Brasil e nos Estados Unidos. Dado o contexto do século XXI, com crescimento populacional urbano explosivo e o esgotamento de finanças públicas, as administrações públicas têm sido encarregadas com a concepção de novas ferramentas e estratégias para endereçar os subprodutos desses acontecimentos, um dos quais é o desafio aumentado de mobilidade urbana. Através de uma revisão de literatura, dados de fontes secundárias e 6 entrevistas semi-estruturadas com operadoras de transporte público e gerentes do setor privado diretamente envolvidos nesses projetos, identificamos características de valor público e de quais formas o mesmo pode ser gerado nessas iniciativas de microtransporte. Avaliamos o potencial para criação de valor público conforme elementos de Moore (1995), Harrison et al. (2012) e Meynhardt (2015). Também, criamos uma adaptação do modelo proposto por Neumann et al. (2019) para analisar o potencial de criação de valor público mais precisamente de acordo com a natureza colaborativa dessas iniciativas. Os resultados revelam algumas evidências de criação de valor público em projetos de microtransporte que envolvem a colaboração entre operadoras de transporte público convencional e parceiros de inovação. Porém, os resultados sugerem que a extensão do valor público que pode ser gerado depende do contexto no qual a iniciativa colaborativa está situada. Concluímos que os relacionamentos entre as operadoras de transporte público e parceiros de inovação abordados nesse estudo atualmente adotam características de agência e características de *stewardship*, em um modelo híbrido. No contexto brasileiro, essas iniciativas tendem a gerar mais valor de negócio devido ao imperativo financeiro de criar valor de negócio imposto por mecanismos mais limitados de financiamento, enquanto que no contexto americano os mecanismos atuais permitem um foco maior em valor público. Em um sentido prático, a pesquisa também identifica abordagens de inovação incremental e o foco no cidadão como boas práticas para futuros projetos de microtransporte por meio de inovação colaborativa.

Palavras-chave: valor público, microtransporte, inovação colaborativa, cidades inteligentes, teoria da *stewardship*, teoria da agência

ABSTRACT

WIENER-BRODKEY, Gabriel Seth. **Public value creation potential of microtransit**. Rio de Janeiro, 2021, 110pp. Dissertation (Master's Degree in Business Administration) - COPPEAD Graduate School of Business, Federal University of Rio de Janeiro, Rio de Janeiro, 2021.

The present study investigates the potential for public value creation through microtransit pilot projects that involve collaboration between conventional public transportation operators and private sector innovation partners, in the United States and Brazil. Given the 21st century context of explosive urban population growth and strained public finances, public administrations have been tasked with devising new tools and strategies to address the byproducts of these developments, one of which is the increased challenge of urban mobility. Through a literature review, secondary source data, and 6 semi-structured interviews with public transportation operators and private sector managers directly involved in these projects, we identify characteristics of public value and in which ways it can be generated through these microtransit initiatives. We assessed the potential for public value creation in these projects according to elements of Moore (1995), Harrison (2012) and Meynhardt (2015). We also created an adaptation of the model proposed by Neumann et al. (2019) to assess the potential for public value creation more precisely according to the collaborative nature of these projects. The findings reveal some evidence of public value creation in microtransit projects that involve collaboration between conventional public transportation operators and innovation partners. However, the results also suggest that the extent of public value that can be created also depends on the context in which the collaborative initiative is situated. We conclude that the relationships between conventional public transportation operators and innovation partners analyzed in this study currently adopt agency-based characteristics and stewardship-based characteristics, in a hybrid model. In the Brazilian context, the results suggest that these projects tend to generate more business value due to a financial imperative to create business value imposed by more limited funding mechanisms, while in the United States context, the current mechanisms allow for a greater focus on public value. In a practical sense, the research also identifies incremental innovation approaches and citizen focus as best practices for future microtransit projects through collaborative innovation.

Keywords: public value, microtransit, collaborative innovation, smart cities, stewardship theory, agency theory

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LIST OF ABBREVIATIONS

BNDES	Banco Nacional de Desenvolvimento Econômico Federal
CPF	Cadastro de Pessoas Físicas, Brazilian taxpayer identification number
DRT	Demand-responsive transit
KCATA	Kansas City Area Transportation Authority
NPM	New Public Management
NTU	Associação Nacional das Empresas de Transportes Urbanos
PVSC	Public Value Scorecard
RMTC	Rede Municipal de Transportes Coletivos
RT	Regional Transit (Sacramento Regional Transit District)
TNC	Transportation Network Company
YCTD	Yolo County Transportation District

CONTENTS

1. Introduction

As populations worldwide gravitate towards cities, the question of how citizens will move around their physical environments has surged to the forefront of public policy discussions (Cervero, 2013). Urban population swelling has resulted in notable increases in traffic congestion, recognized as a major drain on economic productivity, main contributor to air pollution and a leading cause of traffic accidents, reinforcing the need for innovative solutions to promote mobility (Vasconcellos, 1999; Sweet, 2011; Zhang & Betterman, 2013). However, the ability of public administrations to address this need has been hindered by exhausted public budgets and chronic underinvestment in transportation (Graehler, Mucci and Erhardt, 2019). In addition, some studies allude to the possibility that citizen support for conventional public transportation is declining, especially with the advent of private rideshare as a substitute, contributing to the widespread shortfalls and, subsequently, diminished quality of these services (Taylor & Fink, 2003; Hall, Palsson and Price, 2018). Yet, the vital role of transportation in society, especially with respect to sustainable development and its economic, social and environmental impact, exacerbates the need for efficient and flexible transportation systems geared toward improved quality of life through access to employment, education, entertainment and other urban amenities (Song, Srinivasan, Sookoor and Jeschke, 2017). Although the public sector plays an essential role in the provision of transportation options in many cities, the rise of private, on-demand services has proven to be a major challenge to their operations (Graehler et al., 2019).

In the age of smartphone apps that enable on-demand access to services ranging from grocery shopping (e.g, Instacart) to laundromats (e.g. Cleanly), dog-walkers (e.g., Wag!) to food delivery (e.g., DoorDash), transportation services have also embraced this trend (Taylor, 2018). Consumer expectations reflect diminished levels of patience, such as a consumer's ability to summon a vehicle to pick them up from, or close to, their location and drop them off at, or close to, their destination in a matter of minutes, with seamless, efficient payment and a high standard of service (Hu, 2019). Understandably, conventional public transportation

operators have struggled to determine how to "compete" with on-demand ridesharing, in order to stem the steady outflow of traditional public transportation riders to private, on-demand services. This trend, wherein previously loyal public transportation riders have abandoned shared transportation modes in favor of individual, on-demand offerings from private transportation network companies (TNCs), has not only posed threats to public transportation, but has also impacted traffic congestion, air pollution and other elements that contribute to the overall livability of cities (Vasconcellos, 1999; Sweet, 2011; Zhang & Betterman, 2013).

Resulting from the emergence of private rideshare in urban environments, and potential negative byproducts of these systems, is the emerging notion that "it is important not to substitute an existing transport regime with a future that compromises the fundamental underpinnings of successful and efficient cities" (Wong, Hensher and Mulley, 2017, p. 2). Essential to the envisioning of new solutions, therefore, is to build upon or otherwise complement systems that are already in place. The emergent public-private paradigm shift has created space for a new approach in mobility initiatives to materialize, a service that fits somewhere between traditional public transportation and private ridesharing, that has been coined microtransit (Chan & Shaheen, 2011). Digital technology has provided "the interface for connecting demanders and suppliers and facilitating the delivery of physical transportation" (Wong et al., 2017, p. 1) while new opportunities have arisen for public value creation through IT-enabled innovations (Cordella & Bonina, 2012; Pang, Lee and DeLone, 2014; Soe & Drechsler, 2018). The impact that these technologies may have in the crafting of new and innovative solutions requires further study to understand the extent to which conventional public transportation operators can create public value through interaction with private sector innovation partners.

This study examines on-demand public transportation in Brazil and the United States. Though there are many different kinds of on-demand private ridesharing services in Brazilian cities of all sizes (Rodrigues, Ribeiro and Uriarte, 2019), the projects to be analyzed in this paper are unique in the Brazilian context in that they are sponsored by conventional public transportation operators in their respective cities - they are not purely market based solutions aimed at competing directly with large private rideshare players in the Brazilian market such as US-based Uber, 99 (owned by Didi Chuxing, from China) and the Spanish rideshare company, Cabify. It is worth noting that public transportation in Brazil, in nearly all major cities, is operated under a public concession model wherein municipal governments cede the operations to a private company or small group of companies that conduct business under specific rules

delineated in their contracts with regards to vehicle standards, routes, fares charged, accessibility measures for the elderly and people with disabilities, among other elements, since the advent of the Law No. 8987, enacted on February 13, 1995 by the Brazilian federal government (Law No. 8987, 1995).

As a result of this model, most of Brazil's major cities do not provide subsidies directly to the private company or companies responsible for operating public transportation, requiring them to sustain themselves through farebox recovery ratio and heightened attention to operational efficiency and cost-cutting (Carvalho & Pereira, 2012). According to Carvalho (2016), São Paulo is the only Brazilian city to receive significant municipal budget resources to finance the operation of public transportation. However, financing from large development banks such as Brazil's National Development Bank (BNDES), the World Bank and the Inter-American Development Bank is available to public transportation operators in Brazil, notably in the form of loans, rather than grants (Vasconcellos, Carvalho and Pereira, 2011; Carvalho & Pereira, 2012).

In this sense, in the Brazilian context, these microtransit pilot projects could even be seen as entrepreneurial ventures aiming to preserve the relevance of public transportation in a national scenario wherein over 50% of large city residents now use private ridesharing services at least once weekly (Ukon, Nieto and Canabarro, 2019). Moreover, the steady outflow of passengers traveling shorter distances and paying full fares from conventional public transportation options has been well-documented (NTU, 2018), presenting an ongoing challenge to public transportation operators throughout Brazil that may be difficult to reverse under the current financial and operational models (Carvalho, 2016). The idea to experiment with on-demand public transportation seems to represent a paradigm shift in terms of attitude, even with regard to service evaluation in public transportation (NTU, 2019).

Public transportation operators in the United States have also taken to experimenting with on-demand ridesharing initiatives, in spite of the longstanding presence of private ridesharing options in cities across the country (Chan & Shaheen, 2011). However, in contrast to Brazil, the United States federal government, along with state and local governments, have consistently provided subsidies for public transportation, accentuated by a 15-fold increase in subsidy in the 1970s (Pucher, Markstedt and Hirschman, 1983). This suggests that conventional public transportation operators in the United States may not be not bound to the same private sector imperative to compete in order to preserve financial sustainability. However, similarly to Brazil, public transportation operators in the United States face the challenge of maintaining

high utility systems where (especially bus) ridership has declined in response to the introduction of bike sharing programs and TNCs (Graehler et al., 2019). It is pertinent, therefore, to examine conventional public transportation operators' engagements with innovation partners, and what impacts on public value creation this interaction may have. In the United States, the car-dependency of cities has been well documented. According to an analysis by GovTech (Maciag, 2017) of data from the 2015 and 2016 US Census American Community Surveys, most of the least car-dependent US cities are older, Northern cities that were developed before the advent of the personal automobile. Only about 9% of US households did not have access to a car as of 2017, according to the US Department of Transportation. Also, according to Pucher and Lefevre (1996), nearly every facet of life in the US, including work, leisure, education and cultural amenities depends heavily on cars. In summary, the car-centricity of cities is aligned with the widespread availability of cars to the population.

In Brazil, urban development has more closely followed the European model, wherein wealthier individuals tend to live closer to the central regions of cities, and the surrounding areas are more likely inhabited by individuals of a lower socioeconomic status (Nadalin & Mation, 2018). Nevertheless, according to Biderman (2009), Brazilian cities are among the most car-dependent in the world. By international standards, Brazil's car ownership rates are low – the ratio of inhabitants per automobile in the US is 1.2, 3.5 in Mexico (another middle-income country) and 6 in Brazil (Amann et al., 2016). The car-centricity of cities, however, is not necessarily aligned with widespread car ownership. In fact, according to IBGE (2020) just 49.2% of Brazilian households had a car, while 22.9% of households had a motorcycle in 2019. To synthesize, both countries can be seen to be car-dependent in the topographical composition of their cities, but access to cars remains unequal. This difference reinforces the need for creative, mobility-enhancing solutions that are also conceived and executed in an equitable way.

The research undertaken in this study stems from "the marked lack of consensus in the academic community about what constitutes public value", especially given that the "conceptual meaning of the term 'public value' remains ambiguous" (Welch, Rimes & Bozeman, 2015, p. 132). Moreover, heightened attention to "cultural, political and legal context" (Meynhardt et al. 2017, p. 136) must be given, in order to attempt to understand context's practical impact in enabling (or not) public value creation. So, this research aims to contribute a practical perspective on public value creation and an assessment of an existing framework, that of Neumann, Matt, Hitz-Gamper, Schmidthuber and Stürmer (2019), from their paper entitled "Joining forces for public value creation? Exploring collaborative

innovation in smart city initiatives", to analyze the extent to which conventional public transportation operators can generate public value through collaborative innovations, in the United States and Brazil. Additionally, by examining dimensions of public value according to Moore (1995), Harrison et al. (2012) and Meynhardt (2015) we can identify specific elements of public value as outlined by the literature and the extent to which they are generated through these initiatives.

This study exemplifies the phenomenon of general use on-demand public transportation in four distinct contexts to reinforce the merits of studying potential contextual impacts on public value creation, and lessons to be learned from different implementations of the same type of collaborative innovation solution. The intent is to encourage best practices for public administration in a descriptive sense, and to contribute to academic research in the area of public value creation as related to collaborative innovation approaches. The overarching question we aim to address in this study is to what extent public value is created through microtransit projects involving the interaction between conventional public transportation operators and private sector innovation partners, and what is the role of context in enabling or hindering public value creation in these projects.

Here we will present the structure of the document. Chapter 2 explores the concept of microtransit, providing definitions and characteristics, studying the increasing functional overlap between public transportation and services provided by transportation network companies, contributing a historical perspective and outlining some of the key private companies involved in microtransit initiatives. Chapter 3 consists of a literature review that includes an overview of the concepts of public value, collaborative innovation and the theories of agency and stewardship, seen as key theoretical links to explain the selection of microtransit as the phenomenon to examine in this study. Chapter 4 addresses the research methodology, which includes the research process and motivation, research strategy, microtransit initiative selection, data collection strategy and the content analysis process. Chapter 5 explores the selected contexts in which microtransit initiatives have developed through collaboration between public transportation operators and a private sector innovation partner, two in the United States (Sacramento and West Sacramento) and two in Brazil (Goiânia and Fortaleza). Chapter 6 includes analysis and results - assessing the microtransit initiatives involved in this study through Moore's Strategic Triangle Framework (1995), Harrison et al.'s (2012) and Meynhardt's (2015) public value dimensions, and through an adaptation of the Neumann et al. (2019) model which incorporates public value creation specifically through collaborative

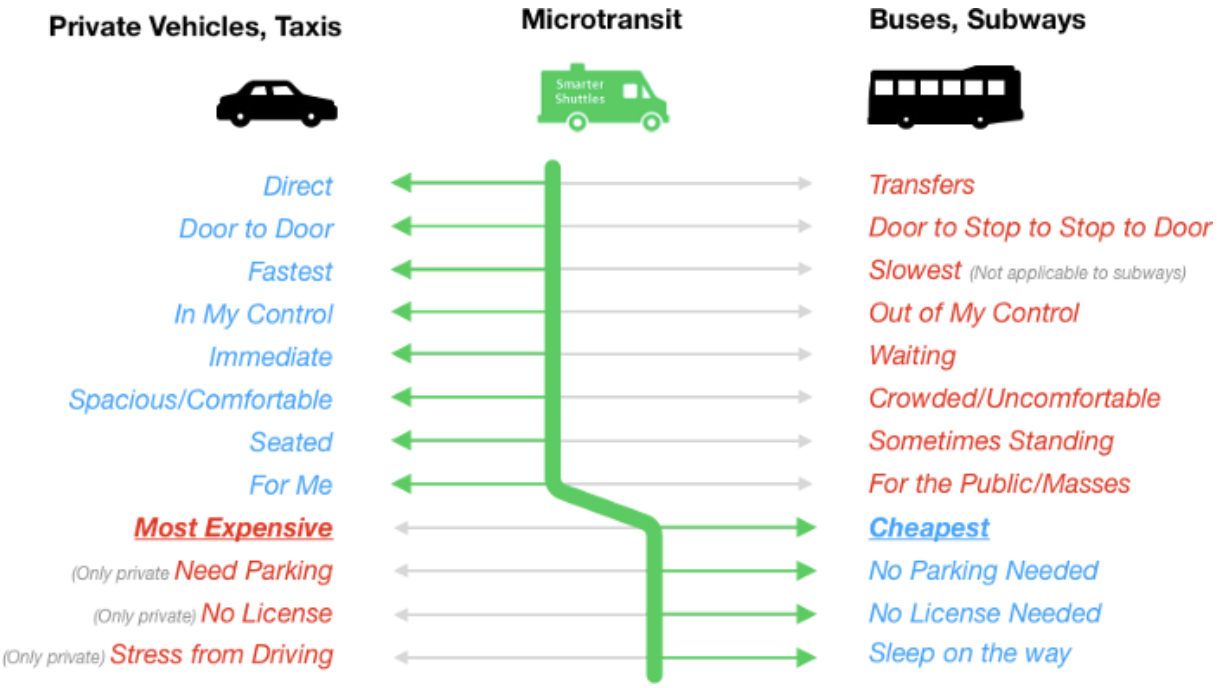
approaches. Finally, Chapter 7 concludes the study, and incorporates key findings, contributions, limitations, and opportunities for future research.

2. Microtransit

2.1 Definitions, characteristics and usage

The concept of a small-scale, on-demand passenger service that utilizes vans or minibuses that travel along dynamic routes is not new. In fact, in *Paratransit in America: Redefining Mass Transportation* (Cervero, 1997) and *The Transit Metropolis: A Global Inquiry* (Cervero, 1998), microtransit was identified as a technologically enhanced version of a transportation mode that had already existed for decades, particularly in the Global South. It has been defined as a niche service, meant for commuters in some contexts, for the elderly and people with disabilities in other contexts, for transportation to and from airports, and for immigrant or low-income groups that historically lived far from traditional fixed public transportation systems (Cervero, 2017). Other definitions of microtransit come from industry reports. One such definition is "app-enabled private multi-passenger transportation service that serves passengers using dynamically generated routes, and may expect passengers to make their way to and from common pick-up and drop-off points" (Transit Cooperative Research Program, 2016). Another is "private or publicly operated, technology enabled transit service that typically uses multi-passenger/pooled shuttles or vans to provide on-demand or fixed-schedule services with either dynamic or fixed routing" ([SAE International microtransit definition], n.d.). Finally, the US Transportation Research Board defines microtransit as "shared public or private sector transportation services that offer fixed or dynamically allocated routes and schedules in response to individual or aggregate consumer demand, using smaller vehicles and capitalizing on widespread mobile GPS and Internet connectivity" (Volinski, 2019).

Figure 1. Characteristics of Microtransit



Source: Kim, N. Y. (2019, March 22). The potential of microtransit shuttle services — part 1 [blog post]. Retrieved from https://namyoonkim.medium.com/what-is-a-microtransit-service-part-1-decc757b6a45

The underlying logic of microtransit, as illustrated above in Fig. 1, is to deliver a compromise between a direct route and a route that requires vehicle transfers. Though they may not transport passengers "door to door", these services often do not depend on physical stops. While microtransit services likely are unable to compete with a private, individual vehicle in terms of speed, generally their routes are optimized to minimize stops, providing a more direct link. These services also emphasize the transfer of control from the transportation provider to the user, as the user summons the ride to, or close to, their location. Similarly, these services tend to emphasize spaciousness and comfort, a more individualized experience, and additional benefits when compared to driving a personal vehicle, such as reducing the need for parking, the need to possess a driver's license, and the stress associated with driving.

The literature on the topic of microtransit remains sparse (Volinski, 2019). Technological advances that have made flexible or on-demand transportation feasible in real time, and particularly the public sector interest in incorporating on-demand into fixed route systems have mainly been assessed through industry reports (Volinski, 2019). For example,

one of the early studies of these services in the United States, which was an effort to provide insight into public transit agencies' experiences operating flexible, on-demand systems, was the US Transportation Research Board's Transit Cooperative Research Program's 2004 publication entitled *Synthesis 53: Operational Experiences with Flexible Transit Services* (Koffman, 2004). This document provided an analysis of 24 public transportation agencies in the US that provided some form of flexible or individualized transportation. The report classified these services according to characteristics such as:

- Deviated routes: Configuration in which "vehicles operate on a regular schedule along a well-defined path, with or without marked bus stops, and deviate to serve demand-responsive requests within a zone around the path. The width or extent of the zone may be precisely established or flexible." (p. 5)
- Point deviation: Configuration in which "vehicles serve demand-responsive requests within a zone and also serve a limited number of stops within the zone without any regular path between the stops." (p. 6)
- Demand-responsive connector: Configuration in which "vehicles operate in demand-responsive mode within a zone, with one or more scheduled transfer points that connect with a fixed-route network [and] a high percentage of ridership consists of trips to or from the transfer points." (p. 6)
- Request stops: Configuration in which "vehicles operate in conventional fixed-route, fixed-schedule mode and also serve a limited number of defined stops near the route in response to passenger requests." (p. 6)
- Flexible-route segments: Configuration in which "vehicles operate in conventional fixed-route, fixed-schedule mode, but switch to demand-responsive operation for a limited portion of the route." (p. 6)
- Zone route: Configuration in which "vehicles operate in demand-responsive mode along a corridor with established departure and arrival times at one or more end points." (p. 6)

In addition, a report entitled *Microtransit: An assessment of potential to drive greenhouse gas emissions* (MaRS Discovery District, 2016) delineates 12 potential use cases for microtransit:

- Shared dynamic shuttle services to suburban rail/metro stations
- Reaching underserved, low-density suburbs
- Off-peak services to mid-density suburbs

- Busy corridor commutes
- Accessible and special transportation services
- Downtown circulation
- School drop-off
- Airport drop-off
- Suburban mall/big retail
- Shift workers
- Trip chaining - home-school-work
- Events and entertainment destinations

Evidently, microtransit is a complex, multifaceted concept with a plethora of definitions, characteristics and use cases. In this study, the four projects examined are general use, that is, they could fit any or all of the use cases outlined in the 2016 MaRS study. They operate (partially) according to the "point deviation" characteristic identified by the Transit Cooperative Research Program's 2004 report in that they "serve demand responsive requests within a zone". Importantly, they emerged as collaborative innovations between conventional public transportation operators and a private sector innovation partner. Indeed, an emerging trend in microtransit includes the potential of partnership to deliver solutions (Shared Use Mobility Center, 2019). However, also according to the Shared Use Mobility Center, this alliance may also be seen as a natural progression due to technological advances that have facilitated this fusion.

