



Dossier 5: Public Transportation in the Euregion Meuse-Rhine (student dossier)

Cross-Border Impact Assessment 2023



Dossier: [Cross-Border Impact Assessment of Public Transportation in the Meuse-Rhine Euroregion]

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ITEM
Cross-border



Contents

Abbreviations.....	3
Table of graphs and figures.....	4
1. Introduction.....	5
1.1. General.....	5
1.2. European Union Law.....	6
2. Objectives & Method.....	8
2.1. Current or Future Effects: Ex-post or ex-ante.....	8
2.2. Demarcation: Defining the Territory of the Research.....	10
2.3. Methodology.....	11
3. Empirical results.....	13
3.1. Survey.....	13
4. Case study: the Drielandentrein.....	24
4.1. The benefits of the the Drielandentrein.....	25
4.2. Obstacles in the realisation of the train.....	26
4.3 Overcoming the obstacles.....	28
4.4 Interview with a policy officer (Ministry of Infrastructure and Water Management).....	29
5. Conclusions and recommendations from a Euregional perspective.....	30
5.1 Substantive Conclusions.....	30
5.2 Recommendations.....	30
5.3 Methodological shortcomings.....	31
6. Acknowledgements.....	32
References.....	33
Dutch Publications.....	33
European Union Law.....	33
Websites.....	33

Abbreviations

Art./Arts.	Article/Articles
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CBPT	Cross-border public transportation
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EMR	Euregio Meuse-Rhine
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EU	European Union
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RE18	Regional-Express 18
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TEN-T	Trans-European Network for Transport
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TEN-T Regulation	EU Regulation No 1315/2013
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TFEU	Consolidated version of the Treaty on the Functioning of the European Union 2012
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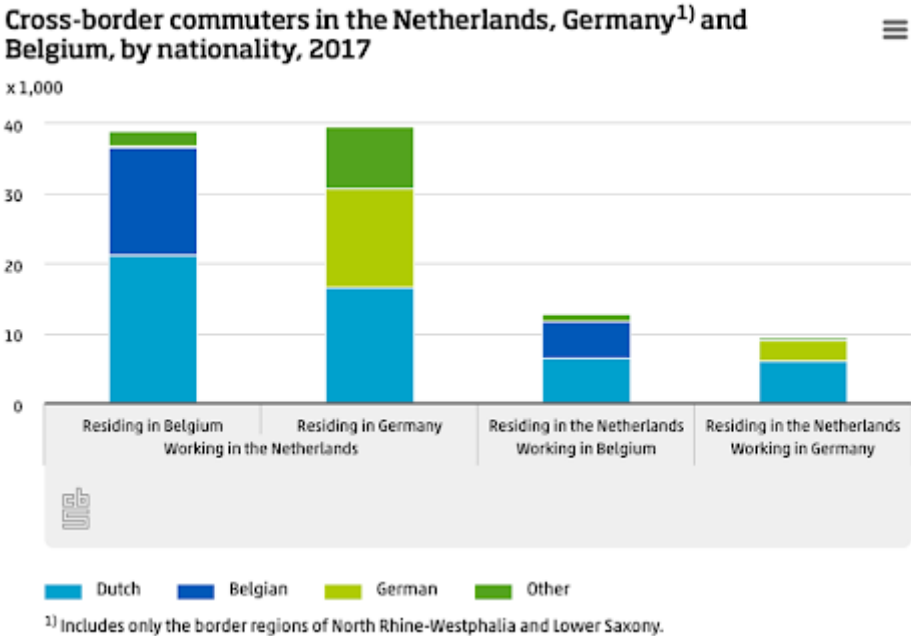
Table of graphs and figures

- Graph 1.** Cross-border commuters in the Netherlands, Germany and Belgium in 2017.....5
- Figure 1.** The impact of cross-border travel on the labour market.....6
- Figure 2.** Map of the EMR.....11
- Table 1.** Overview of interviews.....12
- Graph 2.** Reasons for using CBPT.....14
- Table 2.** Most frequent rating.....15
- Table 3.** Least frequent rating.....16
- Graph 3.** Average satisfaction.....17
- Graph 4.** Reasons for travelling cross-border.....19
- Table 4.** Non-users’ reasons for not using CBPT20
- Graph 5.** Popularity of suggestions for improvement.....21
- Table 5.** Most valuable changes.....22
- Figure 3.** Current state of realisation.....24
- Figure 4.** Current state of the complexity of ticketing in the Drielandentrein.....27
- Figure 5.** Operational obstacles to go from a ‘tweelandentrein’ to a ‘drielandentrein’.....28

1. Introduction

1.1. General

Cross-border public transport (CBPT) within the European Union (EU) plays a crucial role in connecting its Member States. As demonstrated in the figure below, in 2017, it was reported that 40 thousand people working in the Netherlands were cross-border commuters from Germany, while 39 thousand were residents of Belgium. Out of this total, 8 thousand were healthcare workers. Thus, in total 79 thousand people were crossing the border to work in the Netherlands (Centraal Bureau voor de Statistiek, 2020). Given this amount, and given that a substantial portion of the 79 thousand people comprise essential workers such as healthcare workers, it is crucial that cross-border public transport is readily available and that a reliable system is in place for these commuters.



Graph 1. *Cross-border commuters in the Netherlands, Germany and Belgium in 2017*

Not only does CBPT affect workers, on a bigger scale, it has an economic effect on the regions itself. For instance, recent publications (PBL Netherlands Environmental Assessment Agency, 2015; and CPB Netherlands Bureau for Economic Policy Analysis, 2016), show that Limburg would benefit from a more cross-border labour market. According to the latter report, if we assume that agglomeration effects have a range of 60 kilometres, then the Province of Limburg’s gross regional product would increase just over one billion euros per

year if border obstacles to cross-border transportation were removed. This is shown in **Figure 1.** below.

