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Travel between Brussels and its outskirts: contrasting situations

Les déplacements entre Bruxelles et sa périphérie : des situations contrastées

Verplaatsingen tussen Brussel en de rand: sterk uiteenlopende situaties

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AUTHOR'S NOTE

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Introduction

- 1 In many western cities there is a downward trend in road traffic in the heart of urban areas, yet the outskirts often remain more dependent on cars. The reasons for this may relate to lower activity and population density, which make public transport less efficient, a public transport service focused on home-to-work travel along a few well-served lines, or sociological differences. In view of the continued growth of the population and jobs in these outlying areas, the integration of the metropolitan area into urban mobility considerations is becoming crucial.
- 2 These observations also apply to the case of Brussels. While car traffic tends to decrease slowly in the Brussels-Capital Region, it is increasing in the outskirts, as well as near the regional borders. This has a direct influence on mobility in and around Brussels, as well as on the related consequences, namely traffic congestion and the socio-environmental impact. This situation is coupled with a complex political context, as the Brussels metropolitan area covers the three regions of the country, as well as a lack of detailed,

comparable and representative data on the different forms of travel, which complicates the study and the objectification of the problem.

- 3 This article aims to establish a geography of the current travel patterns between Brussels and its outskirts, based on an empirical analysis of transport times and conditions and available modal split data. Secondly, a coherent spatial structure for the organisation of these journeys is identified, differentiating the territories within the metropolitan area.

1. Brussels metropolitan mobility, a complex subject

- 4 Mobility between Brussels and its outskirts is the subject of a large amount of research regarding the transport issues at stake and, indirectly, the exemplary case of the Belgian socio-political structure which it represents.
- 5 From the transport point of view, the high modal share of road transport is highlighted, as well as its structural and historical causes and its impact in terms of congestion, costs and the environment. In 2010, the last year for which a national survey regarding travel was conducted, two thirds of journeys between Brussels and the outskirts and one third of internal journeys were by car [Hubert and al., 2013]. This places Brussels among the most motorised cities in Europe. The modal share of cars has decreased, with 75 % for incoming and outgoing journeys and 50 % for internal journeys in 1999 [Hubert and al., 2013]. Nevertheless, this relative decrease is offset by the absolute increase in the number of journeys. Thus, road congestion has decreased slightly within the regional boundaries and remains high at the entrances to Brussels and on the ring road. In addition, motorists have adapted in order to avoid the busiest periods. Peak hours start earlier and end later, leading to an increase in traffic throughout the day [Lebrun and al., 2013; Ermans and al., 2017 & 2018]. The length and duration of road journeys are increasing as a result of continued urban sprawl and congestion. As regards public transport, while the modal share and the number of journeys have increased (Hubert and al., 2013), its use is still influenced by various factors. The service is focused on commutes, neglecting off-peak hours, non-working days and routes which are not used for home-work journeys [Lebrun and al., 2012; Ermans and al., 2017]. In addition, there are strong geographical divisions in the use of public transport.
- 6 As regards the reasons for travel between Brussels and its outskirts, home-work journeys dominate, as they correspond to 50 % of incoming flows, with cultural, commercial and other reasons each representing less than 6 % [Ermans and al., 2017]. It should be noted that the commute for the inhabitants of Brussels who work outside the Region represents 9 % of the outgoing journeys leaving the Region, testifying to their scale, which is often neglected.
- 7 With regard to the reasons for modal choice, while the performance differential between public transport and car travel is an important factor, it cannot explain everything [Lebrun and Dobruszkes, 2012]. For example, one third of commuters working in companies with good access to public transport do not use it [De Witte and Macharis, 2008]. Among the explanatory factors, there is of course the company car system, which, for those who benefit from it, makes the cost of travel almost free [May and al., 2019], as well as the numerous company car parks in the city, the comfort of cars, and the need to use several means of public transport in complex travel chains. The latter tend to be more and more composite, due to the many different reasons for travel, more frequent job

changes, the lack of schools and crèches and the disappearance of certain local services, shops, banks and post offices, forcing people to travel further and more often [Ermans and al., 2018].