2.2 Historical perspective

As mentioned in the beginning of this chapter, the concept of a shared minibus or shuttle that follows routes defined by the immediate demand of its users is not new - in fact, the idea dates back to the early 20th century. Colloquially known in the United States as dollar vans or "jitneys" these services were extremely popular in major urban areas, such as New York City, Chicago, San Francisco, Miami and Atlanta, especially among lower-income and immigrant groups (Chambliss, 2008; Grossman, 2014; Eckert & Hilton, 1972). To this day, some such services still operate in Miami (especially in immigrant communities such as Little Haiti and Little Havana), and even more commonly in New York City, concentrated in areas that are poorly served by the subway system (Cervero, 1997). Besides having flexible routing and not necessarily relying on physical stops to pick up and drop off riders, these services are often offered at lower prices than a conventional bus service (Kirk, 2017). In some jurisdictions, this

type of service, when privately owned and operated, has been limited by regulators, aiming to eliminate unfair competition with licensed taxis or conventional public transportation (Mahesh, 2015).

According to Eckert & Hilton (1972), the history of jitneys purportedly dates to 1914, in the United States, when a resident of Los Angeles, California offered a short ride to a passenger using his personal Model T. Initially, the owner charged five cents for a point-to-point ride between certain areas of the city of Los Angeles. The name "jitney" came into use due to the word's usage as a slang term for a nickel at the time ("History of the jitney", 1918). By December 1914, a permitting system had been implemented for this mode of transportation, and records showed approximately 1,800 permits and 1,600 shared minibuses in operation ("History of the jitney", 1918). Within a year, intercity jitneys came into operation, providing competition to the streetcar system and even the railroads (Eckert & Hilton, 1972). From California, the idea of the jitney spread to the Pacific Northwest, then to the Midwest and finally to the East Coast, hitting a peak estimate in 1915 of 17,000 shared shuttles in cities across the United States (Eckert & Hilton, 1972; "History of the jitney", 1918).

Also, according to Eckert & Hilton (1972), these systems were plagued by reckless driving resulting in frequent accidents, including drivers colliding with other vehicles and even streetcars in attempts to secure more paying passengers. As a result, jitneys were all but regulated out of existence in the US to clear the path for street cars, buses, trains and, of course, the private, personal automobile. In other countries, however, these systems still maintain a large presence, in many cases providing a vital link to transportation in environments where there is limited or no fixed route public transportation (Cervero, 2001). For example, *tuktuks* have existed in Thailand since the 1930s, and still have an essential role in transportation systems throughout the country (Phun & Yai, 2016). *Matatus*, in Kenya, trace their origins to the early 1960s and were officially deemed legal in 1973, but they were not subject to strict regulation, inspection and licensing until 1984 (Mutongi, 2017). As of 2010, there is a concerted government effort in the Kenyan capital of Nairobi to phase out *matatus* in favor of higher-capacity fixed route buses ("New rules to rein in wild sector", 2010) aimed at reducing traffic congestion and stamping out the illicit activity that has come to be associated with *matatus*, such as speeding, traffic violations, and even physical and sexual abuse of passengers due to persistently lax oversight (Mungai & Samper, 2006).

There are many other examples of similar services, such as *kombis* in Brazil, *moniot sherut* in Israel and in many other countries around the world. The experience of jitneys in the

United States, *matatus* in Kenya and other similar privately owned and operated shared systems suggest that their challenges may stem not from their inability to provide necessary, on-demand transportation, but from inadequate regulation and governance obstacles, and a potential misunderstanding of the value that on-demand transportation can provide when allied with the public administration and conventional public transportation operations.

2.3 Examples of business entities involved in today's microtransit pilot projects

This section provides an overview of some of the main private companies involved in today's microtransit projects, understanding their concept as an evolution of the aforementioned jitney systems of the past. Allying new technology with the underlying logic of the jitney establishes these initiatives as a form of incremental innovation, which, according to Christensen (1997) refers to a change that builds on a firm's expertise in component technology within an established architecture. Moreover, according to Howells (2005), a new model of an existing and established product (such as that pioneered by the jitney) will likely involve refinement of particular components of the product (such as enabling technology) rather than architectural or systemic changes. In this sense, the companies involved in present-day microtransit projects wield enablers, especially technological capabilities, that facilitate their insertion into conventional transportation networks.

Bridj, an Australian-owned company founded in 2014 in the United States, is a SaaS platform designed to support on-demand transportation initiatives. The platform includes an optimization engine that calculates efficient routes for vehicles based on demand, a client portal for interaction between the firm and its business partners, a driver app and a customer app ([Bridj platform information], n.d.). The technology developed by Bridj is currently in use by the public transportation system of Sydney, Australia, and for staff transportation services (from offices to transit hubs) in Singapore ([Bridj usage information], n.d).

Bridj launched its original service as a private rideshare company in Boston, the hometown of the firm's founders, in 2014 (Johnston, 2014). In March 2016, the Kansas City Area Transportation Authority (KCATA) announced it would hire Bridj in order to create a demand-responsive complementary service for its traditional bus-based public transportation offering (Ford, 2016). In Kansas City, Bridj planned passenger trips according to user preferences logged in its smartphone app, while KCATA provided union-represented, full-time drivers and set fares equal to those in effect for the conventional bus system (Marshall, 2016). Ford Transit provided 10 14-seat minibuses to make viable one of the first microtransit projects

founded on a partnership between a public transportation agency and a private mobility company (Ford, 2016). However, in April 2017, the partnership between Bridj and KCATA abruptly ended, due to a combination of a funding impasse and a lack of ridership (Woodward, Vaccar & Gans, 2017). The company was later sold to Australian company Transit Systems and continues to provide technological infrastructure for publicly and privately provisioned on-demand transportation services in Australia and Singapore (Vaccaro, 2017).

Chariot was another private company involved in on-demand transportation initiatives and microtransit projects. Founded in March 2014 in California, it was then purchased by Ford Motor Company in September 2016 (Ford, 2016). It operated in several different US metropolitan areas, as well as in Greater London (Ford, 2018). Users accessed the service through a smartphone app, and then waited at pre-defined, fixed pickup points for the shared shuttle to arrive (Ferris, 2017). New service routes were determined via crowdsourced user preference data from users and based on demographic information from user accounts (Cutler, 2014). Using 15-seat vans, Chariot provided the option to pay per ride, to purchase multi-ride passes at a discount or via monthly passes, all paid for through the app (Lawler, 2015). Without public support, and lacking integration into any existing public transportation modes in the cities in which it operated, Ford Motor Company announced it would discontinue Chariot in early 2019, citing financial challenges (Musulin, 2019).

TransLoc is a US-based mobility firm, owned by Ford Mobility Company, that develops on-demand transportation solutions, focusing on municipalities, corporations, airports, hotels and universities ([TransLoc key areas information], n.d.). The firm has operated since 2004, originally partnering with public transportation agencies to help provide real-time tracking of public transportation vehicles prior to the advent of smartphones with 2G data access, with its first product, RealTime ([TransLoc company history information], n.d.). The company offers a range of services, including microtransit on-demand software, a microtransit simulator, a microtransit pilot program, real-time tracking for public transportation vehicles and a data collection and analysis solution to help public transportation planners optimize their schedules with an open data focus ([TransLoc solutions information], n.d.). It contracts its proprietary software to public transportation agencies and university campus transportation systems, using a three-pronged data-driven approach: big data predictive demand modeling simulation, pilot projects allowing public transportation managers to test their customized microtransit solutions risk-free, and the flexible, demand-response system that facilitates automatic alignment of public transportation operators' resources with rider needs ([TransLoc app features], n.d.).

Lastly, we will mention Via, another significant private player in microtransit projects around the world. The firm was founded in 2012 in New York City, by Israeli entrepreneurs Daniel Ramot e Oren Shoval, inspired by the ubiquitous *moniot sherut* shared taxi system present in Israel for decades (Cremades, 2019). It operates in more than 20 countries, engaging in more than 90 partnerships and providing more than 70 million rides. Via engages with public transportation operators to enable and augment on-demand components of cities' transportation systems, as well as with school districts, universities, corporations, logistics operations and other private transportation operators ([Via client categories], n.d.). Via utilizes a four-pronged strategy in its solutions: service model designs based on customization, launch planning and support for partners, customized marketing campaigns, and a dedicated data science team tasked with performance optimization ([Via operational expertise], n.d.). Via provides on-demand transportation solutions in markets in North America, South America, Europe, the Middle East, Asia and Oceania ([Via project locations map], n.d.). The projects analyzed in the present study involve Via's participation in devising microtransit solutions in four distinct contexts.

These companies contribute a variety of valuable assets to microtransit initiatives especially when partnering with conventional public transportation operators. The utilization of these assets depends on the specific configuration of the projects in which they are partners, and according to Shared Use Mobility Center partnership configurations information (n.d.) range from acting as a technology provider, a technology and vehicle operator provider, or a turnkey operator, in which technology, vehicles and vehicle operators are all provided by private sector innovation partners. Also, according to Shared Use Mobility Center partnership configurations information (n.d.), "different partnerships reflect the capital and operational needs of the partnering agency", fortifying the interest in studying the public value creation potential of these collaborative endeavors. A range of configurations specific to the assets of Via will be exemplified in Chapter 5 in discussing the four projects examined in this study. The next section explores the literature used as the theoretical basis for this research.

3. Literature Review

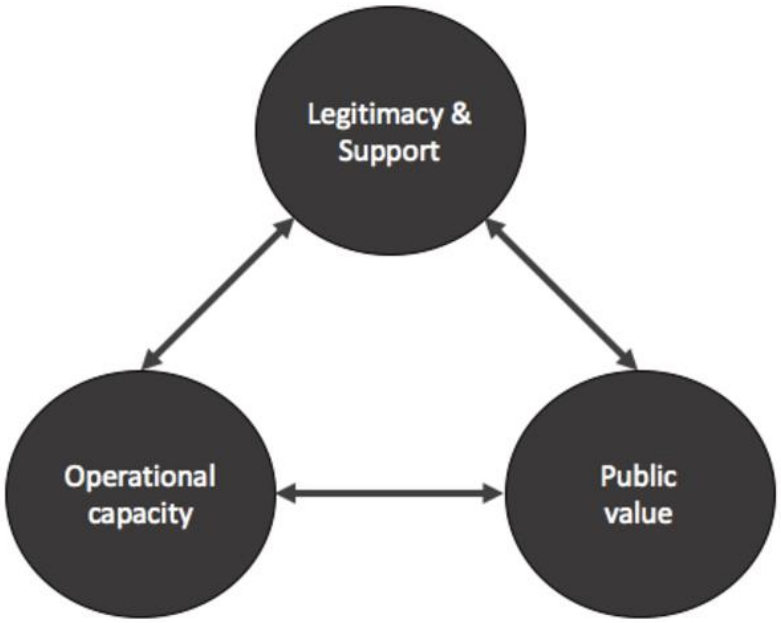
3.1 Public Value

Given this research's focus on microtransit projects that involve cooperation between conventional public transportation operators and a private company, it is pertinent to discuss what value is extracted from this interaction. In other words, what incentives are there for both public transportation operators and private sector mobility companies to get involved in this type of project, especially considering the well-documented reality that private sector rideshare companies such as Uber and Lyft have yet to reach profitability (Kerr, 2020). One dimension through which this interaction can be studied is public value, so this section will provide an overview of the academic literature on this concept. The insights drawn from this literature review aim to highlight the relevance for a study of microtransit especially as delivered through collaboration between conventional public transportation operators and private sector mobility partners. Public value has been discussed extensively in the academic literature, including the work of Moore, Meynhardt, Bozeman, Harrison and many others, but the question of how to assess the potential for public value creation through applied examples of the concept remains worthy of additional investigation.

Public value as it is currently understood and described was first theorized by Mark Moore (1995) as the equivalent of shareholder value but adapted for the context of public sector management. The overarching mission of public sector managers, according to Moore, is to create public value. Notably, however, although the framework was designed for the public sector, it does not assert that a public organization must orchestrate public value creation. According to Moore's Strategic Triangle framework (see Figure 2 below), public value is created when a given strategy or action has democratic legitimacy (e.g., the community supports it) and the support of the authorizing environment (e.g., a governing board), and when the government has the operational capacity to implement the strategy or action effectively (Kavanagh, 2014). Also according to Kavanagh on Moore (2014, p. 57-60), "there is a feedback system in place - when public value is created, so is greater legitimacy and support (e.g., citizens and elected officials have greater trust in the government), and operational capacity is increased (e.g., financial and other resources could be easier to obtain). Moreover, "when managers firm up the legitimacy and support perspective, they make it easier to get inputs (e.g., money, volunteers, etc.) into the government organization. When they firm up the operational capacity

perspective, those outputs are more efficiently and effectively turned into outputs that create public value, which then leads to greater legitimacy and support" (Kavanagh, 2014, pp. 57-60)

Figure 2. Moore's Strategic Triangle



Source: Moore, M. H. (1995). *Creating public value: Strategic management in government*. Cambridge, Mass.:Harvard University Press.

The upper corner of the triangle, "Legitimacy & Support", reflects the so-called "authorizing environment", to address the question of "is the project or policy politically and legally possible?" The lower left corner of the triangle, "Operational capacity", evokes the project or policy's operating capacity, responding to the notion of "is it operationally and administratively possible?" Finally, the lower right corner of the triangle, "Public value" answers the question of whether specifically the purpose of the project or policy is publicly valuable (regardless of the outcome). The framework asserts that a project or policy that is legitimate and politically sustainable, operationally and administratively feasible, and whose purpose is publicly valuable, when taken together, has created public value. The four microtransit projects examined in this study will be assessed according to Moore's Strategic Triangle framework in the analysis section of this research, owing to the notion that "there has been surprisingly little research on its descriptive accuracy or effectiveness in practice" (Bryson, Sancino, Benington & Sørensen, 2017, p. 2).

Bozeman (2007, p. 13) expanded the initial conceptualization proposed by Moore (1995) complementing that public values refer to "those [values] providing normative consensus about (a) the rights, benefits and prerogatives to which citizens should (and should not) be entitled; (b) the obligations of citizens to society, the state and to one another; and (c) the principles on which governments and policies should be based". In this sense, Bozeman's conception of public value implies a contract - citizens earn advantages in exchange for fulfilling certain requirements.

Meynhardt (2009), then, can be seen as having united the seminal framework proposed by Moore (1995) and the dual nature of public value (citizens' responsibilities in society and vice versa) set forth by Bozeman (2007). Meynhardt distinguished between value *for* the public, derived from evaluations of how basic needs of individuals, groups and society are met through interactions with publicly-provisioned services, and value *from* the public, stemming from "the experience of the public" (Meynhardt, 2009, p. 212). Public value creation, by extension, can therefore be described as "any impact on shared experience about the quality of the relationship between the individual and society" (Meynhardt, 2009, p. 212). Meynhardt (2009) also suggested that management terms such as shareholder and stakeholder value, customer value and sustainability can be used in public value discussions specifically addressing questions of private initiatives toward the common good.

Meynhardt (2015) expands on the concept of the Public Value Scorecard, originally presented by Moore (2013) posing it as an alternative to the Balanced Scorecard (Kaplan & Norton, 1992), for public administration. Moreover, his book proposed five dimensions along which public value can be assessed: 1) Utilitarian-instrumental value (1): is it useful?; 2) Economic-financial value (2): is it profitable?; 3) Moral-ethical value: is it decent? 4) Political-social value: is it politically acceptable? and 5) Hedonistic-aesthetic value: is it a positive experience? Utilitarian-instrumental value, political-social value and hedonistic-aesthetic value will be explored in greater detail in the analysis section in relation to the initiatives examined in this study.

Alternatively, Harrison et al. (2012) proposes a set other dimensions along which public value can be created, specifically as a result of government action:

Financial: actions that impact "current or future income, asset values, liabilities, entitlements or other aspects of wealth or risks to any of the above." (p. 6)

Political: actions that impact "a person's or group's influence on government actions or policy, on their role in political affairs, influence in political parties or prospects for public office." (p. 6)

Social: actions that impact "family or community relationships, social mobility, status, and identity." (p. 6)

Strategic: actions that impact "a person's or group's economic or political advantage or opportunities, goals and resources for innovation or planning." (p. 6)

Ideological**:** actions that impact "beliefs, moral or ethical commitments, alignment of government actions or policies or social outcomes with beliefs, or moral or ethical positions." (p. 6)

Stewardship**:** actions that impact "the public's view of government officials as faithful stewards or guardians of the value of the government in terms of public trust, integrity, and legitimacy." (p. 6)

Harrison et al.'s (2012) categorization of public value dimensions resulted in a set of value generators, namely: efficiency, effectiveness, intrinsic enhancements, transparency, participation and collaboration (p. 6). The dimensions forwarded by Harrison et al. (2012) will also be assessed in the analysis section of this paper.

Reynaers & De Graaf (2014) emphasize the potential for public value creation through public-private partnerships. They contribute four sources of ambiguousness in the public value concept: "the adjective 'public'" (p. 121), the use of the public value concept in both empirical and normative studies ("the public sector should safeguard public values", and "affirming that they actually do so", p. 121), the lack of an "objective and universal meaning" (p. 121) behind public values, and, finally, the "inmaterial character of values" (p. 121). Because of the difficulty in establishing an "all-encompassing definition" (p. 121) of public value, it is also "hard to compare research outcomes" (p. 121) in the area of public value. The paper focuses on three specific values: accountability, transparency and democracy. Moreover, the paper suggests a need to emphasize empirical, rather than normative, approaches to public value, as supported by Broadbent & Laughlin (2003, pp. 332-333), stating that "PPPs cannot be ruled out on the basis of prejudice but need to be analyzed with an open mind". This argument opens space for greater discussion of how public value is actually used or applied in practice, rather than how it *should* be used or applied. Second, the paper recommends avoiding a dichotomous

approach to assessing public value outcomes, such as "theorizing PPPs as 'good' or 'bad', 'accountable' or 'unaccountable'" (Flinders, 2010, p. 115), giving preference to a spectrum-based, or more nuanced, perspective of such collaborations. Lastly, Reynaers & De Graaf (2014) suggest "explorative comparative case study research" (p. 126) as a means of evaluating different public values dimensions and "specific conditions that influence the PPPs-public values relation" (p. 126).

Alford & O'Flynn (2009) identify both an "emerging excitement" (p. 185) and a "developing critique" (p. 185) surrounding the discussion of public value. They present four prominent approaches: public value as paradigm, public value as rhetoric, public value as narrative and public value as performance. "Public value as paradigm" refers to how to conceptualize the debate surrounding the progression beyond New Public Management. Stoker (2006) suggested that Public Value Management (PVM) was emerging as a means of balancing democracy and efficiency in public value approaches and outcomes. "Public value as rhetoric" refers to the idea that the public value framework may be merely a "rhetorical strategy, designed to protect the sectional interests of bureaucrats and their organizations" (Alford & O'Flynn, 2009, p. 180). One claim is that public value is designed to defend increasing bureaucratic power, a "defense for allowing public managers to stray into the political domain, increasing their bureaucratic power in pursuit of their mandate" (Alford & O'Flynn, 2009, p. 180), a form of "managerial *realpolitik* (Roberts, 1995, p. 293). Another claim is that "public value is a rationale for existence or a public relations exercise for public organizations" (Alford & O'Flynn, 2009, p. 181). Much of the impact of government activity is difficult to measure in terms of public value because it is "intangible, or because it is consumed jointly, or because it is difficult to attribute effect to cause in its production" (Alford & O'Flynn, 2009, p. 182). "Public value as narrative" refers to "a story of the world of public managers" (Alford & O'Flynn, 2009, p. 182). Stoker (2006) suggested that a new and different narrative could arise from Public Value Management (PVM), while Smith (2004, p. 68) argued that "a focus on public value enables one to bring together debates about values, institutions, systems, processes and people". Finally, Alford & O'Flynn (2009) mapped "public value as performance". This development reflects the notion of public value as a framework to measure performance, attracting the attention of practitioners and management consultants, in addition to academics. To this end, Alford & O'Flynn (2009) suggest the development of a "more sophisticated" (p. 185) public value performance framework, especially one that complements the "strategic management focus" (p. 185) of public value.