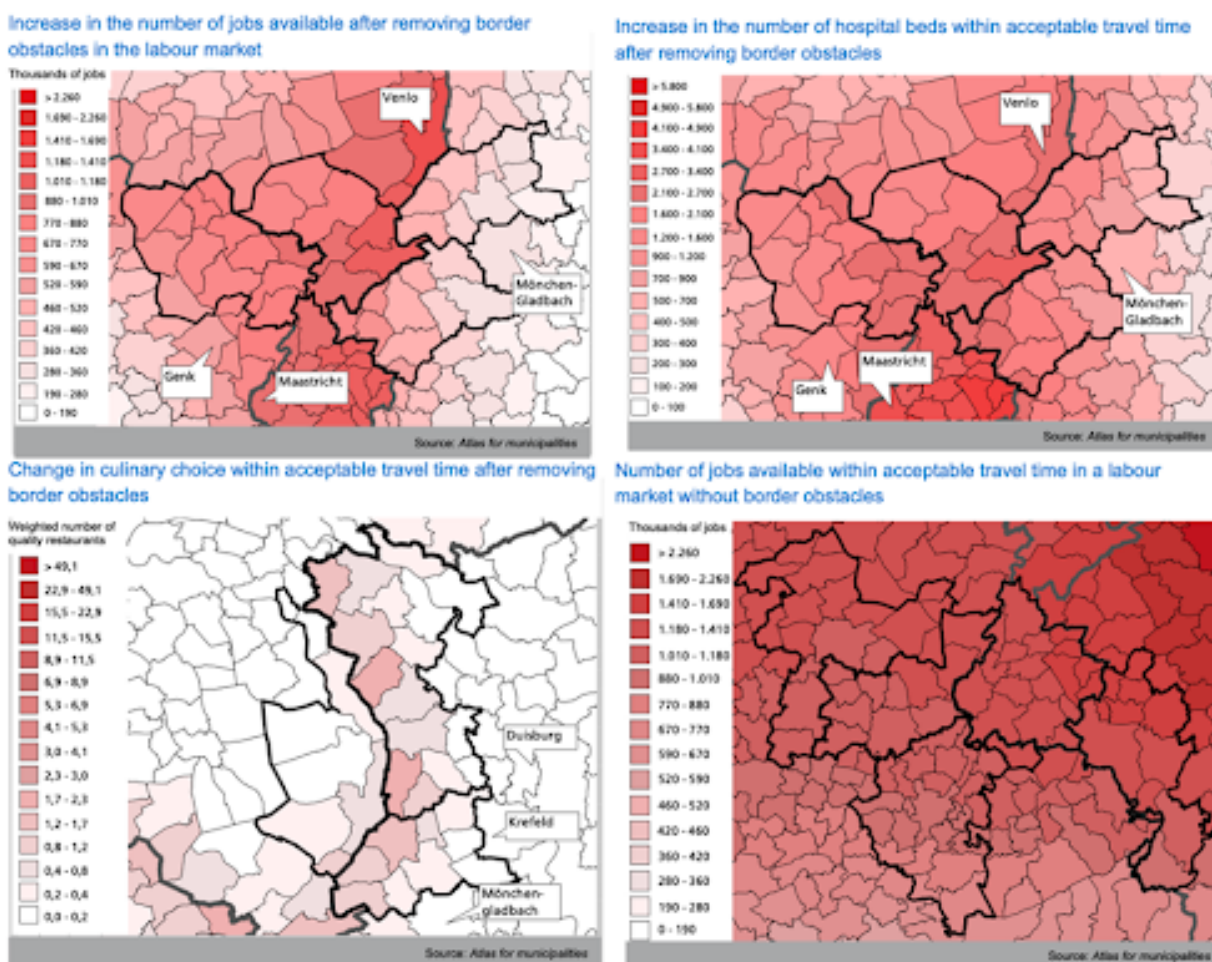


Figure 1. *The impact of cross-border travel on the labour market*

1.2. European Union Law

In light of the importance of CBPT, the EU has created an extensive legislative framework in order to improve CBPT.

1.2.1. Articles 4(2)(g) and (h) TFEU

According to Articles 4(2)(g) and (h) of the Treaty on the Functioning of the European Union (TFEU), the European Union and its Member States share the competence to regulate the area of transportation and the development of trans-European networks. As provided for in Article 2(2) TFEU, when a competence is shared between the Union and its Member States, both actors have the power to legislate and adopt acts in that area. However, the Member States can only exercise this power to the extent that the Union has not already done so, therefore, only having the ability to fill in gaps left by the Union. This indicates that although

the Member States have some legislative power in these designated areas, the Union is the more prominent actor in determining the policies in those areas. However, it is clear that as the Member States have more in-depth knowledge on their own domestic territories and public transport systems, they retain their legislative power in this regard.

1.2.2. Articles 26 co. 45 TFEU

Article 26(1) TFEU contains the general provision that the Union aims to create an internal market, which is further elaborated upon in paragraph (2), which entails the freedom of movement of goods, persons, services and capital. Of these four freedoms, the most relevant is the freedom of movement of persons, which is enshrined in Article 45 TFEU. The basic right of freedom of movement within the Union for workers is provided for in paragraph (1). Particularly, paragraph (3)(b) allows EU citizens to move freely within the territory of Member States in order to pursue offers of employment.

1.2.3. EU Directives and Regulations

Based on the foregoing, Article 45 TFEU provides EU citizens with the right to move freely within the EU for work purposes. In order to give effect to this right, the Union exercises its competences to legislate in the areas of transportation and the development of a trans-European network, as given to it in Articles 4(2)(g) and (h) TFEU. In recent years, the Union has legislated Directives and Regulations regarding CBPT within the territories of its Member States. It is important to note that there is a difference between Directives and Regulations as this also indicates the level of contribution Member States have in implementing these EU instruments. According to Article 288 TFEU, a Regulation is binding in its entirety and directly applicable to all Member States, whereas Directives are only binding with regards to the desired result it aims to achieve and only upon the Member States it addresses, but leaves those Member States the discretion to choose what policies to implement to comply. Therefore, Regulations essentially tell the Member States what needs to be done, where Directives set a goal for Member States to achieve and leave them the power to decide how to achieve this goal.

One of the initiatives the EU has set forth in order to improve CBPT is the Trans-European Network for Transport (TEN-T) which is based on EU Regulation No 1315/2013 (TEN-T Regulation). The overall goals that the Regulation sets forth are the “smooth functioning of the internal market and the strengthening of economic, social and territorial cohesion.” In essence, the improvement of CBPT does not relate only to transportation itself, but is also a stepping stone towards the EU’s overall goals of European integration and Euregional cohesion. However, in light of the European Green Deal and Sustainable and Smart Mobility

Strategy, this Regulation is currently being revised in order to align with the EU's new goals regarding sustainability. The revised TEN-T Regulation aims to reduce emissions in the transport sector by 90%, while maintaining the original goals of increasing connectivity across the EU. This proposal marks the development of another goal of the EU: sustainable development. The Revision, having first been proposed by the EU Commission, is currently awaiting the EU Parliament's position on the proposal in its first reading.

2. Objectives & Method

2.1. Current or Future Effects: Ex-post or ex-ante

2.1.1. The Netherlands

The Netherlands is easily accessible by train from Belgium, France, Germany and the United Kingdom. There are many existing train lines that offer cross-border transport:

- the Intercity service departing from Brussels;
- the Thalys service departing from various stations in France;
- the Eurostar service departing from various stations in the United Kingdom;
- the regional service between Liège and Maastricht;
- the regional service between Antwerp and Roosendaal.

In order to expand its existing train network, there have been initiatives to create new train lines. For instance, the central government and the province of Limburg are also currently assessing the feasibility of a direct Intercity link between Hamont (Belgium) and Weert. There is also a collaborative effort between the central government, the provinces of North Brabant and Limburg to create a direct Intercity link between:

- Düsseldorf, Eindhoven and Venlo;
- Aachen, Eindhoven and Heerlen.

Additionally, the Regional-Express 18 (RE18 or "Drielandentrein") is currently being introduced and will connect Aachen, Maastricht, and Liège. In Chapter 4, we will extensively discuss the "Drielandentrein" and delve into the details of its implementation, focusing on the challenges that needed to be overcome in order to successfully accomplish this trilateral cooperative initiative involving three countries.

With regards to cross-border bus transport, the market is growing, with new operators entering. In this area, the European Commission is proposing to harmonise access to national bus markets (Ministerie van Infrastructuur en Waterstaat, 2021).

Of all regions in the Netherlands, Zuid-Limburg has the highest percentage of employees living in Germany or Belgium. In 2016, this was more than 5%. Zeeuws-Vlaanderen has a relatively high share of border commuters as well, namely 4 %.

The number of employees commuting from Belgium and Germany to the Netherlands in 2016 was considerably higher than the number going in the opposite direction. There were 36.8 thousand employees who travelled to work across the border from Germany to the Netherlands; from Belgium, there were 38.4 thousand (Centraal Bureau voor de Statistiek, 2020).

2.1.2. Germany

The situation in Germany is unique in comparison to the Netherlands and Belgium as the German government has launched a campaign focused on the improvement of cross-border public transport. The mobility portal NRW, a joint campaign of the German Ministry for the Environment, Nature Conservation and Transport, and various transport companies, special-purpose associations, transport associations, and communities in North Rhine-Westphalia, has acknowledged the differences in quality between cross-border and domestic public transport. The portal cites several reasons for these differences, including issues related to service and infrastructure.

Regarding service, transport companies often have to offer cross-border services at their own expense due to a lack of financing arrangements with neighbouring contracting authorities. Additionally, the financial feasibility of new lines is often difficult to achieve, particularly if existing domestic transport lines are not included in the planning process. Furthermore, the high entrance barriers in neighbouring countries, such as the Netherlands' OV chipkaart system, have been shown to have negative effects on demand by German passengers to and from the Netherlands. Incomplete traffic information for passengers and high ticket prices that require purchasing two tickets, one for each country, also contribute to the challenges faced by cross-border public transport. Additionally, connections are not always guaranteed.

Infrastructure also poses a challenge to cross-border public transport. The existing cross-border infrastructure often has less capacity in comparison to the domestic one. Single-track railroads are more common and changes in railway systems are often needed. Gaps in electrification also contribute to the difficulties faced by cross-border public transport.

In a pilot project called "easy connect" by Aachener Verkehrsbund, the transport association of Aachen, several of the above-mentioned issues are currently being tackled. The plan is to

introduce a cross-border online ID-based ticketing system with check in and check out options in both Germany and the Netherlands (Grenzüberschreitender ÖPNV, 2023).

Transport lines that connect Germany within the Euregio Meuse-Rhine (EMR) are the following:

- Train to Venlo, from Hamm via Düsseldorf;
- Train to Maastricht, from Aachen via Heerlen (NL);
- Train to Spa-Géronstère, from Aachen;
- Bus to Maastricht, from Aachen.

