

## Article

# Back to the Future: “De-Transition” to Low-Car Cities

Chloé Taillandier <sup>1,\*</sup> , Marc Dijk <sup>1</sup>  and Martial Vialleix <sup>2</sup>

<sup>1</sup> Maastricht Sustainability Institute, Maastricht University, 6200 MD Maastricht, The Netherlands; m.dijk@maastrichtuniversity.nl

<sup>2</sup> Paris Region Institute, Université Panthéon Sorbonne, UMR 8504 Géographie-Cités, CEDEX 15, 75740 Paris, France; martial.vialleix@institutparisregion.fr

\* Correspondence: chloe.taillandier@maastrichtuniversity.nl

**Abstract:** Current urban mobility systems in Europe, characterized by high car mobility shares, have negative environmental and health impacts but struggle to mitigate these for fear of sacrificing accessibility. Ironically, before the car mobility transition (in the 1950s and 1960s in Western countries and the 1990s in Eastern Europe), most cities were accessible by walking, cycling, public transport, and by the few cars there were. Through a longitudinal case study of a medium-sized urban area in Clermont-Ferrand, France (1950–2022), this paper explores the potential to ‘de-transition’, i.e., to reverse the urban transition process towards ‘accessible, low-car cities’ by reshaping infrastructures to constrain car use whilst accommodating walking, cycling, and public transport. We answer the following questions: To what extent can cities reverse the urban car mobility transition? How could such a process be further encouraged? Our analysis adopts a social practices perspective and uses a mixed-methods approach by combining semi-structured interviews, a survey, and a document analysis. On the one hand, our findings highlight the difficulty of an urban modality shift to car alternatives: (1) the limited reach of public transformation networks (in Clermont-Ferrand, the tramline); (2) the fact that many feel unsafe or assume they need excellent health conditions to cycle, which is associated with leisure and sports; and (3) strong convictions concerning the usefulness of vehicle ownership, which is believed to maximise comfort. On the other hand, based on a historic analysis, we offer practical recommendations to de-transition to low-car urban areas: (1) the creation of an extensive regional tramway network; (2) the development of a full cycling network; and (3) the promotion of an extensive car-free city centre.

**Keywords:** de-transition; urban mobility; modal shift; social practices; medium-size cities; France



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## 1. Introduction

In European cities, sustainable urban mobility is an important matter of concern for citizens and one of the main challenges facing city governments [1]. After all, mobility plays a role in most economic and social activities, enabling economic growth and societal and human development. At the same time, however, current urban mobility systems consist mainly of privately owned, internal combustion engine (ICE)-powered vehicles, which, through the burning of fossil fuels, account for a substantial portion of emissions. Transport-related greenhouse gas (GHG) emissions, which contribute to climate change, account for  $\frac{1}{4}$  of GHG emissions, of which 70% are directly associated with road mobility in the European Union (EU) [2], and for  $\frac{1}{3}$  of French GHG emissions [3]. Air pollutants such as PM<sub>10</sub>, PM<sub>2.5</sub>, and NO<sub>x</sub> raise health concerns, which, in combination with the risk of accidents, threaten the quality of life of citizens [4]. In principle, cars allow for relatively fast travel from point A to B, but in practice, car drivers are increasingly faced with congestion [5] while most vehicles remain parked for 90% of the time [6]. When trips are mostly made by car, people also tend to be less active. This reduced physical activity (i.e., reduced active mobility by walking and cycling) leads to poorer health conditions (e.g., obesity, depression, etc.). Finally, the price of cars has also excluded a large group of

individuals who cannot afford them [7]. Overall, urban car-based transportation systems are widely considered unsustainable [8,9].

Although various studies have proposed how mobility in future urban areas may look, two major scenarios often emerge. The future “Post Automobile City” seems to be inclined to either a radical “Car-free City” model or a “Sustainable Mobility City”. The latter is a less revolutionary vision that would offer various mobility modes, including some share of (possibly autonomous) cars. It would involve both car-free zones and car-accessible urban areas while also accommodating different mobility modes, including active transportation [10].

With or without such scenarios in mind, urban policymakers in most cities have implemented various policy measures to constrain car use. This includes “push measures”, which constrain car mobility in a direct sense, such as parking tariffs or one-way streets, as well as “pull measures”, which make car alternatives more attractive. Despite these efforts, progress towards sustainable urban mobility has remained weak, mostly because of the fear of sacrificing accessibility. Although a few larger European cities have successfully reduced private car use to some extent, in others, use has grown [1]. Although many cities have developed visions of reduced shares of car mobility, they have not yet fully dropped the car-enabling logic of “predict-and-provide”, i.e., predicting where (car road) congestion issues may arise in the future and adding infrastructural (road) capacity to mitigate them [11].

Ironically, before the car mobility transition (in the 1950s and 1960s in Western countries, and in the 1990s in Eastern Europe), most cities were accessible by walking, cycling, public transport, and by the few cars there were. For example, transition scholars have reconstructed the historical transformation of mobility in the city of Maastricht in the period of 1950–1980 from cycling as the most popular mode of traveling in the 1950s to car driving by the end of the 1970s [12]. In many respects, cities are currently seeking to follow a reversed pathway, which we here label as “de-transition”.

This paper aims to explore the potential to “de-transition”, i.e., to reverse the urban transition process towards “accessible, low-car cities” by reshaping infrastructures to constrain car use whilst accommodating walking, cycling, and public transport. We accomplish this through a longitudinal case study of a medium-sized urban area, Clermont-Ferrand, France (1950–2022). The case of this city is of particular interest because it removed the tramway in the 1950s, and then rebuilt it between 2006 and 2013. Based on an analysis of written sources and oral history interviews with local people who experienced this shift for themselves, this article sheds light on the relationship between the historical transition and the transition-in-the-making, including the key actors and the main drivers. We answer the following questions: To what extent can cities reverse the urban car mobility transition? How could such a process further be encouraged?

This paper is structured as follows. In Section 2, we further introduce the path-dependent characteristics of urban car mobility in the city, as well as the concept of de-transition. After describing our methods in Section 3, we present the detailed results of our analysis of Clermont-Ferrand in Section 4. Section 5 discusses the main lessons learned from this analysis and concludes by answering the research questions (mentioned above).

## 2. Conceptual Framing

### 2.1. Locked into Car-Based Cities?

Although many cities have developed scenarios to reduce the shares of car mobility, urban policymakers continue to struggle to find a good compromise between constraining and enabling car use [11]. Urban mobility policies have not yet fully dropped the car-enabling logic of “predict-and-provide”, i.e., predicting where (car road) congestion issues may arise in the future and adding infrastructural (road) capacity to mitigate them. This is mainly because local businesses and shops are convinced that without good car accessibility, the city centre will shrink commercially [12,13]. They have successfully organized local

associations, which have supported this argument and averted societal and political support to constrain car mobility [14].

The most relevant earlier mobility policy studies presented this struggle as the potential “modal shift”, which refers to a (significant) reduction in the share of private car mobility. In an attempt to mitigate the negative impact of car mobility, policymakers have introduced measures to constrain car use. These can be grouped into two broad categories: “push” and “pull” measures [15,16]. “Pull” strategies aim to increase the supply of high-quality, low-carbon transport modes, such as public transport and active mobility (walking, cycling, etc.), and to extend the supportive infrastructure enabling these modes [17,18]. “Push” strategies, on the other hand, aim to discourage car use by making it more expensive or less convenient, for example, by implementing road pricing and congestion charges or traffic-calming measures [16–18]. It is generally accepted that both “push” and “pull” types of measures are needed to encourage modal shift most effectively [18–20]. In practice, however, this has hardly been implemented, seemingly because of “a lack of societal and political acceptance for such restrictions” [14]. The key question which remains is how sustainable urban mobility can be promoted more effectively.

## 2.2. The Concept of De-Transition

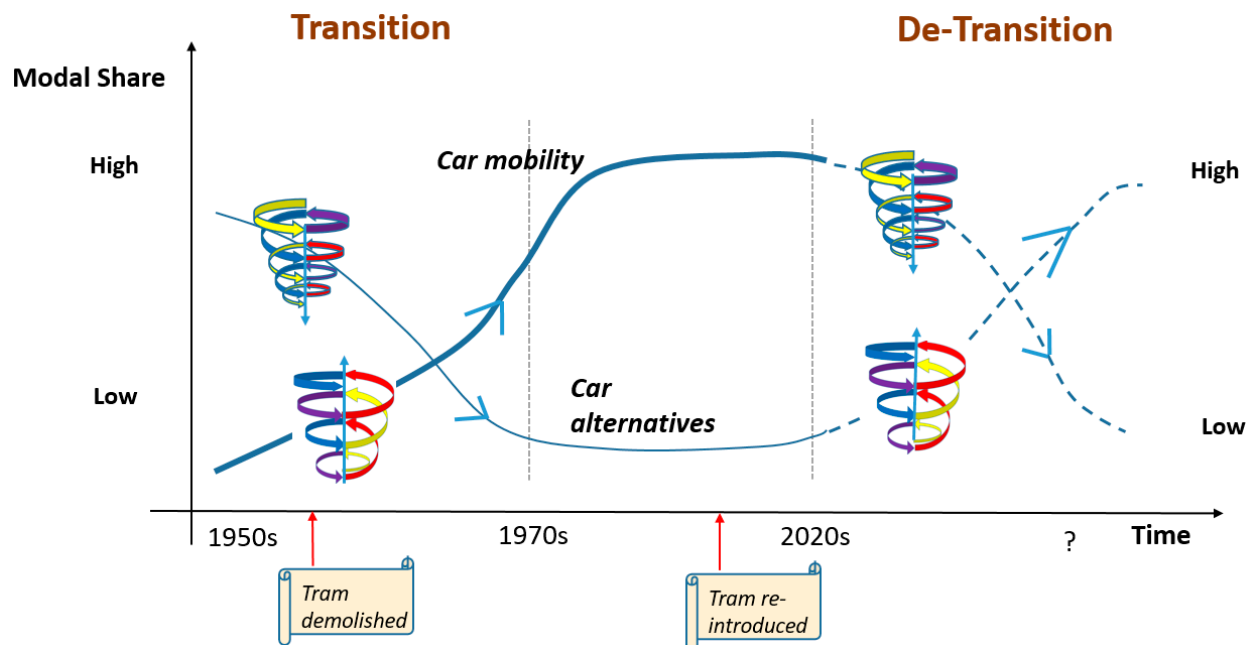
We define sustainable urban mobility transition as the process of reconfiguring urban mobility systems, resulting in a significant reduction in the share of car mobility (being the most unsustainable form of mobility, see [21,22]), whilst ensuring a high but still socially equal level of accessibility. Given the tremendous scale of the sustainable urban mobility transition challenge, it is crucial that policies to achieve this are designed and implemented soon.

Socio-technical transition and urban geography scholars have been paying increasing attention to urban transitions in the past decades [23]. One of the key themes in their dialogue is urban experimentation, which has been seen as an essential seed for more radical changes. Largely as a response to climate change challenges, but also connected to the aim of improving health in cities through healthier environments and promoting socially inclusive cities, urban experiments concerning car-free streets or small, car-free districts have become more popular in the last two decades [24]. Although promising, Bertolini [25] (p. 1) states that, currently, “their potential as triggers of greater systemic change is unclear.” The implementation of car-free areas on a larger scale requires fundamental changes in mobility behaviours, new organizational forms, societal innovation [17,26], and new infrastructure [27]. As Hodson et al. [23] state, in order for experiments to contribute to urban transitions, the focus needs to extend beyond the experimental practices and involve pre-existing infrastructures.

In this respect, the case of Clermont-Ferrand is of particular interest because it removed its tramway in the 1950s, and then rebuilt it between 2006 and 2013. Before the tramway was removed, the city was accessible through trams, buses, walking, cycling, and a limited share of cars. This was before the car mobility transition (1950s–1970s). In many respects, cities are currently seeking to reverse this pathway.

To better understand this development, we have developed the concept of “de-transition”, i.e., to reverse the urban transition process towards “accessible, low-car cities” by reshaping infrastructures to constrain car use whilst accommodating walking, cycling, and public transport. De-transition is a specific form of transition, namely, one that echoes an earlier state of that particular place. An earlier state can help us to imagine or envision what a sustainable state may look like, why it would be attractive (i.e., when comparing it to the current one, it can reveal “what has been lost”), and how the reversal of the steps might take place. The de-transition to a low-car city will not follow exactly the same re-configuration pathway as the historical transition did in a reversed manner. Instead, some new elements will likely be introduced. In the case of low-car cities, this could mean the regulation of car-free streets and possibly new modalities, such as micro-electric mobility, through e-steps and, for instance, Birò. In addition, some historic elements will not return,

such as vehicles only being affordable or accessible to the elite. At the same time, some historical aspects will return, such as street space dedicated to public transport and active mobility as opposed to car mobility. Cycling may be experienced as safe and simple again, and public transportation will become more frequent, convenient, and affordable. Figure 1 illustrates how our analysis seeks to understand constitutive elements and steps in the historic transition and to use these lessons to stimulate the next steps in the de-transition. Our analysis uses a social practices perspective, as explained in the next section.



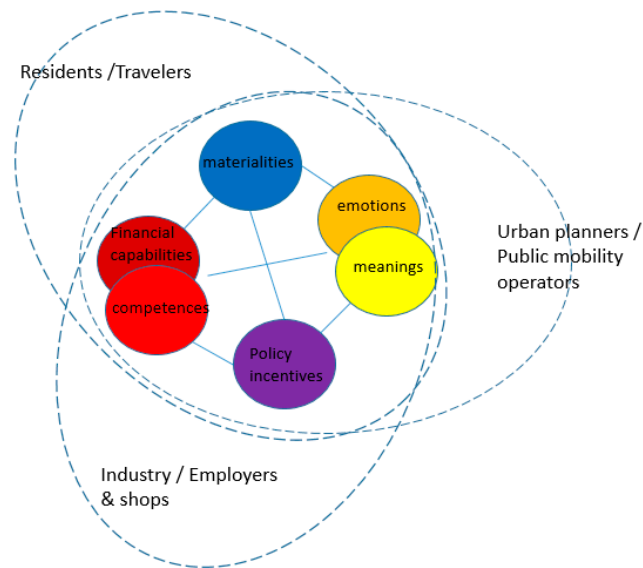
**Figure 1.** The role of constitutive elements in historic mobility transition and de-transition. (As explained in Section 2.3, the coloured arrows refer to changing elements, with blue accounting for materialities, red for competences, yellow for social meanings, and purple for policy incentives).