Talbot (2009) reflects on the merits of public value especially when compared to New Public Management (NPM). This reflection emerged from the perceived need to preserve public value in light of the burgeoning trend toward privatization of conventionally public services, and the pivot toward business-oriented public management philosophies inspired by NPM (De Buijn & Dicke, 2006; Kernaghan, 2000). One such benefit of public value, according to Talbot, is its capacity of "looking simultaneously forward and backward" (p. 169). Looking backward, according to the author, public value examines issues of "managerialism, efficiency and performance" (p. 169), while also considering issues of "legitimacy and trust" (p. 169), "due process and equity" (p. 169). Public value also encompasses a forward-looking perspective, evidenced by "new forms of governance" (p. 169), "networks of policy and implementation" (p. 169) and more agile public services. Talbot (2009) also reflects on the notion that the public value debate seems to be proceeding at similar speeds in both academic and practitioner circles, whereas in the NPM debate, academic contributions seem to constantly attempt to keep up with long-standing, implemented practical measures. In practice, then, it would seem essential to defend public value-generating initiatives and recommend against the adoption of NPM.

Many other authors have proposed sets of public values, which in turn create directives for managers in terms of strategies to pursue when endeavoring to create public value, and methods of identifying when, in fact, public value has been created. Some of these values draw from Tait (1997) and Gregory (1999), among others. A non-comprehensive sample of elements that have been described as critical components of "public value" is forwarded in this section, demonstrating that there is still plenty of difficulty to consolidate one prevailing, conclusive definition of the concept (Bryson et al., 2017; Talbot, 2009).

As becomes evident in assessing the work of Moore, Meynhardt, Harrison et al. (2012) and others in defining public value, its dimensions and its "generators", there are many different angles from which to approach the analysis. Given the nascent interest in public value creation, as evidenced by the exponential increase in research on the topic stemming from Moore's seminal work in 1995 (Williams & Shearer, 2011), it is pertinent to understand why it is useful, in which contexts it may be most useful, and which specific tools can be deployed in order to maximize the potential of public value creation. The literature emphasizes that the primary objectives of smart cities and smart government also include how to incorporate citizen-centricity, innovation and technology and how these can best be deployed to enhance services in a holistic way (Gil-Garcia, Zhang & Puron-Cid, 2016). This enhancement may be executed

through the integration of innovative technology from external actors, so in this sense it is relevant to also introduce the concept of collaborative innovation.

3.2 Collaborative Innovation

Collaborative innovation is described by Sørensen & Torfing (2012, p. 1) as "multi-actor collaboration that [...] may foster innovation by bringing together public and private actors with relevant innovation assets, facilitating knowledge sharing and transformative learning, and building joint ownership to new innovative visions and practices". It can be used as a tool to assist public administrations in public value generation through innovations that incorporate the combining of resources, knowledge sharing and making use of innovation partners' innovation assets (Soe & Drechsler, 2018; Sørensen & Torfing, 2011; Torfing, 2019). However, public value is not necessarily solely created through the actions of a public administration acting alone but can be founded on the organized collaboration between actors from the public and private spheres (Crosby, 't Hart & Torfing, 2017), which, as identified by Cordella & Paletti (2018), represents a shift from public sector-exclusive public value creation to a model based on collaborative generation.

However, collaboration between different organizations in the public and private sectors can also fail to deliver public value (Barringer & Harrison, 2000) particularly, for example, in the event of divergent organizational cultures and expectations regarding the creation of public value (Bryson et al., 2017). Collaborations must take into account that "different individuals and groups in society hold different views about which conditions in their societies should be viewed as public problems to be solved by government action, and what particular actions should be taken by the government to address the problems" (Geuijen, Moore, Cederquist, Ronning & van Twist, 2017, p. 629). This is especially relevant in discussing the case studies examined in this research, wherein two collaborations occur between a public administration and a private sector innovation partner directly, in the context of the United States, and two collaborations stem from a collaboration between two private firms, one of which acts as an innovation partner itself for the public administration through a public-private partnership, identified by Nascimento & Cury (2019) as "an important mechanism for innovation" (p. 7) in Brazil. The present study has as its focus four contexts in which conventional public transportation operators (two public sector providers and two private sector providers) collaborate with private sector innovation partners in order to devise microtransit solutions, explaining the overlap between collaborative innovation and the research theme. In order to

also address the potential for incompatible organizational cultures and expectations regarding the creation of public value, it is necessary to provide a brief explanation of stewardship and agency theory prior to presenting the theoretical model (Neumann et al., 2019) upon which most of the analysis in this paper is based.

3.3 Stewardship and Agency Theories

Stewardship theory and agency theory refer to the relationship between two parties, wherein one serves as the principal, which seeks partnerships with other entities in order to pursue specific objectives (such as innovation), and agents, who are expected to conduct activities on behalf of the principal or otherwise support or cooperate with them (Davis, Schoorman and Donaldson, 1997).

Agency theory expects that individual actors are essentially self-interested entities, seeking to maximize their individual worth (Jensen & Meckling, 1976; Neumann et al., 2019; Ross, 1973). In these relationships, the principal and the agent are generally bound by a contract stipulating specific responsibilities that the agent is responsible for accomplishing for the principal in exchange for a reward (Neumann et al., 2019). In addition, there are typically controls in place to ensure that the agent will in fact act in accordance with the principal's requirements, due to the tendency for divergence between their interests accentuated by mutual mistrust (Van Slyke, 2006; Neumann et al., 2019). However, often the agent's contributions are difficult to measure, and sometimes the agent's goals are in fact aligned with those of the principal (Cordella & Cordella, 2017). To explain situations in which there is alignment between the goals of the principal and the agent, stewardship theory is forwarded.

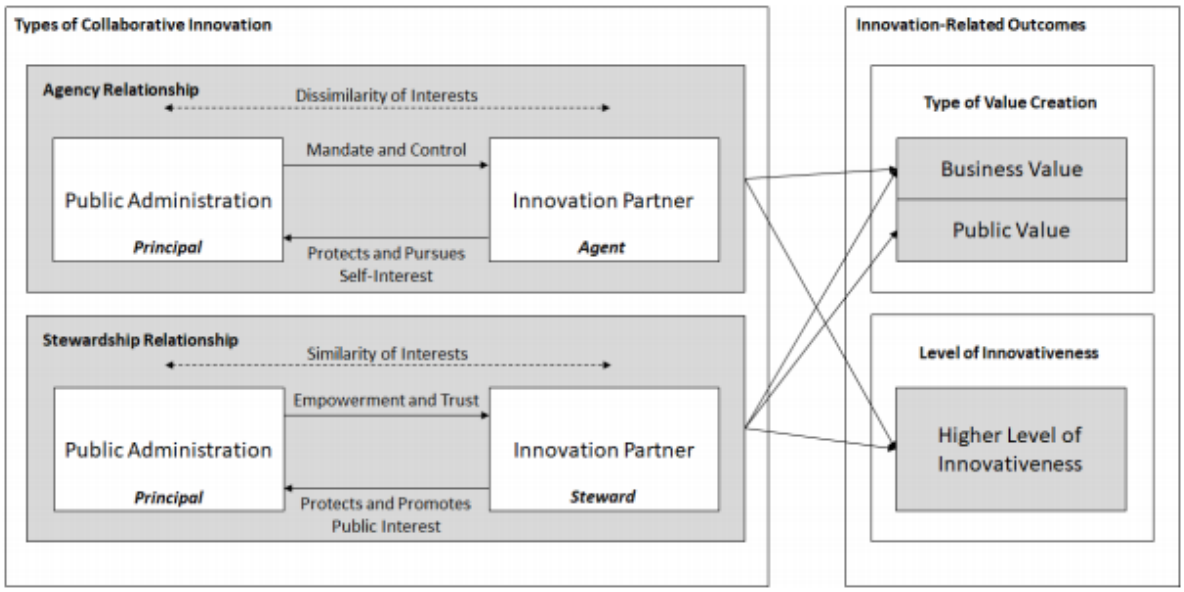
Also according to Davis et al. (1997), stewardship theory, in contrast, assumes that that the interests of agents, as stewards, are aligned with those of principals and "stewards are motivated to behave in ways that are consistent with organisational objectives" (Davis et al., 1997, p. 25). Mechanisms of control and other incentives are therefore not required for the steward to accomplish what the principal expects of them. However, according to Van Slyke (2006), principal-agent relationships tend to evolve into principal-steward relationships, as trust builds, and the expectation of self-interested behavior diminishes.

According to Bryson, Crosby and Bloomberg (2014), stewardship characteristics are generally understood to be more prevalent in public administrations, due to the underlying notion that their primary objective is to create public value as part of their operational goals.

However, according to Van Slyke (2006), exemplifying stewardship relationship characteristics is not necessarily limited to the public sector, as private sector companies can also exhibit these traits.

We therefore present an alternative, integrated model that incorporates the notion of multi-actor collaboration in the public value discussion, that of Neumann et al. (2019), which was designed to analyze the collaboration between utility companies and municipal governments in a specific context (3 medium-sized cities in Switzerland), in terms of potential to create public value and innovate in smart cities contexts:

Figure 3. Neumann et al. (2019) model



Source: Neumann, O., Matt, C., Hitz-Gamper, B. S., Schmidthuber, L., & Stürmer, M. (2019). Joining forces for public value creation? Exploring collaborative innovation in smart city initiatives. *Government Information Quarterly*, *36*(4). https://doi.org/10.1016/j.giq.2019.101411

In this model, two types of relationships between the public administration and an innovation partner are detailed. In agency relationships, the public administration (the principal) wields a mandate and establishes control over the innovation partner (the agent), while the innovation partner safeguards their own interests, implying an overall dissimilarity of interests. This type of relationship would therefore lead to higher levels of business value and comparably lower levels of public value. In stewardship relationships, in contrast, the relationship between the public administration (the principal) and their innovation partner (the steward) is characterized by "empowerment and trust" granted by the public administration, and in return, the innovation partner strives to protect and promote the principal's interests. Stewardship relationships, according to the model, reflect more similarity of interests between

the government and the innovation partner, leading to more prevalent public value outcomes, but not necessarily the exclusion of business value outcomes. Both types of relationships lead to higher levels of innovativeness, due to the alliance of innovation-enhancing capabilities (Neumann et al., 2019).

The data collection and analysis stages of this master's thesis were inspired by the components of the Neumann et al. (2019) framework, tailored to suit the specifics of the surveyed case studies while also considering contextual differences in the configurations of the collaborative initiatives involved in this study. For example, the notion that public transportation in Brazil is often operated by a private company or consortium of private companies with public sector supervision, rather than directly by the public sector, was accounted for in the way in which the questions were asked of the Brazilian respondents. The individuals that were targeted by the researcher for interviews, in turn, were not actually government representatives, but executives of private companies in the Brazilian context. In contrast, the interviewees contacted in the United States context from the microtransit initiatives were public sector employees. For this reason, in the adapted version of the model, the perspectives are altered from "Role of utility company" and "Relationship with local government" to "Role of innovation partner" and "Relationship with public transportation operator". The contextual difference is explored in Chapter 6, and identified as an additional perspective for which the model does not account. Though the research methodology has already been alluded to in this document, the next chapter will explain the approach in greater detail.

4. Methodology

4.1 Research process and motivation

The first stage of the research was the identification of publicly operated (or sponsored) microtransit as a novel transportation mode that is functionally distinct from both the ridesharing services provided by transportation network companies (TNCs), and publicly funded and/or operated coventional public transportation systems present in cities around the globe. The researcher conducted initial research on different types of smart mobility initiatives and identified publicly operated (or sponsored) microtransit as lacking academically-oriented analysis, regardless of the theoretical angle from which it was approached. While the concept fits characteristics of smart cities technologies and the collaborative component of these projects seems theoretically and practically relevant, these links have been made primarily in industry reports (such as those mentioned in Chapter 2), blog posts and websites, rather than through academic studies. In addition, despite a search through academic databases such as ProQuest, Scopus, Emerald and Web of Science, no links between publicly operated (or sponsored) microtransit and discussions of public value were located. Given the emergent push towards descriptive, rather than normative views of the potential of smart cities and the notion that a smart city should be implemented (Wolfram, 2012), rather than merely theorized it was deemed important to contribute instructive case studies, both to further the theoretical discussion and to reinforce actionable strategies for developing microtransit programs.

4.2 Research strategy

The research was conducted using case studies - two from the United States and two from Brazil, in which a conventional public transportation operator has partnered with a private mobility company to develop microtransit solutions. Further, a qualitative research approach was deemed appropriate, owing to the characteristics of the study, such as the importance of context and the need to interpret and understand personal values and experiences (of the interviewees, for example). Drawing from Dyer & Wilkins (1991), Feagin, Orum & Sjoberg (1991) and Yin (2009), case studies are appropriate when a holistic, in-depth investigation is required to substantiate important theoretical generalizations, and to refine and extend them. Also, according to Yin (2009), case studies can be useful to explain, describe or explore events or phenomena in the manner in which they occur in everyday contexts. Moreover, Yin argues that exploratory research questions that answer “how” or “why” are most suited to case studies,

experiments and stories. In endeavoring to establish theoretical generalization upon which to build the research, especially as relating to the comparative, contextual nature of the research question, multiple case studies, not just one, were deemed relevant to explore. Four microtransit initiatives, two from each context (United States and Brazil) were selected to analyze public value creation, especially in collaborative innovation arrangements. It was originally thought that examining a larger quantity of projects would lead to more interesting insights and the possibility of generalizing results to other microtransit initiatives involving the collaboration between conventional public transportation operators and innovation partners.

4.3 Microtransit initiative selection

The case studies included in this research were selected based on a survey of microtransit pilot projects that incorporate cooperation between conventional public transportation operators and private companies. A non-comprehensive, illustrative list of such projects is included in **Appendix D** at the end of this document, using information compiled from Via, TransLoc, Spare, RideCo and Sun Tran. The objective of this compilation was not to generate an exhaustive account of every such project around the world, but to demonstrate that the concept is not merely a phenomenon limited to one company, public agency or specific geographical region, and to solidify the rationale for theory-building based on the concept (Corbin & Strauss, 2008). Ultimately, the microtransit initiatives chosen for in-depth examination were meant to facilitate data collection for the researcher, according to the "convenience" (Patton, 1990, pp. 182-183) type of sampling strategy. However, it is acknowledged that sampling based on this strategy cannot confirm the generalizability of the study on its own (Jager, Putnick and Bornstein, 2017).

The four partnerships that were ultimately selected for deeper study fit the following criteria:

- Projects are not merely authorized by the local government (directly or indirectly), but they work in conjunction with conventional public transportation operators in their cities in collaboration with a private sector innovation partner
- Projects operate within urban and suburban areas, and are not specifically designated as "first mile-last mile" connections to larger transportation hubs

- Projects are limited to two geographical regions (US and Brazil) in order to emphasize the relevance of context in the efficacy of such initiatives, and to manage the scope of the survey

According to Yin (2009), the researcher should wield requisite knowledge of the subject and context to understand the key concepts and the theoretical and practical questions pertinent to the study. The researcher should also be capable of understanding data inputs and adjusting their data collection strategies when appropriate. The United States microtransit initiatives encompass the researcher's hometown of Sacramento, California, and the neighboring city of West Sacramento, while the Brazilian microtransit initiatives were selected due to their novelty, being the first projects of their kind in Latin America, and relevant to the researcher's master's degree studies in Brazil. Fluency in English and Portuguese, deep knowledge of the social and cultural context of the United States and Brazil, and prior experience in dealing with both government and private sector reporting documentation, were understood to sufficiently legitimize the researcher's conceptual familiarity and interpretation skills for the scope of this research.

We will explore the microtransit initiatives in Chapter 5, presenting information compiled via secondary sources and through the semi-structured interviews. By utilizing existing frameworks and dimensions to assess public value creation in these projects, such as those of Moore (1995), Meynhardt (2015) and Harrison et al. (2012), we can identify specific types of public value enabled through the initiatives. Moreover, by utilizing the Neumann et al. (2019) analysis framework we can answer questions related to public value creation wherein multi-actor collaboration is involved. We can attempt to address the question of to what extent the relationships depicted in the four microtransit initiatives are stewardship-based and agency-based, which, according to the framework, imply similarity and dissimilarity of interests between principals and innovation partners, respectively. The differences in the results may illustrate contextual particularities between the United States and Brazil in deploying these initiatives, reinforcing the need to understand and account for context in these projects, from a managerial perspective.

4.4 Data Collection

4.4.1 Data triangulation

Owing to the limited availability of literature on public value as related to microtransit, the data inputs for this research stem from a variety of locations including primary sources (direct contact with individuals actively involved in these projects in the four cities studied, from the public transportation operators and the innovation partner), and secondary documents such as company and agency reports, press releases, and information from other individuals involved in these initiatives that were not contacted directly, but obtained through secondary sources. Therefore, the key approach involved in the data collection was triangulation. Data triangulation aims to "seek approaches on different levels", "combining interviews with observation" to incorporate both "subjective knowledge and experience" and "practices and interactions at a specific moment" (Flick, 2009, p. 48). In this sense, triangulation was identified as the ideal tactic to reconcile the various data sources and compensate for the information obtained from primary sources in order to fully address the research question.

4.4.2 Interviews

The researcher conducted interviews between August and October 2020 with company representatives from Via, the private company responsible for the microtransit projects in Sacramento, West Sacramento, Goiânia and Fortaleza. Additional interviews were completed with representatives from Sindiônibus, the consortium responsible for public transportation operations in Fortaleza, HP Transportes, one of the consortiums responsible for public transportation in Goiânia, the City of West Sacramento, the public entity responsible for public transportation in West Sacramento, and with Sacramento Regional Transit District, the public agency responsible for public transportation in Sacramento. The objective of the interviews was to collect additional information on the extent and ways in which these microtransit initiatives generate public value as outlined by the literature, and to what extent the relationships between the public transportation providers and the innovation partner exhibit agency- and stewardship-based characteristics, in accordance with criteria identified in Neumann et al. (2019).

The individuals reached for interview were either referred to the researcher by representatives of the respective entities through social media contact, in the cases of **Interviewees B, C, D**, identified directly by the researcher in the case of **Interviewee A** through information on the microtransit initiative available on the respective city's website, referred to the researcher by **Interviewee A** in the case of **Interviewee F**, and referred to the researcher by **Interviewee F** in the case of **Interviewee E**. They included main actors in the execution of each

of the four microtransit projects involved in this study from the public transportation operators, and representatives from Via (in the US and in Brazil), the private entity involved in all four initiatives. The multi-perspective approach allowed for investigation of the collaboration between the firm and the public transportation operators, and to provide a foundation for comparison of the contexts. Their profiles are detailed in the table below:

Table 1. Interviewee profiles

Interviewee	**Position**	**Organization**	**City**	**Organizational Independence**
A	Senior Transportation Planner	City of West Sacramento	West Sacramento, USA	Government agency
B	Director, Community & Contract Bus Services	Sacramento Regional Transit District	Sacramento, USA	Government agency
C	President	Sindiônibus	Fortaleza, Brazil	Private company
D	Head of Strategy and Innovation	HP Transportes	Goiânia, Brazil	Private company
E	Western US Partnerships Lead	Via (USA)	Not city-specific	Private company
F	National Director	Via (Brazil)	Not city-specific	Private company

A semi-structured interview guide (see **Appendix A** and **Appendix B**) was devised by the researcher inspired by the secondary data collection, the framework for assessing multi-actor collaborative initiatives in smart cities contexts proposed by Neumann et al. (2019), and the theoretical lens of public value chosen for the scope of the analysis, that includes elements presented by primary authors such as Moore (1995), Meynhardt (2015) and Harrison et al. (2012).

Because the interviewees were either executives in the case of private companies, or high-level employees of public agencies, it is important to clarify that however objective their responses to the questions were, their perspectives are unavoidably guided by their own

experiences and priorities. Participation on the part of the firms, public entities and individuals selected to interview was voluntary, though all of the contributors that were approached for interviews agreed to participate.

4.5 Content Analysis

Defined by Bardin (1977, p. 42) as "a set of techniques of analysis of communications aiming to obtain by systematic procedures and objectives of description of message content, indicators (quantitative or not) that allow the inference knowledge of the conditions of production/reception (inferred variables) of these messages", content analysis was deemed appropriate to identify dimensions though which to assess the collected data. We assessed the categories of analysis (see Fig. 4 below) identified by Neumann et al. (2019), using contextual adaptations, to analyze the aggregated results from the secondary source research and the interviews to attempt to reach conclusions on the levels of stewardship and agency relationship characteristics inherent in the relationships, and resulting levels of public value and innovativeness achieved through the interactions between the public transportation operators and the innovation partner.