2.1.3. Belgium

One of the most visited train stations in Wallonia is Liège-Guillemins, which has connections to Germany, France, the Netherlands, and Luxembourg with trains from Thalys, ICE and InterCity.

Currently, Belgium is connected across the border within the EMR with the following trajectories:

- Train to Maastricht, from Liège-Guillemins;
- Train to Aachen, from Spa-Géronstère;
- Bus to Maastricht, from Hasselt or Tongeren;
- Bus to Vaals, Aachen, or Monschau, from Eupen.

2.2. Demarcation: Defining the Territory of the Research

Geographically, the research will focus on the state of cross-border public transport within the EMR. As one of the most densely populated areas of Europe with an extraordinarily high density of national and subnational borders, the topic of cross-border mobility can be considered to be highly salient for the population. Since the state of public transport across the borders in this region is likely to have a notable impact on the quality of its populace, valuable research results can be expected.

The EMR is one of the oldest cross-border regions in the European Union; it was created in 1976 and achieved legal status in 1991. For the past 35 years, EMR has brought together five partner regions in three countries with different languages and cultures. Since 1976, the southern and central parts of the Dutch Province of Limburg, the German Zweckverband (specific administration union) of the Aachen Region, the German-speaking community of Belgium, and the Belgian provinces of Liège and Limburg have joined forces in tackling cross-border issues (Figure 2). The Euroregion covers a geographical area of approximately

11, 000 km around the city corridor of Aachen– Maastricht–Hasselt–Liège. This cross-border partnership creates new opportunities for the population, thus making an important contribution to the quality of life of the approximately four million inhabitants living in EMR.

EMR contains around 150 municipalities, 49 of which have one or more borders with another country. It has more than 50 hospitals, 22 universities and higher educational colleges, and around 43 000 daily commuters working at 246 000 companies (Euregio Maas-Rhein Organisation).



Figure 2. Map of the EMR

2.3. Methodology

This paper is in a sense exploratory in nature in that it tries to map the field of cross-border transportation in the Euregio Maas-Rijn. However, in doing so, it mostly relies on existing research to create a comprehensive whole of what is a mostly disjoint and disconnected area of knowledge. To that end, the literature review conducted in section 2 forms the basis upon which the survey and interview are conducted later in the paper. Given the purpose of this

paper, it was determined that a mixed-methods approach would be best to capture both the human as well as more technical aspects of cross-border public transport. For the quantitative data we relied on a survey investigating the experiences of users of cross border transport. For the qualitative data, several experts were investigated from various transport-related organisations. While the research will rely primarily on the survey data to guide its findings, the answers from the various interviews are used to provide more qualitative context. In doing so, we get a picture of the issues currently relevant in cross-border transport, but also

Based on literature review, we identified various topics that should be addressed in the survey. In addition, we also looked at projects aimed at improving cross-border public transport in other European cross-border regions to identify which factors were relevant to the experience of cross-border public transport users (Bahndep, n.d.; BBSR, 2014, 2015, 2020; IMeG, 2018; Mobil.NRW, n.d.; Verkehrsverbund Berlin-Brandenburg GmbH, n.d.). We combined our findings and used them to create our survey. The survey was sent out to peers and posted. In addition, a QR code to the survey was printed and posted in various locations relevant to public transport such as buses, bus stops, and so on. In total, 53 responses were collected.

Potential participants for the interviews were selected based on various criteria, such as expert knowledge and relevance to the field. In total 4 interviews were conducted. The number of interviews means that any findings are limited and that the information gained in the interviews should primarily be used to give context to the findings gained from the surveys. Table 1 below gives an overview of the interviewees and their function. The interviews were used primarily to give qualitative background and context to the findings presented in this paper.

Interviewee	Organisation	Function
Interviewee #1	Arriva	Business Development Manager
Interviewee #2	TEC Belgique	Operational Manager
Interviewee #3	Ministerie van Infrastructuur en Waterstaat	Policy Officer
Interviewee #4	Aachener Verkehrsverbund	Manager focussed on cross border public transport

Table 1: Overview of interviewees

3. Empirical results

3.1. Survey

In order to better understand the perspective of users of CBPT, a survey was conducted. It was divided into two main sections: one for those who used CBPT, and one for those who did not use it. The overall aim of the survey was to analyse why those individuals do or do not use CBPT, and to collect their opinions on CBPT and how to improve it. Of the survey's participants, 81.1 % consisted of users of CBPT, whilst the rest did not. The survey was sent to a variety of individuals ranging from: university students, passengers on cross-border commutes, a carpooling WhatsApp group for commuters from Eupen and from Aachen to Maastricht and family members.

3.1.1. CBPT Users

The section for CBPT users has three types of questions. The first type asks standard questions to understand the survey participant's backgrounds, such as age, gender and why they use CBPT. The second type of questions asks the participant to give a rating on statements regarding the following issues:

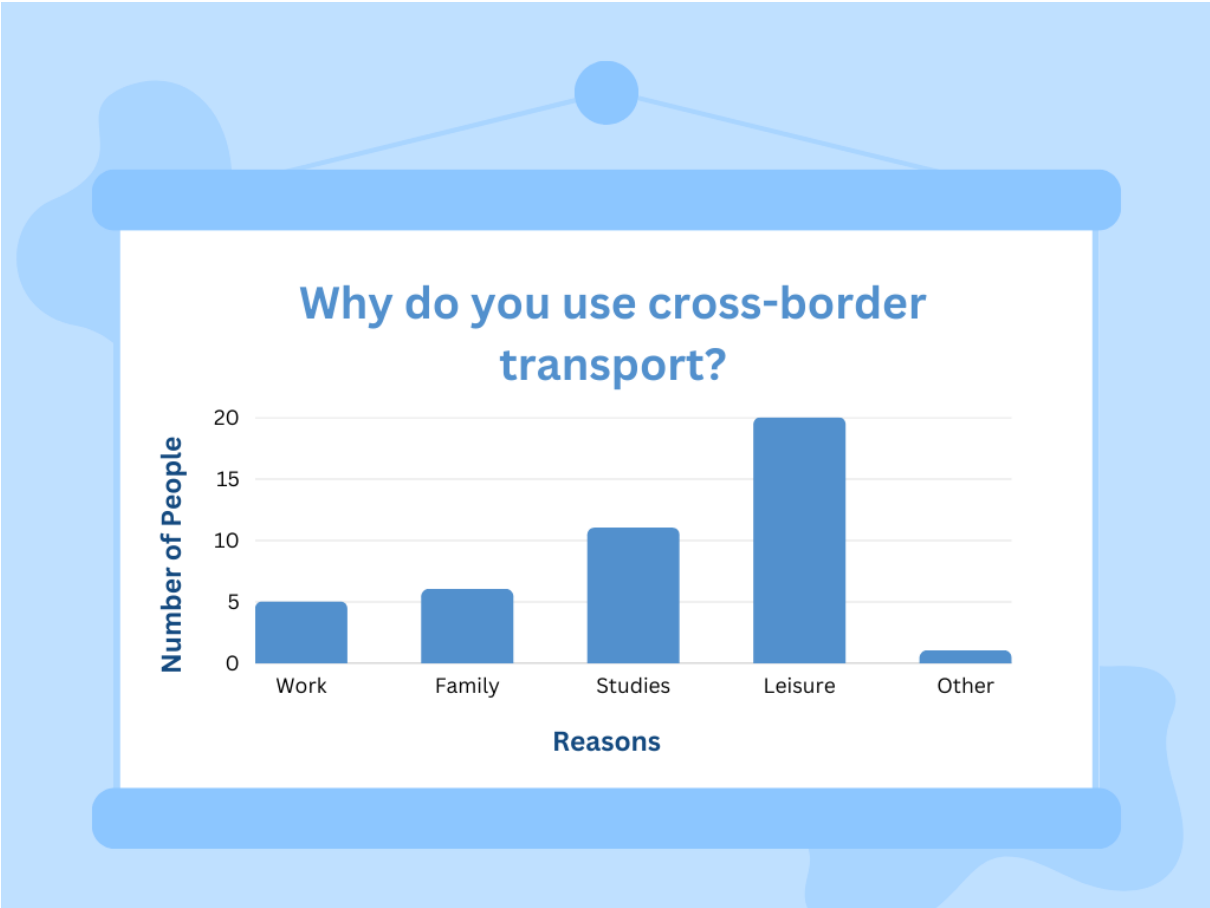
1. Their satisfaction with the communication of CBPT schedules to passengers (e.g. information on the NS app or on the displays at the bus stops and train stations);
2. ease of buying tickets;
3. satisfaction with travel time;
4. safety;
5. reliability (trust that CBPT will operate according to schedule);
6. cost of tickets;
7. satisfaction with the frequency of CBPT;
8. satisfaction with connections and number of needed transfers;
9. cleanliness, comfort, and availability of seats.