### 2.3. A Social Practices Perspective

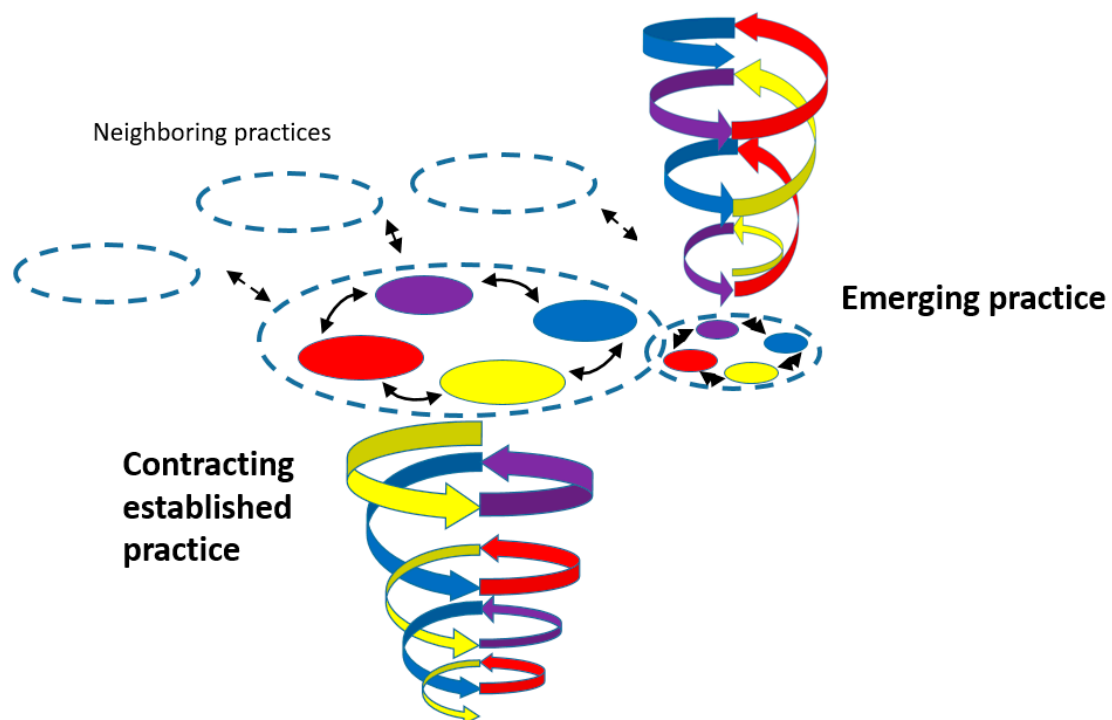
In our analyses, we adopt a social practices (SP) perspective, which is one of the most applied perspectives of socio-technical changes and transitions [28]. The SP framework deconstructs practices by analysing factors and how they relate to one another [29]. One of the SP models, as developed by Shove et al. [30], includes three types of elements (see Figure 2). Material elements are things, technologies, tangible physical entities, and the body itself. Competences are skills, know-how, or techniques regarding the practical and embodied knowledge of how to achieve something. Meanings refer to the symbolism, ideas, norms, understandings, or aspirations that are entwined with a practice [30]. In the conceptualization of a social practice, this research adds one element, namely, policy structures (see Figure 2, in purple). These are defined as (dis)incentives implemented through policies [31]. In addition, similarly to Dijk et al. [31], our analysis distinguishes “emotions” as a sub-category of meanings (to differentiate the affective from the cognitive), and “financial capabilities” as a sub-category of competencies (to differentiate affordability from all sorts of skills and knowledge).

These interdependent elements constitute a practice when being reproduced or transformed. A practice is reproduced when elements and their links are successfully repeated in similar performances. A transformation occurs when new elements or the connections between them emerge, established ones shift, or disappear. In turn, a practice develops, changes, or dissolves. Thus, via reconfigurations between and disruptions in elements, transitions in practices emerge. In addition, because practices are also connected to other practices, it is important to understand not only the constitutive elements of a practice, but also how a specific practice relates to others [30]. Multiple practices overlap, form

hierarchies, or are combined into other practices. In addition to established practices (such as car mobility), there may be emerging practices (such as e-steps or micro-mobility). This concerns not only other mobility practices, but also neighbouring practices such as going to school, leisure, or shopping (see Figure 3). In these so-called bundles, practices are co-dependent, co-constitutive, and co-existing. Therefore, an alteration in one practice might have severe consequences for other practices [32,33]. All in all, an interplay between the circumstances, context, and bundles of practices takes place in everyday life, shaping the conditions and possibilities for change to occur [30,33].



**Figure 2.** An entangled stakeholder practices perspective on urban mobility.



**Figure 3.** Interplays between existing, emerging, and neighbouring practices. (As explained in Section 2.3, the coloured arrows refer to changing elements, with blue accounting for materialities, red for competences, yellow for social meanings, and purple for policy incentives).

The reproduction and replacement of a practice can be perceived as two extremes of a continuum on which incremental or radical change takes place. Therefore, we use the notion of “degree of reconfiguration” [12] (p. 51) to indicate to what extent established practices are potentially influenced by (re-)emerging practices. This degree of reconfiguration (or degree of disruption) is defined as: “the ability [of an emerging practice] to create a major change and interrupt the normal course of a system” [34] (p. 293). In case an emerging practice does expand, but does not affect the established practice, it is considered an “add-on”.

### 3. Methods and Data

This paper describes a longitudinal case study of a medium-sized urban area, Clermont-Ferrand, France, combining the study of a historic transition (1950–2022) with a potential de-transition “in-the-making” (after 2000). The city is located in central France, at the foot of the Limagne fault and a chain of volcanoes, the Puys.

Beyond the city of Clermont-Ferrand itself, our geographic scope includes the 20 towns in its metropolitan urban area (Clermont Auvergne Métropole), because many of the trips involved trips from/to the city and its surroundings. It is particularly interesting to focus on the metropolitan area as a whole, since, in France, only 17.7% of commuting occurs in the centres of metropolitan areas, while 13.9% happens in other municipalities of the metropolitan area and 21.2% in the greater metropolitan area [35]. The use of individual cars in Clermont and its metropolitan area accounts for at least  $\frac{2}{3}$  of the overall daily travels of the inhabitants of the metropolis [36]. Clermont Auvergne Métropole is a medium-sized urban area [37] of slightly under 300,000 inhabitants, among which ~150,000 live in Clermont-Ferrand [38,39].

Given that this paper covers several decades, our access to data differed according to the period, and thus our methods for the first period, the 1950s–1970s, slightly differed from those used for the second period (after 2000). For both periods, we used interviews as our main source, while analyses of reports were conducted to better understand the context of the interview responses. For period 2, we also carried out shorter interviews and a survey, the latter in order to create a larger sample. Due to limited possibilities of accessing travellers from period 1, we did not include these data for that period.

#### 3.1. Interviews and Survey

For period 1, we conducted thirteen semi-structured interviews with people who lived in the urban area during that period. For period 2, fourteen longer semi-structured interviews were carried out. In total, this amounted to 27 interviews (see Table 1).

**Table 1.** Interview details (see Tables A1–A4, Appendix A for more details).

| Who                                                               | Amount and Type                         | Period Concerned | Average Duration |
|-------------------------------------------------------------------|-----------------------------------------|------------------|------------------|
| Travellers, any people aged 75+ who lived in the area in Period 1 | 13 semi-structured interviews           | Period 1         | 57:00 min        |
| Travellers, anyone 18+ who lived in the area past years           | 14 semi-structured interviews           | Period 2         | 57:34 min        |
| Travellers, anyone on street in 2022                              | 23 shorter semi-structured interviews   | Period 2         | 3:25 min         |
| Policymakers                                                      | 2 semi-structured interviews            | Period 2         | 44:18 min        |
| Transportation operator                                           | 1 semi-structured interviews            | Period 2         | -                |
| Driving instructor                                                | 1 unstructured/dialogue-based interview | Period 2         | -                |

For period 1, we called all of the 30 retirement houses in the metropolitan area to ask to contact any people aged 75+ who used to live in the study area. Three of them were willing to organise online or distance interviews with their residents. An additional on-site visit in the metropole was made to interview people face-to-face in two other retirement houses.



For period 2, interviewees were selected through a snowballing process. The only pre-condition for the interview to take place was that the interviewee had to confirm that he/she had been living in the metropolis for the past few years, with a strong preference for people who had already been living there as early as before the re-introduction of the tramway.

In addition to the longer interviews, we conducted 23 shorter interviews for period 2. These were carried out on the streets in Clermont-Ferrand (CF) with people passing by. Four semi- or unstructured interviews were also organised with professionals concerning period 2: two policy professionals, one transport operator (see Appendix B.5 for the interview guide), and one driving instructor.

Long interviews were all separated into two sections: one focussed on the period before and one focussed on that after the removal of the tramway for period 1, and one before and one after the re-introduction of the tramway for period 2. The same questions were used in both sections to obtain a better idea of how constitutive elements of the mobility system were affected by the removal and re-introduction of the tramway. The questions were derived from the elements of our conceptions of the social practices theory, as in Figure 2 (see Appendices B.1 and B.2 for our interview format).

Two formats for the short interviews were used (see Appendices B.3 and B.4). The first was developed to obtain further information on current mobility practices to complement the more longitudinal information from the long interviews. The results from these interviews helped us to inform the development of multiple-choice questions in the survey (especially for emotions and social meaning). The second one was conducted in parallel with the survey to obtain further insight into the current cycling culture and the barriers associated with cycling in metropolitan Clermont-Ferrand, into which the survey did not investigate.

Based on the collected insights from the interviews, for period 2, we developed a survey with the aim of collecting a larger sample of data regarding current mobility practices and people's views about mobility policies. This questionnaire ran from 19 May to 10 June, and people were invited openly online (on LinkedIn and Facebook). This delivered 91 responses, which were fairly well-spread across the region. The questionnaire included both multiple choice questions and open-ended questions. The open-ended questions were instrumental to obtaining open suggestions from the public on ways to encourage sustainable mobility.

### 3.2. Interview and Survey Analysis

Due to the low quality of the recordings, transcribing software could not be used, and all 27 long interviews were transcribed by hand. Software-tool Atlas.ti 22.1.3 was applied to code the interviews systematically. A systematic coding method based on the four elements of the theoretical framework was used. Finally, to better understand the context of the responses about practices, the interpretation responses was supported by a document analysis (see list of written sources in Table A5, Appendix C). We searched for the official municipal and mobility corporation documents proactively by accessing the Archives Départementales du Puy-de-Dôme, and we obtained iconographic documents from the Photothèque du Puy-de-Dôme. We searched for reports and letters from the databases of the archives that followed the following terms: "ponts et chaussées", "travaux publics et transports", "routes, voiries et transports routiers", "équipement", and "chemin de fer" in the metropolitan area of Clermont from the early 1930s to the early 1980s. Some reports were also suggested by interviewees. The documents were carefully read through for relevant supporting information (See Table A5, Appendix C). These concerned infrastructure and technology developments, public policy, and public transport modal shares, which served as complementary information to our study and were, therefore, integrated into our analysis.

The survey data were analysed through descriptive statistics by counting answers to the multiple-choice questions. The answers to the open questions were bundled by theme.

## 4. Results

For this paper, elements forming the social practices associated with different means of mobility are colour-coded in the main text. Blue accounts for materialities, red for competences, dark red for financial capabilities, yellow for social meanings, orange for emotions, and purple for policy incentives. Those coloured elements are later summarised through relevant figures, which illustrate the configuration of the different elements.

### 4.1. The Historic, Unsustainable Transition (1950s–1970s)

What was Clermont's low-car mobility system like in the 1950s, and how can we understand the drivers, actors, and patterns of the car mobility transition? Clermont's mobility system in the 1950s was shaped strongly by vast industrial plants of the tire manufacturer Michelin, which had quickly grown in the first half of the 20th century from 52,000 workers in 1900 to 82,000 in 1921. The company had built a range of neighbourhoods specifically for its workforce, with purpose-built houses, schools, hospitals, etc. If not travelling by foot, a large portion of workers went to work by Clermont's electric tramway, which had been introduced in 1890 and touted as a technological breakthrough. The tramway ran a circle through the city centre (train station, Jaude Square), and, in addition, had three legs reaching outer neighbourhoods (Montferrand, Royat, and Beaumont).

#### Tram mobility

Until its removal in 1956, the tramway was seen as a normal means of transportation. It was mostly used by commuters travelling to work (int. (Interview) 23: *the tramway would mostly be used by those that worked*, int. 25, 26, 19: *many would use the tramway to go to work (in Michelin's factories, namely)*). All the interviewees who took the tramway described their feelings for it in the same way: it was (very) pleasant (int. 17, 23, 25, 2, 7, 21). It was also perceived as very convenient (int. 25: *it would save a lot of time [ . . . ] had it not been there, we would have never been able to come home before 12 h and 14 h*, int. 17: *it was convenient*, int. 7: *it was always available, we never had to wait for it*). Sometimes, it was also more poetically described as having its own charm because of the sound of the rails (int. 7). Additionally, several interviewees reported that the tramway was a rather flexible means of transportation, with very frequent timings (int. 17, 22, 23, 6), so that people could simply show up to the stop. Aside from knowing the stations, no specific know-how was associated with using the tram, which everyone described as very easy. Overall, most people considered the tramway to be affordable (int. 6, 23, 2, 25), although larger families may have found the tramway somewhat expensive (int. 26 and 7).

#### Walking and Cycling

Aside from the use of the tramway, people also moved around the city by bike or on foot. This was a time when walking and cycling were considered normal means of transportation to move around. Cycling was described as normal for short distances, so that people who did not live far would often go by bicycle or on foot to their destination, be it school or work (int. 21, 17, 7, 19, 25, 26). Both means of moving around the city were considered useful modes of transportation (int. 6, 23, 22, 21, 17: *we used the bike to go to work*). In addition, cycling was also perceived as the most efficient non-motorised means of transportation (int. 19), and the ease of parking a bicycle facilitated its usage (int. 17, 2). Before the advent of cars, walking and cycling were viewed as convenient and pleasant unless, of course, it was raining (int. 17, 19). Although most perceptions of cycling were positive, cycling was sometimes associated with danger. People themselves did not necessarily perceive their trips to be dangerous as far as road sharing and the limited traffic, but the interviews revealed that tramway tracks were seen as unsafe by those on bicycles (int. 17: *I was less concerned by cars, because there were fewer, than by the tramway tracks*). Several interviewees, indeed, pointed to recurrent bike accidents on the tracks (int. 23: *I witnessed many people fall on the tracks*; 19: *I crashed more than once on the tracks*; 17, 7). Ryat [40] also emphasised that rails were real traps for cyclists and that deadly accidents happened because of the tracks. It is safe to conclude that many people found the tracks generally dangerous and were fearful of crossing them.



