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Article

Digital Work and Urban Delivery: Profile, Activity and Mobility Practices of On-Demand Food Delivery Couriers in Paris (France)

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Abstract: Platform-based on-demand delivery services are rapidly developing in urban areas, especially in the food sector, raising new issues for urban planners, especially in the field of transport. Based on a survey of over 100 couriers conducted in 2018 in the municipality of Paris (France), this work aims at analyzing the profile, delivery activity and mobility practices of the couriers working for these platforms. The main objective is to show how mobility practices are shaped by the characteristics of digital work in the urban delivery sector, and to highlight new challenges for urban authorities and research. Compared to other studies, our work is based on quantitative data and distinguishes three categories of couriers, depending on whether they have another activity: students, people with another paid job, and people with no other paid or non-paid activity. Findings show that these three categories have different characteristics, regarding age, education, residential location, the intensity of delivery activity and the characteristics of mobility practices, especially regarding the transport modes used. The article ends with the discussion of a number of new challenges for both urban authorities and researchers regarding the sustainability of these new forms of digital work in urban delivery.

Keywords: on-demand urban delivery; couriers; platform; digital work; gig work; mobility practices; Paris (France)



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1. Introduction

The widespread distribution of smartphones has encouraged the digital transformation of many sectors [1], including urban delivery. On-demand platform-based delivery services are developing, mainly in large cities and in the food sector [2–6]. Depending on the country, these new services either accelerate existing consumption patterns or, on the contrary, try to conquer a new market, as is the case in France [7].

Digitalization contributes to the transformation of society in many ways, including the organization of work [8]. If platform-based delivery services are based on diversified models that provide couriers with different statuses [9,10], the model based on gig workers dominates: delivery tends to be performed by a large number of independent couriers, whether on a full-time or part-time basis [11]. This raises new challenges for public authorities in the areas of labor law and employee protection [9,12,13].

Moreover, urban authorities are also facing new issues related to the impacts of these new forms of digital work on physical space, especially in terms of the use of public spaces [14–16], and mobility practices: safety and accidents, traffic growth, carbon-footprint of the transport modes used, etc. [17–22]. These new challenges require better knowledge of the couriers and their work, especially their mobility practices and how they are shaped by platform-based work. However, little research is available in this field [18], especially due to a lack of data.

Based on a quantitative survey by questionnaire of over 100 couriers conducted in 2018 in the municipality of Paris (France), this work aims at better characterizing the profile, delivery activity and mobility practices of the couriers working for these platforms. The main objective is to show how mobility practices are shaped by the characteristics of digital work in the on-demand urban delivery sector, and to highlight new challenges for urban authorities and research. Compared to other studies in this field, our work is based on quantitative data and distinguishes three categories of couriers, depending on whether they have another activity: students, people with another paid job, and people with no other paid or non-paid activity.

The paper is organized as follows. The Section 2 offers a literature review on platform-based on-demand food couriers. The Section 3 details the methodology. The Section 4 describes the characteristics of the three categories of couriers, and the Section 5 analyzes their delivery activity. The Section 6 focuses on their mobility practices. Finally, the article ends with the discussion of a number of new challenges for both urban authorities and researchers regarding the sustainability of these new forms of urban delivery.

2. Literature Review

2.1. Profile of the Couriers

Due to lack of data, the profile of the people working for platform-mediated delivery services remains poorly documented. However, several case studies show that young men are largely over-represented [23–25], as they also are in traditional delivery services [26,27]. This overrepresentation of male workers is related to gendered expectations, harassment from co-workers and the public, but also to difficulties in accessing public restrooms [23]. Moreover, migrants seem to be over-represented in some cities [25]. As for the gig economy in general, platform-mediated food delivery couriers are, students, people with another paid job, for whom platform work offers opportunities to earn additional income, and people for whom platform work provides relatively easy access to employment, requiring little or no qualifications and a low initial financial investment [28,29]. Although it is not yet well documented, the share of these different categories seems to vary across cities [24,30]. Moreover, to our knowledge, existing studies do not compare the profile, delivery activity and mobility patterns of these three categories of couriers, which constitutes the main objective of this article.

2.2. Characteristics of Platform-Based Delivery Activity

Digital work encompasses many forms of work in relationship with the use of digital technologies, such as homebased teleworking, work in satellite offices, etc. [31]. Recently, the platformization of the economy, for instance in the transport sector [32], has brought new challenges in the area of the development of digital work [33].