The last part of this section asked the participants to freely write their opinions on what needs to be changed about CBPT.

3.1.1.1. Survey Participants' Backgrounds

According to the survey, a majority of CBPT users are between the ages of 18-30 and are female, with percentages 88.4% and 61.9% respectively. 69.8% do not own a car, while 30.2 % do, yet still consciously decide to use CBPT. Conventionally, CBPT is used for work, study, leisure or for visiting family, of these reasons for using CBPT, the most used are leisure, at

55.8%, study, at 37.2%, work, at 16.3%, and visiting family, at 13.8%. Uniquely, the other 4.6% use CBPT to purchase products because they are cheaper, or because they have health insurance in the destination country. Although many of the survey’s participants use CBPT for work and study, a majority of the users use it once, or two to three times a week, at 56.8% and 27% respectively, with only 5.4% using CBPT more than five times a week. This is illustrated in **Graph 2** below.



Graph 2. *Reasons for using CBPT*

The participants were also asked which cross-border track they use, with 72.1% responding that they travel along the Maastricht-Aachen line, and 20.9% using the Maastricht-Liège line.

3.1.1.2. Survey Participant’s Ratings of Certain Issues

For this part of the survey, participants were asked to give a rating on their satisfaction levels with regards to certain issues. The scale was set at 1 to 5, with 1 meaning that they are satisfied and 5 meaning they are dissatisfied. The results from this part are displayed in the tables below. The first table is organised by issue, demonstrating the most voted for rating and the percentage of participants who selected that rating, while the second table demonstrates the least voted for rating. The results are organised starting with issues that the users were satisfied with and ending with those users were not satisfied with. Within

each rating, the issues were further ordered in ascending order of how many users gave that rating. The rationale for displaying the most and least frequently chosen rating is to see how much variation there is in the satisfaction of the users.

Issue	Most Frequent Rating	Percentage (%)
Ease of Buying Tickets	1	27.9
Safety	1	46.5
Connections and Transfers	2	30.2
Cleanliness, Comfort and Availability of Seats	2	34.9
Frequency	3	27.9
Communication of Schedules	3	32.6
Reliability	5	32.6
Travel Time	5	34.9
Cost of Tickets	5	44.2

Table 2. *Most frequent rating*

Issue	Least Frequent Rating	Percentage (%)
Travel Time	1	0

Cost of Tickets	1	2.3
Reliability	1	7
Connections and Transfers	1	9.3
Frequency	1	11.6
Communication of Schedules	5	7
Safety	5	7
Ease of Buying Tickets	5	9.3
Cleanliness, Comfort and Availability of Seats	5	9.3

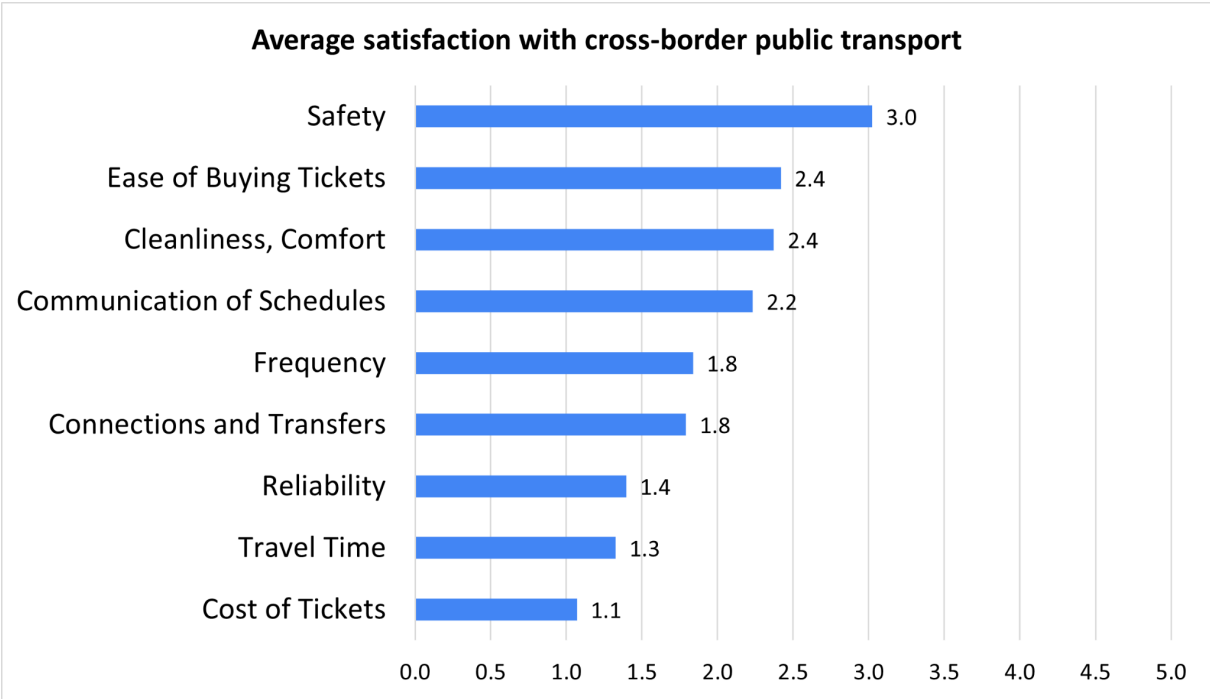
Table 3. *Least frequent rating*

Based on the first table, the two issues that users are most satisfied with are the ease of buying tickets and the safety of travelling with CBPT, with 27.9% and 46.5% users selecting that rating for each issue respectively. On the other side of the spectrum, users are most dissatisfied with travel time, reliability and the cost of tickets, with 44.2% expressing this dissatisfaction. For the rest of the issues, users gave a rating of 2 and 3 meaning that they were mostly satisfied with the other issues. Based on the percentages, it is discernible that almost half of participants agree that they are satisfied with the safety of CBPT and that they are dissatisfied with the cost of the tickets.

The results from the second table demonstrate that the three issues the majority were dissatisfied with: travel time, reliability and ticket pricing, are also the issues the least people were satisfied with. Notably, there were no users at all who were satisfied with the travel time of CBPT. However, there were also other issues that the minority of people were completely satisfied with, which were connections and transfers and the frequency of CBPT. Interestingly, for those two issues, most people had responded that they were somewhat satisfied or were neither satisfied nor dissatisfied. As with the three issues most users were dissatisfied with, there is also a mirroring effect for the issues that users were most satisfied

with. Regarding ease of buying tickets and safety, only the minority of users were completely dissatisfied, with 9.3% and 7% of users expressing such dissatisfaction for each issue respectively.

Regarding the overall results of both tables, it is evident that most people are in between being satisfied and dissatisfied for most issues. Particularly, the second table demonstrates that most of the users did not want to choose the extremes of completely being satisfied or being dissatisfied. It also was interesting to see that there was a mirroring effect in the opinions of the users. The issues that most users were dissatisfied with were also the issues where only the minority were satisfied with, and the same could be seen with the issues users were satisfied with. This juxtaposition confirms those certain issues as those that most users are satisfied or dissatisfied with, in contrast to others where the opinions were more varied and spread out.



Graph 3. Average Satisfaction

3.1.1.3. Survey Participant’s Views on What Needs to be Improved

The final question asked users what they thought needs to be changed about CBPT. Most responses suggested multiple changes, rather than one single change. This demonstrates that there is no one big prevalent issue users have with CBPT and that there are multiple issues they would like to see resolved in order to improve their CBPT experience. Of those issues, the most often discussed were the pricing of the tickets and the frequency of the

buses. As pricing was one of the issues that most users were dissatisfied with, this was to be expected. However, the frequency of the buses was discussed nearly as often as ticket pricing, despite the fact that most users had said they were neither satisfied nor dissatisfied with the frequency of CBPT. Though, this may be justified by the fact that the minority of users were satisfied with the frequency of CBPT, indicating that user opinion was spread amongst being neutral or dissatisfied. However, the disparity between what needs to be improved most and the issues that most users were dissatisfied with suggests (i) users have different priorities in improving their experience of CBPT, which presumably is why there is such a disparity, and (ii) users may continue using CBPT even though they are dissatisfied with certain aspects because they are reliant on CBPT.