Another aspect of walking and cycling to consider is the cost of these modes of movement. Although the initial cost of purchasing a bicycle was high, almost all families had bikes, so it was very common to own one (int. 25: *bikes were expensive*, 19: *bikes were not so affordable, but it was the only thing I could afford*). As for walking, which is not usually associated with any costs, the question here is how to determine whether people were walking only because it was affordable. In fact, the collected data show that financial capacity did not necessarily define the choice of mobility. Rather, people chose to walk because it was perceived as normal and even *pleasant* for short distances (int. 7, 20, 19), albeit inconvenient for long distances (int. 23). In that respect, it was similar to cycling: something one did for *pleasure* (int. 7, 20, 19) or because it conferred a feeling of *freedom* (int. 4: *we could go wherever we wanted, we were free*). Finally, while cycling and walking might have *required certain physical and health conditions*, every interviewee agreed that both modes of transportation were very accessible, with the only reported difficulty being the strenuousness of walking long distances, and although cyclists needed to share the same infrastructure as the tramway, they did not necessarily need to be expert riders due to the limited traffic of the time.

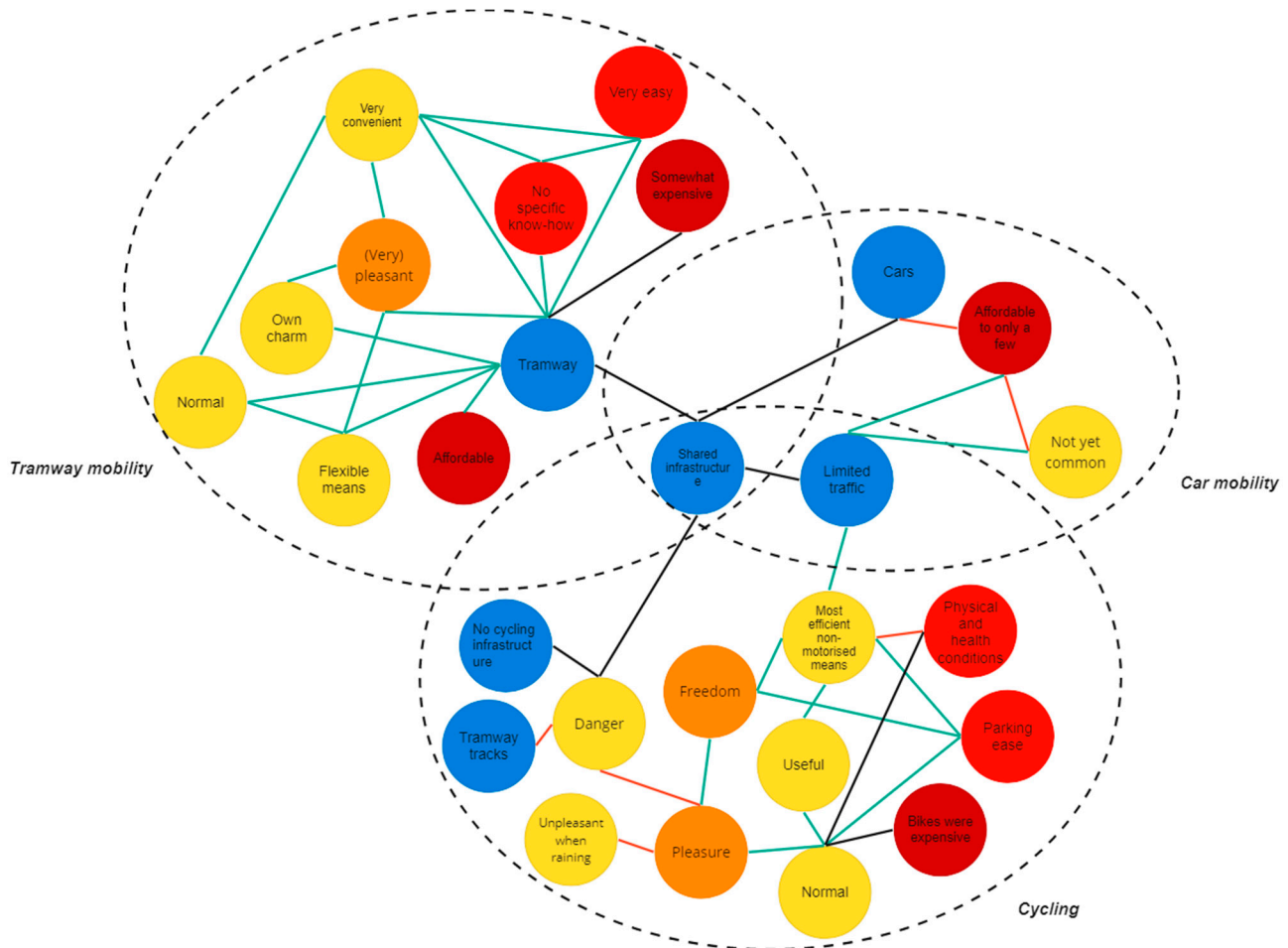
#### Car mobility

In the early 1950s, *cars*, which were expensive at first and *affordable to only a few people* with higher incomes (int. 2, 7), were *not yet in common* use. For this reason, the traffic was still very limited in the city. All interviewees who commented on the extent of the car modality's share acknowledged this fact (int. 2, 20, 19, 21, 17, 6). Photographic data also corroborate this element and provide us with further insight into the infrastructure at the time (see Figure 4 below). As reported by six interviewees, cars, buses, tramways, cyclists, and pedestrians *all shared the same infrastructure* all mixed together, with cyclists weaving around cars and pedestrians (int. 25, 22, 23). Still, in spite of sharing the same infrastructure and an *absence of cycling lanes*, interviewees did not voice any concerns over their safety.



**Figure 4.** Jaude Square in the early 1950s, with a mix of walking, cycling, car, bus, and tram transportation (Copyright, 2022, La Montagne) [41].

The following figure (Figure 5) summarises the interaction of the different elements associated with the various modes of transportation available in metropolitan Clermont-Ferrand in the early 1950s.



**Figure 5.** Cycling, walking, car, and tramway mobility in metropolitan Clermont-Ferrand in the early 1950s. (The coloured circles represent the highlighted terms in the main text, with blue accounting for materialities, red for competences, dark red for financial capabilities, yellow for social meanings, and orange for emotions). Elements are linked to one another through lines indicating a positive causal effect (green lines), a negative effect (red lines), or a neutral relationship (black lines).

### Removal of the tramway and the (temporary) rise of bus mobility

In the 1950s, one could see the rise of an anti-tramway mentality in metropolitan Clermont-Ferrand. The main reasons for this shift in mentality were that the tramway “had become **cumbersome** to urban traffic with the rise in car flow and that there was a **need for modernising the network**” (written source #1, see Table A5, Appendix C). The tramway had begun to be perceived as a form of urban congestion since former tramway users were by then using the car, and these new drivers found that the tramway merely cluttered the roads [40] (p.75). Even before the war, in 1938, there had been a plan to modernise or completely remove the tramway (written source #2, see Table A5, Appendix C). Later, in 1954, people felt that the electric tramway needed to be replaced by something faster and more comfortable (written source #3, see Table A5, Appendix C). The proposed modifications were turned down, however, and according to written source #4 (see Table A5, Appendix C), it was decided that buses should replace the existing transportation system. In the first instance, the trolleybus, a more sustainable means of transportation, was discussed, but the idea of installing it in the city was finally discarded in 1957, which

left no opportunity for the continuation of electric transport in the city. Municipalities in the metropolitan area also regarded the tramway as being something from the “old days” (written source #5, see Table A5, Appendix C), and the demand for buses to be installed rose, since buses, unlike trams, were not limited by rails to a single travel route.

With regard to costs, there were **no monetary incentives** to use buses after the **removal of the tramway**. People were simply dependent on the decisions made by the municipality (int. 21: *we followed the new urban trends from the municipality, we had to evolve, int. 6: once they removed the tramway, people still needed to move around so they used the buses*), so that once the tramway was replaced, **buses simply became the default mobility option** (int. 6: *once [the tram was] removed, we would go by bus*; int. 21: *there were buses so we were using them*; int. 4: *buses were the best means of transportation for people that could not afford individual mobility*). The removal of the tramway, however, did not leave people indifferent. Interviewees expressed feeling a certain void and a nostalgia for the tramway (int. 23, 2, 21, 25, 26). Although the tramway had been regarded as lacking both in the areas of service and convenience (i.e., there would almost always be a tramway) (int. 25, 26, 21), most people still felt that it was a relevant and useful means of transportation. By contrast, the advent of the bus improved access to PT since *new bus routes went to neighbourhoods that had before never had public transportation* (written source #6, see Table A5, Appendix C). After the removal of the last tramway in 1956, bus lines continued to develop in the metropole.

The difference in **cost** of using buses instead of trams does **not seem to be significant**. This modernised means of transportation was mainly (but not exclusively) used by workers to travel to their places of work (int. 17: *it was normal to take the bus to go to work*; 23: *it would benefit everybody*) and was affordable to most people, although perhaps seen as something that was expensive on a daily basis (int. 4) or for a large family (int. 7: *since we were 6 in the family, it was somewhat costly for us*). To alleviate this expense, **differentiated tariffs** were available for public transportation, as was also the case before the removal of the tramway (int. 25, 26). Those tariffs allowed larger families and physically disabled people to travel at discounted prices (written source #7, see Table A5, Appendix C). In contrast to the tramway, buses triggered **mixed feelings**. While some people considered buses to be pleasant and convenient (int. 17, 7), most people saw them in a negative light. Interviewees mentioned the fact that there were often so many people in the bus that the experience was less enjoyable (int. 4, 8). Another negative aspect of buses related to their fixed timetables, which did not allow as much flexibility for travellers as cars did. (int. 23, 8, 20). As with the trams they formerly took, users **needed to know where the stations were** in order to take the bus. Unlike the tramway, however, they now also **needed to know about the timings of the buses**, which were, in most cases, less frequent than the trams had been.

After 1960, the general opinion about the bus as a means of transportation changed, and more people began to prefer the convenience of the car (int. 23, 8, 20). From the pinnacle of bus use in 1964, there was a slow decline over the next ten years. Within 10 years, from 1964 onward, the uptake of the bus fell by 33% (written source #8, see Table A5, Appendix C). The available data show that bus usage shifted to an older generation of people, who were generally frightened to switch to this new mode of transport and preferred to stick with bus transport instead of learning to drive a car (int. 17: *older people were scared of driving cars since it was new, [so] they stuck with the bus instead*).

### The rise of car mobility

While, at first, driving one's own car was considered to be only possible for a few rich people, this perception soon faded as cars became **more affordable**. The market for cars grew as wages surged by a factor of 10 [42]. Soon, most people were able to buy cars. Nonetheless, buying a car was still seen as a large investment (int. 19: *we could afford a car, but the purchase was very expensive*; int. 8: *we had to purchase the car on credit because we were not rich*). In addition, the costs of operating and maintaining the car were not insignificant for most people. (int. 17: *we would do car-pooling so that the costs were shared [ . . . ] the price of gasoline was certainly a barrier to driving more*; int. 4: *we still had to pay for the gasoline and the insurance*). Interestingly, and perhaps relevant only to the Clermont-Ferrand case, not every

car owner had to spend the same amount of money to maintain their car. Michelin, the tire multinational located in the city, provided **benefits** to its employees that were likely linked to the surge in driving as a new and popular mode of transport. Employees could, for example, receive tires for free and have them fitted free of charge (int. 17). There were also inter-factory buses, enabling employees who arrived in Cataroux by car to travel to the other sites (int. 19, 17). While these two elements may not seem so important, the number of people that were affected by those factors was significant. Employment at Michelin rose from almost 15,000 employees in the early 1950s to nearly twice as many people in the early 1970s [43]. This indicates that, in comparison to the population of the entire urban area, >10% of the population worked for Michelin in the early 1950s, and this number rose to about 15% of the whole population by the 1970s.

Cars, as a practice, were one of the least negatively described modes of transportation in that period of time. People would describe them as ultimately convenient (int. 4, 20, 21, 8), as allowing for **freedom and ease of movement** (int. 7, 8, 20), and as **savingtime** (int. 7, 17). Different meanings started to be associated with cars. One of the perceptions which materialised was that of freedom, both in time and space (int. 2: *we can go further and are freer to move around*; int. 21, int. 6: *we would use the car to go further away*). The perception that driving was normal also developed (int. 21: *it was normal to drive*; int. 7: *there was this distorted perception that it was normal to have a car because it was convenient*). People also tended to consider the car as an **advancement** that they had to keep up with (int. 4, 23), and as a *genuinely helpful innovation and a luxury* (int. 7).

During this period, the traffic flow became much higher (int. 17: *traffic was much higher, there were many more people [on the roads]*; int. 20: *traffic flow was higher, people were buying cars*; int. 22: *there were many more cars*). This was partly driven by urban housing planning. After 1960, Clermont-Ferrant launched a public housing programme (while the role of Michelin in housing decreased). Concerning transport or public space, this program was fully focussed on providing car accessibility, neglecting everything else [44] (p. 1429). In addition, the plan involved sprawled housing areas over a larger region, outside the reach of the tram network, in areas that were difficult to be reached even by the urban bus lines (ibid.). In France, at the time, car ownership indeed rose sharply between the mid-1950s and the early 1970s, from 2.5 million to 15.5 million cars. Speculating that this growth was linear, it would roughly equate to a 23.5% increase in cars on the road every year during that period [45]. Thus, even if those numbers represented a national phenomenon, the perceived increase in car traffic seems to be corroborated by those statistics. To face the increasing car flow, the removal of the tramway in the city center enabled the municipality to create further roads. The tramway tracks were tarred into new roads to facilitate the circulation of both buses and cars [40]. Even though driving was considered very easy because of the light traffic, this practice required specific knowledge: **a driving licence**. Furthermore, while many very easily transitioned to this practice, some people (mostly older people), seem to have found it more difficult to adapt to this new practice and would not necessarily make an effort to learn the new required skills (int. 17). Since driving a car implies acquiring further skills, the meaning of cars was then mostly associated with **youth** (int. 17).