Figure 4. Adaptation of dimensions of analysis of Neumann et al. (2019)

Perspective	Attributes
Role of innovation partner	Identification with city Trust by citizens Pressure to innovate Innovation department Key actors of innovation Business agility Error management culture
Relationship with public transportation operator	Provider of smart cities solutions Type of assignment mandate Innovation mandate Dependence of innovation partner on political processes Key public transportation provider actor for relation with innovation partner Service delivery regulation (fares, accessibility, etc.) Communication between public transportation provider and innovation partner Common understanding of innovation Alignment of strategies and structures Level of agency relationship characteristics Level of stewardship relationship characteristics
Innovation related outcomes	Type of value creation Level of innovativeness

The researcher also used ATLAS.ti, a computer-assisted, qualitative data analysis software (CAQDAS) to enhance the categorization process and bring more valuable insights to the study. This includes the definition of two different categories for the "role of public transportation operator" perspective in the adaptation of the Neumann et al. (2019) framework, "service delivery regulation (fares, accessibility, etc.)" and "provider of smart cities solutions" as a replacement for "smart city strategy of local government". In addition, to account for the notion that the public transportation operator is not explicitly governmental in the Brazilian cases, several other attributes from the Neumann et al. (2019) model were altered in the second perspective, starting with the name of the perspective ("relationship with local government"

became “relationship with public transportation operator” in the adaptation). Finally, while in the original model, the first perspective was “role of utility company”, to suit the cases analyzed in the present study, the name was altered to “role of innovation partner”, referring to the mobility company that partners with the public transportation operators in all four projects examined in this study. In order to guarantee proper attribution of the dimensions of analysis, we clarify that “identification with city”, “trust by citizens”, “pressure to innovate”, “innovation department”, “key actors of innovation”, “business agility” and “error management culture” are all dimensions that come directly from the Neumann et al. (2019) study. Moreover, “type of assignment mandate”, “innovation mandate”, “common understanding of innovation”, “alignment of strategies and structures”, “level of agency relationship characteristics” and “level of stewardship relationship characteristics” also come directly from Neumann et al. (2019). Finally, in the “innovation related outcomes” component, both “type of value creation” and “level of innovativeness” come directly from Neumann et al. (2019).

The next chapter explores the microtransit initiatives, providing background information and details on the functionality of each microtransit pilot project in their respective context.

5. Microtransit Initiatives

5.1 SmaRT Ride: Sacramento, California, United States

(Note: when not specified directly, information in this section comes from Sacramento Regional Transit District materials, City of Sacramento materials, and the interview with the public transportation operator representative, "**Interviewee B"**)

5.1.1 Background

Sacramento Regional Transit District, the government agency responsible for public transportation in the city of Sacramento, California, in the United States (pop. 513,624 as of July 2019, according to the US Census Bureau) and some surrounding areas, launched its first microtransit pilot project in February 2018, in a service area restricted to the northeastern suburb of Citrus Heights (Bizjak, 2018). The success of this first pilot project led to the expansion of microtransit into other areas of the Sacramento region, such as Antelope, Orangevale, Rancho Cordova, Folsom and South Sacramento. In January 2020, the service was expanded to encompass other areas of the city, such as Downtown, Midtown, East Sacramento and North Sacramento (Moffitt, 2020). In June 2020, three existing service areas (Franklin-South Sacramento, North Sacramento, and Rancho Cordova) were expanded (Sacramento Regional Transit District, 2020).

The public transportation agency operates a system of three light rail lines, covering a total distance of 42.9 miles (69 kilometers), as well as a network of 69 fixed route bus services (Sacramento Regional Transit District, 2015). In recent years, largely resulting from a combination of low gas prices and reductions in service, RT has lost a significant portion of its ridership (Bizjak, 2017). This loss has been accentuated by the migration of so-called "choice riders", those that have access to a personal vehicle but choose to use public transportation, from the system to personal vehicles and private ridesharing companies such as Uber and Lyft, both of which operate in the Sacramento region (Bizjak, 2017). This phenomenon has presented RT with a unique set of challenges, compounded by increasing traffic congestion due to the influx of new residents to the area (Ho, 2019). These factors, in addition to the increased difficulty to attract external funding, led RT to pursue incorporating "on-demand" into its existing fixed route network of bus and light rail.

5.1.2 Functionality

The microtransit service, known as “SmaRT Ride”, was founded on a partnership between the public transit agency serving the city of Sacramento and several adjacent suburbs, and TransLoc, a mobility company mentioned in Chapter 2 that operates as a subsidiary of Ford Motor Company’s Mobility initiative, Ford Mobility (Bizjak, 2018). The project is now overseen by Via, where Via provides the software to enable the program, but not the vehicles or operators (Via, 2020). It is an on-demand, curb-to-curb service, reaching all GPS locations within the boundaries of the service areas, which are not contiguous - there are several different bounded service areas under the “umbrella” operation of “SmaRT Ride”. Each SmaRT Ride vehicle is a 12 or 14-seat passenger van that guarantees a seat to all passengers, with no standing room.

The microtransit services operate under the existing fare structure of the public transportation agency partner; that is, the fares are integrated and also conform to legislation guaranteeing discount fares for students, seniors, people with disabilities, and those that utilize the public system’s daily and monthly passes. Groups of five or more people, when traveling from the same pick-up point to the same drop-off point, travel for free (Sacramento Regional Transit District, 2020). Payment options include through the public transit agency’s app (ZipPass), the public transit agency’s smart fare card (Connect Card), or in exact change onboard the bus. SmaRT Ride’s base fare, which is not subject to surge or distance-based pricing, is $2.50. The vehicle operators of the service are employees of the public transportation operator, and the fleet of vehicles also belongs to RT. The technology infrastructure, on the other hand, is provided by Via. The SmaRT Ride microtransit service receives funding through passenger fares, a grant of $12 million from the Sacramento Transportation Authority, and from a local sales tax measure, Measure A (Sacramento Regional Transit District, 2020).

According to Sacramento Regional Transit District (2020), in order to use the SmaRT Ride service, one must either download the SmaRT Ride app to their mobile phone, or contact the dedicated call center, guaranteeing access to the service to those that do not have a smartphone. The app for the SmaRT Ride service provides an interface where the user inserts their pick-up and drop-off locations, both within a demarcated service region that is highlighted on the map. Once this is completed and the payment method is confirmed, the app calibrates the optimal route based on the number of SmaRT Ride vehicles on the road and their locations, and the time it will take to reach the pick-up location and deliver the passenger to their destination. Alternatively, by contacting the call center, passengers can speak to a customer

service representative who confirms the ride and informs the passenger at what time, and where, they will be picked up. In this rendition, there is admittedly little difference between the microtransit service and traditional dial-a-ride "paratransit" services that have transported the elderly and people with disabilities for decades in the United States and in other countries (Cervero, 1997), the main advantage being that rides are typically available within minutes rather than having to schedule hours or days in advance

The service maps for each of the regions comprising the SmaRT Ride microtransit system in Sacramento and its surrounding areas are provided in **Appendix C**. As illustrated, each service area is compartmentalized to provide greater mobility within the designated regions. Each region is strategically geofenced to provide connectivity to conventional public transportation routes, and greater accessibility to places of interest such as schools, hospitals, public libraries, public parks, government offices and supermarkets (Sacramento Regional Transit District, 2020).

5.2 Via Rideshare: West Sacramento, California, United States

(Note: when not specified directly, information in this section comes from City of West Sacramento materials, Via materials, and the interview with the public transportation operator representative, "**Interviewee A**")

5.2.1 Background

The city of West Sacramento, located just across a river from California's capital city of Sacramento, also launched a microtransit pilot program in 2018, based on a similar premise to the aforementioned "SmaRT Ride", but with context-specific adjustments in the operations and service delivery. The program launched in May 2018 as a public-private partnership between the City of West Sacramento and mobility company Via, in a service area of 59.2 sq. km. (22.8 sq. mi.) (Via, 2018). Via provides the software, the vehicles and the operators for this program, in a "turnkey transportation solution for a city dependent on personal vehicles" (Via, 2018). The challenge of this project, according to Via (2018), is to "convince a population that is accustomed to driving alone to consider sharing their rides". The city also has a conventional fixed route bus system, Yolobus, administered by the Yolo County Transportation District, providing service within the city, routes to Sacramento, Davis and other towns in Yolo County including Woodland, Winters, and Knights Landing ([YCTD organizational profile], n.d.). It is worth noting that this system, which, despite geographic proximity to Sacramento,

is distinct from the public transportation system in Sacramento, generating, according to Via (2018), “lack of coordination between the two cities’ transit networks, resulting in commute times of up to 90 minutes”. In addition, the City of West Sacramento’s pedestrian infrastructure is highly prohibitive to walking, even for short distances, making “single-occupancy vehicle travel the overwhelming mode of choice in the city” (Via, 2018).

With no dedicated vehicles or operators, and a relatively limited budget (Via, 2018), the City of West Sacramento joined Via to create a solution based on specific city goals: “to provide regular and reliable transit options to residents, particularly seniors and those from disadvantaged communities” and to “gather data to inform the city’s Mobility Action Plan” (Via, 2018). Also, according to Via (2018), “regular, reliable and equitable transit service that is sustainable and scalable” assists the city in meeting additional objectives, such as “parking pressure alleviation, congestion mitigation and reduced vehicle miles traveled/single-occupancy vehicle travel”.

5.2.2 Functionality

The Via Rideshare system works similarly to SmaRT Ride in Sacramento. According to City of West Sacramento information about the Via rideshare program (n.d.), passengers enter their pick-up and drop-off locations and a vehicle picks them up at their location or within a block or two Alternatively, passengers can call the City of West Sacramento directly through a dedicated customer service line to book rides and for support. The program’s fare structure is flat, not subject to distance or surge-based pricing. Adult passengers pay $3.50, while seniors and people with eligible disabilities pay $1.75, to travel to any GPS location within the demarcated service area. The service area roughly encompasses the geographical limits of West Sacramento, a city of 53,519 residents as of July 2019, according to the US Census Bureau.

Also, according to City of West Sacramento information about the Via rideshare program (n.d.), although fares cannot be integrated into the payment system for the city’s conventional public transportation system, free, one-time transfers are available, from the on-demand system to the conventional, fixed route bus system. Moreover, in order to enhance accessibility, unbanked individuals can pay using prepaid credit cards that are available at local drugstores and grocery stores. Along the same lines of preserving accessibility, “riders have the option to request a wheelchair-accessible ride (Via, 2018). A graphic in **Appendix C** illustrates the service area of West Sacramento’s microtransit pilot program. As evidenced by

the map, the West Sacramento service area comprises one contiguous geofenced region that encompasses the main points of interest in the city.

5.3 CityBus 2.0: Goiânia, Goiás, Brazil

(Note: when not specified directly, information in this section comes from City of Goiânia materials, CityBus 2.0's website, Via materials, and the interview with the public transportation operator representative, "**Interviewee D**")

5.3.1 Background

In February 2019, the first "public" microtransit pilot project in Latin America was launched in the city of Goiânia, an agricultural hub inhabited by an estimated 1,536,097 people (Instituto Brasileiro de Geografia e Estatística, 2020) located about 200 kilometers (125 miles) southwest of Brazil's capital, Brasília. According to Via (2019), the city boasts a robust network of fixed-route buses, as well as the highest vehicle-per-capita ratio in Brazil. This project was conceived through a partnership between HP Transportes, a private company that operates conventional public transportation for the city, and Via, the US-based mobility company (Via, 2019). For this program, "HP Transportes manages all day-to-day operations of the service, while Via has provided training and consultative support on operational data analysis, promotions and pricing for ongoing service optimization" (Via, 2019). Also, according to Via (2019), the program is a "flexible, on-demand transit solution for quick city trips", whose primary challenge is to "raise rider awareness for the country's first ever on-demand public transport service".

CityBus 2.0 was rolled out first in the urban core of Goiânia, integrating neighborhoods such as Jardim Goiás, Setor Bueno, Setor Marista and Setor Sul, in a contiguous service area of 11 neighborhoods served by a fleet of 15 minibuses (Marques, 2020). In July 2019, CityBus 2.0 began serving 13 more neighborhoods, and in November 2019 an additional 5 neighborhoods were added to the service range (Marques, 2020). As of October 2020, after additional service area expansions in 2020, CityBus 2.0 served approximately 80 neighborhoods in the city of Goiânia, in an area of approximately 70 sq. km. (27 sq. mi) (RMTC Goiânia, 2020), illustrated on a map in **Appendix C**.

In Goiânia, like in other cities in Brazil and around the world, widespread protests by taxi drivers have been staged against the purported unfair competition posed by private rideshare companies such as Uber (Borges, 2016). CityBus 2.0, however, is provided by the

same private company that is under contract with the city to provide conventional public transportation. Due to the rise of private on-demand rideshare options, Goiânia's public transportation system has seen a steady outflow of ridership, especially among riders that would typically travel shorter distances and pay the full, non-discounted fare (Pelegi, 2017). HP Transportes faces the challenge of how to remain relevant in a rapidly changing mobility scenario marked by the entry of more flexible, responsive options becoming available for those that are willing and able to pay. One possibility that is currently being weighed is on-demand, shared, privately operated but publicly overseen, microtransit in partnership with Via, US-based mobility company (RMTC Goiânia, 2020). The service aims to provide "a convenient, cost-effective and environmentally friendly option for short inner-city trips" and teach a lesson on "how on-demand ridesharing can complement fixed-route transit systems in large, congested urban cores, providing an attractive alternative to single-occupancy vehicles" (Via, 2019).

In February 2020, Via released a report reflecting on one year of CityBus 2.0 in Goiânia. In one year, the fleet expanded to 40 vehicles, trips covered a total distance of 1,172,095 kilometers, and removed an estimated 6,500 cars from the streets (Via, 2020). According to a 2019 study conducted at the University of Brasilia, 81% of CityBus 2.0 users would have chosen individual modes of transportation rather than the bus (Guimarães, Silva, Ortiz & Brasil, 2019). This number is supported by Via's own data, claiming that 75% of CityBus 2.0 users had switched from private cars (Via, 2019). According to RMTC Goiânia (2020), at the end of the first year of operations, CityBus 2.0 had 80,000 registered Android and iOS users. Among the passengers' highest-rated aspects of the service were driver conduct, comfort and cleanliness of the vehicles, and the stops/routing of the vehicles. In addition, the atmosphere was spared of approximately 64 tons of CO2 emissions, equivalent to the CO2 absorption of more than 392,638 adult trees from the Amazon rainforest.

5.3.2 Functionality

According to CityBus 2.0 FAQ (n.d.) the user summons a ride through the app, and within a couple of minutes receives an indication of where to go to board the vehicle, usually at a nearby street corner or at a conventional bus stop. CityBus 2.0 was conceived as "a smart bus that picks you up and takes you wherever you want, inside the area utilized during the test phases". The vehicles used are 14-seat Mercedes Benz vans, equipped with comfortable seats and air conditioning, with no standing room, to guarantee "the best experience and comfort" for passengers. The service is meant to cover short distances within the central region of the

city of Goiânia. According to Marques (2020), as a direct result of customer feedback, the minibuses received USB ports to charge cell phones, and security cameras to monitor trips, enhancing safety for both passengers and drivers. According to Chaves (2020), the CityBus 2.0 service was expanded to operate on Sundays in direct response to customer demand.

Also according to CityBus 2.0 FAQ (n.d.), the base fare is R$2,50 (about $0.50 USD), with variable increases based on distance traveled, and no dynamic pricing. Payment is made either through the app by credit card, or onboard the vehicle, in cash or using the city of Goiânia's smart fare payment card for conventional public transportation, the Cartão Fácil ("Easy Card", in English). Passengers are allowed to cancel the ride prior to boarding the vehicle. If the cancellation request occurs within 3 minutes of the initial ride request, there is no charge. After 3 minutes, the passenger is charged 50% of the fare that was displayed in the app when the ride was requested. If the passenger cancels after 7 minutes, the full fare is charged. However, if the vehicle takes more than 10 minutes beyond the scheduled arrival time to pick up the passenger, cancellation is free of charge. Finally, the vehicle operators are experienced, trained and hired HP Transportes employees.

5.4 TopBus+: Fortaleza, Ceará, Brazil

(Note: when not specified directly, information in this section comes from City of Fortaleza materials, TopBus+'s website, Via materials, and the interview with the public transportation operator representative, "**Interviewee C**")

5.4.1 Background

In December 2019, Brazil received its second microtransit pilot project, in the northeastern city of Fortaleza, inhabited by an estimated 2,686,612 people (Instituto Brasileiro de Geografia e Estatística, 2020). According to Metrofor - Fortaleza rail system information (n.d.), the city also has a hybrid subway-light rail system with 3 lines, 39 stations and 56.8 km (35.3 mi) of track as of January 2021. In addition, according to Canal Mobilidade - City of Fortaleza (n.d.), the city has a fixed-route bus system (269 regular routes) and 19 fixed van and minibus routes that complement the regular bus system. The service was dubbed "TopBus+" ("+" is pronounced "mais", meaning "more" in Portuguese), invoking an enhanced experience of riding the bus. As of July 2020, TopBus+ operated in 17 neighborhoods in the central region of the city and surroundings, in one contiguous geofenced area, including neighborhoods such as Parquelândia, Bairro de Fátima, Aldeota, Cocó and Montese. The service area of TopBus+ is depicted on a map in **Appendix C**. The fleet consists of 18 Mercedes-Benz Sprinter vans

with 13 leather seats and no standing room, air conditioning and individual USB ports to charge cell phones. The project is made possible via collaboration between the Urban and Metropolitan Passenger Mass Transportation Union of the State of Ceará (Sindiônibus), and Via, the same US-based mobility company involved in the three aforementioned projects. In this initiative, Via provides the software to enable the microtransit service, but not the vehicles or the vehicle operators, both of which are provided by Sindiônibus. It is hoped that, according to Via (2019), "by developing an efficient and cost-effective form of public transportation, TopBus+ will meet the commuting needs of people in Fortaleza".

5.4.2 Functionality

As with the microtransit projects in Sacramento, West Sacramento and Goiânia, TopBus+ functions as a flexible route on-demand shuttle service that operates within a specified geographic area, picking up and dropping off passengers based on algorithmically optimized routes. One summons the vehicle via a smartphone app and must register a debit or credit card in order to request a ride. Upon confirmation of the ride, the app displays the vehicle's license plate number, the operator's name, and where the vehicle will pick up the passenger. The vehicles use virtual bus stops that are defined by the app, usually on street corners close to the passengers' destination. There is no dynamic pricing, but the fare is variable based on the distance traveled, starting with a base fare of R$3,50 (about $0.70 USD), and an additional R$1,50 (about $0.30 USD) per kilometer traveled. Payment is made by debit or credit card through the app. Multiple passengers can ride together in the same vehicle on the same request, up to the limit of 13 passengers per vehicle, space permitting, and the fare paid per passenger decreases as the number of riders on a request increases, as an incentive for reducing traffic congestion in the city (Via, 2019). TopBus+ users also benefit from periodic discounts provided directly via the app and can also receive discounts by sharing their individualized referral codes with new users.

Overall, according to TopBus+ website homepage (n.d.), their value propositions include comfort, safety, sustainability, cost savings and speed. The service's "comfort" includes modern vehicles equipped with air conditioning, leather seats and individual USB ports to charge cell phones. For "safety" the service highlights the notion that the vehicle operators are "selected, hired and trained to serve" the passenger. For "sustainability", the service emphasizes a collective means of transportation compared to personal vehicle use, encouraging consciousness of greenhouse gas reductions and urban mobility enhancements.

For “cost savings”, TopBus+ focuses on inexpensive fares, the lack of dynamic pricing, and that when multiple people ride together on the same request, the price per person decreases. Finally, for “speed”, TopBus+ utilizes the exclusive bus lanes in the downtown area, allowing passengers to bypass traffic congestion. As Via (2019) notes regarding the service, “because there are no fixed routes, Via’s technology intelligently routes each van to bypass traffic congestion, getting riders to their destination more quickly”.

6. Analysis and Results

Crosby et al. (2017, p. 659) claim that public value is not to be achieved "through the heroic efforts of strategic public managers, but through dispersed efforts and distributed leadership in which much of the enabling work can be performed by agents without formal authority in the government system". In this sense, for the purpose of standardizing the analysis, as appropriate, HP Transportes in Goiânia and Sindiônibus in Fortaleza will be treated as agents acting on behalf of the municipal governments in their respective cities, as the main companies authorized to provide conventional public transportation in their cities. However, this is not to say that their motivations in conducting these microtransit pilot projects are necessarily purely driven towards public value creation, as will be shown in the analysis.

6.1 Moore

In his 2013 book, *Recognizing Public Value*, Moore explains two main perspectives geared to assist public administrations in the creation of public value. The first perspective, legitimacy and support, is defined as "a set of measures designed to capture an organization's standing with all those individual and collective actors who provide it with the social legitimacy, public authority and public funding necessary to sustain itself" (Moore, 2013, p. 12). The second perspective, operational capacity, is defined as "a set of measures designed to capture the organization's ability to engage in the activities and produce the outputs that are thought to be consistent with achieving desired outcomes" (Moore, 2013, p. 12). Taking these definitions, we can assess the microtransit pilot projects in the four cities analyzed.

6.1.1 Sacramento

i. Legitimacy and Support perspective

The microtransit pilot project in Sacramento, SmaRT Ride, can be understood to have high levels of legitimacy and support, since the project is operated by Sacramento Regional Transit District, a public agency that is authorized to operate the public transportation for the city. Moreover, it is a trusted entity in the city, having been in existence since 1973 and having an extensive history of providing mobility options in the geographical region in which it operates.

ii. Operational Capacity perspective

For now, the microtransit pilot program in Sacramento has the operational capacity to sustain itself. There is dedicated funding allocated to it by a local tax measure (Measure A), as well as the $12 million grant from the Sacramento Transportation Authority. Further, this program is supported by fare revenues collected directly from users. However, in the long term, SmaRT Ride will likely need new funding sources in order to continue to operate and expand, to "produce the outputs" to achieve "desired outcomes" from the program.

6.1.2 West Sacramento

i. Legitimacy and Support perspective

The microtransit pilot project in West Sacramento, Via Rideshare, can also be understood to have high levels of legitimacy and support, given that the project is operated directly by the City of West Sacramento. Moreover, citizens recognize that the service is provided directly by the city, owing to the fact that the vehicles used in the program cite the City of West Sacramento as the sponsoring entity. There is public funding dedicated to this program, as well as tax revenues and fares paid directly by passengers.

ii. Operational Capacity perspective

The microtransit pilot program in West Sacramento is supported directly by state and local funding, starting with a budget of $749,000 in 2018. In addition, a local tax measure, Measure E, was approved in 2016 increasing the local sales tax by 0.25% to pay for general city services, which, according to Interviewee A, includes the microtransit pilot program. Using this revenue, the City of West Sacramento is able to engage in the "activities" of the program, and work to produce "desired outcomes".