In previous years, platform work has been extensively analyzed in the area of on-demand food delivery. If some studies underline that flexible working hours, independence and the absence of a hierarchy are appreciated [4], they also highlight numerous negative aspects. They firstly report on the difficulties related to the algorithmic control imposed by the platforms [25,34–37]. Platforms assign tasks by using algorithms that lack transparency, create competition between couriers and tend to reward those who are the most connected and available by giving them the best delivery runs [37–39]. Secondly, gig work and the lack of social protection makes workers financially vulnerable, especially those with no other paid activity [40]. Many couriers have to work for several platforms [30,41] in order to reduce non-productive idle time and increase their income, as they are generally paid by task and each task is poorly paid [28,36,42,43]. Thirdly, precarity is reinforced by the fact that many costs are not met by the platform [24]. These include those related to smartphones (purchase, subscription), but also to mobility, such as purchase, insurance, fuel and maintenance of the delivery vehicle, which further erodes incomes [30,38].

2.3. Mobility Practices of the Couriers

Three main categories of studies investigate the mobility patterns of platform-based food delivery couriers. A first category falls in the area of ‘classical’ studies on travel behavior. They describe the transport modes used or the distances traveled by the couriers. They show that the use of bicycles and motorized two-wheelers (mopeds and bikes) is dominant, even though there seem to be differences across cities. In Manaus City (Brazil), for instance, 55% of platform-mediated food delivery workers ride a motorcycle, 44% a bike and 1% drive a car [44], whereas in Perth and Melbourne (Australia) bicycles are used by 75% of couriers, motorcycles by only 20% and cars by the remaining 5% [30]. In Japan, more than 50% of couriers working for Uber Eats use a bicycle, and the other half a moped, with no difference before and after the pandemic [45]. Average distance traveled or speed are poorly documented. Data from a major on-demand platform provider, [46], highlighted that the mean one-way trip distance for meal delivery was 2 km at 5.5 km per hour in Greater London in 2017, and that meal deliveries by cars and motorized two-wheelers were associated with more emissions and curb occupancy than by bicycles.

A second category of studies falls in the area of road safety, and shows interesting links between platform work, the transport modes used and the risks and accidents. The use of bicycles and two-wheelers exposes platform-mediated couriers to road accidents, such as collisions with cars [47]. Long hours on the road, the need to frequently use smartphones, and also the pressure to violate traffic regulations to gain time and make more deliveries are also important risk factors [20,25,47,48]. In China, the authors in [47] showed how road traffic injuries were affected by daily travel distances and bad cycling behavior. Recently, the authors in [49] demonstrated that risk-taking behaviors and accidents of what they called commercial cyclists (i.e., bike messengers and food delivery bike couriers) were directly impacted by work-related factors, such as travel distances, accumulation of multiple short trips, type of bicycle used, experience of the work, knowledge of the city, and, finally, the type of working arrangements (full-time, seasonal or part-time).

Finally, few studies investigate the links with urban policies, and constitute a third category. They highlight that the design of the streets and the cycling network seem to have a strong influence in making the delivery activity a more or less dangerous experience [50,51].

3. Materials and Methods

3.1. Survey

We conducted a survey by questionnaire from January to March 2018. Platform-based delivery couriers were randomly chosen in the north and east of Paris on the street, during their working hours, while waiting in front of a restaurant or during a delivery. The survey perimeter covered several districts in the East of Paris. We used a sample of 107 respondents, randomly chosen during their idle times, and we met with very few rejections. The questionnaire had previously been tested with exploratory interviews. It consisted mainly of closed-ended questions administered face to face by an interviewer or online if they did not have enough time. However, only 20% of the 107 questionnaires were completed online.

It was not possible to proceed by sampling due to the absence of a public database on the population of delivery workers in France or Paris, and the refusal of the platforms to share their data with us. However, the number of couriers (more than 100) and the selection process (random selection of the couriers within a precisely defined perimeter, with variation in survey days and times) constituted a guarantee of representativeness.

3.2. Questionnaire

A set of questions aimed to obtain data to describe the socio-demographic and economic characteristics of the couriers using the usual variables: age, gender, educational attainment, place of residence and whether or not they had any activity other than delivery work. The respondents’ career paths were also described, including length of service in the platform-mediated delivery business and their main motivation for being a courier. The

respondents had to choose one option from the five following representative modalities: I wanted a job with a lot of independence; I wanted a job that would allow me to earn more money; it was the only job I could find; to supplement my income; other.