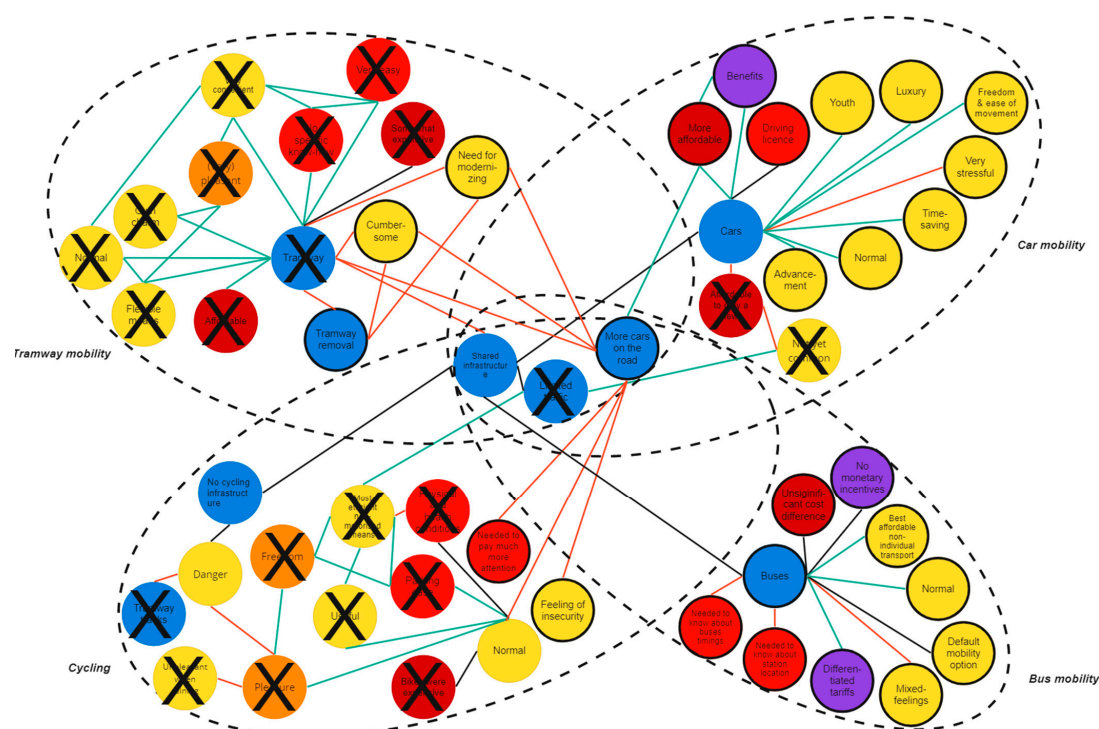
Finally, unlike with public transportation, people need to park their cars. As reported by interviewees 2 and 8, car mobility was regulated with paid and limited parking in the city center, between the Salins (neighbourhood) and Jaude and Gaillard squares. Although parking infrastructure existed around the city (int. 4) and some companies provided their employees with parking (e.g., Michelin (int. 17)), people began facing major difficulties regarding parking (int. 2, 19, 23). Parking was progressively seen as a constraining factor that could even lead to limited use of the car (int. 2: *I would only use the car if I knew for sure I could park*). The fact that people would look for a place to park their car in the evening (i.e., not in the street) could also lead to the following assumptions: cars were seen as valuable artefacts that their owners would not like to leave outside, or parking facilities were very limited. Both assumptions happen to be justifiable. Cars were very expensive



between 1950 and the 1970s, and parking locations could not be found all around the city. As mentioned by interviewee 20, it was frequently the case that people needed to go to a completely different neighbourhood to park their car in a garage. Unlike the actual action of driving, this indissociable element of the practice of driving was considered **very stressful** (int. 23, 2, 19).

### Contraction of cycling

When it comes to cyclists and pedestrians, the road sharing situation did not significantly evolve until the 1970s. Until then, cyclists and walkers were still sharing the roads with cars, buses, and mopeds (int. 19: *bikes were on the road with cars*; 22, 23). Interviewees all corroborated the fact that **no cycling infrastructure** existed at the time in the city nor in its metropolitan urban area. In addition to that, the data also revealed that, back then, pedestrians were treated with respect as co-road users (int. 22 and 23). Nonetheless, the brisk surge in traffic did not leave cyclists unaffected. As a result of this modal shift, a **feeling of insecurity** developed among bike users, who started feeling vulnerable around cars (int. 17: *cyclists were at risk of being hit by cars*; int. 23: *we had to pay much more attention*; int. 2: *it was dangerous because of the traffic, you could get hit and fall*). Although no one reported a significant shift in meaning over the period, fewer and fewer people mentioned using bicycles as **more cars took over the roads**. Walking, as a practice, was also impacted by these developments. Although considered normal at first, walking longer distances started to be questioned by society (int. 23: *how can you handle this? How can you balance your family and professional life and come to work walking?*). Increasingly, people turned away from the practice of walking and started using their cars (int. 22, 23). The following figure (Figure 6) summarises the interaction of the different elements associated with the various modes of transportation available in metropolitan CF Ferrand after the removal of the tramway.



**Figure 6.** Cycling, walking, car, tramway, and bus mobility in metropolitan Clermont-Ferrand from 1956 to the 1970s. Elements that disappeared after the early 1950s are crossed out, while newly emerging elements have black lines surrounding them. Blue accounts for materialities, red for competences, dark red for financial capabilities, yellow for social meanings, orange for emotions, and purple for policy incentives. Elements are linked to one another through lines indicating a positive causal effect (green lines), a negative effect (red lines), or a neutral relationship (black lines).



#### 4.2. Starting the De-Transition (after 2000)

In the 1990s, the municipality of Clermont-Ferrand initiated discussions about the reintroduction of the tramway in the metropolitan area as a means to reduce car mobility, and in turn reduce air pollution and congestion levels in the area. These debates translated into action with the construction of the tramway line between 2004 and 2006 and its opening at the end of 2006 (as described below in more detail). Cycling was later revived in metropolitan Clermont-Ferrand with the installation of self-service bike stations and the development of a cycling network. Although the re-introduction of the tramway led to an overall increase in PT trips, it did not necessarily replace car trips, but complemented them. Indeed, cars are still the dominant mode of transportation in metropolitan Clermont-Ferrand. In that regard, cars are largely present on the roads, and although cycling lanes have been created, the network is still underdeveloped and fragmented, which leaves the practice of cycling as an “in-development” practice rather than a well-established one.

Metropolitan Clermont-Ferrand’s size also increased institutionally from 8 municipalities in the 1990s to the current 21 municipalities constituting the Clermont Auvergne Métropole. Consequently, the surface of the area governed by the metropolitan government increased by almost 200 km<sup>2</sup>. What were then the more urbanized settlements have extended to the outer rural boundaries that reach as far as the Chaîne des Puys (the Puys surrounding Clermont-Ferrand), with significantly distinct land usage. While the core municipalities in metropolitan Clermont-Ferrand are mostly urbanized, this is not the case of most of the newly added municipalities, which are composed of fields; forests; and small, scattered discontinuous urban areas. Around 2000, Michelin shrunk compared to period 1 (although still employing about 9000 to 12,000 people in the area [46], in contrast to employing around 30,000 in 1970), and Clermont-Ferrand experienced an economic rebalancing in favour of the tertiary sector. Economic activities, which were, in period 1, predominantly concentrated around Michelin’s factories, then shifted to the eastern side of metropolitan Clermont-Ferrand, with mostly continuous and discontinuous urban areas covering the centre of the metropolitan area [47]. In 2000, automobility was still dominant in CF (as in the 1970s), with ~80% of inhabitants having a car and with a car modal share above 84% in 1992 [40]. Cars are an integral part of everyday life around which habits and emotions have built themselves. People associate car use with **positive feelings**, particularly the feelings of **freedom** and **autonomy** (int.9, 10): *really going where we want, whenever we want*. For many, the only negative emotion associated with cars would be the **stress of finding a parking spot in the city**. For that, people reported that they needed to know the city very well (int. 24, 5). The municipalities seem to have facilitated the use of cars with the construction, maintenance, and **extension of roads** [36]. This has not prevented **roads** from being **crowded**, especially during rush hours (Int. 13). In such a context, and without cycling paths, it is not surprising that cycling rates were around 1% in 2003 [48].

##### Public transportation

Next to extending car infrastructure, the regional mobility authority SMTC (Syndicat Mixte Transports en Commun de l’agglomération clermontoise, created in 1976) tried to facilitate the flow of bus mobility through the creation of dedicated **bus lanes and bus lights** with a first attempt in the 1980s and a re-launch in the early 1990s [40]. This was intended to ease the circulation of buses around the city despite the crowded roads, which were significantly delayed by it (int. 13, 24). However, the bus lane policy was ineffective, because (1) later parts of the plan were halted because of lack of funding, and (2) the number of bus lanes was limited compared to the ample space for cars, and, therefore, their impact. Using the buses was **affordable** (int. 13, 9); while they were often crowded (int. 24) and found **not to be flexible** (compared to a car) (int. 16, 13, 10, 1), they were attractive due to **not needing to find a parking spot** (int. 24).

##### Tram mobility re-emerging

With the negative impact of car mobility on the urban space, and with congestion increasing, the idea of a tramway in the city emerged again after its demolition 35 years earlier. The support for it was driven by the growing conviction that car mobility was

becoming more and more complex [40], with increasing traffic (int. 8, 24, 10), parking shortage (int. 24, 5), and links to pollution [49]. Despite wide support, the decision to implement the **tramway**, which opened in November 2006 (see Figure 7), it was qualified as a form of revolution by mobility policymakers. Just like in the late 19th century, the introduction of a tramway was perceived by urban planners as a significant technological improvement, bringing about a good reputation to the city [40,50]. The 2000 urban development ordinance (PDU) of metropolitan Clermont-Ferrand had placed clear emphasis on the development of public transport in the city, with the aim to find a “**credible alternative to car mobility**” [51] (p. 42). In that sense, the tramway was seen in a different light, in the sense that it was a means to promote more sustainable political agendas during election times and that it benefitted from a special status with its dedicated track and, accordingly, its right-of-way route [50] (p. 8). This which contrasted with its position as one of the available means of transportation with the infrastructure in Period 1. The need for such a right-of-way route to be created with the reintroduction of the tramway arose from the observed air and noise pollution [51] (p. 61), as well as the congestion levels in the metropolitan area associated with car use [40]. The vision was then to reduce car use, and this was linked to the further decentralisation of amenities (such as new supermarkets) and activities through the creation of public transport lines (including the tramway line) so as to stimulate local shopping, reinforce the attraction of central facilities, and in turn hamper car mobility [51] (p. 73). As Ryat [40] argues, the new tramway in Clermont-Ferrand is on tires, which perform better when going uphill. This is due to the presence of Michelin in the city, which played an important role in the new tramway’s design.



**Figure 7.** New tramway on Jaude Square (Copyright, 2007, Fabien1309) [52].

Although the project faced (national) budget cuts and the according cancellation of accompanying measures, such as reduced car access in the city center and urban regeneration projects [44], the **tramway line** was **extended** in 2013 to connect the northern neighbourhoods of Clermont-Ferrand. Unlike in the 1950s, the current tramway line does not include several municipalities, but solely travels to Clermont-Ferrand and Aubière. Local residents and travellers are happy with the tram, considering it a priority over **cars in the city center**, as it is **faster** for trips there (int. 16, 15, 12, 9, 13). It is seen as **convenient** (int. 9, 13, 15, 12, 11, 10, 8), although **crowded at peak hours** (int. 12, 11, 9, 15). People associate more positive feelings with the tramway in comparison to the buses (due to frequency and priority over road users), apart from the **limited reach of the line**, which

practically limits its usefulness to trips within the city center (int. 16, 15, 5). In comparison, a bus network is available throughout the metropole. Three years after the re-introduction of the tramway, the number of PT trips had grown by 42.5% compared to three years prior to its reintroduction [53]. It is likely that this has stimulated the reputation of PT more generally, which has translated into a significant increase in PT trips (transportation operator interview).

Since 2015, to promote public transportation and to be more inclusive to lower income groups, **tariffs** are not **indexed** on people's statuses anymore, but **on people's incomes** [54]. To benefit from those discounted prices, users need to fill in some forms and provide documents proving their eligibility [55], which has, however, proved to be irksome (int. 12). More recently, a two-year experiment with **free travelling on weekends** began in December 2021 [56].

### Revival of Cycling

Since 2013, it has also been possible to rent a bike thanks to the creation of the **CVélo network**, which offers both self-service bikes, which are free for the first 30 min [57], and **long-period bike rental**. Currently, more than 680 bikes are distributed throughout the 57 stations within the city of Clermont-Ferrand (not outside it). While the self-service bikes are solely normal/non-assisted, long-period bike rental includes traditional bikes and electric bikes. People have also been encouraged to take on cycling through national **incentives** for the purchase of e-bikes, for which people can reclaim up to EUR 400 [58]. The financial help for e-bikes appears to have affected more people than that one interviewee (16); two questionnaire respondents benefitted from it. The government has not, however, rested its whole strategy on monetary incentives, but also aims to educate and raise awareness about active means of transportation and to normalise the practice in citizens from a young age. Primary school children are now **taught how to ride** bikes as they enter middle school [58]. However, this **educational scheme** was not highlighted by any interviewee, even when they were talking about their children. Due to its novelty, it could therefore be assumed that this policy incentive is still making its way through French cities.

While the **cycling infrastructure** has been developing in Clermont Auvergne Métropole, with some lanes separated from the car lanes and some not, interviewees and questionnaire respondents agreed that it remains very **fragmented**. This means that in many places, the cyclist needs to cycle alongside other traffic, with no (cycling) lane at all, which is experienced as **unsafe** by cyclists and **annoying** for car motorists (int. c and 15: *I am scared of cars*; int. 16: *I wear all the protection gears that exist ( . . . ) although I am extremely careful, you can't be careful for others*; int. 13: *cars really make you feel fragile and vulnerable*; int. 16: *when we are cycling at 20 km/h on the road, people are pissed off*; int. e: *many get annoyed when they are behind us, they honk*).