6.1.3 Goiânia

i. Legitimacy and Support perspective

The microtransit pilot project in Goiânia, CityBus 2.0, can be understood to have legitimacy and support, but not directly. The entity that operates the program, HP Transportes, has direct legitimacy and support as the city's primary, long-standing operator of public transportation, according to **Interviewee D** ("we [HP] have a public concession granted by the

City of Goiânia"), with a direct link of legitimacy and support for this project specifically observed at the municipal government level ("the City embraced the service, approving its operation"). The project can be seen as an innovation initiative of HP Transportes, but not necessarily part of a larger city-wide effort to foster "social legitimacy, public authority and public funding necessary" in order to maintain and grow the service.

ii. Operational Capacity perspective

In Goiânia, the CityBus 2.0 program is financed directly by the public transportation operator, HP Transportes, and does not receive direct funding from the municipal government. They are able to "engage in the activities" to "produce the outputs" and "achieve desired outcomes", but the program does not depend on direct financial support from the city towards meeting these objectives. In this sense, the operational capacity is more limited in its scope.

6.1.4 Fortaleza

i. Legitimacy and Support perspective

The microtransit pilot project, TopBus+, appears to have legitimacy and support allocated to it by the municipal government, as, according to **Interviewee C**, "the project is included in our contract with the city", but not a direct authorizing relationship that governs all aspects of the service. However, the program is operated by the city's main public transportation operator, which is a "company that is duly established and respected in the city, with formally hired drivers, training, safety measures and someone with social responsibility behind it", according to **Interviewee C**.

ii. Operational Capacity perspective

In Fortaleza, like in Goiânia, the microtransit pilot project does not receive dedicated funding from the municipal government, and it is financed directly by the public transportation operator and through revenue from fares. Therefore, it cannot be said that there is direct operational capacity allotted to this program by the public administration, as it is an innovation initiative that has been conceived by the public transportation operator, independently from the public administration.

In summary, while the US microtransit pilot projects have direct funding mechanisms available to them from their respective municipal governments, grants and state-level funding,

the Brazilian microtransit pilot projects have more limited support, relying on operational efficiency, contributing to the "business necessity" of these initiatives, as stated by **Interviewee C**, owing to the observation of **Interviewee D** that "many or most of the passengers of the conventional bus system don't pay for themselves, especially the elderly and people that ride for free". Therefore, while all four projects have some degree of public value creation potential, according to Moore's Strategic Triangle framework, the Brazilian projects may be insufficiently leveraged in terms of operational capacity to generate significant levels of public value. A summary of the results of this analysis is provided in the table below:

Table 2. Summary of results from analysis of Moore's Strategic Triangle (1995) dimensions

City	**Legitimacy & Support**	**Operational Capacity**	**Public Value**
Sacramento	High	Moderate	Moderate
West Sacramento	High	Moderate	Moderate
Goiânia	High, but indirect	Moderate-Low	Low
Fortaleza	High, but indirect	Moderate-Low	Low

6.2 Harrison et al. (2012)

For the analysis of Harrison et al.'s (2012) elements of public value, we will use the value types "financial", "political", "social", "strategic", "ideological" and "stewardship".

6.2.1 "Financial"

First, we will analyze the "financial" dimension, which to reiterate, is defined as "impacts on current or future income, asset values, liabilities, entitlements, or other aspects of wealth or risks to any of the above" (p. 6). If transportation is seen as a means of increasing economic activity and expanding opportunities for a community in general, as alluded to by **Interviewees A** and **B** in West Sacramento and Sacramento, then the microtransit pilot projects in those specific contexts can be seen as contributing to the "financial" dimension. **Interviewee A** noted that the microtransit program is frequently used by people going to "the grocery store, to school, to work, to medical care" while **Interviewee B** remarked that "certain service areas were designed to grow the economy there and increase access...to and from workplaces". However, in Goiânia and Fortaleza, no specific information about the impact of CityBus 2.0

and TopBus+ on the "financial" dimension, or on the economic benefits of this program was encountered.

6.2.2 "Political"

Next, we will analyze the "political" dimension, defined as "impacts on a person's or group's influence on government actions or policy, on their role in political affairs, influence in political parties or prospects for public office" (Harrison et al., 2012, p. 6). The four microtransit projects analyzed in this study can be seen to have varying degrees of applicability of the "political" dimension of analysis. In Sacramento and West Sacramento, the microtransit pilot projects provide a direct means of impacting "government actions or policy", as these projects are operated directly by the government and there are several ways for citizens to interact with these services through a direct interface with the local government authorities. First, both projects include several ways of voicing opinions, registering complaints or providing suggestions to improve the service, which are direct links to the government. According to **Interviewees A** and **B** there have been community surveys and assessments in order to evaluate how these services are addressing voiced community needs. **Interviewee A** noted that "we conducted a survey a while back to understand who the users of that program are and how they use it", while **Interviewee B** remarked that "we identified some underserved areas and ways to connect to grocery stores in transit deserts". In contrast, in Goiânia and Fortaleza, these microtransit pilot projects have negligible impact on government actions or policies, as the initiatives are only indirectly sponsored by the local municipal governments. While there are ways for citizens to voice their opinions regarding CityBus 2.0 and TopBus+, they are not directly through government channels, but rather through the "social media profiles, phone numbers and e-mail addresses" of private entities according to **Interviewee C** and "social media profiles and a brand ambassador program", as stated by **Interviewee D**. For this reason, this element cannot exactly be assessed in the Brazilian context.

6.2.3 "Social"

The "social" dimension, defined by Harrison et al. (2012, p. 6) as "impacts on family or community relationships, social mobility, status, and identity", was identified to varying degrees in the microtransit pilot projects. In Sacramento and West Sacramento, **Interviewees A** and **B** stressed the extent to which these programs are helping certain community stakeholders, such as young people and the elderly to build a stronger relationship with the

community through expanded access to community assets such as supermarkets and recreational activities. By extension, these projects, in these contexts, could be seen as mechanisms to increase social mobility through this expanded access to resources. In Goiania and Fortaleza, however, "status" and "identity" were more closely aligned with the impacts that these projects have brought to those contexts. For "status", **Interviewees C** and **D** both stressed that the target demographic for these microtransit services is a college student in their mid-20s that would otherwise likely get around in their own personal vehicle, so the ability of potential users to choose between the microtransit service and their personal vehicle, rather than using the regular bus, for example, could be seen as a demonstration of "status". Moreover, it was understood through an analysis of materials for CityBus 2.0 and TopBus+ that the services were meant to invoke a specific identity, that of an "environmentally conscious, collectively-minded individual that is willing to leave the car at home, thereby impacting individual convenience, for the collective benefit of the city", as **Interviewee C** explained. However, these results, in the Brazilian context, stem from the innovative actions of private companies, rather than the government.

6.2.4 "Strategic"

"Strategic" is the next value type to be assessed, defined as "impacts on a person's or group's economic or political advantage or opportunities, goals, and resources for innovation or planning" (Harrison et al., 2012, p. 6). In Sacramento and West Sacramento, there are some clear examples of how the microtransit pilot program has had a "strategic" impact. The programs have expanded mobility options for elderly residents and for young people, and for people living in areas that are poorly served by conventional public transportation options. In this sense, these programs can be seen as a lifeline, "connecting citizens to the community and enabling economic opportunities for involvement and advancement", through access to jobs, education, healthcare and leisure activities, cited by both **Interviewees A** and **B**. No evidence of an impact of these programs on individuals' "resources for innovation or planning" was encountered. In Goiânia and Fortaleza, no measurable impact on "economic or political advantage" or "resources for innovation or planning" were encountered. This may be owing to the notion that in the context of Goiânia and Fortaleza, the microtransit services are generally not used by people that would need to use the service as a means of leveraging "economic or political advantage" or as a means of forwarding their goals, according to the target demographics cited by **Interviewees C** and **D.**

6.2.5 “Ideological”

Next, we will analyze the value type “ideological”. This is defined by Harrison et al. (2012, p. 6) as the “impacts on beliefs, moral or ethical commitments, alignment of government actions or policies or social outcomes with beliefs, or moral or ethical positions”. If the government is understood to have a moral or ethical commitment to citizens in order to promote social or economic benefits through their actions, then the microtransit pilot projects in Sacramento and West Sacramento can be seen as addressing those commitments, at least partially. By creating the microtransit programs, there would be some level of alignment between the policy initiative and the “beliefs, or moral or ethical positions” that it is in the government’s interest to promote the benefits that are hoped for through these programs. In Goiânia and Fortaleza, however, no such link can be made. Whether or not there are “moral or ethical commitments” or “alignment of government actions or policies or social outcomes with beliefs, or moral or ethical positions”, the CityBus 2.0 and TopBus+ programs cannot be seen as reflections of those “moral or ethical commitments”, whether present or not in the municipal governments of Goiânia and Fortaleza, as the initiatives are not driven by the public administration. They are innovative measures within the public transportation operators, which are themselves private companies which may be understood to have some commitment to purported “moral or ethical commitments” of the municipal governments, but no direct link between these projects and those “commitments” was discovered. Therefore, it cannot be claimed that this dimension applies to the Brazilian context in these projects.

6.2.6 “Stewardship”

Finally, we will analyze the “stewardship” dimension. According to Harrison et al. (2012, p. 6), this dimension refers to “impacts on the public’s view of government officials as faithful stewards or guardians of the value of the government in terms of public trust, integrity, and legitimacy”. Due to the strong association that citizens have between the SmaRT Ride program and the Sacramento Regional Transit District as a public agency, and between the Via Rideshare program and the City of West Sacramento, according to **Interviewees A** and **B** it can be argued that the performance of these programs has a direct effect on the “public’s view of government officials”. In the context of these projects, there is a direct relationship between the public transportation operators as “faithful stewards” and their abilities to promote “public trust, integrity and legitimacy” through their initiatives. Moreover, the means through which citizens can express their opinions regarding these projects are directly tied to government

channels, providing additional levels of accountability and instilling "public trust, integrity, and legitimacy" (Harrison et al., 2012, p. 6). However, in the case of Goiânia and Fortaleza, while the public transportation operators have strong reputations in their cities, according to **Interviewees C** and **D**, and the interviewees alluded to the notion that the success of these programs could have a positive impact on the public's view of services provided by the municipal government in these contexts ("improved service quality with more efficient public spending", according to **Interviewee C** and "shifting the paradigm to look at people's real needs", according to **Interviewee D**), it cannot be determined that CityBus 2.0 and TopBus+ would have a direct impact on views of "government officials as faithful stewards", because of the lack of involvement of "government officials" in the microtransit initiatives.

To summarize, according to the elements of public value presented by Harrison et al. (2012), this model appears to have limited applicability in the Brazilian context in the projects examined in this study. The main difficulty encountered is that there is no direct connection between the public administration and the microtransit initiatives, as in the Brazilian cases, there are private sector intermediaries - HP Transportes in Goiânia and Sindiônibus in Fortaleza - that operate these programs. In the US cases, both in Sacramento and West Sacramento, the projects are operated directly by the public administration and therefore it is possible to establish connections between actions specifically attributed to the government and their impacts on the analyzed dimensions through the microtransit programs. A summary of the results of this analysis is provided in the table below:

Table 3. Summary of results from analysis of Harrison et al. (2012) dimensions

Dimensions	**Sacramento**	**West Sacramento**	**Goiânia**	**Fortaleza**
"financial"	Applicable	Applicable	Not applicable	Not applicable
"political"	Applicable	Applicable	Not applicable	Not applicable
"social"	Applicable	Applicable	Not applicable	Not applicable
"strategic"	Partially applicable	Partially applicable	Not applicable	Not applicable
"ideological"	Partially applicable	Partially applicable	Not applicable	Not applicable
"stewardship"	Partially applicable	Partially applicable	Not applicable	Not applicable

6.4 Meynhardt (2015)

We can also assess the potential for public value creation in the examined microtransit projects by using some of the dimensions outlined by Meynhardt (2015), such as utilitarian-instrumental (is it useful?), political-social (is it politically acceptable?) and hedonistic-aesthetic (is it a positive experience?) In all four projects surveyed, we were able to identify examples of these values manifested through the efforts of the involved entities.

6.4.1 Sacramento

i. Utilitarian-instrumental value

In Sacramento, we identified utilitarian-instrumental value in the way that the microtransit project is configured in order to foster greater connectivity in the city, especially to other modes of transportation, such as the fixed route bus and light rail systems. **Interviewee B** mentioned that "this connectivity is one key aspect that Sacramento Regional Transit District considers in evaluating the usefulness of the microtransit program". Additional factors that would contribute to the usefulness of the project is the notion that fares are integrated whether the passenger uses the fixed route system or the microtransit system, and not subject to dynamic pricing or distance-based variations in fares.

ii. Political-social value

We also identified political-social value in the way that **Interviewee B** spoke of the "pressure" that the public transportation operator faced regarding the reach of one of the service areas, "providing access to a supermarket in a transit desert". In responding to that "pressure" by adjusting the service, this project can be said to strive for political acceptability, even as a means of establishing trust in the program in its early phases.

iii. Hedonistic-aesthetic value

Finally, we identified an example of hedonistic-aesthetic value in Sacramento's microtransit project, which reflects the "relative positivity of (the) experience". **Interviewee B** mentioned that riders can call in to a dedicated call center to request a ride on the microtransit service, clearly a way for the public transportation operator to enhance the experience of interacting with the program for potential users that do not have a smartphone, or do not know

how to, or cannot, use their smartphone to access the service. Other factors related to the positivity of the experience of using Sacramento's microtransit service include the inability of vehicle operators to cancel or choose which passengers to pick up (or which areas to serve), and the predictability of the fare structure, characterized by the absence of dynamic pricing.

6.4.2 West Sacramento

i. Utilitarian-instrumental value

In West Sacramento, we identified clear evidence of utilitarian-instrumental value fostered through the city's Via Rideshare program. **Interviewee A** provided concrete examples of the initiative's usefulness, such as the ability to reach "schools, libraries, parks, supermarkets and community events", especially for younger riders and the elderly, target passengers that may use the service due to the inability to drive a car in a suburban context in which not having a car would "likely provide substantial mobility barriers", according to **Interviewee A**.

ii. Political-social value

Moreover, political-social value was identified, reflecting a degree of political acceptability of the program, in that the vehicles used by the service are marked with the City of West Sacramento name and logo. In this way, as **Interviewee A** explained, riders are reassured that the service they are using has been authorized by the city, which also "adds a layer of accountability to the program if some aspect of the service does not meet the rider's expectations". There are clear mechanisms associated with the program that provide a direct interface with the government, to address questions and concerns.

iii. Hedonistic-aesthetic value

Finally, we identified an element of hedonistic-aesthetic value in West Sacramento's Via Rideshare program, to address the question of the positivity of the experience of interacting with the initiative. As **Interviewee A** explained, the City of West Sacramento "made a lot of minor tweaks and improvements to the app...it was a lot of piloting", geared towards adjusting the service in response to user feedback. This also illustrates the role that iteration, or trial and error, has in the development of these experimental programs.

6.4.3 Goiânia

i. Utilitarian-instrumental value

In the CityBus 2.0 program in Goiânia, we also identified a degree of utilitarian-instrumental value generated through the initiative. However, the inputs indicate an additional level of complexity to understand to what extent the project can effectively generate value according to these dimensions. **Interviewee D** remarked that CityBus 2.0 "is not a service for the conventional user of public transportation that uses it for longer distances". This suggests that although the service may be useful for potential users that fit the persona described by **Interviewee D (**"a woman, between the ages of 20 and 25 that is finishing college and will stop riding the bus due to all of its problems in favor of individual means of transportation"), it may have limited usefulness for other demographics. It is relevant to reinforce that the CityBus 2.0 program is operated by a private company concerned with, as **Interviewee D** stated, "a business necessity to confront a threatening situation of loss of competitiveness". It is therefore possible that the instrumental-utilitarian value of this project is more oriented towards business value than public value.

ii. Political-social value

Moreover, we identified the *possibility* of political-social value in the CityBus 2.0 program that provided some insight into its political acceptability. HP Transportes, the public transportation operator, could be said to be politically acceptable as an entity ("We (HP Transportes) have a strong relationship with the municipal government of Goiânia"), but no direct link between the municipal government and the CityBus 2.0 project was encountered in order to assess whether the initiative itself could claim political acceptability. For that reason, we have inconclusive inputs to state whether CityBus 2.0 creates political-social value.

iii. Hedonistic-aesthetic value

Finally, we identified hedonistic-aesthetic value in the CityBus 2.0 program, reflecting on the positivity of the experience of interacting with the initiative. According to **Interviewee D**, "we addressed three main pain points when people need to get around: time, comfort and safety". Understanding that timeliness, comfort and safety are all aspects that would contribute to a positive user experience, we can say that there may be some level of hedonistic-aesthetic value to be drawn from the program. However, the role that the municipal government plays

in contributing these values is negligible, as the CityBus 2.0 program is not directly governed by the city.

6.4.4 Fortaleza

i. Utilitarian-instrumental value

Fortaleza's TopBus+ program also exhibits some degree of utilitarian-instrumental value. The program's usefulness stems from the way that it "created a new option for people to move around the urban core of the city, that is convenient both for the individual and for the city", according to **Interviewee C**. It may be useful to people that need "the guarantee of not having dynamic pricing", as **Interviewee C** also stated.

ii. Political-social value

For political-social value, we were able to identify political acceptability for Sindiônibus as an entity, but not necessarily for the TopBus+ program specifically. As **Interviewee C** said, "we have a solid reputation with the public administration, and we have the civil responsibility that Uber and others don't have when they enter a new market". This implies that there may be some direct political acceptability for the TopBus+ program, but there is insufficient information to make a definitive conclusion.

iii. Hedonistic-aesthetic value

Finally, for hedonistic-aesthetic value, TopBus+'s main differentiating factors are comfort, safety, sustainability, savings and speed, according to the microtransit program's website ([TopBus+ website homepage, n.d.). These are all elements that, when taken together, can be understood to contribute to the relative positivity of the experience of the microtransit program. However, the role that the municipal government has in dictating these aspects of the service is uncertain, and, similarly to the project in Goiânia, may be a result of the project's status as "not *purely* a market-based solution", as stated by **Interviewee C**. There are other aspects of the service that suggest an orientation towards user experience owing to underlying financial motivations, such as the affirmation by **Interviewee C** that "the conventional public transportation system is sustained by passengers that pay full fare and ride for short distances". A summary of the results of this analysis is provided in the table below:

Table 4. Summary of results from analysis of Meynhardt (2015) dimensions

City	Value	Examples
Sacramento	Utilitarian-instrumental	**Interviewee B:** "Our service areas are set up to provide connectivity to bus and light rail stations around the region"
	Political-social	**Interviewee B:** "We were under political pressure to expand the service region to provide access to a supermarket"
	Hedonistic-aesthetic	**Interviewee B:** "Riders can call if they don't have a smartphone - they can call in and we can set them up there"
West Sacramento	Utilitarian-instrumental	**Interviewee A:** "Riders can use the service to reach schools, parks, libraries and community events"
	Political-social	**Interviewee A:** "Users can trust in the service knowing that it is sponsored by the City, and not just some private company with no connection or responsibility"
	Hedonistic-aesthetic	**Interviewee A:** "We have made a lot of minor tweaks and improvements to the app...it was a lot of piloting"
Goiânia	Utilitarian-instrumental	**Interviewee D**: "It is not a service for the standard user of conventional public transportation that uses it for longer distances"
	Political-social	**Interviewee D**: "We (HP Transportes) have a strong

		relationship with the municipal government of Goiânia" - *inconclusive*
	Hedonistic-aesthetic	**Interviewee D**: "We addressed three main pain points when people need to get around: time, comfort and safety"
Fortaleza	Utilitarian-instrumental	**Interviewee C:** "We created a new option for people to move around the urban core of the city, that is convenient both for the individual and for the city"
	Political-social	**Interviewee C**: "We have a solid reputation with the public administration, and we have the civil responsibility that Uber and others don't have when they enter a new market"
	Hedonistic-aesthetic	**Interviewee C**: "TopBus+'s main differentiating factors are comfort, safety, sustainability, savings and speed"

6.5 Neumann et al. (2019)

Finally, we will assess all four of the microtransit projects examined in this study to determine the extent of the suitability of the Neumann et al. (2019) model to explain the interactions between public transportation operators and innovation partners in different contexts. Unlike the previous lenses of analysis, which aimed to identify public value in the microtransit initiatives in general, this model assists in assessing public value creation potential specifically through the collaborative nature of the projects. In Neumann et al. (2019), as previously mentioned, the model conceptualized the collaboration between the municipal governments of three medium-sized Swiss cities and public and semi-public utility companies as innovation partners. The interactions involved in this study examine public transportation

operators (whether public or private) and an innovation partner, in the context of Brazil and the United States.

We analyzed the categories presented in the Neumann et al. (2019) model, including the adaptation of several elements to suit the different contexts, in order to shed light on public value and business value creation, and the appropriate characterizations of the microtransit collaborations according to stewardship and agency-based relationship traits.