The characteristics of delivery work concerned the occupational status of the person (employee or self-employed), working conditions (in particular remuneration, the number of deliveries per day, the days worked during the week and the method of remuneration) and the name of the platform(s) involved.

Furthermore, some challenges relating to their delivery work were proposed to the couriers. The items proposed were identified through exploratory interviews: customers (incorrect address, etc.); smartphone (battery, application malfunction, etc.); their equipment (parking, mechanical problems, repairs, etc.); restaurants or pick-up points (waiting time, etc.); other (to be specified). The couriers had to choose their two most significant constraints from this list.

The questionnaires collected data on the couriers' usual mobility practices when making their deliveries. Data about mobility related to the main usual mode of transport used. France is an interesting case study since the purchase of a Domestic Transportation License is required to use a motorized vehicle (including a mop) for freight transport. The latter is based on financial capacity, specific training and lack of offenses on judicial records. It is required for any freight transport company owner, to which self-employed delivery workers belong. Data on mobility also included average travel time (for each delivery run) and average distance covered for a delivery run. The couriers were also asked about risk taking on the road, feelings of vulnerability and, finally, about the reaction of customers in the event of delays (whether or not they were understanding). The questionnaire also included closed-ended questions about the constraints they faced with regard to mobility during delivery. The couriers had to choose their two most significant constraints from the following list: congestion; road hazards; the weather; lack of suitable equipment for travel needs.

Finally, five areas for improvement, which respondents were asked to rank in order of importance, were also included at the end of the questionnaire: Optimize meal preparation time so the courier does not have to wait at the restaurant; Increase the number of pieces of equipment provided (for free) by the platform; Provide containers that are appropriate for the varied nature of the contents and their transportation; Provide dedicated, secure, bicycle parking; Increase the number of cycle lanes. These items were previously identified during exploratory interviews

4. Profile of the Couriers

As with deliveries in general, the on-demand delivery sector is male-dominated: in 2018, 98% of the people surveyed were male, which was more than in the study by [24] in Belgium. Two other characteristics which are typical of those who work for a delivery platform are their youth, two thirds of them are under 25 years of age and, therefore, probably have few family constraints, as family constraints are not very compatible with a job which is mainly conducted in the evenings and at weekends. On the other hand, almost all of them are independent contractors, as demanded by the platforms. In 2018, the majority of delivery workers lived in Paris (43%) or nearby, in one of the three adjoining districts (37%), but 20% lived in the outer suburbs.

As expected, our sample was composed of three categories of workers (Figure 1). There were those for whom on-demand delivery was a way of securing additional income or financing their studies. This is the idea of "making money with your bike", as put forward by some platforms [52]. In 2018, students accounted for just over a third (36%) of our sample, and persons with other paid jobs seeking additional income accounted for only 16%. Students and persons with another income, therefore, made a total of 42% of those surveyed in 2018.

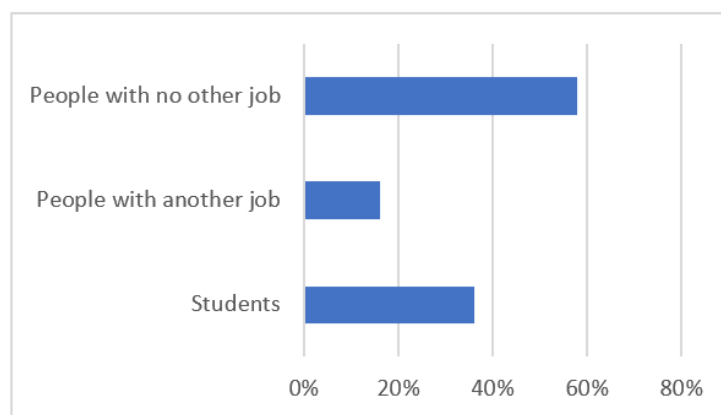


Figure 1. Profile of the couriers in Paris in 2018. Source: Survey by the authors.

The platforms also attract a third category of people who find it difficult to access the mainstream labor market because of their youth (i.e., inexperience, lack of professional networks, etc.), lack of qualifications and/or discrimination. These ‘full-timers’ (as opposed to part-time couriers) of on-demand delivery represent 58% of the couriers surveyed in 2018. They were initially attracted by the independence provided by on-demand delivery in terms of work organization (workers are free to accept or refuse delivery runs) and work schedules. Half of this group emphasized this aspect when explaining why they worked for one or more platforms, 10 percent more than for the other types of respondents. However, for a quarter of them, it was also the only job they had found, while the other categories of delivery workers were more interested in the prospect of an additional income. Full-timers also more often resided outside the capital, more so than in the other categories: 34% lived in Paris (about 10 percent fewer than the average for the sample in 2018), and 40% in one of the three adjoining districts, mainly in working-class municipalities.