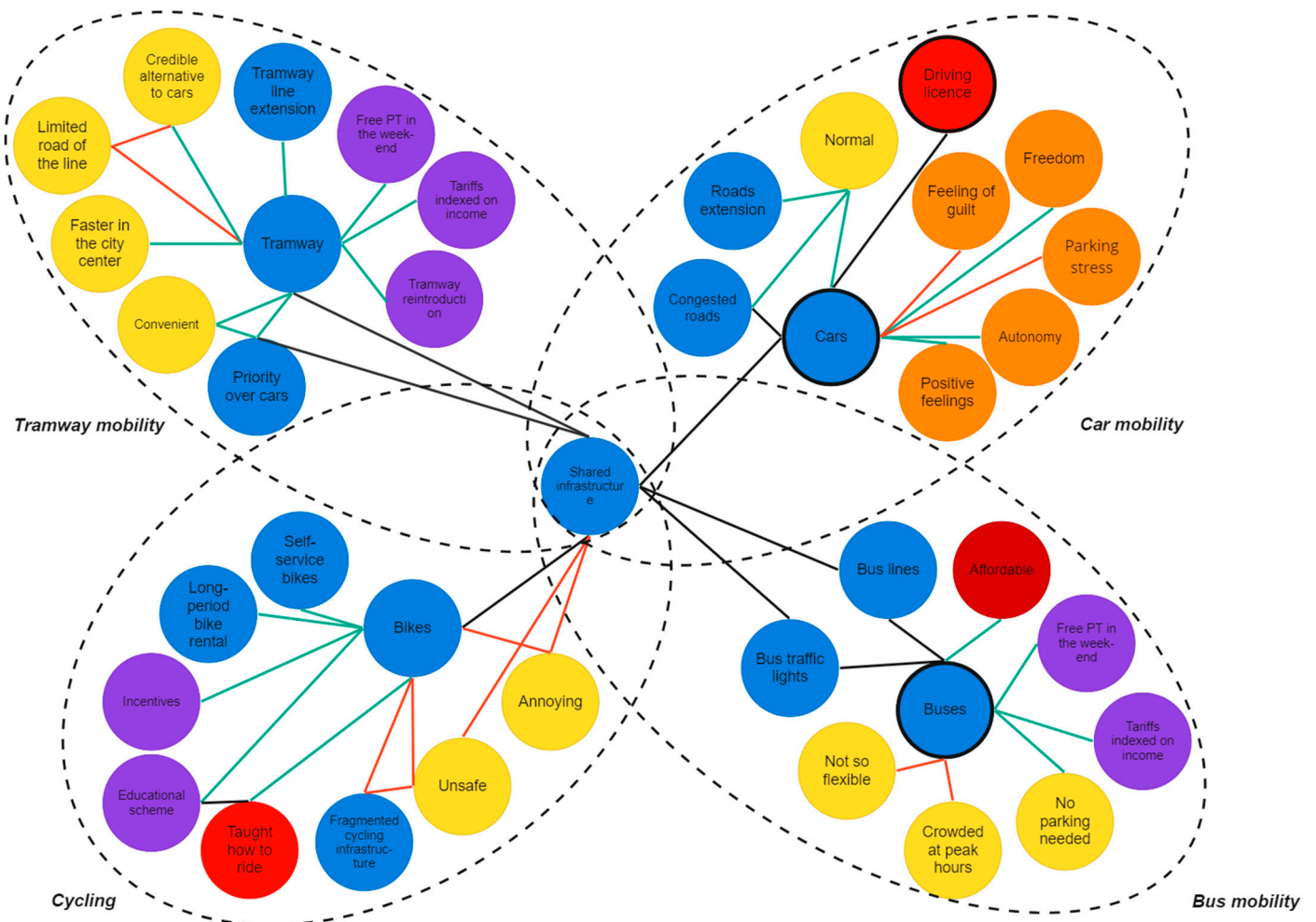
This result emerged despite an adaptation of the driving theory curriculum in the past few years, which added a course for drivers to increase their awareness of cyclists and to better interact with them (interview with a driving instructor). In the survey, 44% of respondents indicated that they found cycling dangerous; 39% found it pleasant; and 5% found it unpleasant. This broadly shows the ways in which people see cycling, with one interviewee summarizing this clearly: *it really takes courage to do that!* (Int. 3). More recently, in 2021, the speed limit on many secondary roads in Clermont-Ferrand was reduced from 50 to 30 km/h, but interviewees did not mention any effects of this.

### Impact of trams and cycling on the hegemony of cars

Since the re-introduction of the tramline and cycling facilities, car mobility has not changed much. Convenience, independence, and autonomy are still keywords. One policymaker linked the continued facilitation of car mobility with Michelin: *we are the city of Michelin, so cars are important* (interviewee number 2). Interviewees did mention that there has been more and more environmental concern and awareness of the (negative) impact of cars, which has encouraged them to move to alternatives (int. 2, 9, 10, 11, 12, 13, and 15). For instance: *now there is almost a feeling of guilt when we use the car; you know it is better to travel by public transportation*. Still, respondents spoke about necessary changes, and did



not report actual changes in transport modality. The increasing cost of car mobility, mainly due to fuel prices, was also mentioned in the survey as a constraint, with a significant difference between people under 45 years (strong constraint) and those above 45 years (little constraint). All in all, the re-introduction of the tramline and cycling facilities has hardly affected car mobility in CF and its surroundings. The following figure (Figure 8) summarises the interaction of the different elements associated with the various modes of transportation available in metropolitan Clermont-Ferrand since 2006.



**Figure 8.** Cycling, walking, car, bus, and tramway mobility in metropolitan Clermont-Ferrand (since 2006). Blue accounts for materialities, red for competences, dark red for financial capabilities, yellow for social meanings, orange for emotions, and purple for policy incentives. Elements are linked to one another through lines indicating a positive causal effect (green lines), a negative effect (red lines), or a neutral relationship (black lines).

## 5. Discussion and Conclusions

### 5.1. Useful Lessons of the Historic, Unsustainable Transition

The analysis of mobility development from the 1950s to the 1970s shows how, before the growth of car use, taking the tram was normal and travellers experienced it more positively. Because of rising car use and falling tram patronage, the tramway line was demolished in 1956. Passengers who did not own a car shifted to taking the bus, which was experienced less positively than taking the tram. Buses had a less charming atmosphere than the tram, and they were less frequent and convenient (possible because of lost patronage, or because fewer buses covered more lines). Urban housing policies implemented in the 1960s, which focused on providing car accessibility and encouraged urban sprawling

over a larger area, further undermined the primacy of buses as a credible alternative to cars, since the urban bus lines hardly reached these outlying areas [44]. In turn, passenger kilometres on public transportation (that is, in this case, the average number of km per person per day) fell from an average of 6.2 PK in 1954 to 3.8 in 1973 (written source #8, see Table A5, Appendix C). In the meantime, car mobility continued to grow year by year due to increasing incomes and more affordable cars. Consequently, congestion on the roads also grew.

Two key points seem to have enabled the accessible, car-free city of the past: (1) the normality of collective transport and cycling, and (2) a barrier for car mobility. The normality of using the tram for many people was key for the financial sustainability of the regional tram network. With people at the time hardly owning cars, the tram was competing with the bicycle and the bus. In the areas in which the tram was running, it was the preferred means. To what extent is the tram infrastructure today retaking its original position? Only to a slight extent, and mainly in the central city areas where the tram network actually exists and car use is constrained. Indeed, the current tramway network is limited to a single line in the city centre of Clermont-Ferrand. For the tramway to have a regional outreach like it had in the past, more lines would need to be created, and the area in which car use is strongly constrained would have to be much larger (broadly the same area). In addition, while the tramway in Period 1 took passengers to the train station (enabling multi-modal trips in the region), this feature is absent from the current line of the tramway. This further confines the usefulness of the tramway to trips within the administrative boundaries of Clermont-Ferrand, and limits the potential of the tramway as a means to bridge the gap between different regional transportation modes.

Our findings also point to the normality of cycling in Period 1, but is cycling becoming normal again? Is the bicycle the new car? No, not yet: the cycling infrastructure is still too fragmented and the cycling culture needs to grow broader. Although the municipality has put some effort into redeveloping cycling in the metropolitan area through the installation of self-service bike stations and the development of cycling lanes, cycling still seems to be in its early stage, and accounted for only 2% of the modal share in 2012 [59]. One of the biggest barriers to cycling that was mentioned is the insecurity linked to the presence of many motorized vehicles and the near absence of separated lanes. To this day, the cycling network is still fragmented and does not allow for the safe use of bikes throughout metropolitan Clermont-Ferrand. Furthermore, the culture of cycling for practical matters (e.g., commuting) is only just starting to re-emerge, and is not widespread. Rather, cycling is associated with leisure trips outside the city. In that sense, the practice is not yet considered to be the norm, but rather the exception. The municipality is, however, trying to remedy this situation, as mentioned in its 2019 transport ordinance plan (PDU). It aims to reach 5% of the modal share by 2030 through the development of a cycling network [59].

Secondly, there was a barrier for car mobility in the past, namely, a financial barrier. For many, car mobility was too expensive. Although owning a car is again becoming too expensive for part of the population today, hampering car mobility through financial impediment is not the fairest approach. To prevent remaking the car into a vehicle of the happy few, a fairer approach would be to have an extensive car-free area in the city, which would be accessible only by car alternatives, i.e., by combinations of tram, train, bus, bicycle, and possibly micro e-vehicles, encouraging multi-modal trips. By doing so, car mobility would not be limited through the financial exclusion of part of the population, but rather by pushing everyone, collectively, away from the practice in a given area. Re-creating a norm of car-free/low-car-mobility zones will be essential to the successful de-transition in metropolitan Clermont-Ferrand, where car alternatives may thrive again.

## 5.2. Using Historic Lessons to Stimulate Next Steps in the De-Transition

Our findings, therefore, highlight certain developments in the mobility system which have occurred over the past decades as attempts to reduce car use, namely, the re-introduction of the tramway and the revitalisation of cycling. The findings also suggest



starting points for the next steps in the de-transition: (1) the creation of a more extensive regional tramway network, (2) the development of a full cycling network, and (3) the promotion of an extensive car-free city centre. The first point, the creation of a more extensive regional tramway network as a credible alternative to car use, comes partly from the fact that the tramway has always been seen in a more positive light than buses. In addition, the current tramway network has brought a more positive meaning to PT. Our study confirms that factors such as frequency and rapidity due to congested traffic make the tramway, and, therefore, PTs, more attractive [60]. However, because of the limited network of the tramway, the positive effect is limited to the city centre of Clermont-Ferrand, and is, therefore, not contributing much to the status of PT as a credible alternative to cars in the overall metropolitan area. Additionally, our results highlight that cycling used to be an important practice in the metropolitan area of CF, but that this normality was lost due to the rise of cars and the associated increasing danger of cycling. Our findings also shed light on the current revitalization of the cycling and the rapid increase in bike use, with people indicating preferring cycling to being stuck in congestion with a car. However, one of the main barriers identified to the further spread of cycling are safety concerns, which are associated to a significant extent with the fragmented cycling network. This confirms Deguitre and Coudrel's argument that insecurity linked to potential accidents is a constraining factor [60], and it is fair to propose the development of a cycling network for the purpose of furthering the de-transition as our second point. Finally, third, to make PT and active mobility the default option again, like in the past, there needs to be a way to discourage the tempting option of individual car mobility, which creates many collective negative externalities (such as congestion) and, in practice, often reduces individual benefits. Therefore, promoting an extensive car-free city centre will be essential to shifting the paradigm from cars to more sustainable means of transportation.

More recently, ambitions to reduce car mobility have been increasing. The municipality implemented a test policy in December 2021 for a two-year period, making all public transport within metropolitan CF free of charge during the weekend. Our survey shows that this measure was met with a positive response, with 33% of respondents reporting feeling encouraged to take PT because of this policy. However, the extent to which people were affected is not entirely clear, as another 10% reported not knowing about this measure. While almost 19% of respondents also mentioned price reduction or completely free public transportation throughout the week as a measure that would further encourage them to take PT, more respondents stated that they would be positively influenced should the frequency and the itineraries of the bus be reshuffled (almost 22%) and the tramway line extended.

Furthermore, as of 2013, metropolitan CF introduced self-service bikes in the city of Clermont-Ferrand. Although integrated in the mobility share, the fragmentation of the cycling infrastructure is still a barrier to the further development of the practice. As such, survey respondents did mention the need for an extended cycling network throughout the metropolitan area. Moreover, they also placed emphasis on the need to install self-service bike stations outside of the city of Clermont-Ferrand, therefore enabling their use by all people living in metropolitan CF. In addition, while the rapid uptake of cycling in the city of Clermont-Ferrand should be noted, the renewal of the practice has not occurred independently of income. Although cycling lanes are considered as social answers to mobility, this statement is contradicted by the fact that the observed shift to more sustainable practices is driven by people with higher incomes. One question, therefore, arises from this observation: will cycling be adopted by all in society, or will it remain a "higher-income people" transportation type? In that regard, it will be helpful for future research to study the impact of financial capacity and sociological barriers on the use of bikes as means of transportation.

Although not previously discussed, some organisations, such as "Vélocité 63" and "Un guidon dans la tête", are actively promoting the use of alternative forms of mobility such as walking and cycling. These organisations are raising awareness about active mobility,

protecting user rights, and objecting to urban policies by informing policymakers about social demands. While their role has not been thoroughly developed in this study, the extent to which they affect mobility may be greater than expected. In that regard, further research may be conducted to identify the roles played by these organisations, other institutions, and civil society, as well as their impact on the transformation of the mobility system.

Despite these developments in support of public transportation and cycling, and, hence, of sustainable urban mobility transition, there are two conditions in particular that challenge the implementation of the threefold next step towards de-transition which we formulated above. These are governance challenges, limited societal support, and conflicting policy visions on sustainable mobility.

First, our analysis has highlighted the non-alignment of mobility plans with housing and economic activity plans as one of the factors leading to car use as the only viable available means of transportation. This is due to fragmentation in the governance process of the city's public policies, wherein mobility is considered separately from housing and economic activities. This fragmentation in urban ordinance plans is not the only fragmentation occurring which has a direct impact on mobility. While the statutes from the SMTC indicate its complete authority on mobility, the reality is very different, with several entities sharing and, in some cases, disputing authority over mobility (SMTC, municipalities, metropolitan services, national government, etc.). Over time, this significant fragmentation in reference to ordinances and to institutions has led to both disorganised and discontinued actions in terms of mobility. In turn, this has enabled the continued dominance of car mobility as the main means of transportation. This situation challenges the successful implementation of the suggested next steps towards de-transition in two respects: (1) current societal support for such measures, and (2) governance challenges. Considering the social meaning associated with car use in metropolitan CF, it is uncertain how much support those measures would have. While the promotion of cycling and public transport may not impede car mobility as such, the creation of extensive car-free areas would. The creation of the image of an accessible, low-car CF, which used to exist (Figure 4), may help. Rather than imposing a vision, which may irritate car users and limit societal acceptance, the design of a common vision in a participatory process, with the picture as a source of inspiration, may be effective.

Second, societal support towards a de-transition to low car use is still uncertain in the case of metropolitan Clermont-Ferrand. Indeed, as of December 2021, the municipality of Clermont-Ferrand also implemented a 30 km/h speed limit in most of its roads. While we would expect this measure to be complementary to the re-development of cycling infrastructure, and to improving safety on roads for all users, this measure has not necessarily benefitted from the expected support. Our survey shows that cyclists do not yet feel more secure since the infrastructure is still largely absent (25% of respondents); cycling is still perceived as unsafe (50% of respondents); and drivers complain about it generating traffic jams, making their trips slow and therefore longer (e.g., *it takes me an extra 15 min to come home*). Some oppose the measure more strongly by not respecting it at all, considering it a useless constraint. The support for a low-car city does not seem to have been acquired yet. However, a few survey respondents also pressed for more push measures to be implemented to further curb car use in the city (centre). This suggests that CF's society is not yet ready to rule car use out of their city, and that the acceptance of very constricting measures may be limited.