6.5.1 Innovation partner perspective

i. Identification with city

We found that in all four cases studied, the innovation partner has limited identification with the cities in which they partner to create microtransit solutions. Interviewee E noted that the innovation partner does not choose cities for their projects, rather, the company is "chosen by cities after the release of requests for proposal and a bidding process that results in [the innovation partner] being selected". Interviewee F noted that the innovation partner has as a selection criterion the "viability for demand-responsive transit (DRT) in geographic locations in which they operate", but that similarly to Interviewee E, cities and public transportation operators select the innovation partner, and not vice versa. The innovation partner has, therefore, no particular affinity towards the locations in which it operates. For this reason, this element was classified as "Low" in all four initiatives.

ii. Trust by citizens

We identified some specific efforts that may be made to instill trust in the citizens of the locations in which the innovation partner collaborates on microtransit pilot projects. **Interviewee E** noted that there is a community outreach team that is tasked with "understanding the local context and even obtaining preliminary data on mobility needs", but that these objectives are directed by the public transportation operators, and merely facilitated by the innovation. **Interviewee F** remarked that "our Brazilian clients are private operators, we do not have relationships with public agencies like in the US, for example". However, "in the beginning of each project [we] have meetings with representatives from the municipal government to explain what the project will contribute to society". Whether these activities actually result in trust in the innovation partner by citizens of the locations, or just the

government, remains unclear. For this reason, "trust by citizens" is "uncertain" in all four contexts.

iii. Urgency to innovate

It was observed by **Interviewee E** and **Interviewee F** that while there is some urgency to innovate, the "competition in the area of microtransit solutions is not highly pronounced", according to **Interviewee E**, in that there are not many firms that have similar competencies and resources. **Interviewee E** cited the names of other firms seen as competitors, but affirmed that "what we offer our partners is unique, no other firm offers the same thing". Moreover, **Interviewee F** echoed the same sentiment, claiming that "what we [the innovation partner] do is absolutely innovative, no other company was doing what we do when we started". In all of the cases, however, it was noted that there is some urgency when it comes to providing a cost-effective solution that is appealing to the public transportation operators, aligned with tools that help the providers to address specific problems better than another firm would be capable of achieving, since fundamentally the innovation partner is chosen following a competitive bidding process involving other potential vendors. For this reason, this element was classified as "Medium" for all four initiatives.

iv. Innovation department

In the Neumann et al. (2019) study, the innovation partner in two of the cases established innovation departments. No specific evidence of a dedicated innovation department was identified in the innovation partner's role in any of the four projects examined in this study. This may be due to the notion that the firm's innovation capabilities transcend a specific sector or department, rather encompassing the entirety of the business, contributing to their recent innovations including technology that adapts to autonomous vehicles, electric vehicles, mobility as a service and healthcare transportation ([Information about Via solutions, n.d.]). For this reason, this element was classified as "None - N/A" for all four initiatives.

v. Key innovation actors

Similar to the previous category, limited evidence of key innovation actors was identified in all four projects. These projects, still in their initial phases, are small in structure and the interface between the innovation partner and the public transportation operators is limited to just a few people. For example, **Interviewee E** noted that their scope of work includes "geographical regions, rather than total dedication to a specific pilot project".

Interviewee F did not mention anything specific as far as the action of specific members of the firm's operation, but given that "[the innovation partner's] activity in Brazil is currently limited to two projects", it can be understood that the team is similarly small, reducing the necessity to have specific innovation actors. Due to incomplete information in this category, for all four projects, this element was classified as "Limited - N/A".

vi. Business agility

For this category, we aimed to understand what tools the innovation partner has at its disposal to collect data and quickly use it to optimize its services. It was found that the firm's level of responsiveness depends on the context and the service model that is deployed. The firm offers a range of services, depending on the project: "software only, vehicles and software, or vehicle operators, vehicles, and software in a turnkey operation", as affirmed by **Interviewee E**. In the cases studied, only West Sacramento's operation notably expands the role of the private innovation partner in the delivery of the service, providing vehicles, vehicle operators and the software to enable the service in a turnkey operation. In the other three contexts, as previously mentioned in this research, Via provides the software, but the vehicles and vehicle operators are provided by the public transportation operator. It was noted by **Interviewee E**, however, that "We [the innovation partner] provide recommendations to our partners on service areas using collected data to serve more potential riders and increase passengers per vehicle hour, an important indicator of the operational performance of these projects" This idea was supported by **Interviewee F**, who noted that "our capacity to provide real-time information to assist with routing, to help with fare integration and to help with customer feedback data collection are very innovative". Because of the more autonomous role of the innovation partner in the West Sacramento project, business agility was classified as "High", whereas due to the important insights derived from the partner's participation in the other projects despite less operational autonomy, business agility was classified as "Medium".

vii. Error management culture

Here, we intended to identify to what extent the innovation partner experiments with its microtransit pilot projects, how projects are designed (whether functionality-based, context-based, or other criteria), and to what extent the "iterative" culture involves public sector participation in devising solutions. According to **Interviewee E**, Via's projects "are mostly all experimental, and the lessons learned from one can be and are easily applied to others", in a continuous effort to improve the product offering and delivery. Moreover, and this point was

also reinforced by **Interviewee F**, the firm adapts to contextual differences, but since they are primarily procured by public transportation operators to contribute their expertise, the design and delivery of projects is mainly functionality-based, and "in line with what the partners request from [the innovation partner] to address their specific situations", according to **Interviewee F**. As to whether the public sector has ample participation in devising these projects in order to tailor them to citizen needs, **Interviewee E** stated that it "really depends on the context of the specific project". In cases where the innovation partner merely acts as a software provider, the public sector has a large role in the overall design of the projects, in the US context. In the Brazilian context, however, **Interviewee F** noted that "we do not have relationships with public agencies like in the US", rather clients are private firms that operate public transportation. In this sense, there is limited involvement by the public sector in crafting these solutions. However, **Interviewee F**, in agreement with **Interviewee E** on the question of the role of trial and error, noted that "what we do in Brazil is easily replicated in other places, but we have our particularities". The innovation partner was therefore considered to wield a "strong" error management culture spurred by the iterative, experimental approach inherent to the innovation partner's business strategy, regardless of context and project.

6.5.2 Public transportation operator perspective

i. Provider of smart cities solutions

This category, not included in the original Neumann et al. (2019) model (original category: "smart city strategy of local government"), aimed to identify to what extent the public transportation operator interviewees view their organizations as providers of smart cities solutions. To clarify, this was not meant to affirm that these specific microtransit projects are explicitly included in the cities' smart city strategies. All four representatives, from the four projects, identified their organizations as promoters of smart cities solutions, and alluded to the idea that the microtransit projects were considered smart projects. None of the respondents went as far as to associate the microtransit initiative with the city's smart city strategy, with the exception of **Interviewee A**, who stated that "the city's Mobility Action Plan…[which is] tied to equity and addressing climate as one of the key pieces of smartness, to address the same goals that are at the core of city services, making it affordable for people to live here, play here and work here". **Interviewee B** noted that "smartness is about integrating technology into day-to-day life and modernizing antiquated infrastructures", and that "transit has been around for a

very long time but it also has not changed for a very long time", so engaging the innovation partner assists in the creation of a smarter transportation system. **Interviewee C** explained that "[we] want to create a smart solution that uses resources more efficiently and effectively in this program" and by "using innovation to our advantage to create something that is smart for the collective". Finally, **Interviewee D** mentioned that "our objective is to deliver value to the city and deliver in a smart way" and that "a smart city is one that puts people and the environment in the middle of discussions", to "deliver an environment that is sustainable for people, not for machines or cars". The responses suggest an incipient understanding of the concept of smartness and how these projects align with it, but fall short of a direct association with the smart city strategy, at least in the initial stages of the projects. For this reason, all four projects were classified as "Yes" in this category.

ii. Type of assignment mandate

In all four projects, the expectation of the public transportation operator with regard to the role of the private mobility partner was specifically to assist with the microtransit pilot program. In the Neumann et al. (2019) cases, the assignment mandate for the utility companies ranged from general strategy, to a performance contract, to governmental participation in the innovation partner's supervisory board. In our study, there is a specific and limited role for the innovation partner, in the form of a negotiated service contract to conduct specific activities for the microtransit initiatives. Moreover, apart from West Sacramento, the role of the private mobility partner is that of a software provider, providing technology and data know-how to assist the public transportation operators in accelerating their microtransit programs. In West Sacramento, while the degree of involvement of the innovation partner could be deemed slightly higher, as they are responsible for providing vehicles and vehicle operators in addition to software and data insights, the innovation partner's scope is limited to a specific project, at least at the present time. For this reason, all four cases have been classified as "Service contract" in the "type of assignment mandate" category.

iii. Innovation mandate

As in the previous category, an innovation mandate has been established for the innovation partner by the public transportation operator that is limited to assisting to potentialize and enhance the efficacy of their microtransit programs. At the present time, this

is the scope of the innovation partner's work and what they are expected to assist the principal to accomplish, with high levels of control and monitoring, particularly regarding the fare structure, the lack of dynamic pricing, the policies guaranteeing access to elderly and disabled people (in the US cases) and the service areas, for which the innovation partner provides data-driven recommendations, but is ultimately driven by the public transportation operator's needs. According to the Executive Director of HP Transportes in Goiânia, as quoted by Via (2019), upon launch of CityBus 2.0, "the eyes need to be geared towards the prioritization of the collective public transportation and investing in innovation to promote transit ridership". According to **Interviewee C**, in an external communication with the innovation partner (["Tackling public transit in the most densely populated city in Brazil"], n.d.), public transportation must continue to innovate to keep up with evolving urban environments, and services like TopBus+ in partnership with Via in Fortaleza address that need. In West Sacramento, according to the West Sacramento On-Demand case (n.d.), the partnership with the innovation partner has as its fundamental goal "to design and operate an end-to-end microtransit service". Finally, in Sacramento, according to the innovation partner's founder and CEO Daniel Ramot (Via, 2020), the involvement of the firm in the public transportation operator's activities is to "partner with [the public transportation operator] to provide an innovative transit solution to the residents of Sacramento". For this reason, in all four projects, the category "innovation mandate" was classified as "specific".

iv. Dependence of innovation partner on political processes

In the cases of Sacramento and West Sacramento, a high level of dependence on political processes was identified. This stems from the direct relationship between the public sector (Sacramento Regional Transit District and the City of West Sacramento, respectively) and the innovation partner to govern specific aspects of the operation, establishing rules and regulations to guide the actions of the innovation partners. Specific challenges were raised by **Interviewee E** with regard to "procurement and agreeing on the budget" for the microtransit projects in the US context, which would suggest internal political discussion and debate regarding how much financial (and personnel) resources the public administration should devote to these programs. In this sense, the innovation partner in the two US projects is highly dependent on political processes, leading to the classification "High". In the Brazilian cases, there is a degree of dependence on political processes faced by the innovation partner, as **Interviewee F** explained, "in the beginning of each project [we] have meetings with representatives from the municipal government to explain what the project will contribute to

society", but, fundamentally, "the commercial relationship that we have in Brazil is with private companies". The dependence of the innovation partner in the Brazilian cases is more aligned with the processes, goals and expectations of private companies (HP Transportes in Goiânia and Sindiônibus in Fortaleza) rather than the public sector. This is especially given the operational autonomy of the public transportation operator in the Brazilian context (**Interviewee C**: "We have the freedom to change the pricing, offer promotions, and the flexibility to change service areas and schedules, within limits"). For this reason, we classified this element in the Brazilian cases as "Medium-Low".

v. Key public transportation operator actor for interaction with innovation partner

In the Neumann et al. (2019) study, specific people from the municipal governments were identified as key actors for interactions with the utility companies, including the town clerk, head of economic development and the Chief Digital Officer. The underlying motivation for selecting the individuals for interview from the four projects in this study, was due to their perceived critical role in the interactions with the innovation partner. In fact, **Interviewee A** is the focal point for the microtransit initiative in West Sacramento, according to City of West Sacramento information on Via Rideshare program (n.d.). The other interviewees, **B**, **C** and **D** were also considered to be key actors, but the relevance of this category due to the size and incipient nature of the microtransit programs is questionable. With the exception of **Interviewee A**, the representatives from the other public transportation operators were recommended to the researcher after initial contact with the entities.

vi. Service delivery regulation (fares, accessibility, etc.)

In this category, not included in the Neumann et al. (2019) model, we aimed to understand what specific rules and regulations were imposed by the public transportation operator on the innovation partner. This was done in order to further substantiate the degree of control the public transportation operator has over the innovation partner. In all cases, we found a "high" level of service delivery regulation, which, consequently, would imply low levels of empowerment and trust (Neumann et al., 2019) of the innovation partner. However, **Interviewee A** mentioned that the innovation partner "already operated a flat-fare model in other markets and this is something that appealed to us about them, bringing an equity element to the service". Therefore, it cannot be said that certain aspects of the service delivery came about purely through "mandates and controls", but also were supported and even promoted by the innovation partner. In a similar light, **Interviewee B** cited the lack of dynamic pricing and

also the notion that vehicle operators "cannot cancel rides or choose specific neighborhoods or areas to serve", a sentiment echoed by **Interviewee C** ("we won't have trip cancellations, the vehicle operator can't say 'I don't like this client, or I don't like this area so I won't go there'"). Finally, **Interviewee D** noted that "we don't use dynamic pricing" and "the program is a complementary service but we still need to understand the roles and responsibilities, what we must deliver through the concession". In this sense, there are several mechanisms in place to regulate the service, enforced by the public transportation operator but also agreed upon by the innovation partner, suggesting similarity of interests.

vii. Communication between public transportation operator and innovation partner

By understanding the extent to which information is shared between the public transportation operator and the innovation partner, we gained a means of verifying the avenues of communication between the parties. According to Neumann et al. (2019), communication between the actors in a collaborative innovation is an important element of a stewardship-like relationship. We concluded that there was "established" communication between the public transportation operator and the innovation partner in all four cases. In West Sacramento, however, it was determined that the communication between the parties was of relatively lower relevance due to the comparatively high level of operational autonomy that the innovation partner wields in this project. **Interviewee A** cited several examples supporting the "established" level of communication between the parties, such as crucial information sharing, including "origin and destination data", "ridership and amount of shared rides", "number of passengers per hour", "number of senior and disabled passenger accounts" and other data "to inform improvements to the City's fixed route bus service", thereby better complementing the on-demand service. **Interviewee B** mentioned, similarly, that "rider profiles are archived using [the innovation partner's] technology and then are made available to us [the public transportation operator]" while maintaining anonymity and "a demand map to show where the 'hot' areas are", which helps the public transportation operator to inform decisions regarding where to expand the service or even alter the fixed-route public transportation services. **Interviewee C** mentioned that "we developed our program largely based on their [the innovation partner's] experiences in other places, we exchange ideas with them whenever we want, and we use them to help us with communication with users and in terms of creating parameters to develop and improve the service", reinforcing the "established" nature of the communication. **Interviewee D** seemed to downplay the role of the innovation partner in these projects, exemplified by the following statement: "They are simply a technology provider - they

don't interfere in the service and HP determines all of the parameters and requirements of the service...they don't have any form of authority over the service". Nevertheless, communication between the public transportation operator and the innovation partner can be classified as minimally "established", owing to the comment from **Interviewee D** that "[the innovation partner] operationalizes our decisions", which would imply that decisions must first be communicated, and "there is no negotiation", suggesting that the innovation partner's role is to follow the public transportation operator's instructions.

viii. Common understanding of innovation

The aim of this category is to assess whether the public transportation operators and the innovation partner in each of the four contexts studied wield a common understanding of the innovation objectives. As mentioned in the previous categories "type of assignment mandate" and "innovation mandate", the relationships between the parties are governed by service contracts that lead to specific innovation mandates to assist in the operation of the microtransit pilot projects based on directed objectives laid out by the public transportation provider during the procurement process. According to **Interviewee A** in a Via case study report for West Sacramento's microtransit program ("West Sacramento On-Demand," n.d.), "working hand-in-hand with the city, [the innovation partner] helped us design an innovative, right-sized transit solution tailored to our community's needs". **Interviewee B** reinforced this message, stating that "we work pretty well together - if we have adjustments that we would like to make we inform [the innovation partner] and they make the changes for us" and "any sort of adjustments or readjustments come at a price". **Interviewee C** noted that "we had a few bottlenecks at the beginning of our test period especially related to supply during rush hour, and we started to talk [to the innovation partner] to check the viability of changing the pricing structure, or having different pricing during rush hour". This suggests a common understanding of innovation that is also linked to the "established" communication between the public transportation operation and the innovation partner. Finally, **Interviewee D** explained that "in the technical aspect, we needed to develop what was possible and what wasn't using [the innovation partner's] platform. For example, we wanted to be able to track users using their CPF, but [the innovation partner] needed some time to develop this functionality". We can therefore conclude that there is a common understanding and aligned expectations regarding innovation, reinforced by the assignment mandate, innovation mandate and established communication between the parties.

ix. Alignment of strategies and structures

This category investigated the extent to which the public transportation operator's is aligned with that of the innovation partner. **Interviewee A** mentioned in a Via case study report for West Sacramento's microtransit program ("West Sacramento On-Demand," n.d.) that the innovation partner "has been an incredible partner. Working hand-in-hand with the City, [the innovation partner] helped us design an innovative, right-sized transit solution tailored to our community's needs, leveraging both their advanced ride-matching technology and operational expertise". **Interviewee B** mentioned that "we work pretty well together - if we have adjustments that we would like to make we inform [the innovation partner] and they make the changes for us". In this sense, for both Sacramento and West Sacramento there is alignment in strategy based on the innovation partner's role as a contracted service provider. **Interviewee C** noted that "we do a lot based on [the innovation partner's] experience, whether it involves communication with users or modifying the service, to bring, besides the technology, their market intelligence". Owing to the utilization of the innovation partner's expertise for specific goals outlined by the public transportation operator, for Fortaleza, the alignment between the public transportation operator and the innovation partner can be seen as "High" as well. **Interviewee D** noted that "[the innovation partner] operationalizes our decisions, but there is not much negotiation as far as the strategy to follow". For Goiânia, finally, the alignment between strategy and structure is also "High", as it can be understood that the innovation partner tends to follow the strategy of the public transportation operator within the confines of the service contract.

x. Level of agency relationship characteristics

A strong element of "mandate and control" was detected in all four projects in this study, governing the relationships between the public transportation operators and the innovation partner. Evidence includes assignment mandates driven by specific service contracts and a specific innovation mandate, to assist in the development of microtransit initiatives, in line with principles of agency theory and reinforced by Neumann et al. (2019). **Interviewee A** claimed that "one of the reasons we set up the contracting the way that we did was so that we could retain control over things like pricing and offering discounts where we see fit". **Interviewee B** remarked that, for example, "[we can] require that rides are $2.50. Myself as a contractor will charge $2.50 - I'm not getting paid that $2.50, I'm getting paid for providing the service." **Interviewee C** mentioned that "with TopBus+ you are using the service of a duly established company in the city, with formally hired employees and all of the safety requirements...and performance indicators that are enforced in the contract". Finally, **Interviewee D** stated that

"[the innovation partner] is a technology provider. They don't interfere in the service - [we] decide all of the service parameters, from the design to the requirements". In this sense, it is evident that the principal controls the actions of the innovation partner in all four contexts, using their services for limited activities.

xi. Level of stewardship relationship characteristics

At the same time, however, there are examples of stewardship characteristics present in the relationships between the public transportation operator and the innovation partner. As mentioned, communication between the parties could be classified as established and even friendly based on the information obtained. Moreover, there is a common understanding of innovation and adequate alignment of strategy between them. Though these congruences are enforced by the service contract, there is evidence that the innovation partner does not necessarily require such controls in order to perform in accordance with the public transportation partner's objectives. For example, **Interviewee A** noted that "[we] had a bunch of questions to be answered and one that was scored in the criteria for who was selected was about accessibility - can you bring a solution for wheelchair access, or non-smartphone users, or unbanked individuals to the table?" The innovation partner also "already operated a flat-fare model in other markets and this is something that appealed to us about them, bringing an equity element to the service", according to **Interviewee A.** Taking this category and the previous category together, we conclude that the microtransit initiatives Sacramento, Goiânia and Fortaleza exhibit both agency relationship characteristics and stewardship relationship characteristics ("medium" for each). Due to the two examples of alignment between the public transportation operator and the innovation partner in West Sacramento identified even without a contract in place, this collaboration was assigned "medium-high" stewardship characteristics and "medium-low" agency characteristics.

6.5.3 Innovation related outcomes

i. Type of value creation

In all four contexts, we found that the innovation partner is engaged primarily in business value creation, given that partnering in microtransit pilot programs is a key pillar of the firm's business model. Moreover, according to Moore (1995), all private firms strive to generate business value. We did find, however, examples of utilitarian-instrumental, political-social and hedonistic-aesthetic value (Meynhardt, 2015) in all four contexts, facilitated by the

innovation partner, showing that they generate some degree of public value as well. In the Brazilian context, where the public transportation operators were observed to aim for business value, in response to a business problem aggravated by abandonment of the public transportation system by passengers that paid full fare and traveled shorter distances (i.e., more profitable and more attractive passengers), the innovation partner was seen to help achieve the objectives of enticing these users back into the system. For this reason, the collaborative innovations in Sacramento and West Sacramento were understood to generate business and public value, while the Brazilian projects were seen as primarily generating business value (both for the public transportation operator and the innovation partner).

ii. Level of innovativeness

In all four projects examined in this study, the evidence suggests the level of innovativeness achieved by the innovation partner in the projects can be adequately classified as at least "medium". In Neumann et al. (2019), high innovativeness is attributed to a strong innovation department in one of the utility companies. Conversely, low innovativeness of another utility company is attributed to a difficult relationship between the local government and the utility company. Alternatively, medium innovativeness is attributed to strategies and structures that are established but not rehearsed. We found a cooperative, albeit limited in scope, relationship between the public transportation operators and the innovation partner in the microtransit projects. However, the innovation partner is not known to compartmentalize its innovation in a "department", as was the case in the utility companies in Neumann et al. (2019); rather, the firm strives for innovativeness as a competitive means of preserving its partnerships and attracting new business. The limited innovation mandate in all four cases, coupled with the assignment mandate which is specific to a service contract to assist with microtransit initiatives in all four cases, suggests that while the level of innovativeness achieved by the innovation partner is not high, which could be attributed to the "mandate and control" elements predominantly governing the relationships at present, it is also not particularly low. The relationship between the innovation partner and the public transportation operators was deemed to be cooperative and amicable, rather than difficult (attributed to low innovativeness in the Neumann et al. (2019) study). Due to the additional autonomy afforded to the innovation partner in West Sacramento, in providing the vehicles and operators in addition to acting as a software provider, the level of innovativeness in this context was classified as "medium-high". In Sacramento, Goiânia and Fortaleza, the level of innovativeness was classified as "medium".