5. Characteristics of the Delivery Activity

In 2018, 70% of our respondents worked for one of the two main platforms present on the French market. Most of the deliveries consisted only of meals, although some of the surveyed couriers also carried small parcels or mail (19% of them in 2018). Moreover, in 2018, just over half of the couriers worked for a platform that delivers in less than 30 min, and 42% for one that delivers within between 30 min and one hour. Half of them worked in a single district of Paris, and the other half delivered to all parts of the city. In proportion, more full-time couriers delivered all over Paris (63%) than students (47%) and couriers who had other jobs (57%).

Eighty-four percent of the couriers surveyed in 2018 were paid per delivery run, and each run earned them about €5 on average. Tips, which were almost universally received (by 90% of the surveyed couriers), substantially increased their remuneration, by around one or two euros per run. In addition, the platforms often provided bonuses or incentives. Three-quarters of the couriers reported receiving some, but the amount varied greatly and was rarely more than €100 in any month. In 2018, just over a quarter of the respondents worked for two or more platforms, probably to increase their income. More than 80% earned on average less than 1500 Euros gross by month, which corresponded roughly to the French minimum wage. Earning a sufficient income, especially when on-demand delivery was someone’s only paid work, therefore required couriers to increase the number of hours and days they worked. In 2018, more than half of the people surveyed stated that they worked more than 5 h a day (Figure 2), and 44% reported making deliveries on at least 6 days a week. In particular, they worked on days when demand was high, such as Saturday and/or Sunday, and often both, which applied to three-quarters of the couriers interviewed in 2018.

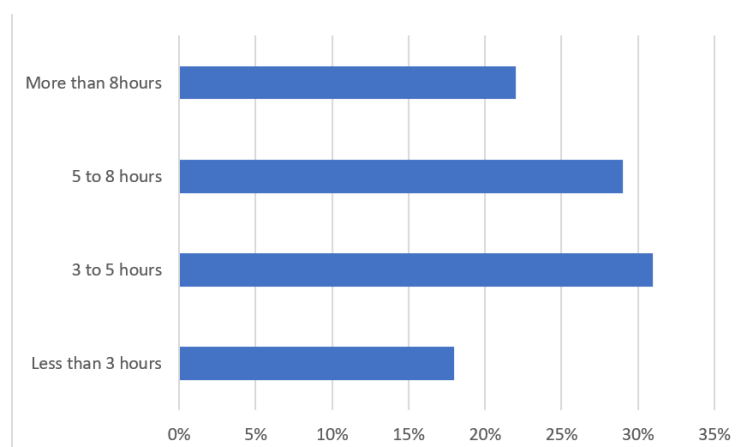


Figure 2. Working hours per day in 2018. Source: Survey by the authors.

As one would expect, the couriers who reported having another activity (either paid work or study) worked less frequently and did fewer hours than “full-timers”. In 2018, 75% of the students and half of those with other paid jobs worked 5 days a week or less (and, respectively, 36% and 19% worked only 3 days), while 40% of the “full-timers” reported working six days a week, and over a quarter (27%) made deliveries every day. Three-quarters of “full-timers” worked more than 5 h a working day, compared to 44% of those with other paid work and just under a quarter of the students. The “full-timers”, therefore, had a particularly heavy workload. The workload of those seeking additional income was lower, but still very considerable. Thus, half the students worked between 3 and 5 h on a working day, and a quarter of those couriers with other jobs reported doing more than 8 h of deliveries per day. The income generated (gross amounts) was barely decent in relation to the workload. In 2018, the “full-timers” estimated that they earned just over €1700 per month, compared to €1400 for those with another job and €1100 for the students.

6. Mobility Practices

6.1. Number of Delivery Runs

Couriers made about 12.5 deliveries per day in 2018. More than half of them (54%) made less than 10 deliveries, and 11% made more than 21 deliveries. The “full-timers” (13.2 deliveries per day) and the people who had another job (12.7) made, on average, more deliveries per day than the students (11.7). However, the differences remained quite low.

6.2. Transport Modes Used

A total of 94% of the couriers owned their transport mode. About two-thirds of them were using a bicycle for their deliveries in 2018, and a quarter of them were using a moped or motorcycle. Transport modes varied primarily according to the courier’s profile. “Full-timers” and couriers who also had another job were the most frequent users of mopeds or motorcycles (27% and 50% of respondents, respectively). On the other hand, three-quarters of students used a bicycle for their deliveries.