The third barrier to implementing the next step to achieve de-transition is related to conflicting policy visions on sustainable mobility. While some policymakers consider the promotion of electric cars as the next important step, others argue for car trip reduction altogether. Although these visions are not necessarily contradictory to de-transition, one fundamental element underlies those debates: funding. Electric cars are nationally promoted through individual financial incentives [61]. In the case of alternative means of transportation, regional entities and municipalities are in charge. However, the budget they have to accelerate mobility transition directly comes from the national government, and is

often limited. In the case of metropolitan CF, national funding failed with the reintroduction of its tramway [44], thus placing the burden of transition on the municipalities (interviews with a policymaker and a transport operator), which led to projects being dropped because of the lack of available funds [44]. Therefore, limited national funding is currently biased to “greening of car mobility”, which hampers the abilities of urban areas to take the necessary steps to de-transition towards low-car-mobility systems.

### 5.3. Contribution to the Literature

Our study contributes in three ways to the existing body of literature. First, our paper broadens the literature on transition studies and coins the concept of “de-transition” to describe a return to former sustainable mobility configurations, characterised by low car usage. Case studies with this concept would include an earlier, more sustainable state of the particular practice under study, which may help in envisioning the (more) sustainable practices, why they would be attractive (i.e., to see “what has been lost”), and how the reversal of the steps might take place.

Secondly, our extended social practices framework adds one element to the three-element model of Shove [30], policy, as well as two sub-elements, emotions (sub-element of meaning) and financial capacity (sub-element of competences). Like Dijk [62], we found that our addition of the element of policy helped to highlight the significant role of policy and regulation in reconfiguration towards more sustainable practices. Our framework also, like that of Dijk [31], includes two other sub-elements: emotions and financial capabilities. Financial capabilities (relating to prices, investments, and affordability) play an important role in changing mobility practices. While Shove [30] does not argue for taking financial capabilities into account, earlier mobility research, such as Kaufmann’s study [63], indicates that economic factors play a role in the accessibility of the different transport means and recognizes that individuals do not face the same realities when it comes to economic circumstances. We therefore suggest integrating this element in order to better examine the extent to which mobility choices are constrained or enabled by finances. Emotions were also included in the framework to distinguish emotions, such as fear (which turned out to be very important for lack of cycling), from more cognitive frames. Overall, our framework, with its extended elements, does not mean to suggest that all these elements are certainly important in every case study, but rather as a checklist of elements whose roles need to be taken into account to better comprehend mobility practices in their local contexts. In addition, it is impossible to tell which factors play the most important roles in shaping practices, since the elements are dynamically intertwined and appear to evolve in context-specific situations. This study, therefore, calls for further comparative research to be carried out on the transition to low-car cities, which may enable the identification of more generic patterns.

Thirdly, although the combination of “push” and “pull” strategies has been advocated for in earlier mobility research [64], few studies have actually analysed these empirically. Our study, therefore, supplements the limited body of literature discussing the combination of “pull” and “push” measures for modal shifting. Better insight into such a combination is critical to develop a more effective sustainable urban mobility policy.

### 5.4. Study Limitations

Although this study offers extensive longitudinal insight into mobility system transition, it also faces some limitations. These concern the limited types of stakeholders interviewed, limited scope of practices, limited geographical scope, and limited generalization. First, although we conducted a significant number of interviews, interviews with people in industry, businesspeople, and shop owners (see Figure 2) were limited. Although we collected information about these types of stakeholders through other interviews and documents, this might have created some bias and reduced our insights. Second, while Figure 2 shows the interactions between neighbouring practices and the overall mobility system, our work did not account much for neighbouring practices as such. As for the

urban planners, we did refer to the neighbouring field of housing planning. For travellers, examples of neighbouring practices include, but are not limited to, leisure activities, working, shopping, or taking children to school. We did not take these into account. The nature of the trip is likely to at least partly affect the chosen means of transport. In a society that is increasingly “liquid” [65], it is clearly challenging to include all the means of mobility and the needs to which they respond. However limiting, we argue that our focus on commuting trips offers a fair lens for our analysis, in that those trips represent between 30–50% of all trips in France [66] (p. 12). Thirdly, our study’s geographical scope mainly considered metropolitan Clermont-Ferrand and neglected its relationship to the broader environment in which it is embedded. Metropolitan Clermont-Ferrand, in this study, is viewed in separation from incoming and outgoing mobility to the metropolitan area. Taking into account the broader functional urban area would probably lead to the discovery of complex and diverse mobility patterns on which further research could build. Finally, this paper offers an in-depth case study regarding one city, but does not enable us to identify generic historical pathways towards unsustainable mobility transition nor more generic de-transition pathways, which a comparative case study might have enabled.

### 5.5. Conclusions

Based on the above discussion points, we are able to answer the two following questions: (1) to what extent can cities reverse the urban mobility transition? (2) How could such a process be further encouraged?

We have seen that CF, like most western cities, has evolved into a car-dependent system over the course of a few decades, and that there is no simple way to return to a low-car system. Our findings also suggested starting points for the next steps to de-transition. (1) The creation of a more extensive regional tramway network—the tram is seen as a credible alternative to car use, but currently, the limited network (only the city centre) limits its positive effect. (2) The development of a full cycling network—the current network is too fragmented to prevent people from feeling unsafe on their bikes. (3) The promotion of an extensive car-free city centre—this would make PT and active mobility the default option in a large area, just like in the past. A car-free area would preclude the use of the tempting option of individual car mobility, and would provide space for the adaptation of high-quality alternatives.

As was pointed out in this paper, the re-introduction of the tramway in the city of Clermont-Ferrand and the redynamizing of cycling in the city are steps towards a future de-transition, but they have not been sufficient elements to trigger a radical modal shift. Rather, it seems that de-transition is incremental in nature. Changing the social meaning associated with means of transportation takes time (e.g., the slow rise of a cycling culture), and this meaning is heavily affected by and intertwined with other elements (such as changing infrastructure) which have a direct impact on the speed at which the norm evolves. Our study also shows that a number of push and pull measures need to be implemented to compete with the long-dominating and almost unwavering norm of car mobility. Until recently, almost only pull measures have been implemented as easy changes, not tackling the bigger issue of car use. However, if cities want to reconfigure their systems to low-car mobility, pull measures (i.e., alternatives to cars) are not going to suffice. Car mobility itself also needs to be constrained. In that sense, we can say that cities can partially reverse the urban mobility transition. The de-transition can be complemented by a set of new components that will come into play.

Therefore, this paper also highlights the need for certain conditions to be introduced to facilitate the use of car alternatives and to constrain car use. Identified enabling conditions (“pull” measures) range from the development of a fully-fledged cycling network to an extended tramway network, and “push” measures include the creation of large car-free zones in the city, which would increase road safety and, in turn, positively affect cycling. While national funding or a lack thereof may have been a barrier historically, it will become instrumental to the successful realisation of the suggested next steps towards de-transition.



Without a solid low-car city vision and adequate funding to achieve this ambition, it is very likely that de-transition will take much longer to be initiated or will not be accomplished at all.

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## Appendix A Interview Details

**Table A1.** Long interviews, period 1.

| Interview Number | Date          | Interview Location  | Length     | Period Covered in the Interview | Age | Residence Place(s) (at the Period Covered in the Interview) |
|------------------|---------------|---------------------|------------|---------------------------------|-----|-------------------------------------------------------------|
| 2                | 22 April 2022 | Distance (phone)    | 00 h 43.46 | 1950–1970                       | 87  | Clermont-Ferrand                                            |
| 4                | 25 April 2022 | Distance (WhatsApp) | 01 h 01.06 | 1960–1970s                      | 80  | Clermont-Ferrand/Ceyrat                                     |
| 6                | 25 April 2022 | Distance (WhatsApp) | 00 h 42.12 | 1950s–1970s                     | 80  | Royat/Clermont-Ferrand                                      |
| 7                | 26 April 2022 | Distance (phone)    | 01 h 47.00 | 1950s–1970s                     | 85  | Clermont-Ferrand                                            |
| 8                | 26 April 2022 | Distance (phone)    | 00 h 42.12 | 1963–1970s                      | 80  | Lempdes                                                     |
| 17               | 29 April 2022 | Distance (WhatsApp) | 01 h 14.58 | 1950s–1970s                     | 89  | Clermont-Ferrand/Ceyrat                                     |
| 19               | 3 May 2022    | On site (Durtol)    | 00 h 48.30 | 1950–1970s                      | 92  | Clermont-Ferrand                                            |
| 20               | 3 May 2022    | On site (Durtol)    | 00 h 55.43 | Late 1940s–1970s                | 99  | Clermont-Ferrand                                            |
| 21               | 3 May 2022    | On site (Durtol)    | 00 h 59.11 | 1950s–1970s                     | 91  | Clermont-Ferrand                                            |
| 22               | 4 May 2022    | On site (Royat)     | 01 h 01.00 | 1960s–1970s                     | 71  | Clermont-Ferrand/Chamalières                                |
| 23               | 4 May 2022    | On site (Royat)     | 01 h 01.00 | 1950s–1970s                     | 83  | Clermont-Ferrand                                            |
| 25               | 4 May 2022    | On site (Royat)     | 00 h 42.17 | 1950–1960                       | 95  | Clermont-Ferrand                                            |
| 26               | 4 May 2022    | On site (Royat)     | 00 h 42.17 | 1950–1965                       | 82  | Cournon-d’Auvergne                                          |

**Table A2.** Long interviews, period 2.

| Interview Number | Date          | Interview Location   | Length     | Period Covered in the Interview | Age | Residence Place(s) (at the Period Covered in the Interview) |
|------------------|---------------|----------------------|------------|---------------------------------|-----|-------------------------------------------------------------|
| 1                | 20 April 2022 | Distance (Zoom)      | 01 h 08.47 | 2000–2022                       | 36  | Saint-Genès Champanelle                                     |
| 2                | 22 April 2022 | Distance (phone)     | 00 h 43.46 | 2000–2006                       | 87  | Clermont-Ferrand                                            |
| 3                | 23 April 2022 | Distance (Messenger) | 01 h 37.12 | 2005–2022                       | 25  | Cournon-d’Auvergne/Clermont-Ferrand                         |

**Table A2.** *Cont.*

| Interview Number | Date          | Interview Location   | Length     | Period Covered in the Interview | Age | Residence Place(s) (at the Period Covered in the Interview) |
|------------------|---------------|----------------------|------------|---------------------------------|-----|-------------------------------------------------------------|
| 5                | 25 April 2022 | Distance (phone)     | 01 h 20.00 | 2000s–2022                      | 21  | Aubière                                                     |
| 8                | 26 April 2022 | Distance (phone)     | 00 h 42.12 | 2000–2020                       | 80  | Lempdes                                                     |
| 9                | 27 April 2022 | Distance (phone)     | 01 h 00.23 | 2000–2022                       | 70  | Romagnat                                                    |
| 10               | 27 April 2022 | Distance (phone)     | 00 h 37.43 | 2000–2022                       | 59  | Aubière                                                     |
| 11               | 27 April 2022 | Distance (Messenger) | 00 h 57.05 | 2011–2022                       | 31  | Clermont-Ferrand                                            |
| 12               | 28 April 2022 | Distance (Messenger) | 00 h 54.09 | 2008–2022                       | 31  | Clermont-Ferrand                                            |
| 13               | 28 April 2022 | Distance (Messenger) | 01 h 22.28 | 2000–2018                       | 37  | Clermont-Ferrand/Beaumont/Gerzat                            |
| 15               | 29 April 2022 | Distance (phone)     | 00 h 45.15 | 2007–2022                       | 50  | Clermont-Ferrand                                            |
| 16               | 29 April 2022 | Distance (phone)     | 01 h 06.26 | 2003–2022                       | 54  | Aubière                                                     |
| 18               | 29 April 2022 | Distance (phone)     | 00 h 40.32 | 2000–2022                       | 27  | Clermont-Ferrand/Ceyrat                                     |
| 24               | 4 May 2022    | On site (Royat)      | 00 h 29.54 | 2000–2009                       | 76  | Lempdes                                                     |

**Table A3.** Short interviews (current mobility practices [A–P] and cycling culture [a–g]).

| Interview Number | Date       | Interview Location | Length | Age | Residence Place  |
|------------------|------------|--------------------|--------|-----|------------------|
| A                | 5 May 2022 | Clermont-Ferrand   | 03:01  | 67  | Clermont-Ferrand |
| B                | 5 May 2022 | Clermont-Ferrand   | 02:31  | 31  | Clermont-Ferrand |
| C                | 5 May 2022 | Clermont-Ferrand   | 02:15  | 42  | Clermont-Ferrand |
| D                | 5 May 2022 | Clermont-Ferrand   | 03:57  | 19  | Beaumont         |
| E                | 5 May 2022 | Clermont-Ferrand   | 03:57  | 20  | Beaumont         |
| F                | 5 May 2022 | Clermont-Ferrand   | 03:13  | 29  | Clermont-Ferrand |
| G                | 5 May 2022 | Durtol             | 02:46  | 48  | Cébazat          |
| H                | 5 May 2022 | Clermont-Ferrand   | 03:05  | 53  | Beaumont         |
| I                | 5 May 2022 | Aubière            | 03:19  | 60  | Clermont-Ferrand |
| J                | 5 May 2022 | Clermont-Ferrand   | 03:59  | 49  | Clermont-Ferrand |
| K                | 5 May 2022 | Clermont-Ferrand   | 02:26  | 35  | Clermont-Ferrand |
| L                | 5 May 2022 | Clermont-Ferrand   | 03:48  | 26  | Clermont-Ferrand |
| M                | 5 May 2022 | Clermont-Ferrand   | 04:54  | 21  | Clermont-Ferrand |
| N                | 5 May 2022 | Clermont-Ferrand   | 07:34  | 60  | Clermont-Ferrand |
| O                | 5 May 2022 | Clermont-Ferrand   | 03:51  | 22  | Clermont-Ferrand |
| P                | 5 May 2022 | Distance (phone)   | 02:54  | 22  | Clermont-Ferrand |

Table A3. Cont.

| Interview Number | Date         | Interview Location | Length | Age | Residence Place    |
|------------------|--------------|--------------------|--------|-----|--------------------|
| a                | 8 June 2022  | Clermont-Ferrand   | 02:33  | 24  | Clermont-Ferrand   |
| b                | 8 June 2022  | Clermont-Ferrand   | 03:03  | 22  | Clermont-Ferrand   |
| c                | 8 June 2022  | Clermont-Ferrand   | 03:44  | -   | Clermont-Ferrand   |
| d                | 9 June 2022  | Clermont-Ferrand   | 02:45  | -   | Aulnat             |
| e                | 9 June 2022  | Clermont-Ferrand   | 02:45  | -   | Cournon-d'Auvergne |
| f                | 9 June 2022  | Clermont-Ferrand   | 02:45  | -   | Clermont-Ferrand   |
| g                | 10 June 2022 | Distance (Zoom)    | 03:25  | 62  | Clermont-Ferrand   |

Table A4. Other interviews.

| Interview Number   | Date            | Interview Location         | Length   |
|--------------------|-----------------|----------------------------|----------|
| Policymaker (1)    | 25 October 2022 | Distance (Microsoft Teams) | 00h48.38 |
| Policymaker (2)    | 25 October 2022 | Distance (phone)           | 00h39.59 |
| Transport operator | 4 November 2022 | Distance (Zoom)            | 01h11:39 |
| Driving instructor | 10 June 2022    | Courpière                  | 00h31.15 |

## Appendix B Interview Guides

### Appendix B.1 Long Interview Guide (Period 1): The Impact of the Removal of the Tramway on Travelling Routines in Clermont and Its Metropolitan Area (Early 1950s–1970s)

Name

Age

Job position

City

Did you own a car/bike/motorcycle in that period of time? When did you get it?