- 8 Of course, the political dimension occupies a prominent place in the literature. The lack of coordination of the public transport service has been underlined. It is organised by four operators: STIB in Brussels, De Lijn in Flanders, TEC in Wallonia and SNCB, which is still national [Lebrun and al., 2012], in the absence of the integration of fares, timetables, networks and information. Consequently, the intermodal, interoperator service is highly underused; for example, while the train dominates for long journeys, it is rarely used for short commutes, and almost never for internal journeys within Brussels [Lebrun and al., 2013; Hubert and al., 2013]. This weak coordination is also political and strategic, with the implementation of uncoordinated regional mobility plans within the Brussels metropolitan area [Lebrun and al., 2012] and, as a corollary, the non-existence of an integrated policy to limit car traffic. Finally, the observation is that political geography does not correspond to the geography of mobility issues [Hubert and al., 2008; Van Wynsberghe, 2013]. Behind this absence are questions of funding and direction for possible metropolitan management [Frenay, 2009]. Thus, although the 2011 state reform was supposed to lead to the creation of a Brussels metropolitan community which was competent in the area of mobility, this was not the case [Hubert and al., 2013; Ermans and al., 2018]. The Regional Express Network (Réseau Express Régional, RER) is an emblematic project which crystallises the difficulties and paradoxes [Frenay, 2009; Hubert and al., 2013]. Lack of resources, lack of political will to implement, lack of interest in a federal SNCB focused on interurban links, invisibility of the Brussels Region in strategic decisions when this network could, or should, participate in internal mobility in Brussels, and lack of agreement on operating methods and financing: there are countless problems to be solved [Frenay, 2009; Lebrun & Dobruszkes, 2012].
- 9 From a socio-spatial perspective, some researchers [Ermans and al., 2018] highlight social and societal divides. The inhabitants of Brussels take the train three times less often than those who live in Wallonia or Flanders, young people, single people, households without children and women use public transport more often, while senior managers use cars more frequently [Ermans and al., 2018]. These are obviously elements to be considered in order to define coherent mobility policies. Another challenge is population growth in and around Brussels, which is leading to an increase in the number of journeys [Hubert and al., 2013]. Behind the question of mobility is the broader issue of the organisation and use of the territory and the peri-urbanisation of populations and activities and its economic, environmental and social consequences [Hubert and al., 2008; Frenay, 2009].
- 10 In this context, it should be recalled that the large number of commutes between Brussels and its outskirts have historical roots. Very early on, the Belgian political authorities favoured access to property in the suburbs and the commute to Brussels [Hubert and al., 2008; Dessouroux, 2008]. Similarly, the extent of car use is also the consequence of the very car-friendly policy pursued since the 1950s, resulting in the construction of major infrastructures in and around Brussels [Hubert, 2008]. Thus, Brussels has inherited a dense traffic network, in terms of public transport and roads, linking it to its outskirts and facilitating urban travel [Lebrun and al., 2013].

2. What are the detailed data on commuting mobility around Brussels?

- 11 As we can see, the challenges of metropolitan mobility in Brussels are multidimensional. In this context, geographical analysis has a unique role, since it allows the causes and consequences of the way in which travel is organised to be identified and located. This approach requires defining a coherent study space and mobilising relevant and available data.
- 12 The boundaries of the metropolitan area can be drawn in different ways. We have chosen to take into account socio-economic and transport aspects. Thus, we use a perimeter combining the Brussels employment area, i.e. the area where the main place of employment of workers active outside their municipality of residence is the Brussels-Capital Region, and the boundaries of the IRIS 2 area [Brussels-Capital Region, 2011], which is the perimeter of analysis for the IRIS 2 Brussels regional mobility plan, which also corresponds to the planned area for the Brussels RER. The employment area extends from the IRIS 2 area to the east, beyond Tienen, and to the west, to Ath, while the RER area includes Leuven, which is outside the Brussels area of influence, as this city itself is a regional employment centre. The IRIS 1 area is part of the first regional mobility plan and its boundaries correspond to the immediate outskirts of Brussels.
- 13 The Brussels metropolitan area has 3,4 million inhabitants, 1,2 million of whom live in the Brussels-Capital Region (Figure 1). Of these, about 600 000 are employed in the Brussels-Capital Region, almost half of whom do not live there (Figure 2). To get a complete overview of workers' commutes to Brussels, it would be necessary to include self-employed workers and those who work at international institutions, for which statistics are missing. While the majority of commuters working in Brussels come from Flanders, their share in the total workforce is higher in the Walloon outskirts. This means that proportionately, dependence on the capital is greater there. In addition to travel to and from work, there are also the journeys of students who attend schools in the capital [Ermans and al., 2017], as well as shopping trips or journeys for cultural, social or family reasons.
- 14 The main roads and railways are organised in the form of common radial roads, linking Brussels to Antwerp, Ghent, Leuven, Liège, Namur, Charleroi and Mons. In addition, there is the ring road around Brussels. The points between these roads, which are generally less densely populated, do not have as good an infrastructure.