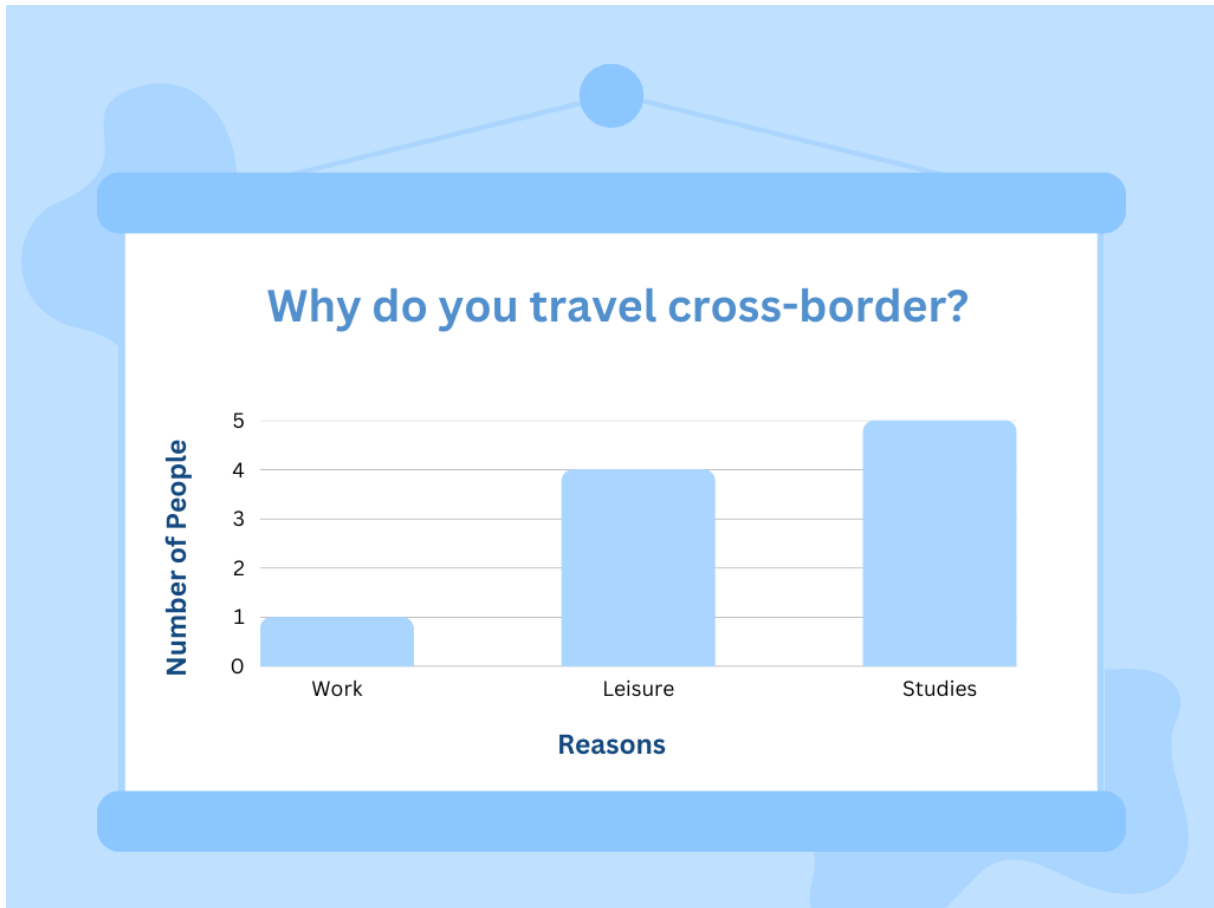
Most changes that were discussed were the same issues that were presented to the users in the previous part of the survey. Nonetheless, there was a user who suggested an alternative change: increasing the politeness of drivers. This proposition is interesting as most issues presented to the users in the survey related to more technical issues regarding the operation of CBPT. Yet, one user commenting on the behaviour of drivers indicates that there is also a social element to a user's CBPT experience, which may affect their choice in taking CBPT.

Interestingly, 9.3% of users indicated that no other changes needed to be made to CBPT or simply did not give a response to this question. This result must be viewed critically, while it may be that some of the users genuinely believed that nothing needs to be changed, it may also be that these users simply did not want to think and type out a response. In this regard, this question could have been a multiple-choice question asking the user which of the issues presented to them in the previous part of the survey, with the option of typing out an alternative suggestion or additional notes if needed.

3.1.2. Non-users

The section for non-users did not have as varied types of questions as the section for CBPT users. The questions also inquired about the participants' backgrounds, but additionally asked them why they do not use CBPT and what would need to be changed for them in order to start using it.

As with users of CBPT, the majority consisted of individuals between the ages of 18-30 and were female, with percentages of 80% and 70% respectively. In contrast to CBPT users, the majority, at 60%, own a car. As for the reason why non-CBPT users would travel across the border, there is a parallel with CBPT users, where leisure was the most chosen reason, at 55.6%, school, at 44.4% and work, at 11.1%. This is illustrated in Graph 4 below.



Graph 4. *Reasons for travelling cross-border*

What stands out is that there were no other reasons why non-CBPT users would cross the border, while CBPT users also travelled across the border to visit family, and for other various reasons. As with CBPT users, the non-users were also asked how often they travel across the border. The majority of the votes were divided between two to three times a week and not at all. Similar to CBPT users, 44.4% of users travelled from Maastricht to Aachen, with the rest of users travelling along other tracks.

As it is illogical to ask non-users their satisfaction levels on certain issues related to CBPT, they were asked two questions instead: (i) why they did not use CBPT and (ii) what needed to be changed for them to start using CBPT.

The first question was a multiple-choice question where the participants had the ability to choose more than one option, and were able to include their own reason for why they did not use CBPT.

Issues	Percentage (%)
Unreliable communication of passenger information	20
Safety concerns	0
High ticket prices	80
Complex ticket purchasing process	20
Risk of potential trip delays/cancellations	40
Few available seats & lack of comfort during the ride	30
Low frequency of train/bus rides	20
Too many necessary transfers and long waiting times between connections	30
Long travel duration in comparison to car rides	70
Insufficient accessibility (e.g., accommodation for passengers with disabilities)	0

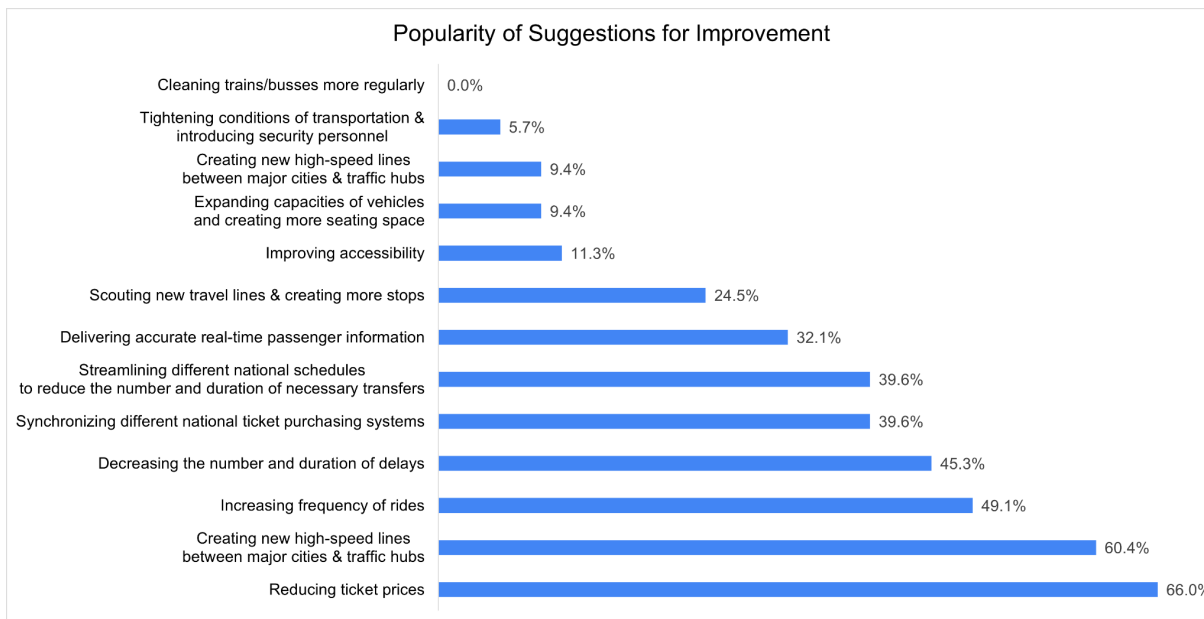
Table 4. *Non-users’ reasons for not using CBPT*