**Before the tramway was removed (shortly before 1950 to 1956):**

Snapshot—What were your travelling/commuting routines at that time?/What were your main reasons for travelling at that time (work/school/tourism, ...)? (+ Which itinerary would you usually take?) [depending on how well they remember]

1. (Emotions/feelings)—What did your routine look like? Can you precisely describe it? Would it entail several means of transportation? Did it involve changes? (+ where?) What feelings/emotions would you associate with the means of transportation you would use (fun, stressful, feeling of freedom, of constraint, ...)? What were your views on the tramway/were you still supporting the tramway?
2. (Skills/capabilities)—How easy was it? Could anyone do the same or did it require specific skills/capabilities? (e.g., navigating through the city (e.g., during rush hours) with cars, buses, tramways, pedestrians, and bikes around; getting a driving licence; learning to ride a bike; knowledge about other means available (times and stops), distance and elevation (may be related to individual overall health and fitness level), ...)
3. (Financial capabilities)—Would money play an important role in your travelling routine? (e.g., tramway subscriptions/tickets, bus tickets, purchase of a bike, driving licence costs, purchase of a car, insurance costs, gasoline, ...)
4. (Social meanings)—In your surroundings, what would people think about your routine? Would it be seen as normal/unusual/dangerous/safe/difficult/easy? Would others do the same?
5. (Regulatory incentives/policies)—Do you remember any policy that could have affected your travelling routine? (e.g., progressive removal of tramway lines, one-way

road, car-free zones, tramway-only road, car/bus roads only, *subsidies to use a specific means of transport*)

6. (Infrastructure/artefact)–How were the tramway tracks/bus tracks/roads/cycling lanes/parking spots/pavement at the time? ((cobblestones, asphalt, concrete), delineated/mixed with other means of transportation) What was the frequency of tramways and buses? Was it the same at all stops? How time-efficient/time-saving was the tramway? Could you always find a spot in the tramway (*same at peak hours*)?

**After the tramway was removed (1956 to somewhere in the 1970s (*may stop with the first oil crisis in 1973*))**

Snapshot–What were your travelling/commuting routines at that time?/What were your main reasons for travelling at that time (work/school/tourism, ... )? (+ Which itinerary would you usually take?) (*depending on how well they remember*)

1. (Emotions/feelings)–What did your routine look like? Can you precisely describe it? (Would it encompass several means of transportation? Did it involve changes? (+ where?)) What feelings/emotions would you associate with the means of transportation you would use? What were your views on the buses?
2. (Skills/capabilities)–How easy was it? Could anyone do the same or did it require specific skills/capabilities? (e.g., navigating through the city (e.g., *during rush hours*) with cars, buses, pedestrians, and bikes around; getting a driving licence; learning to ride a bike; knowledge about other means available (times and stops), distance and elevation (may be related to individual overall health and fitness level), ... )
3. (Financial capabilities)–Would money play an important role in your travelling routine? (e.g., bus tickets, purchase of a bike, driving licence costs, purchase of a car, insurance costs, gasoline, car maintenance costs, parking tariffs, car registration costs ... )
4. (Social meanings)–In your surroundings, what would people think about your routine? Would it be seen as normal/unusual/dangerous/safe/difficult/easy? Would others do the same?
5. (Regulatory incentives/policies)–Do you remember any policy that could have affected your travelling habits? (e.g., road enlargement, enlargement of the bus fleet, one way road, car-free zones, car/bus roads only, *subsidies to use a specific means of transport*)
6. (Infrastructure)–How were the bus tracks/roads (road enlargement? creation of new roads?)/cycling lanes/parking spots/pavement at the time? ((cobblestones, asphalt, concrete), delineated/mixed with other means of transportation (any separate infrastructure for bikes?)) Did buses stop at the same places as the tramway would? What was the frequency of buses? Was it the same for all stops? How time-efficient/time-saving were the buses? How easy was it to find a seat on the buses (*same at peak hours*)?

Concluding thoughts/opening up: Are there any other things that we have not yet touched upon, you would like to bring to the fore that could explain the shift from the use of the tramway to other means of transportation?

*Appendix B.2 Long Interview Guide (Period 2): The Impact of the Reintroduction of the Tramway on Travelling Routines in Clermont and Its Metropolitan Area (2000–2022)*

Name

Age

Job position

City

Do you own a car/bike/scooter/motorcycle? When did you get it?

**Before the reintroduction of the tramway (2000–2006)**



Snapshot—What were your travelling/commuting routines at that time?/What were your main reasons for travelling at that time (work/school/tourism, ...)? Which itinerary would you usually take?

1. (Emotions/feelings)—What did your routine look like? Can you precisely describe it? Would it encompass several means of transportation? Did it involve changes? Where were the changes? What feelings/emotions/values would you associate with the means of transportation you would use (fun, stressful, feeling of freedom, of constraint, environmental values, ...)? What were your views on public transportation?
2. (Skills/capabilities)—How easy was your routine? Could anyone do the same or did it require specific skills/capabilities? (e.g., navigating through the city (e.g., *during rush hours*) with cars, buses, pedestrians, and bikes around; getting a driving licence; learning to ride a bike; knowledge about other means available (schedules and stops), distance and elevation (may be related to individual overall health and fitness level), ...)
3. (Financial capabilities)—Would money play an important role in your travelling routine? (e.g., bus tickets, bus subscription, purchase of a bike, purchase of a car, insurance costs, gasoline, car maintenance costs, parking tariffs (surface and underground), road taxes ...)
4. (Social meanings)—In your surroundings, how would people view your routine? Would it be seen as normal/unusual/dangerous/safe/difficult/easy? Would others do the same?
5. (Regulatory incentives/policies)—Do you remember any policy that could have affected your travelling habits? (e.g., road enlargement, enlargement of the bus fleet, one way road, extension of cycling lanes, car-free zones, car/bus roads only, subsidies to use a specific means of transport)
6. (Infrastructure/artefact)—How were the bus tracks/roads (road enlargement? creation of new roads?)/cycling lanes/parking spots (inc. underground parking)/pavement at the time? ((cobblestones, asphalt, concrete), equal distribution of all the means throughout the city/in some places, delineated/mixed with other means of transportation (any separate infrastructure for bikes?)) What was the frequency of buses? Was it the same for all stops? How time-efficient/time-saving were the buses? How easy was it to find a seat on the buses (*same at peak hours*)?

#### **After the reintroduction of the tramway (2006-onwards)**

Snapshot—What have been your travelling/commuting routines since that time?/What are your main reasons for travelling (work/school/tourism, ...)? Which itinerary do you usually take?

1. (Emotions/feelings)—What does your routine look like? Can you precisely describe it? Do you take several means of transportation? Does your routine involve changes? Where are the changes? What feelings/emotions/values would you associate with the means of transportation you use (fun, stressful, feeling of freedom, of constraint, environmental values, ...)? What are your views on public transportation and on the tramway?
2. (Skills/capabilities)—How easy is your routine? Can anyone do the same or does it require specific skills/capabilities? (e.g., navigating through the city (e.g., *during rush hours*) with cars, tramways, buses, pedestrians, and bikes around; getting a driving licence; learning to ride a bike; knowledge about other means available (schedules and stops), distance and elevation (may be related to individual overall health and fitness level), ...)
3. (Financial capabilities)—Does money play an important role in your travelling routine? (e.g., bus/tramway tickets, tramway/bus subscription, purchase of a bike, purchase of a car, insurance costs, gasoline, car maintenance costs, parking tariffs (surface and underground), road taxes ...)

4. (Social meanings)–In your surroundings, how do people view your routine? Is it seen as normal/unusual/dangerous/safe/difficult/easy? Do others do the same?
5. (Regulatory incentives/policies)–Can you think of any policy that has been affecting your travelling habits? (e.g., reintroduction of the tramway, one way road, extension of cycling lanes, extension of car-free zones, financial incentives to use/buy a specific means of transport, free public transport in the weekend)
6. (Infrastructure/artefact)–How are the tramway tracks/bus tracks/roads (road enlargement? creation of new roads?)/cycling lanes (length and geographical location)/parking spots (inc. underground parking)/bike parking spaces/pavement/charging stations (geographical location and number)? ((cobblestones, asphalt, concrete), equal distribution of all the means throughout the city/in some places, delineated/mixed with other means of transportation (any separate infrastructure for bikes?)) How time-efficient/time-saving are the tramway and the buses? How easy is it to find a seat on the buses and on the tramway (*same at peak hours*)?

Concluding thoughts/opening up: Are there any other things that we have not yet touched upon, you would like to bring to the fore that could further inform the impact of the reintroduction of the tramway on travelling habits?

#### *Appendix B.3 Short Interview Guide: Current Mobility Practices in Clermont and Its Metropolitan Area*

Name

Age

Job

City

Snapshot: What is the main reason you travel? Where do you go? How do you travel there?

1. How easy is your routine? (ICT skills, physical capacities . . . )
2. Do other people do the same? How would society describe your routine? (normal, dangerous, easy)
3. What does the infrastructure overall look like? (bus lanes, cycling lanes, pavement . . . )

#### *Appendix B.4 Short Interview Guide: Cycling Practice/Culture Interview*

1. Do you cycle in Clermont or its metropolitan area? (YES/NO) Why? Why not? (OPEN-ENDED)
2. (emotions)\_Would you cycle more if the lanes were safer? (OPEN-ENDED YES/NO)
3. (infrastructure)\_Would you cycle more if there were more cycling lanes/if the cycling lane network was more extensive? (OPEN-ENDED YES/NO)
4. (financial capabilities)\_Would you cycle more if it was more affordable? (OPEN-ENDED YES/NO)
5. (emotions) 29 survey respondents expressed that cycling in Clermont is scary/dangerous. How do you feel about this? Do you agree/disagree? Why? (OPEN-ENDED)
6. (social meanings)\_Do you think there is a bike culture in France? (YES/NO)
7. Please define [French culture] in your own words (OPEN-ENDED)

#### *Appendix B.5 Interview Guide: Policymakers and Transportation Operator Interviews*

1. Could you summarise the main trends in mobility policies in Clermont-Ferrand in the last 10 years?
2. According to you, what could explain the change of focus from public transport-only to public transportation and active mobility?
3. Clermont-Ferrand has invested in the tramway as well as in cycling infrastructure. Still, car mobility is prominent and dominating in the Metropole. Could you reflect

- on the effect of mobility policies implemented in the last ten years, especially on the limited reduction of car mobility?
4. Could you reflect on why policies encouraging cycling in the city have been met with limited success?
  5. Olivier Bianchi (head of Clermont Metropole and mayor of Clermont-Ferrand) recently stated that “infrastructure changes should have occurred more than ten years ago”. Can you think of any factor that would have impaired/impeded the decision making to such an extent?
  6. To what extent do you perceive poverty and financial factors affect people’s mobility choices?
  7. How do you see the link between urban development projects (e.g., housing development areas, offices, etc.) and mobility choices?
  8. Which role should policy-making play in steering fundamental mobility practice changes? (for example reducing the share of car mobility by 10%) To what extent do you perceive policy-making as a powerful tool to steer fundamental mobility practice changes?
  9. Anything else? e.g., do you recommend particular policy reports? Do you know of any particular modal share data?

### Appendix C Written Sources

**Table A5.** Written sources.

|                   |                                                                                                                                                                                       |
|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Written source #1 | Anonymous. (Undated, after 1953). Note.                                                                                                                                               |
| Written source #2 | Préfet du Puy-de-Dôme. (17 March 1938). Tramways de Clermont-Ferrand: Le Préfet du Puy-de-Dôme à Monsieur l’Ingénieur en Chef du Contrôle des V.F.I.L. et des Tramways.               |
| Written source #3 | Union Locale des Syndicats C.G.T. June 1954. Tramways ou trolleybus.                                                                                                                  |
| Written source #4 | Crepon. P. (9 March 1970). Réseau de transports en commun de l’agglomération clermontoise. pp. 1–4.                                                                                   |
| Written source #5 | Crepon, P. (10 December 1957). Compte rendu d’enquête sur les modifications dans l’exploitation du réseau de la compagnie des T.C.R.C. p. 2.                                          |
| Written source #6 | Ponts et Chaussées. (21 January 1941). Déclassement de la ligne de tramways électriques “Place Gaillard-Octroi de Fontgiève” et établissement d’un service d’autobus de remplacement. |
| Written source #7 | Transports de l’Agglomération Clermontoise. (1953). Tarification actuelle. p. 9.                                                                                                      |
| Written source #8 | Anonymous handwritten table. (1975). Évolution Réseau T.C.R.C. depuis 1947.                                                                                                           |

As mentioned in the methods section, documents were selected using keywords associated with the dates of period 1, and consulted at the Archives Départementales du Puy-de-Dôme. Documents, which were unnumbered, were photographed, and the table below presents the identification information available for each of the document we used in our research.