Figure 1. The Brussels metropolitan area and its population

Figure 2. Commuters in the Brussels metropolitan area

- 15 With respect to travel data, as there has not been a census since 2001, there is no exhaustive source, but rather a disparate set of information which is difficult to compare. Thus, two studies, MOBEL in 1999 and BELDAM in 2010, aimed to understand and quantify the daily mobility of Belgians. This is how the main trends in modal shares are known, particularly for journeys within Brussels and between Brussels and the outskirts.

However, these data, collected by means of a survey among samples of households, cannot be used on a small scale. The usage figures of public transport operators show a sharp increase in the use of public transport, particularly in and around Brussels. STIB, TEC and De Lijn saw the number of passengers more than double since 2000; during the same period, SNCB observed an increase of more than 60 % in the number of its passengers. However, these data are not available for each line, which excludes the possibility of reconstituting routes. As regards road transport, one possibility is to rely on counts, but they do not provide information about origins and destinations, and there has not been a national survey since 2010. A final approach is to rely on modelling data. The Brussels-Capital Region has developed a transport model called “MUSTI”, which allocates journeys by all modes on the transport network [Monneaux, 2012]. However, it has the disadvantage of only making it possible to reconstruct journeys during peak hours and to mobilise various sources, the most reliable concerning home-work commutes. Moreover, while the model has a tight mesh within the Brussels-Capital Region, it is much looser in the outskirts.

- 16 In this context, we have chosen to rely on different sources.
- 17 With regard to travel conditions, we relied on data compiled by Google Maps. These allow us to know the travel time by car and by public transport, taking traffic congestion into account.
- 18 In order to make this choice, several data providers were compared. Among Mappy, Viamichelin, Waze, openstreetmap and Google, the latter provides the most accurate information on the impact of congestion on travel times. In addition, it has the advantage of allowing comparable route calculations by public transport, unlike Mappy, Waze or Viamichelin. In order to qualify the conditions of travel between the outskirts and the Brussels-Capital Region at peak times, for each former municipality in the study area, travel times from Google Maps were compiled with the criterion of arriving at destination around 8 am on a Tuesday during the school year.
- 19 This choice of arrival time is based on Beldam analyses as well as on the observation of peak traffic congestion in Google data. A Tuesday during the school year is a particularly busy day for traffic [Lebrun and al., 2013; Cornelis and al., 2012].
- 20 The division of the municipalities before the merger corresponds to a good approximation of the village nuclei. The precise starting point is the barycentre of the old municipality.
- 21 As for the destinations to be reached in the Brussels-Capital Region, three arrival points have been selected: the South Station, the North Station and Arts-Loi. These are three major employment centres with very different access conditions. The choice of Arts-Loi is justified by its location in the centre of the Brussels Central Business District, between the European quarter and the offices in the east central area of the Pentagon.
- 22 In terms of public transport, the travel time envisaged is the optimal shortest time to arrive at the destination at the scheduled time, i.e. 8 am. The frequency of service is therefore not taken into account. The addition of a penalty for places where public transit is less frequent would undoubtedly have widened the gap between places with good or poor service in terms of travel times, which is already well reflected in the results.
- 23 As far as modal split is concerned, the choice was made on the basis of data from company travel plans compiled by FPS Mobility. They provide detailed statistics on the modes of transport used by workers between home and work. While these data have the

dual disadvantage of not taking into account other reasons for travel, workers in small businesses or self-employed people, they represent the only information which allows modal shares to be calculated on a fine scale. In addition, it is during peak hours, when the proportion of commutes between home and work is highest, that mobility problems are most pronounced [Ermans and al., 2018]. The data should therefore be interpreted as an indication of the preferred modes of transport rather than as exhaustive information. In this context, commuting to and from work leads to greater use of public transport than other reasons for travel [Lebrun and al., 2013]. It should also be noted that the mode of transport considered is the main mode used during the journey. For example, a train journey may involve a short journey by car or bus at the point of departure or destination.