Interestingly, the results show a parallel with CBPT users, where most non-users indicated that one of the reasons why they do not use CBPT is due to the ticket prices and the non-users showing no concerns with the safety of CBPT. However, in contrast to CBPT users, more than half of non-users cared about the travel time in comparison to car rides. It is important to note that although there were no concerns regarding insufficient accessibility, that does not mean that this is an issue that needs to be addressed as it is likely that none of

the participants of the survey needed this accessibility. Thus, the results in this regard are not reliable.

As the participants were able to add their own reason, there were some who had indicated that they did not use CBPT because they had a car. On this note, some said that travelling by car was cheaper or simply that they enjoyed driving rather than travelling by CBPT. This indicates that even if CBPT was to be improved in the needed areas, there are some users who, simply by preference, will still not use CBPT. Finally, one reason for not using CBPT raised by one of the participants is that there were no direct connections between their starting point and desired destination. Although this was only raised by one of the non-CBPT using participants, the issue of connections is also one that not many CBPT users were satisfied with.

As for the second question on what needs to be improved for these non-users to use CBPT, it was also asked with an open writing section. In parallel to CBPT-users, price was the biggest issue that needed to be improved, with half of the participants indicating this opinion. Travel time and better connections were also the most discussed issues. Uniquely, one participant suggested that CBPT needs to be promoted more for leisure, which contradicts with the result that almost half of the non-CBPT using participants had indicated that they cross the border for that very purpose. There were also concerns with the accessibility of bus stops in the sense that some participants did not live close to a bus stop, which would enable them to use CBPT more often. One participant also stated that, as they have their car “right outside their door”, there was no reason for them to use CBPT. Despite this singular participant preferring the use of their car, it is apparent that the biggest changes that are needed for more people to use CBPT are relating to technical issues relating to its operation.



Graph 5. Popularity of Suggestions for Improvement

3.1.3. Improvements to CBPT

The final question of the survey was posed to all participants, asking them to choose which proposed changes to improve CBPT they would value the most, with the option of being able to choose more than one proposed change. The results are displayed in the table below, which was organised beginning with the most popular to least option.

Option	Percentage (%)
Reducing ticket prices	66
Creating new high-speed lines between major cities & traffic hubs	60.4
Increasing frequency of rides	49.1
Decreasing the number and duration of delays	45.3
Streamlining different national schedules to reduce the number and duration of	39.6

necessary transfers	
Synchronising different national ticket purchasing systems	39.6
Delivering accurate real-time passenger information	32.1
Scouting new travel lines & creating more stops	24.5
Improving accessibility	11.3
Expanding capacities of vehicles and creating more seating space	9.4
Cleaning trains/busses more regularly	9.4
Tightening conditions of transportation & introducing security personnel	5,7
None of these options are relevant to me	1.9

Table 5. Most valuable changes

Overall, there is a parallel between the issues CBPT users were most dissatisfied with and the reasons why non-users did not use CBPT, and the most and least chosen options. Consistent with the results from the other parts of the survey, the most voted change was a reduction in ticket prices, at 66%. The next most popular option, at 60.4%, tackled the issues of connections and travel times simultaneously by creating new high-speed lines between major cities and traffic hubs. The concerns with frequency and reliability can also be seen in almost half of the participants voting for the increase of frequency of rides and decreasing the number and duration of delays. Consistent with the lack of concern for safety, only 5.7% of participants voted for the tightening of conditions of transportation and the introduction

of security personnel. Interestingly, one participant indicated that none of the options were relevant to them, which suggests that they may be perfectly satisfied with CBPT.

4. Case study: the Drielandentrein

The following chapter will deal with a specific instance of a cross-border public transport project in the EMR. At the hand of the case of the Drielandentrein, the process of conducting cross-border mobility projects will be illustrated. Particular focus will be put on the deficiencies in the quality of cross-border public transport service that set off the planning process and are supposed to be addressed with the creation of the new train. Furthermore, the obstacles that had to be overcome during that process will be elucidated as well. The case will thus allow to get a better understanding of underlying mechanisms and relevant factors influencing the expansion of cross-border public transport infrastructure in the region.

In 2019, the Dutch railway company Arriva began operating the Drielandentrein. Up until this point, the train only runs between Aachen and Maastricht (Figure 3), via Heerlen, in Germany and the Netherlands. Belgium refused to allow Arriva to continue to operate the train to Liège, citing the absence of the European Train Control System (ETCS) onboard. Germany and the Netherlands allowed Arriva a transitional period to install the system, but the then-Mobility Minister, François Bellot (MR), did not grant an exception and did not allow the trains to enter Belgium. As a result, passengers had to travel to Aachen via a transfer in Maastricht or Verviers. Meanwhile, the ETCS system has been installed, and tests have been carried out on the Belgian railway network. Starting from December, when the new European railway timetable begins, the Drielandentrein will run all the way to Liège. From December, the Drielandentrein will link these two connections so that a change in Maastricht will not be necessary for those travelling between the cities near the borders of the three countries. The train is expected to run every hour.

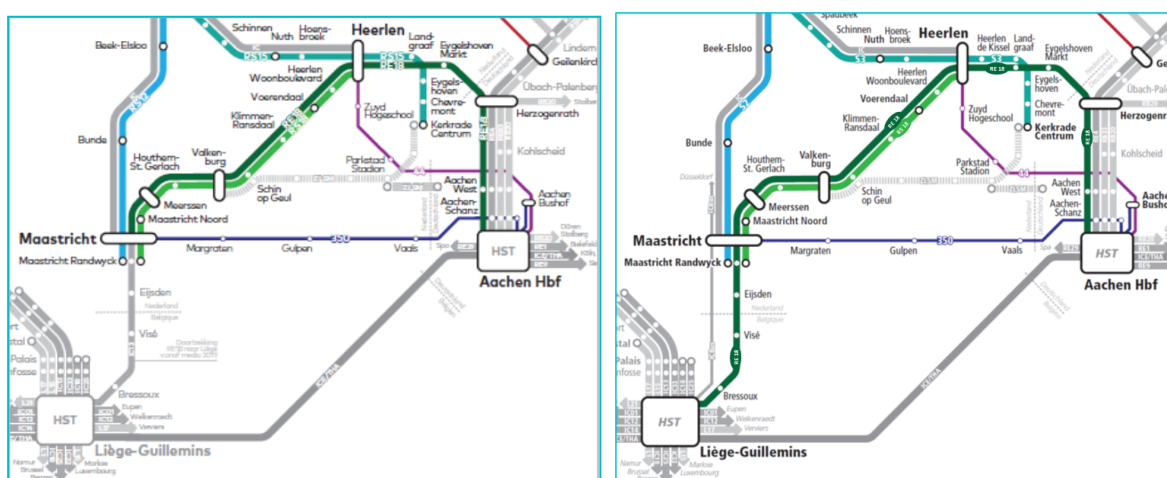


Figure 3. *Current state of the realisation (left) and realisation of the 'Drielandentrein' as planned by the end of 2023 (right). Source: Arriva*

The Drielandentrein has two cross-border connections. This means frequent consultation between Belgian, Dutch and German parties. Parties involved in the Drielandentrein include the German partners Nahverkehr Rheinland and the Aachener Verkehrsverbund, the Belgian partners the Cabinet, the Federal Public Service, the Belgian carrier NMBS, and rail manager Infrabel. On the Dutch side, the Ministry of Infrastructure and Water Management, ProRail, the province of Limburg, and the two carriers NS and Arriva are involved.