### References

1. ECA. *Sustainable Urban Mobility in the EU: No Substantial Improvement is Possible without Member States’ Commitment*, European Court of Auditors; Special Report 06/2020; European Court of Auditors: Luxembourg, 2020.
2. EU Commission. Transport Emissions. Climate Action. 2021. Available online: [https://ec.europa.eu/clima/eu-action/transport-emissions\\_en](https://ec.europa.eu/clima/eu-action/transport-emissions_en) (accessed on 7 December 2021).
3. Ministère de la Transition Écologique. Chiffres Clés des Transports: Émissions de Gaz à Effet de Serre du Transport. 2022. Available online: <https://www.statistiques.developpement-durable.gouv.fr/edition-numerique/chiffres-cles-transports-2022/19-emissions-de-gaz-a-effet#:~:text=Depuis%201998%2C%20les%20transports%20sont,en%20repr%C3%A9sentaient%2031%2C1%20%25> (accessed on 2 March 2022).
4. Loustic, I.; Matyas, M. Exploring city propensity for the market success of micro-electric vehicles. *Eur. Transp. Res. Rev.* **2020**, *12*, 42. [CrossRef]
5. Hardt, C.; Bogenberger, K. Usage of e-Scooters in Urban Environments. *Transp. Res. Procedia* **2019**, *37*, 155–162. [CrossRef]

6. KiM. Sturen in parkeren. Retrieved from The Hague. 2018. Available online: <https://www.kimnet.nl/publicaties/rapporten/2018/06/18/sturen-in-parkeren> (accessed on 3 April 2023).
7. Huang, Y.; Qian, L.; Soopramanien, D.; Tyfield, D. Buy, lease, or share? Consumer preferences for innovative business models in the market for electric vehicles. *Technol. Forecast. Soc. Chang.* **2021**, *166*, 120639. [CrossRef]
8. EU Commission. Sustainable and Smart Mobility Strategy. 2021. Available online: <https://transport.ec.europa.eu/system/files/2021-04/2021-mobility-strategy-and-action-plan.pdf> (accessed on 7 December 2021).
9. Holden, E.; Gilpin, G.; Banister, D. Sustainable Mobility at Thirty. *Sustainability* **2019**, *11*, 1965. [CrossRef]
10. Bieda, K. Car-free cities: Urban utopia or real perspective? A: Virtual City and Territory. In *Back to the Sense of the City: International Monograph Book*; Centre de Política de Sòl i Valoracions: Barcelona, Spain, 2016; pp. 50–61.
11. Curtis, C.; Low, N. *Institutional Barriers for Sustainable Transport*; Ashgate: Farnham, UK, 2012.
12. Dijk, M.; Hommels, A.; Stoffers, M. The transformation of urban mobility practices in Maastricht (1950–1980): Coevolution of cycling and car mobility. *Transf. Interdiscip. J. Mobil. Stud.* **2021**, *11*, 22–61. [CrossRef]
13. Stanković, J.; Dijk, M.; Hommels, A. Upscaling, Obduracy, and Underground Parking in Maastricht (1965–Present): Is There a Way Out? *J. Urban Hist.* **2021**, *47*, 1225–1250. [CrossRef]
14. Schippl, J.; Arnold, A. Stakeholders' Views on Multimodal Urban Mobility Futures: A Matter of Policy Interventions or Just the Logical Result of Digitalization? *Energies* **2020**, *13*, 1788. [CrossRef]
15. Batty, P.; Palacin, R.; González-Gil, A. Challenges and opportunities in developing urban modal shift. *Travel Behav. Soc.* **2015**, *2*, 109–123. [CrossRef]
16. Curtis, P. D5.1 A long term analysis of traffic congestion and car use reduction in major European cities: What policies and measures worked? In *Tackling Urban Road Congestion: Congestion Reduction in Europe: Advancing Transport Efficiency*; European Commission: Brussels, Belgium, 2018.
17. Buehler, R.; Pucher, J.; Gerike, R.; Götschi, T. Reducing car dependence in the heart of Europe: Lessons from Germany, Austria, and Switzerland. *Transp. Rev.* **2017**, *37*, 4–28. [CrossRef]
18. Strompen, F.; Litman, T.; Bongardt, D. *Reducing Carbon Emissions through Transport Demand Management Strategies Beijing Transportation Research Center Beijing Transportation Research Center*; Federal Ministry for the Environment, Nature Conservation, and Nuclear Safety: Berlin, Germany, 2017.
19. IEA. *Transport, Energy, and CO<sub>2</sub>: Moving Towards Sustainability*; OECD iLibrary: Washington, DC, USA, 2009. [CrossRef]
20. Black, C.S.; Schreffler, E.N. Understanding transport demand management and its role in delivery of sustainable urban transport. *Transportation Transp. Res. Rec.* **2010**, *2163*, 81–88. [CrossRef]
21. Banister, D. The sustainable mobility paradigm. *Transp. Policy* **2008**, *15*, 73–80. [CrossRef]
22. Cairns, S.; Harmer, C.; Hopkin, J.; Skippon, S. Sociological perspectives on travel and mobilities: A review. *Transp. Res. Part A Policy Pract.* **2014**, *63*, 107–117. [CrossRef]
23. Hodson, M.; Geels, F.W.; McMeekin, A. Reconfiguring urban sustainability transitions, analysing multiplicity. *Sustainability* **2017**, *9*, 299. [CrossRef]
24. Nieuwenhuijsen, M.; Bastiaanssen, J.; Sersli, S.; Waygood, E.O.D.; Khreis, H. Implementing car-free cities: Rationale, requirements, barriers and facilitators. In *Integrating Human Health into Urban and Transport Planning*; Nieuwenhuijsen, M., Khreis, H., Eds.; Springer: Cham, Switzerland, 2019; pp. 199–219.
25. Bertolini, L. From “streets for traffic” to “streets for people”: Can Street experiments transform urban mobility? *Transp. Rev.* **2020**, *40*, 734–753. [CrossRef]
26. Nijland, H.; van Meerkerk, J. Mobility and environmental impacts of car sharing in the Netherlands. *Environ. Innov. Soc. Transit.* **2017**, *23*, 84–91. [CrossRef]
27. Watson, M.; Shove, E. How Infrastructures and Practices Shape Each Other: Aggregation, Integration and the Introduction of Gas Central Heating. *Sociol. Res. Online* **2022**, 136078042110554. [CrossRef]
28. Sovacool, B.K.; Hess, D.J. Ordering theories: Typologies and conceptual frameworks for sociotechnical change. *Soc. Stud. Sci.* **2017**, *47*, 703–750. [CrossRef]
29. Reckwitz, A. Toward a theory of social practices: A development in culturalist theorizing. *Eur. J. Soc. Theory* **2002**, *5*, 243–263. [CrossRef]
30. Shove, E.; Pantzar, M.; Watson, M. *The Dynamics of Social Practice*; Sage: London, UK, 2012. [CrossRef]
31. Dijk, M.; Backhaus, J.; Wieser, H.; Kemp, R. Policies tackling the “web of constraints” on resource efficient practices: The case of mobility. *Sustain. Sci. Pr. Policy* **2019**, *15*, 62–81. [CrossRef]
32. Cass, N.; Faulconbridge, J. Commuting practices: New insights into modal shift from theories of social practice. *Transp. Policy* **2016**, *45*, 1–14. [CrossRef]
33. Sopjani, L.; Stier, J.J.; Hesselgren, M.; Ritzén, S. Shared mobility services versus private car: Implications of changes in everyday life. *J. Clean. Prod.* **2020**, *259*, 120845. [CrossRef]
34. Sprei, F. Disrupting mobility. *Energy Res. Soc. Sci.* **2018**, *37*, 238–242. [CrossRef]
35. Ministère de la Transition Écologique et de la Cohésion des Territoires. Données et Études Statistiques: Mobilité Locale en Semaine Selon les Motifs de Déplacements. 2019. Available online: <https://www.statistiques.developpement-durable.gouv.fr/resultats-detailles-de-lenquete-mobilite-des-personnes-de-2019> (accessed on 4 May 2023).

36. Clermont Métropole. PDU de L'agglomération Clermontoise—Diagnostic et Enjeux. 2019. Available online: <https://fr.calameo.com/read/002852444c666b93fca2b> (accessed on 25 January 2022).
37. OECD. Urban Population by City Size. 2022. Available online: <https://data.oecd.org/popregion/urban-population-by-city-size.htm#indicator-chart> (accessed on 8 March 2022).
38. INSEE. Comparateur de Territoires—Commune de Clermont-Ferrand. 2022. Available online: <https://www.insee.fr/fr/statistiques/1405599?geo=COM-63113> (accessed on 16 May 2022).
39. Clermont Auvergne Métropole. Chiffres Clés. 2022. Available online: <https://www.clermontmetropole.eu/ma-metropole/la-carte-et-le-territoire/chiffres-cles/> (accessed on 3 March 2022).
40. Ryat, A.; Decker, J.-P. *D'un Tram à L'autre, une Histoire des Transports Publics de L'agglomération Clermontoise*, 1st, 2nd and 4th ed.; Consulted at Bibliothèque du Patrimoine in Clermont-Ferrand in February and May 2022; T2C: Clermont-Ferrand, France, 2002.
41. La Montagne. *Hors-Série: "Clermont des Années 50"*; Consulted on site in May 2022; Centre France: Clermont Ferrand, France, 2022.
42. Baudelot, C.; Lebeaupin, A. Les salaires de 1950 à 1975. *Econ. Stat.* **1979**, *113*, 15–22. Available online: [https://www.persee.fr/doc/estat\\_0336-1454\\_1979\\_num\\_113\\_1\\_4224](https://www.persee.fr/doc/estat_0336-1454_1979_num_113_1_4224) (accessed on 21 June 2022). [CrossRef]
43. L'Aventure Michelin. Naissance D'une Ville Industrielle: Michelin et Clermont-Ferrand. 2021. Available online: <https://laventure.michelin.com/wp-content/uploads/sites/43/2021/06/Naissance-dune-ville-industrielle.pdf> (accessed on 3 April 2022).
44. Pflieger, G.; Pattaroni, L.; Kaufmann, V.; Jemelin, C. How Does Urban Public Transport Change Cities? Correlations between Past and Present Transport and Urban Planning Policies. *Urban Stud.* **2009**, *46*, 1421–1437. [CrossRef]
45. Méot, T. L'industrie Automobile en France Depuis 1950: Des Mutations à la Chaîne. 2009. Available online: <https://www.insee.fr/fr/statistiques/1372354?sommaire=1372361> (accessed on 26 April 2022).
46. La Montagne. Michelin Emploie Encore Près de 9300 Salariés à Clermont-Ferrand. 2022. Available online: [https://www.lamontagne.fr/clermont-ferrand-63000/entreprendre/michelin-emploi-encore-pres-de-9-300-salaries-a-clermont-ferrand\\_14226186/](https://www.lamontagne.fr/clermont-ferrand-63000/entreprendre/michelin-emploi-encore-pres-de-9-300-salaries-a-clermont-ferrand_14226186/) (accessed on 28 September 2022).
47. European Environmental Agency. *Corine Land Cover*; Clermont Auvergne Métropole: Clermont Ferrand, France, 2012; 1.108159. Available online: <https://www.geoportail.gouv.fr/donnees/corine-land-cover-2012>. (accessed on 17 October 2022).
48. Papon, F. Le Retour du Vélo Comme Mode de Déplacement. 2012. Available online: <https://tel.archives-ouvertes.fr/tel-00852427> (accessed on 2 June 2022).
49. Préfet du Puy-de-Dôme. L'environnement: Une Chance Pour le Grand Clermont. 2007. Available online: [https://www.puy-de-dome.gouv.fr/IMG/pdf/4\\_\\_environnement\\_cle19ae46.pdf](https://www.puy-de-dome.gouv.fr/IMG/pdf/4__environnement_cle19ae46.pdf) (accessed on 11 May 2022).
50. Boquet, Y. The Renaissance of Tramways and Urban Redevelopment in France. *Misc. Geogr.* **2017**, *21*, 5–18. [CrossRef]
51. Golias, R.; Kertudo, C.; Dablanc, L.; Bernard, P.; Dujeancourt, M.; Sampic, J.; Burkhart, J.-F.; Dejeammes, M.; Jean, M.; Laferrère, G.; et al. *Suivi National des PDU: Le Point au 30 Juin 2000*. Centre D'études Sur les Réseaux, les Transports, L'urbanisme et les Constructions Publiques (CERTU); HAL Open Science: Lyon, France, 2000; 100p, hal-02165270.
52. Fabien1309. Tram sur la place de Jaude à Clermont-Ferrand. (2007). Available online: [https://commons.wikimedia.org/wiki/File:Tram\\_place\\_de\\_jaude\\_1.jpg](https://commons.wikimedia.org/wiki/File:Tram_place_de_jaude_1.jpg) (accessed on 30 May 2023).
53. Gagnière, V. Les effets du tramway sur la fréquentation du transport public. Un bilan des agglomérations françaises de province. *Rev. Géographique l'Est* **2010**, *52*, 1–2. [CrossRef]
54. T2C. Rapport D'activité 2015. 2015. Available online: <https://es.calameo.com/read/0002507369a609924599d> (accessed on 5 November 2022).
55. T2C. Principes et Tarifs. 2022. Available online: <https://www.t2c.fr/principes-et-tarifs> (accessed on 7 March 2022).
56. T2C. Gratuité le Week-End. 2022. Available online: <https://www.t2c.fr/gratuite-le-week-end> (accessed on 13 January 2022).
57. CVélo. Vélos en Libre-Service. 2022. Available online: <https://www.c-velo.fr/velos-en-libre-service/> (accessed on 19 August 2022).
58. Ministère de la Transition Écologique et de la Cohésion territoriale. Le Plan Vélo et Mobilités Actives. 2022. Available online: <https://www.ecologie.gouv.fr/velo-et-marche> (accessed on 30 May 2022).
59. Clermont Métropole. Plan de Déplacements Urbains (PDU) de L'agglomération Clermontoise—Plan D'actions. 2019. Available online: <https://www.calameo.com/read/002852444a25a9dca060b> (accessed on 14 January 2022).
60. Deguitre, L.; Courel, J. *Les Déterminants du Choix Modal: Synthèse des Connaissances Scientifiques*; L'Institut Paris Région: Paris, France, 2020.
61. Ministère de la Transition Écologique. Prime à la Conversion des Véhicules et Bonus Écologique 2023. 2023. Available online: <https://www.primealaconversion.gouv.fr/dboneco/accueil/accueilVehiculesParticulier.html> (accessed on 9 March 2023).
62. Dijk, M. *Making the market: The transformation pathway to electric car mobility in the Netherlands*. *Electrifying Mobility: Realising a Sustainable Future for the Car (Transport and Sustainability)*; Parkhurst, G., Clayton, W., Eds.; Emerald Publishing Limited: Bingley, UK, 2022; Volume 15, pp. 71–95. Available online: <https://www.emerald.com/insight/content/doi/10.1108/S2044-99412022000015007/full/html> (accessed on 8 May 2023).
63. Kaufmann, V. Mobilités et réversibilités: Vers des sociétés plus fluides? *Cah. Int. Sociol.* **2005**, *118*, 119–135. [CrossRef]
64. Givoni, M.; Macmillen, J.; Banister, D.; Feitelson, E. From Policy Measures to Policy Packages. *Transp. Rev.* **2013**, *33*, 1–20. [CrossRef]



- 
65. Bauman, Z. *Liquid Modernity*; Polity Press: Cambridge, UK, 2000.
  66. Pearce, M.; Landriève, S.; Gay, C.; Dubois, T. *Enquête Nationale Mobilité et Modes de Vie 2020*; Forum vie Mobiles: Paris, France, 2020.

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