3. The organisation of metropolitan mobility

3.1 Car travel

- 24 As regards car travel, two situations were analysed: theoretical accessibility by car, i.e. without taking congestion into account, and accessibility which deteriorates due to congestion.
- 25 The differences in theoretical average metropolitan road accessibility (Figure 3) are highly dependent on the presence of motorways. They reduce travel times between Brussels and the outskirts of the city. On the contrary, areas without direct motorways to the capital, for example from Ninove or northern Aalst, have relatively poor theoretical accessibility.

Figure 3. Theoretical conditions for travelling by car to three Brussels centres (South, North and Arts-Loi).

The indicator is the residual from the regression between the average travel time to arrive at midnight on a Sunday at South Station, North Station and Arts-Loi, and the average road distances to these three destinations, based on Google Maps data. Then, the former municipalities (before merger) are classified according to the standard deviation of the residuals.

- 26 If we add the dimension of traffic congestion (Figure 4), which is calculated by dividing the average travel time to arrive at 8 am on a Tuesday during the school year by the theoretical time, the picture is quite different. Due to congestion on the motorways linking Leuven, Ghent and Namur to Brussels, travel times by car are often more than doubled along these roads. Traffic congestion also has an impact on the sections of these journeys within Brussels. In this context, the entrance into Brussels via the Herrmann-Debroux viaduct suffers from the lack of a direct link to the city centre, unlike the north, north-west or east entrances, via the Leopold II tunnel, the Reyers complex or the A12. This undoubtedly explains the strong impact of traffic congestion at the southern entrances to Brussels.

Figure 4. Impact of congestion on car travel to three Brussels centres (South Station, North Station and Arts-Loi) during the morning rush hour.

The indicator is the relationship between travel time to arrive at midnight on a Sunday at South Station, North Station and Arts-Loi and travel time to the same destinations on a Tuesday during the school year to arrive at 8am, based on Google Maps data.

- 27 As a result, the average accessibility of Brussels by car from its outskirts at rush hour (Figure 5) has a dual geography. Several areas are characterised by poor accessibility, relative to their distance from Brussels, due to the absence of major direct routes, such as the surroundings of Ninove or northern Aalst. Others also have poor accessibility due to congestion on major roads, particularly around Leuven or along the E411. On the contrary, relatively better situations are found along less congested roads, such as the E429 motorway from Ath or the E19 from Nivelles. The municipalities in the immediate surroundings also have a relatively good quality of accessibility, probably due to the possibility of bypassing traffic jams via the secondary network.

Figure 6. Organisation of public transport services to Brussels

Sources: data from public transport operators and personal processing

- 29 The organisation of the network influences the quality of service. Areas with a direct rail connection to Brussels, and in particular those close to a station offering express trains to the capital, have the best relative accessibility (Figure 7). This is the case of the regional cities located in the metropolitan area, i.e. Aalst, Mechelen, Leuven, Halle, Ottignies, Nivelles and Tienen.
- 30 On the contrary, territories which depend on bus lines to travel directly to Brussels or to the nearest stations have poorer performance, especially compared to average car travel times. Similarly, a large part of the municipalities in the inner ring around Brussels have poor public transport accessibility relative to their distance from the capital. The SNCB train service is focused on interurban connections, while performance in terms of journey times is much lower in smaller stations. In addition, the time it takes to get to the station – unless you live near it – is longer for short trips. The interurban bus service partly compensates for this situation, but at the cost of relatively long transport times, due to congestion and frequent stops. Therefore, compared to the car, many village nuclei in the inner ring have longer travel times.

Figure 7. Quality of public transport service to three Brussels centres (South Station, North Station and Arts-Loi) during the morning rush hour.

The accessibility gap is the residual from the regression between the average travel time to arrive at 8 am on a Tuesday during the school year at South Station, North Station and Arts-Loi by public transport and the average road distances to these three destinations, based on Google Maps data. The former municipalities (before merger) are classified according to the standard deviation of the residuals. The additional PT/car time is the relationship between the average travel time by public transport (PT) and by car to arrive at 8 am on a Tuesday during the school year at South Station, North Station and Arts-Loi, based on Google Maps data.