A summary of results of the Neumann et al. (2019) analysis was compiled in the tables below:

Table 5. Summary of results from analysis of Neumann et al. (2019) dimensions - innovation partner perspective

Perspective	Variables	Sacramento	West Sacramento	Goiânia	Fortaleza
Innovation Partner	Identification with city	Low	Low	Low	Low
	Trust by citizens	Uncertain	Uncertain	Uncertain	Uncertain
	Pressure to innovate	Medium	Medium	Medium	Medium
	Innovation department	None - N/A	None - N/A	None - N/A	None - N/A
	Key innovation actors	Limited	Limited	Limited	Limited
	Business agility	Medium	High	Medium	Medium
	Error management culture	Strong	Strong	Strong	Strong

Table 6. Summary of results from analysis of Neumann et al. (2019) dimensions - public transportation operator perspective

Public transportation operator	Provider of smart cities solutions	Yes	Yes	Yes	Yes
	Type of assignment mandate	Service contract	Service contract	Service contract	Service contract
	Innovation mandate	Specific	Specific	Specific	Specific
	Dependence on political processes	High	High	Medium-Low	Medium-Low
	Key actor for interaction with innovation partner	Director, Community and Contract Bus Services - questionable relevance	Senior Transportation Planner - questionable relevance	Head of Strategy and Innovation - questionable relevance	President - questionable relevance

	Service delivery regulation (fares, accessibility, etc.)	High	High	High	High
	Communication between public transportation operator and innovation partner	Established	Established, but lower relevance due to innovation partner autonomy	Established	Established
	Common understanding of innovation	High	High	High	High
	Alignment of strategies and structures	High	High	High	High
	Level of agency relationship characteristics	Medium	Medium-Low	Medium	Medium
	Level of stewardship relationship characteristics	Medium	Medium-High	Medium	Medium

Table 7. Summary of results from analysis of Neumann et al. (2019) dimensions - innovation related outcomes

		Sacramento	**West Sacramento**	**Goiânia**	**Fortaleza**
Innovation related outcomes	Type of value creation	Business and public	Business and public	Mainly business	Mainly business
	Level of innovativeness	Medium	Medium-High	Medium	Medium

The researcher also compiled practical results of this study, so as to provide relevant information for practitioners interested in the potential of microtransit projects sponsored by public transportation operators.

6.6 Best Practices

Through insights obtained in this research, we were also able to identify two best practices for public transportation operators that operate or are exploring the possibility of operating microtransit programs, assisted by innovation partners.

6.6.1 Prioritize incremental innovation approaches and experimentation

The role of testing and experimenting in order to continuously improve the service offering emerged as a critical factor apparent to the early popularity of the microtransit initiatives examined in this study. This exploration includes with regard to payment methods (credit cards, debit cards, regular fare methods for conventional transportation, service areas (data-informed expansions and minor changes) and elements of the service aimed at increasing user satisfaction such as the individual USB ports. Just as the transition from the jitneys of the early 20th century to technology-enhanced on-demand microtransit today could be seen as a form of incremental innovation, building on components rather than architecture or systems, these microtransit initiatives have been shown in their early stages to involve these component changes in response to feedback from users. Mechanisms for feedback that include both customer-oriented and citizen-oriented responses seem to be crucial to the projects' efficacy.

6.6.2 Maintain the focus on citizens, rather than specifically "users"

Though it may be tempting to jump hastily to assess microtransit initiatives based on their financial performance and logistical viability, it is important for public administrations, as purported stewards of public funds and public interests, to emphasize providing effective, quality of life-enhancing solutions for citizen users of the implemented services, that transcend traditional cost-benefit analysis. Giving specific attention to the four microtransit pilot projects explored in this study, we observe that some projects may achieve this objective more easily than others, but not necessarily for a lack of willingness. In the initial phases of these projects, it is recommended to devote more attention to non-financial value to be extracted from them, to create services that are optimally tailored to citizens' needs and expressed desires, in terms of characteristics of the service and how it is delivered. In order to provide a valuable service to citizens that are unwilling or unable to use a smartphone to interact with the

service, for example, the Brazilian projects could implement a real-time call center. They could also focus on ways to truly integrate fare payment of the service with conventional public transportation modes or reduce reliance on distance-based fares to sustain the operating model. Also, they could operationalize ways to make the service more accessible to people with disabilities and seniors, given that the microtransit vehicles are not currently wheelchair accessible. In addition to building more trust with the ridership, this approach could lead towards the enhanced ability of the transportation service provider to obtain alternative forms of funding to maintain and expand service levels.

It is hoped that the contribution of both theoretical underpinnings for the study of microtransit in the context of public value, and practical learnings for public transportation operators exploring the idea of incorporating microtransit into their transportation systems, provides valuable insight and helps to demystify some of the theoretical and practical implications of both public value and microtransit.

7. Conclusion

The present study aimed to address the question of to what extent, and in which ways, public value can be generated through microtransit initiatives involving collaboration between conventional public transportation operators and a private sector innovation partner. Also, it attempted to identify contextual elements that could impact public value creation in the US and in Brazil. The following section will explore key findings, contributions, limitations and opportunities for future research.

7.1. Key findings

Through an analysis of several models of public value, such as Moore's Strategic Triangle (1995), Harrison et al. (2012) and Meynhardt (2015) we identified specific aspects of public value present in the microtransit pilot projects examined in this study.

For Moore (1995), we identified high levels of legitimacy and support for all four projects, albeit more indirectly for the Brazilian projects due to the lack of direct involvement of the public administration. We noted moderate, immediate operational capacity in the US projects due to dedicated external funding mechanisms available to them, but moderate-low operational capacity in the Brazilian projects due to the lack of subsidy for public

transportation, attributed to the fundamental rationale behind these microtransit projects, to address a business challenge of higher-value passengers leaving the conventional public transportation system. Therefore, we suggest that, according to Moore, all four projects could be seen to create some public value, with a caveat stemming from the notion that the legitimacy and support of the Brazilian projects is indirect, and the US projects creating a comparatively higher degree of public value according to these criteria.

For Harrison et al. (2012), we identified the presence of "financial", "political" and "social" value in Sacramento and West Sacramento's microtransit pilot projects, and partial applicability of the "strategic", "ideological" and "stewardship" dimensions of the model. In Goiânia and Fortaleza, we identified limited applicability of the model to assess the Brazilian context since these dimensions were conceived to describe the impact of government actions. As has been reinforced throughout this research, the Brazilian microtransit initiatives cannot be said to be government actions, as their sponsors are private companies that have some autonomy to innovate without specific public sector authorization.

For Meynhardt (2015), we identified examples of utilitarian-instrumental, political-social, and hedonistic-aesthetic elements of public value in all four contexts, showing that even in the Brazilian context, where it is assumed that the public transportation operators strive to create primarily business value like any other company (Moore, 1995), they still manage to create public value as well.

When viewed through the lens of the Neumann et al. (2019) model, based on the current configurations of all four microtransit initiatives as service contract relationships, with consequently high levels of "mandate and control" in terms of the specific assignment mandates and limited innovation mandates, the relationships involve agency characteristics. However, at the same time, it was found that the service contract between the public transportation operators and the innovation partner facilitates a common understanding of innovation, communication, and alignment of strategy between the parties, characteristics that would be more in line with stewardship relationships. Moreover, examples of public value were identified, according to Meynhardt (2015) elements in all four projects. Given the focus of the Brazilian initiatives on addressing business problems, including the gradual abandonment of public transportation in conjunction with the emergence of private ridesharing companies and the emphasis on customer service and needs as a means of recapturing users, these collaborative innovations may generate mostly business value, with public value figuring as a byproduct or afterthought. The Brazilian public transportation operators must innovate and reimagine their service offering in order to stay financially

relevant, and the advent of CityBus 2.0 and TopBus+ demonstrates that imperative. Creating a financially self-sustaining model may imply sacrificing some measures more geared towards public value in favor of business value.

However, this is not to say that public transportation operators in the US cases examined in this study do not confront a similar innovation imperative. The reasoning behind the urgency may be a distinguishing factor - in the Brazilian projects, the need to innovate seems to stem more from financial pressure on the private companies that operate the microtransit projects, while in the US projects, the urgency appears to originate in factors such as responding to voiced community needs for greater mobility options given the contexts of the cities of West Sacramento and Sacramento, as a form of direct public accountability.

7.2 Contributions

The present study has made several contributions to further the research of public value creation through collaborative innovation. First, through the selection of cases we identified several critical aspects of context that appear to impact the ability of public transportation operators to effectively create public value through their on-demand microtransit initiatives. These aspects include the forms of payment and ways to access the services, the pricing structures of these systems, and the difference in delivery model between the US and Brazil for public transportation - directly by the public sector in the US, and through a public concession with a private company intermediary in Brazil.

Also, this research reinforces incremental innovation approaches, including trial and error to increase the likelihood of widespread acceptance of new resources and technologies, and boost citizen-centricity, rather than innovating for the sake of technology. Public administrations must account for a wide array of citizen needs and wants, and varying degrees of capacity to engage with smart infrastructure. Depending on factors such as age, socioeconomic status and technology (especially smartphone) access, citizens may face difficulty in actually taking advantage of ICT-enhanced services. For this reason, the incorporation of ample experimentation and feedback, evidently crucial to the functioning and continuous improvement of the services provided by the projects examined in this study, must be preserved.

Finally, this research contributes an adaptation of the model proposed by Neumann et al. (2019) and concluded that, as suggested by part of Proposition 2 of Neumann et al. (2019),

hybrid agency and stewardship relationships can still lead to successful partnerships (Huang, Baptista & Newell, 2015; Sundaramurthy & Lewis, 2003). However, as the case of West Sacramento showed, a marginally lesser degree of "mandate and control" governing the relationship between the principal and the innovation partner, does not necessarily result in a lack of common understanding of the objectives of the collaborative innovation. This understanding is more closely attributed to a limited innovation mandate, a specific assignment mandate and established communication, stipulated through service contracts, clearly delimiting the roles and responsibilities of both the public transportation operators and the innovation partners in the microtransit initiatives.

Lastly, the study brings inputs on public value creation through collaborative innovation involving both public-private collaborations, in the US microtransit initiatives, and private-private collaborations, in the Brazilian microtransit initiatives.

7.3 Limitations

This study has several key limitations. For one, due to inadequate data inputs, only 3 of 5 elements of public value (utilitarian-instrumental, political-social and hedonistic-aesthetic, and not financial-economic or moral-ethical) according to Meynhardt (2015) were assessed, while all 6 categories of Harrison et al. (2012), the Strategic Triangle model (Moore, 1995) and the adaptation of the Neumann et al. (2019) model were analyzed to evaluate the public value creation potential of microtransit pilot projects involving collaboration between actors. Many other elements that have been used to describe the concept of public value and how to identify it could be explored by analyzing the same or different projects, depending on the objectives of the researcher's study. In this research, we aimed to establish connections between academic discussions of public value and the phenomenon of microtransit as conceived through collaborative innovation between conventional public transportation operators and innovation partners, a novel approach with relevant theoretical and practical implications. For the purposes of this study, it was deemed unnecessary to include inputs for all 5 dimensions of Meynhardt (2015), due to the study's objective to identify elements of public value in these microtransit initiatives.

Moreover, due to the lack of previous studies of microtransit through the theoretical lens of public value, the researcher's approach depended heavily on existing frameworks and models, and explored descriptive (rather than normative) characteristics of public value to

generate dimensions of analysis. Future academic studies of public value in microtransit could focus on creating new theoretical models to conceptualize the interactions, rather than examining the suitability of existing models and characteristics to describe them, especially given the Brazilian context wherein the collaboration occurs between two private entities.

Another limitation of the study involved the data collection methods. The questions that were asked in the interviews with representatives from the public transportation operator and the innovation partner yielded limited inputs with which it was possible to address the dimensions of analysis and therefore attempt to validate the public value frameworks analyzed in this study. The result of this incompleteness was substantial reliance on secondary source data to fill in gaps, admittedly a highly time-intensive endeavor given the time constraints involved in developing research based on four different contexts. The researcher recognizes that this limitation may have been avoided with closer attention to the precise objectives of the data collection methods earlier in the research process.

Finally, the researcher intended to study four different microtransit projects as a means of extracting more valuable insights and highlighting significant differences between them in the dimensions of analysis. However, we found that the most significant differences, from a contextual perspective, were particularities in service delivery and operating environment between the US and Brazil, especially regarding funding mechanisms available to the public transportation providers responsible for the microtransit initiatives, and location-specific regulation. The West Sacramento context provided unique insight in that it was the project in which the innovation partner can be said to have the greatest degree of autonomy, in providing a turnkey mobility solution for the city. The inclusion of four projects for in-depth study, rather than two (for example), likely impacted the overall depth of the analysis, without necessarily adding significantly greater insight other than the *possibility* of generalizing the results to other microtransit projects in other settings. However, it is recognized that owing to the "convenience" (Patton, 1990, pp. 182-183) strategy deployed to select microtransit initiatives for closer review, this study does not affirm it has reached generalizable results (Bornstein et al., 2017). For that reason, in order to draw definitive conclusions on the public value creation potential of microtransit through collaborative innovation, more examples, such as those compiled in the list in **Appendix D**, would need to be analyzed according to the same dimensions as this study.

7.4 Opportunities for Future Research

Throughout the course of this research process, the researcher reflected upon other areas of interest that could contribute additional academic breadth related to the themes of this study. Particularly through the lens of public value, there are multiple directions that future research could take, based on the information compiled in this paper.

One opportunity for future research addresses the implications of the public concession model in Brazil on public value creation, surveying different examples, or creating case studies, to assess whether the idea of limited public value creation potential can be generalized to other areas of public services that are provided through concessions rather than directly by local government entities, such as roads, energy (primarily gas and electricity) and waste management. This would be an extension of the literature on public value creation through public-private partnerships as forwarded by Reynaers & de Graaf (2014), Greve (2015), Mendel & Brudney (2014), Villani (2017) and others, adapted to the Brazilian context. In addition to assisting in the advancement of public value creation theory as it relates to collaborative innovations such as PPPs, this research could contribute broad-based policy recommendations for the future provisioning of public services in Brazil.

Also, a future study could revisit the same microtransit projects at a different point in time, once they are more established and the relationship between the public transportation operators and the innovation partner is more consolidated, to validate the idea forwarded by Van Syke (2006) that agency relationships tend to evolve into stewardship relationships over time, as trust is built and, consequently, mandates and controls are loosened. This research presents evidence that the projects in all four cities examined already generate some measure of public value, depending on the dimensions of analysis. However, time will dictate the ultimate role of the innovation partner in these projects, especially regarding whether, in collaboration with conventional public transportation operators, they manage to generate more public value than business value. Finally, whether or not there is more widespread adoption of subsidy in public transportation in Brazil could dictate the extent to which operators are able to shift their focus from business value creation to devise more citizen-centric, public value-generating results.

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APPENDIX A - Semi-structured interview guide for innovation partner

I. The Interviewee

a. What is your role in this company?

II. City Identification

a. How were/are cities chosen by Via for these public microtransit pilot projects? What characteristics do you look for?
b. What kinds of studies or analyses do you conduct to understand the local context before getting actively involved in a project?
c. Would you say you "identify" with the cities you eventually choose for these projects, or is the approach more experimental and non-partial?

III. Trust of the citizens

a. In the initial stages of your involvement in new projects, do you reach out to the local community, whether to gather data on potential ridership or to survey people on the needs or desires of the population in terms of mobility?
b. How do you use user feedback, whether feedback that is sent directly to Via through its channels, or through the review mechanisms on the pilot projects' apps on social media and in the App Store/Play Store, for example?
c. Are there any special considerations you make when it comes to accessibility, democratizing the service, and eliminating barriers to use for the elderly, minorities and people with disabilities (for example)?

IV. Urgency to innovate

a. Who do you see as your major competitors in this space?
b. Especially with regard to your projects in which you have partnered with public transit agencies or local governments, what have been your biggest challenges?
c. What do you see as your company's major competitive advantages and what are you doing to preserve them?

V. Speed of Service Delivery

a. In light of quickly shifting demands in mobility, what tools do you have at your disposal to collect data and use it quickly to optimize your services? When one of your projects changes its service area, for example, what role does your company have in informing those decisions?
b. There is increasing discussion about managing demand for public services, in real time. How do you see these microtransit pilot projects in the context of managing demand for public transportation, for example?

VI. Iterative Culture/Error Management

a. To what extent does your company experiment with these microtransit projects? Do you feel like the lessons learned from one project are easily applicable to other projects?
b. Are the differences in your project design and delivery mainly context based, functionality based, or something else?
c. Is there ample participation by the public sector in designing these projects, tailoring them based on citizen needs?

VII. Public Value

a. When you think of "the public", what comes to mind? Who is the "public"?
b. What non-financial value are you providing to your public sector partners in the projects in question?
c. Examples of dimensions of public value: **outcome achievement** (social, economic, environmental, cultural), **trust and legitimacy** (Moore's "authorizing environment), **service delivery quality** (client satisfaction, responsiveness, citizen engagement, accessibility, convenience), **efficiency** (value for money, minimize bureaucracy, benefits outweigh costs)
    1. What social, economic, environmental or cultural outcomes have you seen with this project and are you hoping to see in the future?
    2. What about in terms of service delivery quality?
    3. What about in terms of efficiency (value for money, low bureaucracy, benefits outweigh costs, etc.) from the point of view of the users of the microtransit service?

VIII. Conclude/Thank the Interviewee

APPENDIX B - Semi-structured interview guide for public transportation operators

I. Smart City

a. Do you see your organization as a provider/enabler of smart cities solutions? What is your understanding of the concept of "smartness"?
b. What strategies does your organization use to enhance "smartness" in the finished project? Technology, personnel, infrastructure, data collection, etc.
c. How do you assess this particular category of smart city initiative (microtransit) in the larger context of other smart cities initiatives currently in place or being developed in your city?

II. Expectation of Innovation

a. Do you think that users of the service see the projects as innovative, or are they similar to TNCs?
b. What do you expect to learn from these microtransit projects?
c. Clearly, the idea of publicly-sponsored on-demand transportation is unique, but do you see any limitations in this configuration when it comes to access to services that are designed to be for the "public"?

III. Consensus of "Innovation"

a. Can you please talk about what is innovative about this microtransit project?
b. How are you managing the pace of innovation of these projects (i.e. incremental or disruptive) and do you think users and potential users are "keeping up" with the changes?
c. Would you say there is "urgency" to innovate in this area (creating "smart" mobility)
d. Do you see room for innovation in other kinds of publicly-oriented services towards an on-demand model? How would you make the case for these projects, especially when it comes to preserving access to disadvantaged groups?

IV. Information exchange between public transportation operator and innovation partner

a. To what extent do you share information (about ridership data, for example) with the mobility company partner?
b. What valuable insights have you been able to obtain from the mobility company partner's data collection? Are there specific areas in which you might be able to improve based on these insights?

V. Extent of Alignment of Strategy

a. When you began this microtransit project, after finalizing your contract with the mobility company, you had specific strategic initiatives in mind. How has Via helped to forward those initiatives?

b. Despite the short time this project has been in operation, what is your assessment of the results so far?

VI. Service Delivery Regulation (specifically with regard to fares, accessibility, etc.)

a. What kinds of rules or regulations do you impose on the mobility company partner, so that the service avoids becoming "just another Uber"?
b. Do you believe that the mobility company partner is generally on-board with this kind of regulation, or have you experienced pushback?