4.1. The benefits of the the Drielandentrein

The province of Limburg summarises the benefits of the new train as follows (Provincie Limburg):

1. **More trains and less waiting.** In the future, more trains will run between Liège, Maastricht, Maastricht Randwyck, and Eijsden. For travellers in Eijsden, this would mean a connection to Maastricht every half hour. Travellers between Maastricht Randwyck and Maastricht will have 6 trains per hour. In addition, in the new situation, on Saturdays and Sundays, 1 extra train will run back and forth between Maastricht and Liège
2. **More direct connections.** The Drielandentrein connects cities on the Belgian and Dutch side directly with each other. Think of Liège, with Meerssen, Valkenburg, Heerlen, and Landgraaf. As a result, travellers no longer have to transfer, and new direct (express) connections are created. For example, Liège will be connected to Maastricht Randwyck (Maastricht UMC+ and MECC) and Heerlen (Hogeschool Zuyd, Brightlands Campus) via an express train. But travellers from Heerlen and Maastricht will also have a great direct connection to the capital of the Liège region.
3. **New trains and more comfort.** WiFi, power outlets, USB ports, and a wheelchair accessible toilet are available on board. In addition, the trains have a level entrance, which represents a significant improvement compared to the current equipment.
4. **Tickets.** It is already possible to travel to Belgium from any station in the Netherlands with a single ticket from the ticket machine, but this is not yet possible with the OV-chip card. Dutch check-in and check-out poles have been placed at the German stations of the Drielandentrein to enable this. We are also investigating whether these poles can be installed at the Belgian stations between Liège and Maastricht.

Another option will be to use the Glimble app, a development in the field of Mobility as a Service.

- 5. Increased security.** The new trains will be equipped with the latest European safety system, the European Rail Traffic Management System (ERTMS). This system ensures that the maximum speed and maximum distance are not exceeded. If this happens, the ERTMS computer always brakes the train in time. The ERTMS is an important part of the European Rail Traffic Management System (ERTMS), a European project to standardise and improve rail safety

4.2. Obstacles in the realisation of the train

Initially, the Drielandentrein was supposed to start running on December 9th, 2018 (OV magazine, 2019). As stated above, the implementation of the ERTMS (European Rail Traffic Management System, of which ERCTS is a part) was a problem in Belgium. The ERTMS software system ensures that trains do not exceed the permitted speed, even at speeds below 40 km/h. The driver is warned in case of a speed limit violation and can take measures. If not, the train brakes. ERTMS is one system with components installed in both rolling stock and the railway infrastructure itself. Arriva has always indicated that they want to equip the trains with ERTMS, but they had to wait for the Dutch specifications first. Second, making financial arrangements between the three countries proved to be difficult and required long and frequent talks between NS, Arriva and NMBS (the three transport companies involved).

In 2018, Stadler delivered eight new electric train sets to Arriva for the Drielandentrein, which are almost identical to the existing Flirt 3 type. They are also suitable for operating on the Dutch (1500 volt DC), German (15,000 volt AC) and Belgian (3000 volt DC) overhead line voltage. Passenger amenities include wifi, laptop power outlets, air conditioning, and toilets . The Dutch ATB, German Indusi and Belgian TBLI+ train protection systems are installed. But, in order to get the trains running, the ERTMS system on the Visé-Liège line had to become operational and the Dutch government had to decide on the installation of ERTMS in the Netherlands, which delayed the whole project further. Belgian ministers Bellot and Ducarme confirm that this modern security system must be installed on all new trains before they may operate in Belgium. "This regulation, which applies in all European Union member states, requires the installation of ETCS on all new rolling stock that was ordered after 1 January 2012 or put into service after 1 January 2015. Exceptions cannot be granted because the Liège-Maastricht line is part of the trans-European transport network (TEN-T)," they explain. According to them, the Safety and Interoperability Service, also known as the Belgian Railway Inspection, informed and explained the necessary security system obligation to Stadler, which built the train sets in 2015. "This obligation was also emphasised in bilateral contacts between the Federal Public Service Mobility and Transport and the (Dutch) Ministry of

Infrastructure and Water Management. This was also reiterated at the ministerial level," they said (Treinenweb, 2018).

In addition to the challenges associated with the installation of the European Rail Traffic Management System (ERTMS), several other obstacles required resolution. These obstacles encompassed multiple aspects, including the diverse organisational responsibilities for staff, necessitating the overcoming of language barriers. Furthermore, the complexity of ticketing systems (represented by figure 4) with their varied rules and regulations posed a persistent challenge that demanded effective resolution strategies.

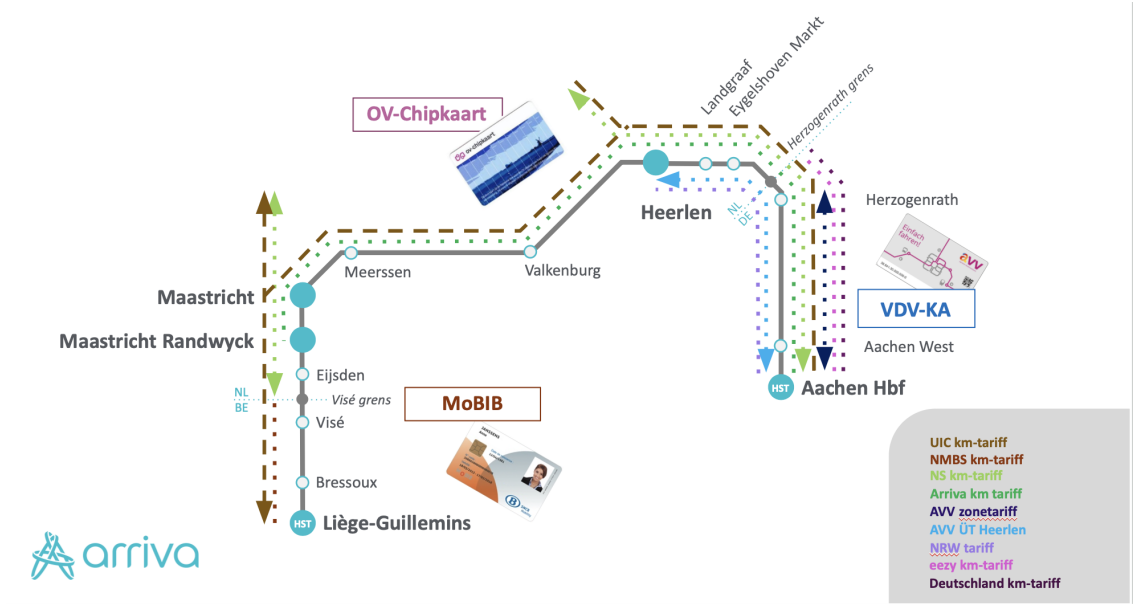


Figure 4. Current state of the complexity of ticketing in the Drielandentrein

Figure 5 shows the current obstacles in terms of operation that had to be overcome in order to get the train running by the end of 2023.

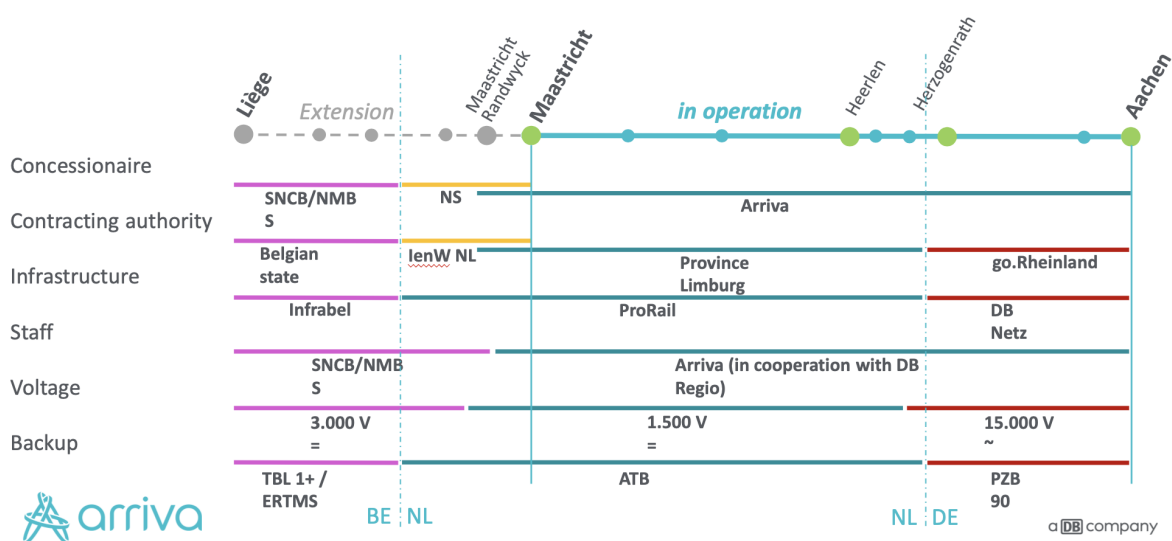


Figure 5. Operational obstacles to go from a ‘tweelandentrein’ to a ‘drielandentrein’. Source: Arriva