4. How do people travel?

- 31 This raises the question of modal choices. As a reminder, the data correspond to the modes of transport used by people to go to work in companies in Brussels with more than 100 employees.
- 32 In this respect, a first divide appears between the nearby outskirts, where car use is the majority, while public transport, and in particular the train, is favoured in the outer suburbs, especially from medium-sized cities (Figure 8). This difference seems to be related to travel conditions. In the nearby outskirts, the public transport service is not very efficient. This is probably where the lack of coordination between operators is the most penalising, since it often involves a connection between the STIB urban network and the TEC or De Lijn networks, as well as a double payment due to a lack of fare integration. In addition, there is the dispersion of housing, which is unfavourable to the use of public transport, and the possibility of bypassing major congested roads. In the village nuclei in the immediate outskirts connected to the STIB network, such as Kraainem, Drogenbos or Strombeek, commuters do not need to combine several operators in order to travel to Brussels, and public transport use is therefore higher.
- 33 On the contrary, from the more distant outskirts, the railway attracts more users. The service is more efficient, the time needed to reach a station is less penalising and

congestion is high on the main roads leading to Brussels. Within this outer ring, there is also a difference between the areas well connected to rail, located along the corridors between Brussels and Namur, Leuven and Liège, Mechelen and Antwerp, Waterloo and Nivelles, Halle and Mons and Aalst and Ghent. The modal share of the train is particularly high there. And in less well-served areas, for example east of Wavre, along the A12 or east of Mechelen, car use is higher. These places are often more rural, which implies less public transport service and relatively less traffic congestion.

- 34 In this context, there is the special case of the Dender valley north and south of Aalst. The public transport service is moderately efficient there, with rail service to Brussels possibly involving connections. Yet there is a high use of the train. This may be due to the poor quality of road connections and the organisation in the past of a shuttle service for workers to industries in Brussels.
- 35 Finally, the use of bicycles for urban travel is insignificant, with the exception of a few village nuclei immediately adjacent to Brussels.
- 36 Thus, these observations seem to attest to a link between the quality of public transport supply and the modes used to travel to Brussels, at least for journeys between home and work.
- 37 Of course, these are not the only factors. Let us consider the socio-economic aspect, for example. Public transport use is higher among the working classes than among the wealthiest. This is a consequence of the company car system, which by far favours their use [May and al., 2019]. The nearby outskirts and all of the points along the outskirts to the southeast of Brussels are upmarket areas, which certainly contributes to the overuse of cars. On the contrary, regional cities such as Aalst, Mechelen, Nivelles and Halle, as well as the Dender and Senne valleys, have a low to medium status, which to a certain extent probably explains the higher use of public transport.
- 38 Another dimension is land use planning. The concentration of housing and high population density are conducive to the development of an efficient public transport network, concentrating the service and limiting the length of travel to and from the public transport stop. This is the case, for example, for the rail transport service and its use, which focuses on connections from small and medium-sized cities. On the contrary, in the (semi-)rural areas on the southeast and northeast borders of the study area, providing an efficient and frequent public transport service is more complex, due to the low potential for passengers and the fact that they are scattered.

Figure 8. Modal distribution of workers' commutes to the Brussels-Capital Region.

Modal shares: the main mode of transport used for journeys. Additional PT/car time: relationship between the average travel time by public transport (PT) and by car to arrive at 8am on a Tuesday during the school year at South Station, North Station and Arts-Loi, based on Google Maps data.

- 39 To summarise these findings, a typology was established based on an analysis of the main components, followed by a hierarchical classification (Ward method).¹ The data used correspond to the conditions and modes of travel, namely: the quality of accessibility by car, train, bus, tram or metro, road congestion and the modal shares of home-to-work travel for people who work for companies with more than 100 employees.
- 40 Four types of space can be seen (Figure 9):
- 41 - The nearby car outskirts, where just under 700 000 people live, 100 000 of whom are employed in the Brussels-Capital Region and where public transport use is low, despite overuse of interregional buses compared to the average for the outskirts, while car use is high and the impact of traffic congestion is relatively limited compared to the regional average.
- 42 - The well-connected outskirts, with just under one million inhabitants and 40 000 commuters, are crossed by the railways and motorways linking Brussels to other Belgian cities and to the small and medium-sized towns on the outskirts of Brussels. The use of the railway is high and the impact of traffic congestion is greater than the average for the outskirts.
- 43 - The remote car outskirts, where about 500 000 people live, 55 000 of whom are employed in the Brussels-Capital Region, are sparsely populated and have limited public transport service, and the impact of congestion is relatively low and car use is over-represented.
- 44 - The remote and poorly connected outskirts, where about 400 000 people live, 40 000 of whom make the commute to work, and where both road and public transport accessibility is relatively poor, and railway use is high.