VII. Public Value Creation

a. When you think of "the public", what comes to mind? Who is the "public"?
b. What non-financial value are you providing to your stakeholders (citizen users of services) with this project?
c. Examples of dimensions of public value: **outcome achievement** (social, economic, environmental, cultural), **trust and legitimacy** (Moore's "authorizing environment), **service delivery quality** (client satisfaction, responsiveness, citizen engagement, accessibility, convenience), **efficiency** (value for money, minimize bureaucracy, benefits outweigh costs)

VIII. Conclude/Thank the Interviewee

APPENDIX C - Service Area Maps of Selected Microtransit Pilot Projects

Figure 5. Service area of Citrus Heights-Antelope-Orangevale Zone, SmaRT Ride, Sacramento, USA

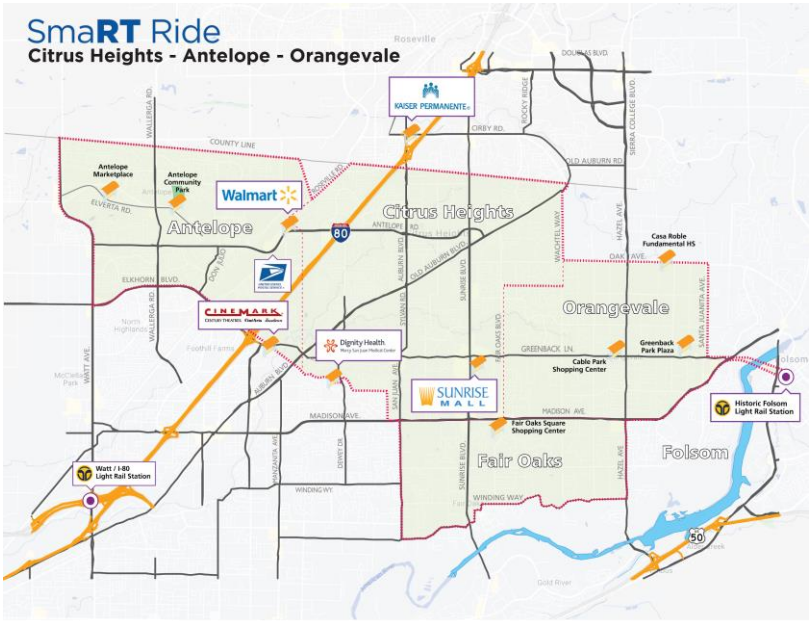


Figure 6. Service area of Arden-Arcade Zone, SmaRT Ride, Sacramento, USA

Figure 7. Service area of Arden-Arcade Zone, SmaRT Ride, Sacramento, USA

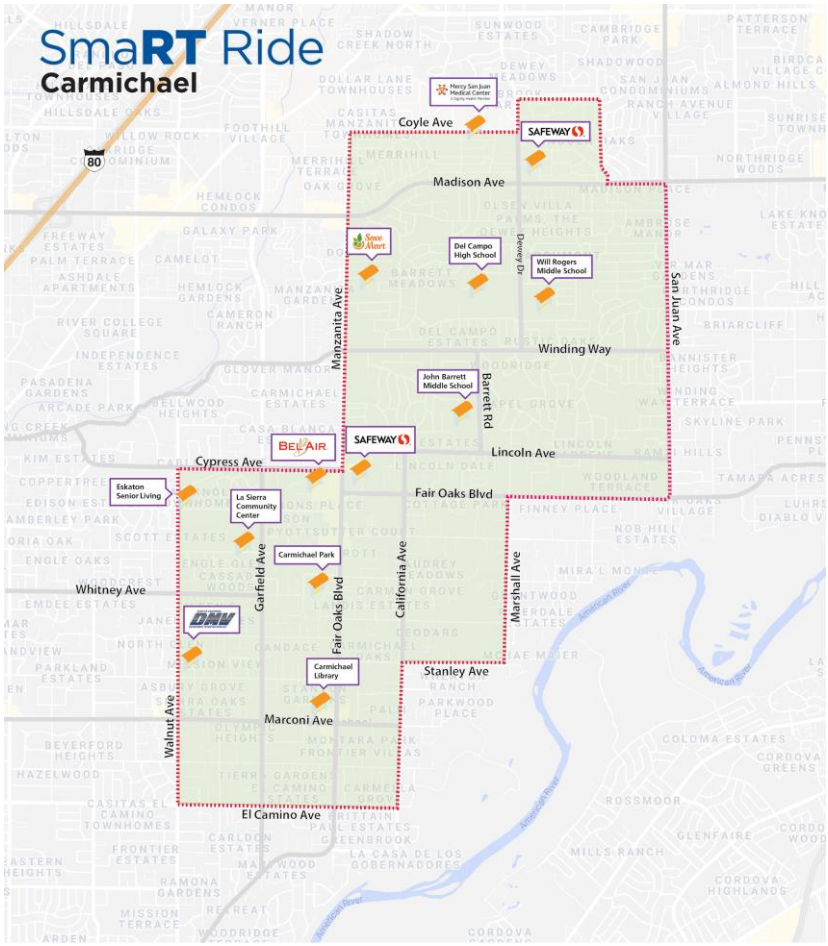


Figure 8. Service area of Downtown-Midtown-East Sacramento Zone, SmaRT Ride, Sacramento, USA

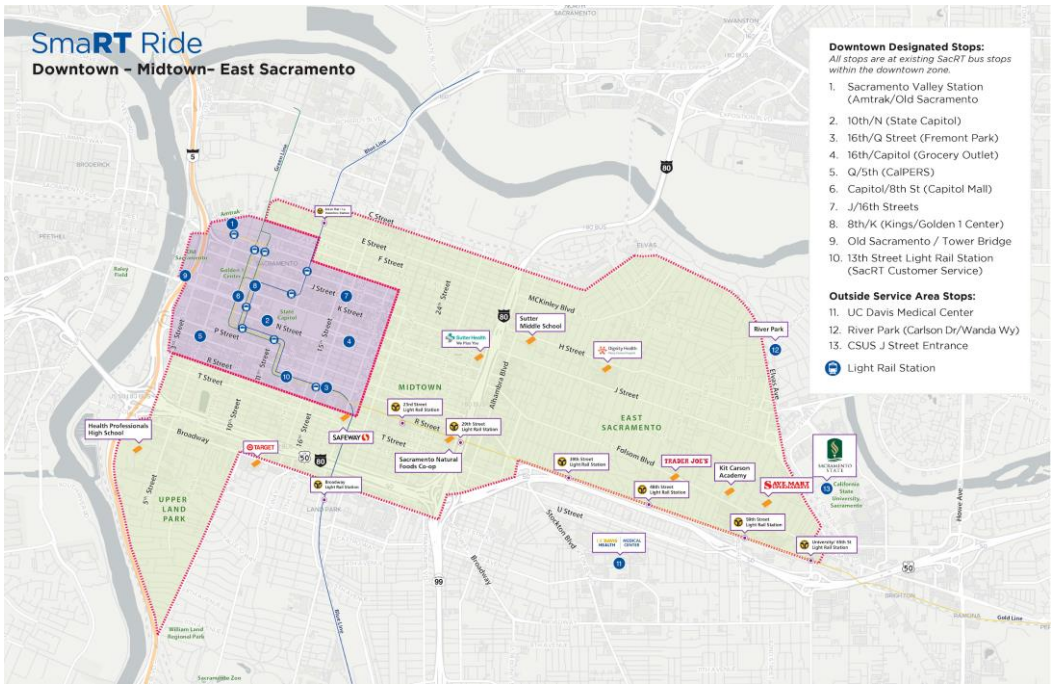


Figure 9. Service area of Folsom Zone, SmaRT Ride, Sacramento, USA

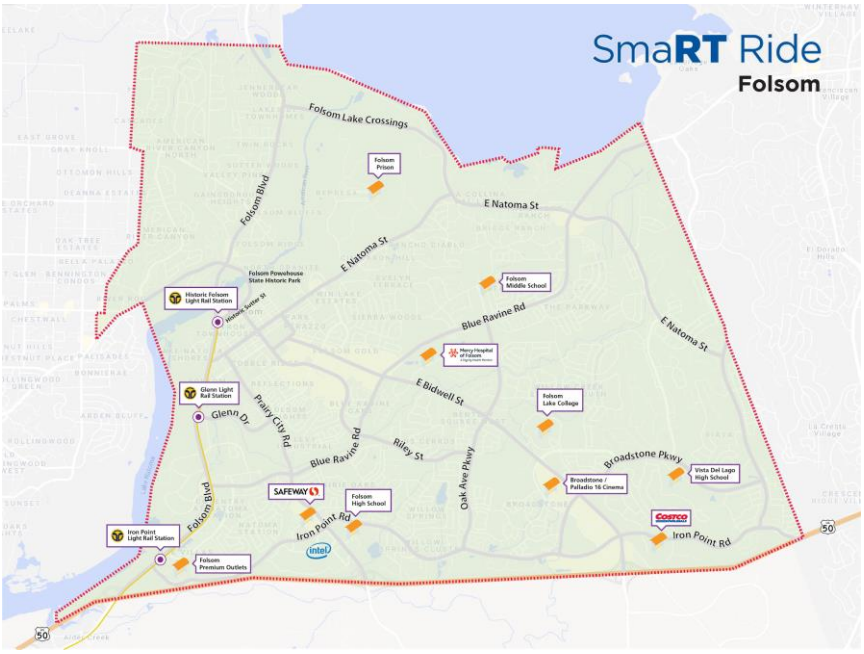


Figure 10. Service area of Franklin-South Sacramento Zone, SmaRT Ride, Sacramento, USA

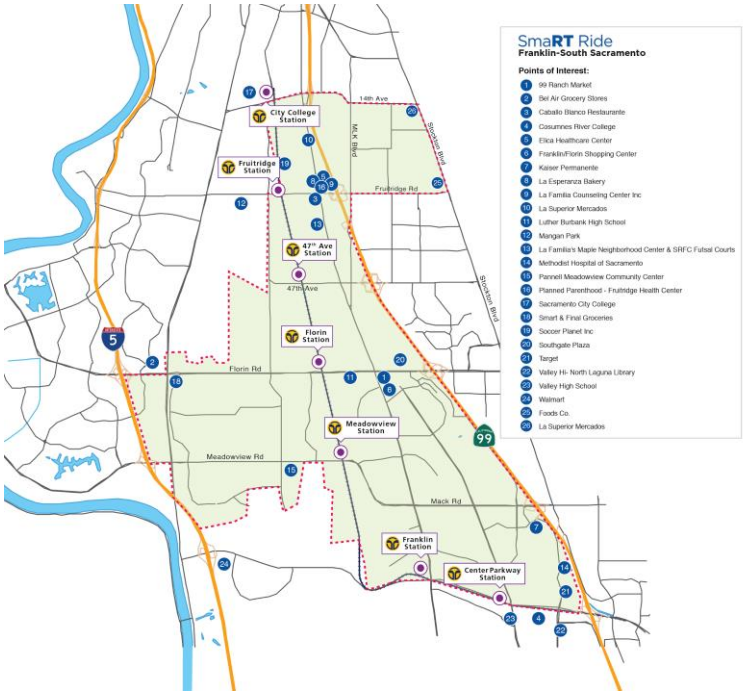


Figure 11. Service area of Gerber-Calvine Zone, SmaRT Ride, Sacramento, USA

Figure 12. Service area of North Sacramento Zone, SmaRT Ride, Sacramento, USA

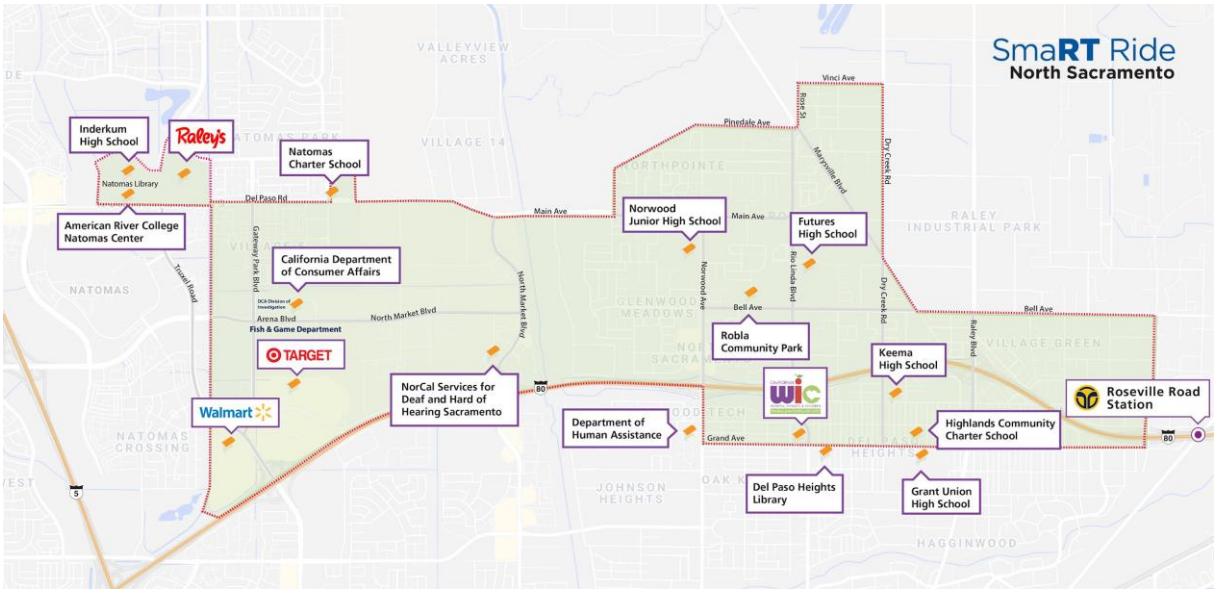


Figure 13. Service area of Rancho Cordova Zone, SmaRT Ride, Sacramento, USA

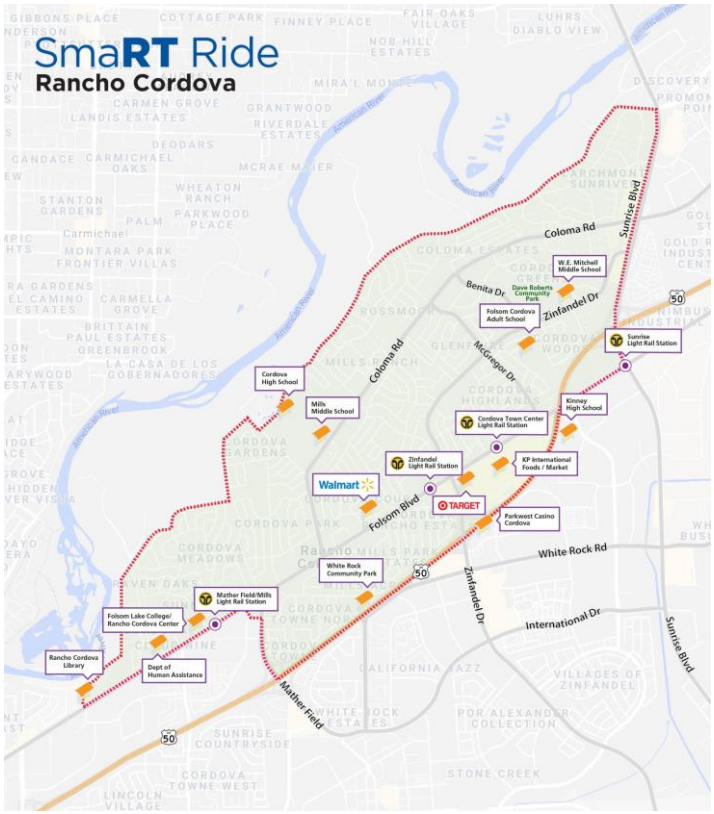


Figure 14. Service area of Rancho Cordova Zone, SmaRT Ride, Sacramento, USA

Figure 15. Service area of CityBus 2.0, Goiânia, Brazil

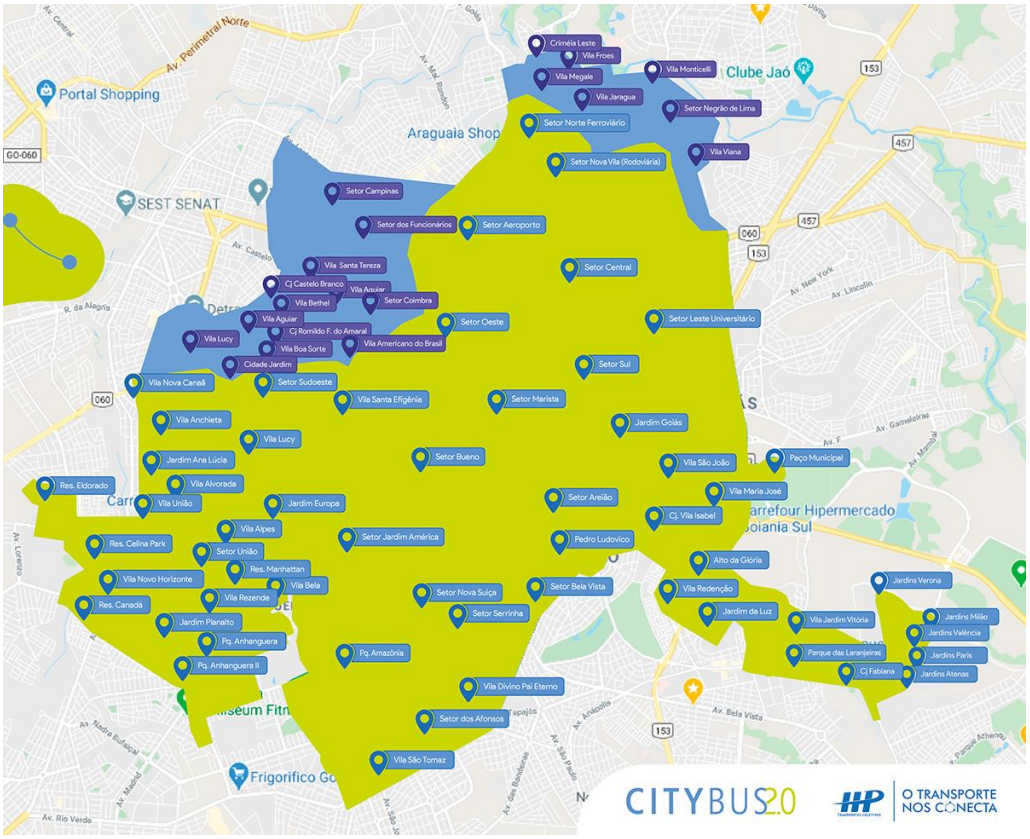
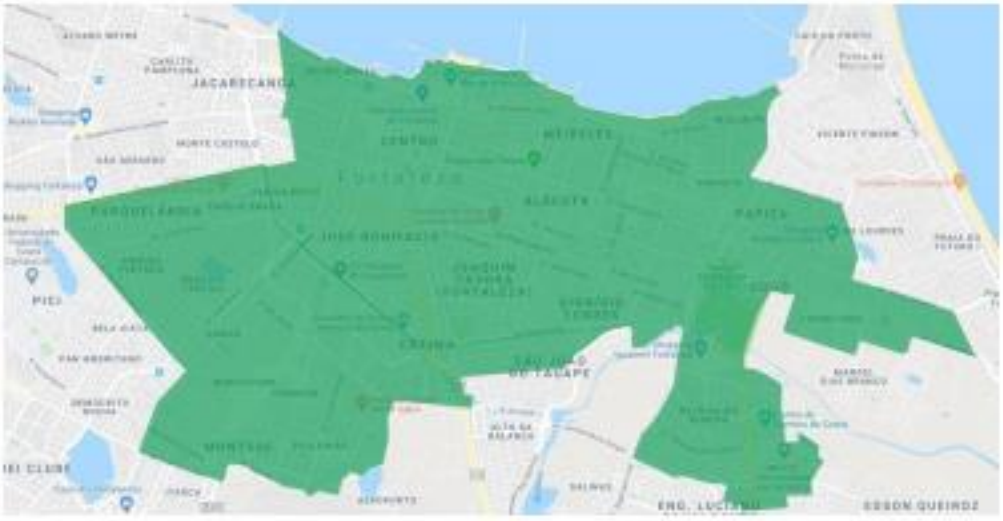


Figure 16. Service area of TopBus+, Fortaleza, Brazil



APPENDIX D - Sample of active “public” microtransit projects as of January 2021

Table 8. Sample of active "public" microtransit pilot projects (January 2021)

Location	Public Transportation Operator	Private Company	When Started
Quad Cities, USA	MetroLink	TransLoc	2017
Sacramento, USA	Sacramento Regional Transit District	Via	2018
West Sacramento, USA	City of West Sacramento, California	Via	2018
Berlin, Germany	Berliner Verkehrsbetrieben	Via	2018
Plymouth, USA	Plymouth Metrolink	TransLoc	2018
Orange County, USA	Orange County Transportation Authority	Via	2018
Milton Keynes, UK	City of Milton Keynes, UK	Via	2018
Salt Lake City, USA	Utah Transit Authority	Via	2019
California Delta, USA	Tri Delta Transit	TransLoc	2019
Austin, USA	Capital Metro	Via	2019
Sutton (London), UK	Transport for London	Via	2019
Fortaleza, Brazil	Sindiônibus	Via	2019
Goiânia, Brazil	HP Transportes	Via	2019
Columbus, USA	Central Ohio Transit Authority	Via	2019
Kansas City, USA	Kansas City Area Transportation Authority	TransLoc	2019
Chicago, USA	Chicago Transit Authority	Via	2019
Washington, DC, USA	Washington Metropolitan Area Transit Authority	Via	2019
Sault Ste. Marie, Canada	Sault Ste. Marie Transit Services	Via	2019
Grand Rapids, USA	The Rapid	Via	2019
Gwinnett County, USA	Snellville, Georgia (Gwinnett County)	TransLoc	2019
Aparecida de Goiânia, Brazil	HP Transportes	Via	2020
Los Angeles, USA	Los Angeles Metro	RideCo	2020
Wilson, USA	City of Wilson, North Carolina	Via	2020
Guelph, Canada	Guelph Transit	RideCo	2020
Tucson, USA	Sun Tran	NA	2020
Houston, USA	Metropolitan Transit Authority	RideCo	2020
Seattle, USA	King County Metro	Via	2020
Denton County, USA	Denton County Transportation Authority	Spare	2020
Albany, USA	Capital District Transportation Authority	TransLoc	2020
St. Louis, USA	Metro Transit	Via	2020
Westborough, USA	Worcester Regional Transit Authority	Via	2020

Sources: Via, TransLoc, RideCo, Spare and Sun Tran