For most couriers, the use of moped and motorcycle was illegal, since they did not own a Transportation License, as requested by French Law to use a motorized vehicle for delivery. Most of them could probably not afford such a License, the cost of which was not supported by the platforms.

The use of motorized two-wheelers came from the need to travel fast in order to make more deliveries and earn more money, especially for those who had no other source of income. Our data showed a direct link between the number of deliveries and earnings: couriers using mopeds or motorcycles made more deliveries per day (14 versus 11.5 for those using a bicycle, in 2018) and earned on average 100 euros more per week than people

using a bicycle. Logically, they also traveled more kilometers: 265 versus 178 km for couriers using a bicycle.

Time pressure is very high in platform-based on demand delivery work. However, the couriers have little control over most aspects of their activities, except mobility patterns. On the one hand, platforms are responsible for planning delivery runs. Therefore, couriers have limited ways of reducing idle time between two deliveries. Moreover, the pressure to be fast is driven by the platforms themselves, which reward the most efficient couriers by giving them the opportunity to choose the best time slots. On the other hand, couriers suffer from waiting times in front of restaurants. The ranking of the main problems encountered by the couriers showed no significant difference across our three categories of couriers, and the main concern was related to wait times at restaurants and pick-up places. This item was rated as the main challenge by 51% of respondents, and 54% of couriers placed this item at the top of the list of ways to improve the job. The second concern was related to the customers (such as incorrect address) and was seen as the main problem by 25% of the couriers. Again, an incorrect address could increase lost times and then decrease the number of daily deliveries. In the third position, 16% of couriers mentioned problems related to their smartphone (battery, application malfunction, etc.). The main way of optimizing their productivity, therefore, seemed to reduce their travel time by increasing speed with the use of motorized vehicles.

In addition, the use of illegal transportation modes also seems to be related to the difficulties to reach Paris by bike, or accommodating a bike in suburban trains, for those living far from the city center: 50% of couriers living in the outer suburbs used motorized two-wheelers in 2018, which is twice as much as the average.

6.3. Risk-Taking and Accidents

Regardless of the mode of transport they used, our data showed that couriers felt particularly at risk on the roads because of their vulnerability as motorized or non-motorized two-wheeler users in traffic. This vulnerability is logically exacerbated during bad weather, and the fact that surveys were conducted in autumn/winter may also explain these responses: road hazards (mentioned by 48% of respondents) and bad weather (38%) were very much at the top of the list of travel difficulties in 2018, far ahead of congestion (9%) (Figure 3).

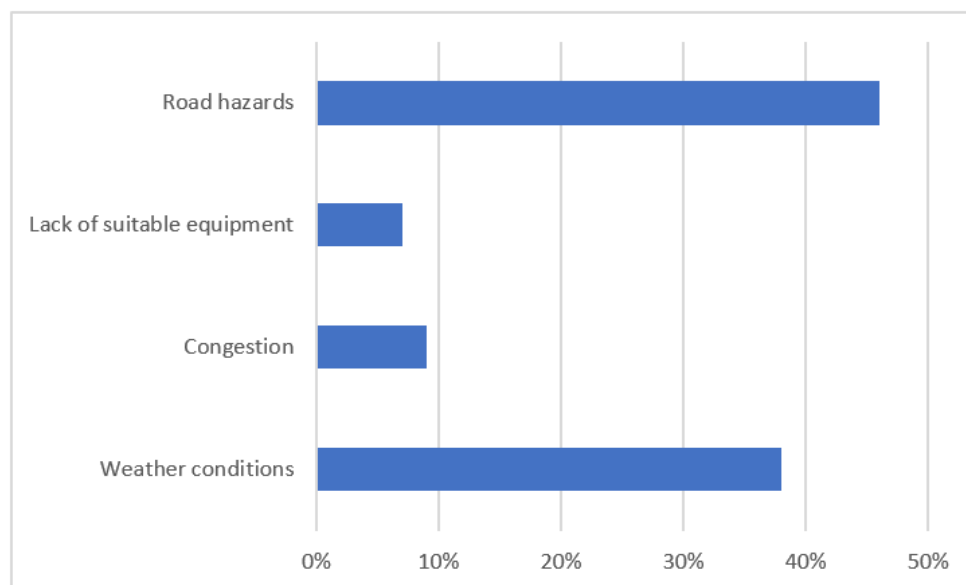


Figure 3. Travel difficulties reported by the couriers in 2018. Source: Survey by the authors.