Figure 9. Typology of conditions and ways of travelling from the outskirts to Brussels

- 45 These results suggest that different policies should be pursued in order to respond to the situations in these areas. For the nearby outskirts, the challenge is undoubtedly to implement solutions for relatively short journeys. This means, for example, a better integration of STIB, De Lijn and TEC services, extending STIB lines outside Brussels and developing an efficient network of service to Brussels, as well as making it easier to use bicycles. The creation of park and ride facilities could be considered, designed to accommodate some of the commuters for whom no alternative exists. In the outer ring, the aim would be to improve railway services in well-connected areas and discourage car use, including short journeys to stations, for example by developing local bus feeder services. For less well connected areas, fast bus lines to main stations for areas where there is sufficient demand could be considered, or car parks at these same stations, designed to accommodate commuters from rural areas, in order to reduce car journeys to the capital as much as possible. Of course, these measures should be accompanied by policies related to land use planning, road infrastructure, the organisation and location of services, and car taxation, as service alone is not a sufficient factor to induce a modal shift.

Conclusions

- 46 Mobility between Brussels and its outskirts appears to be a problem which links political, social, economic, environmental and organisational issues. The interweaving of these different dimensions makes it difficult to understand and deal with, particularly in the Brussels metropolitan institutional context.
- 47 Consequently, the geography of these journeys reveals significant disparities between areas well connected by road or public transport, mainly along the corridors linking Brussels to regional cities, and other areas, either further away and more rural, or in the

immediate outskirts, where public transport is not very efficient. This is due to the socio-spatial structure of the metropolitan area, as well as to the lack of integration of public transport supply and, more generally, to the lack of metropolitan mobility strategy.

- 48 Of course, the quality of the transport service is not the only factor which explains the modal split. Socio-economic dimensions are essential in order to understand how people travel in the metropolitan area. Nevertheless, the lack of a quality service which is an alternative to cars seems to contribute to their overuse in and around Brussels. More generally, this weak political integration at metropolitan level poses the risk of competitive regulation between territories, which is socially unfair, economically inefficient and costly.
- 49 The regional and national authorities are planning and carrying out various mobility projects in the Brussels metropolitan area. However, in the absence of an integrated vision, these remain difficult to achieve and may not necessarily meet the challenges or may even compete with each other.
- 50 This raises the central question of the implementation of metropolitan mobility regulation, which could then be applied in other areas such as land use planning, economic policy or public services. It seems to be able to respond, at least in part, to the issues raised in this article and to represent a relevant scale for considering mobility problems around Brussels. However, very concrete issues regarding funding, structure or delegation of authority remain unresolved for the time being and hamper any major changes.

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NOTES

1. The scores of the first four components of the Principal Component Analysis (PCA), which together represent 92 % of the information and have a proper value greater than one, were used for the typology.

The choice of the number of classes was made on the basis of the hierarchical classification tree derived from the Ward typology. A break occurs from the fifth division onwards, with the emergence of classes with very small numbers of students.

ABSTRACTS

Mobility between Brussels and its outskirts is a key multidimensional issue involving socio-economic, environmental and political challenges. However, precise data on this issue are relatively limited. In this context, this article proposes to address the issue through empirical geographical analysis. Thus, the differentiated conditions and ways of travelling to Brussels from its metropolitan area emerge, and are summarised within a typology.

La mobilité entre Bruxelles et sa périphérie est une problématique multidimensionnelle qui soulève des enjeux socioéconomiques, environnementaux et politiques. Pourtant, les données précises à son sujet sont relativement limitées. Dans ce cadre, cet article propose d'aborder la question par le biais d'une analyse géographique empirique. Apparaissent ainsi les conditions et façons différenciées de se déplacer vers Bruxelles depuis son aire métropolitaine, qui sont synthétisées au sein d'une typologie.

De mobiliteit tussen Brussel en de rand is een multidimensionale problematiek die uitdagingen op sociaal-economisch, ecologisch en politiek vlak meebrengt. En toch zijn er relatief weinig nauwkeurige gegevens terug te vinden over dit onderwerp. Tegen die achtergrond gaat dit artikel dieper in op de kwestie aan de hand van een empirische geografische analyse. Het resultaat zijn uiteenlopende omstandigheden en manieren om zich vanuit het grootstedelijk gebied naar Brussel te verplaatsen, die in een typologie worden samengevat.

INDEX

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