4.3 Overcoming the obstacles

The three countries involved in the Drielandentrein initiative undertook various measures to overcome the obstacles encountered. Firstly, in terms of staff responsibilities and language issues, the organisations involved implemented comprehensive language training programs to ensure effective communication and collaboration among personnel from different countries. Language proficiency standards and resources such as translators or interpreters have been utilised to facilitate smooth operations. Technical solutions, such as the integration of ticketing systems or the development of interoperable platforms, might have been explored. Implementing advanced technologies and digital solutions have facilitated cross-border ticketing processes and enhanced customer convenience. Additionally, collaboration between the three countries' railway authorities and continuous communication channels have played a vital role in identifying and addressing any emerging challenges promptly. Regular meetings, joint working groups, and the sharing of best practices might have been employed to ensure ongoing cooperation and the resolution of issues related to staff, ticketing, and other operational aspects.

Overall, overcoming the obstacles in the Drielandentrein initiative required a combination of effective communication, intergovernmental cooperation, standardisation efforts, and the utilisation of technological advancements to streamline processes and enhance cross-border rail travel.

State Secretary Vivianne Heijnen of Infrastructure and Water Management (CDA), Maarten van Gaans, the transport deputy for Limburg (D66), and Belgian Minister of Mobility Georges

Gilkinet (Ecolo) have signed a memorandum of understanding for the Drielandentrein. This document outlines the agreements for the use of the route between Maastricht and Liège. The first test runs have been successful, according to a spokesperson from the Ministry of Infrastructure and Water Management. The Drielandentrein trains, acquired by Arriva, have been modified to meet additional safety requirements imposed by Belgium. Dutch and NMBS personnel will be deployed between Maastricht and Liège. Although agreements still need to be reached regarding ticket sales and fares, the signing of the memorandum of understanding formally authorised the commencement of the service, as stated by the Ministry of Infrastructure and Water Management.

The integration of ticketing systems among the three countries involved in the Drielandentrein initiative has proven to be a significant challenge, resulting in a lack of consensus on a unified ticketing system. The complexity arises from the divergent existing systems in each country, encompassing varying rules, regulations, and pricing structures. Achieving a seamless integration requires extensive coordination and harmonisation efforts to ensure compatibility and interoperability. The intricacies involved in reconciling these disparate systems, along with the potential technological and logistical hurdles, have contributed to the ongoing absence of a consensus. Nonetheless, stakeholders remain engaged in discussions, actively seeking innovative solutions and collaborative strategies to overcome these difficulties and pave the way for a unified ticketing system that will enhance cross-border travel convenience for passengers.

4.4 Interview with a policy officer (Ministry of Infrastructure and Water Management)

Interviewee 3, from the Ministry of Infrastructure and Water Management, discusses the current challenges facing domestic transportation due to the significant impact of the COVID-19 pandemic. Additionally, she highlights the personnel shortages that have affected the public transport system, making it necessary to work with the available resources. However, the interviewee believes that the transportation system itself is well-designed, particularly in terms of decentralised operations, which have proven effective for regional travellers. Despite the current issues, she expresses confidence in the overall functionality of the system, suggesting that compared to other countries, the train system in the Netherlands is quite efficient, even though people tend to complain.

Shifting focus to international transportation, the interviewee acknowledges the complexities involved in coordinating with other countries. While domestic transport operates under clear concessions and agreements between parties, international connections are more challenging due to the involvement of multiple nations and

responsibilities. The interviewee raises questions about how such connections can be organised and suggests that various models, including a concession-based approach or self-offering by transport providers, could be considered. Additionally, she mentions the need to address passenger rights when train services are disrupted, drawing attention to the lack of harmonisation in this area internationally.

The interviewee further discusses the issue of ticketing and highlights the disparity between national and international systems. In the Netherlands, the chip card system has been established, allowing passengers to use their bank cards for check-in and other transactions. However, this standardisation is not yet present for international travel, making sustainable and convenient ticketing options challenging. Another complexity arises from the differences in technical specifications and safety systems among countries, making integration and cooperation more difficult than they may seem at first glance. The interviewee emphasises the absence of a single responsible party in these matters, as cooperation between countries is necessary to overcome the various obstacles and differences in pricing, subscriptions, and other factors. Despite the strong willingness to improve international transportation, the interview highlights the multitude of factors that make it a complex task.

5. Conclusions and recommendations from a Euregional perspective

5.1 Substantive Conclusions

The cross-border public transport system in the EMR faces several challenges that hinder its optimal functioning. Despite the presence of numerous engaged stakeholders, there is a noticeable lack of coordination among them, leading to inefficiencies. Public opinion towards (international) public transport is negative, reflecting a need for improved transparency and a demonstration of ongoing efforts. Additionally, the slow processes and lack of prioritisation in the region contribute to delays and hinder progress. Logistical issues, such as differences in voltage and signalling systems, further complicate the system's operations. This highlights the discrepancies between the EU and national policies and their actual implementation. Although there are regulations and national laws in place, it is a simple fact that the train and bus operators are not able to adapt and modernise their public transportation systems to comply with those laws.

5.2 Recommendations

To effectively address the challenges identified in the CBPT system, it is essential to adopt a comprehensive approach that encompasses various aspects. The following measures can be implemented to tackle these challenges and improve the CBPT system within the EMR:

1. **Standard Framework:** Making use of resources provided by the EU for the coordination of cross-border public transport development. Establishing an EU-wide standard framework for CBPT projects can play a crucial role in promoting better coordination among stakeholders. This framework should encompass guidelines and regulations that facilitate seamless cross-border operations, harmonise ticketing systems, align human resource planning, and ensure compatibility of schedules and routes. By standardising procedures and protocols, it becomes easier to overcome administrative barriers and streamline operations.

2. **Transparency and Communication:** Increasing transparency and showcasing ongoing efforts in improving the CBPT system can help reshape public opinion. It is important to effectively communicate the benefits and advancements made in CBPT to build trust among passengers, businesses, and communities. Regular updates, public consultations, and awareness campaigns can foster greater understanding and support for cross-border transport initiatives. Furthermore, openness about the obstacles encountered in CBPT development can lead to greater understanding.

3. **Resource Allocation:** Allocating adequate resources, including staffing, funding, and prioritisation, is crucial for the successful implementation and improvement of the CBPT system. Governments, transportation authorities, and relevant organisations should prioritise investments in CBPT infrastructure, technology, and human resources. This can help expedite processes, address capacity constraints, and enhance the overall quality of services.

4. **Harmonisation of Infrastructure:** Logistical issues can be mitigated by harmonising the infrastructure across borders. This involves coordinating the development and maintenance of transport infrastructure, such as roads, railways, and bus terminals, in a way that facilitates efficient cross-border connectivity. Standardisation of signage, information systems, and facilities can enhance passenger experience and navigation.

By addressing these challenges and implementing the proposed solutions, the EMR can significantly enhance its cross-border public transport system. This comprehensive approach ensures better coordination, improves efficiency, and fosters regional integration. Ultimately, a robust and seamless CBPT system contributes to sustainable mobility, economic growth, and improved quality of life for the residents and visitors within the EMR.

5.3 Methodological shortcomings

With regards to the survey, there were methodological shortcomings that affected the results that were collected. For instance, the survey was mainly sent to university students who were residing and studying within the Limburg region. This may have skewed the results

regarding the reasons why the participants use CBPT. The most voted reason by CBPT users was leisure instead of work and study as a result, as those participants already resided in the region they worked or studied in. Thus, in order to have more varied survey results, one proposed change to the methodology would be to distribute the survey amongst a wider audience.

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