There is no difference between the students and the “full-timers”, but the third category of couriers (those who have another paid job) declared themselves to be more concerned

about congestion (19% of the respondents). On the other hand, no difference was observed according to the mode of transport used. Another study, also conducted in Paris in 2018, showed that three-quarters of cyclist couriers admitted to running red lights at hazardous intersections, compared with only half of other cyclists [53].

7. Conclusions

7.1. Main Contributions

This work highlights that on-demand urban delivery is subject to the traditional challenges associated with rapid urban delivery: travel conditions, road hazards, parking problems, relations with customers and those who prepare the orders. However, this article highlights that digitalization adds new issues that question the environmental and social sustainability of this form of work.

Food platform-mediated delivery couriers must accept the terms of digital platforms: self-employed status, payment per delivery run, very short delivery times, algorithmic control, and personal possession of their means of transportation. Their activity is also very constrained by the time it takes restaurants to prepare the orders. In this context, mobility appears as one of the only parameters that the couriers can control and use in order to increase their earnings, since the rest of their activity is constrained by both the platforms (gig work, algorithmic control), the restaurants (waiting times) and the clients (timeliness).

Finally, and beyond the Paris case study, our study contributes to highlighting the contradictions that can exist between environmental and social sustainability objectives in the transportation sector, and how some individuals react by taking risks and using illegal modes of transport. Couriers depend on the French regulation that requires the use of a bicycle, even though traffic, conditions related to traveling from home, digital work and, especially, algorithmic control and delivery deadlines make bicycles dangerous and, in many cases, unsuitable, especially for those for whom delivery is the only source of income (the “full-timers”).

7.2. Policy Challenges

These results raise new challenges for public authorities, that go beyond the Paris case study. A first challenge is about the modes of transport for instant deliveries. National and municipal policies promote clean delivery modes. However, our findings show that this purely technical approach of sustainable urban logistics is not without negative social implications [54]. Couriers increasingly use illegal transport modes, especially delivery couriers who work full time. They also take risks on the road, which increases their vulnerability. Moreover, reaching Paris (the main market for on-demand delivery in the Ile de France Region) with a bicycle from the outer suburbs, where many low-skilled young people (who account for a large share of the “full-timers”) are located, is very difficult, especially in the evenings when the suburban trains are full of people.

Beyond the Paris case study, our results suggest that in designing more sustainable transport policies, cities should also take into account the new social challenges brought by the rise of platform-based delivery work. A second challenge is to take better account of the mobility behaviors and needs of platform-based couriers, the number of whom is growing rapidly, in the design of transport and planning policies. Our work suggests that there is not one but (at least) three categories of instant delivery workers, with some common, but also some specific, behaviors and needs. For public authorities, it means first of all collecting data about travel behaviors, and, especially, accidents involving couriers. Cities need to identify the most dangerous areas, such as signalized intersections that pose threats to the safety of delivery cyclists, and implement roadway equipment to improve bicycle safety. Secondly, it means better design of cycle lanes, construction of secure bicycle parking spaces, which could also help solve commuting problems for couriers identified in this work. The increase in the number of cycle lanes, which make routes safer and increase average speeds, was the second most common demand for improvement from our respondents (mentioned by 18% of the respondents in 2018, including a quarter of students,

who accounted for the largest number of bicycle users). 10% of respondents mentioned the need for secured parking spaces. Creating waiting areas for couriers in front of restaurants could also be discussed. Training sessions on road safety, made easily and freely available to them, and financial support for enhancing their cycling equipment and protection, could also be proposed by local authorities.

7.3. Limitations and Future Research Directions

The main limitation of this research was the difficulty to guarantee the representativeness of the couriers' sample, as well as the comparability between the two surveys. Digital platforms do not give out their data, and street surveys are hampered by the fact that people are in a hurry or may be reluctant to talk about their work practices, especially when they are illegal (such as the use of motorized two-wheelers). The method we proposed to make up for this lack of data was to meet gig workers randomly but systematically (few rejections were to be noted).

This work also highlights that research in transport needs to better understand the mobility practices and needs of these new categories of mobile workers and the relationship with platform work and transport policies. It is important to go beyond the simple idea that bicycle delivery is automatically "more sustainable". Indeed, our work shows how it is crucial to better understand working conditions in the gig economy, as it creates new types of mobile workers and impacts their travel behaviors.

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