Ref. Ares(2018)3903039 - 23/07/2018

Horizon 2020 ETC 636126

Pilot Report (Evaluation)

&

Pilot Report Luxembourg

–

Deliverable 14.3

9 May 2018

Any dissemination of results reflects only the author's view. The Agency is not responsible for any use that may be made of the information it contains.

_____

Table of Contents

_____

_____

1. Introduction and description of the pilots

This report elaborates on the results of the pilot, as part of work package 14 of the European Travellers Club. This report also covers, or includes Deliverable 13.2: Pilot Report Luxembourg.

The pilots are testing and demonstrating the workings of interoperable Account-Based Travelling (ABT) in a live environment. The essence of ABT is that the ticket is stored in the cloud, rather than printed on paper or written on a chip. The ticket can be a pre-booked ticket, a repeat journey, a pass, or an open ticket (Check In Only or Check In - Check Out). In order to make this possible, the transport scheme must connect several scheme roles in an online or nearly online environment. The concept allows for interoperability across schemes – for example schemes in different countries - but also across services – for example parking services and public transport. Both forms of interoperability have been tested in the pilot. The Dutch and the German pilot covered interoperable ABT across schemes. The Luxembourg pilot covered interoperable ABT across services.

Consortium members involved in the pilots were the Dutch ACCEPT institute, Translink Systems (TLS – operator of the Dutch E-Ticket scheme OV-Chipkaart), the Luxemburgish transport association (Verkéiersverbond) and the VDV eTicket Service GmbH & Co. KG, as manager of the German eTicket Standard (VDV-KA) and UL Transaction Security.

Next to the consortium members the following parties were involved:
- ASEAG, transport operator in Germany;
- Arriva, transport operator the Netherlands;
- CFL, national railways of Luxembourg;
- Cubic, supplier of the Online Ticket Stock in Germany;
- IVU, supplier of the validators in Germany;
- SystemTechnik, supplier BO Germany & inspection devices;
- Identa, supplier of the smart-cards for Germany and Luxembourg;
- Technolution, supplier of the ETC-application software for the validators in the Netherlands;
- PSTGoSmart, supplier of the validators in the Netherlands;
- Blue Bridge/ Scheidt & Bachmann, supplier of the back-office in the Netherlands;
- Init, supplier of the validator-software for Luxembourg;
- Scheidt & Bachmann, supplier of terminals in the parking for Luxembourg.

1.1. The Dutch pilot

The lack of interoperability between the different ticketing systems has been the main barrier for cross border travellers in the Euregio Maas-Rijn area, especially in the region Zuid-Limburg – Aachen. All initiatives up until now lead up to no structural improvements with the large potential of cross-border travel at loss.

_____

A turning point is the initiative of seamless ticketing. An initiative which was set up within the context of the European Horizon 2020 project 'European Travellers Club'. Since 2016 Trans Link Systems has been involved in this project and responsible for conducting the Dutch pilot. A pilot to prove a new technological solution, token-based-ticketing, through which interoperability is facilitated. For this Trans Link Systems has provided the Backoffice solution in cooperation with Blue Bridge/Scheidt & Bachmann and Technolution, and has included ARRIVA as the public transport company that operates cross-border bus lines and provides the required service for the pilot. The approach offers cross border traveling with one token, in this case a European Travelers Club card. Resulting in Dutch and German participants traveling between the Netherlands and Germany with only one token: seamless traveling.

1.2. The German pilot

Aachener Verkehrsverbund is located in the Euregio Maas Rhein. Even though progress was made in improving cross border travelling in the last years, we are still facing barriers in the field of public transport. This concerns especially the area of cross-border ticketing. In the past 10 years the three countries introduced and established different e-Ticket schemes, which were developed in isolation from each other. These schemes cannot communicate with each other and thus form barriers for cross-border public transport. This leads to a lack of interoperability in the area of e-Ticketing. Thus, a German eTicket or a Dutch OV-Chipkaart cannot be used for cross-border journeys or for journeys in the neighbour country.

For the future, the objective must be to enable an easy and seamless use of e-Tickets, even across national borders, to facilitate access to cross-border public transport and reduce the complexity in the field of tickets and tariffs.

Since 2016 AVV is involved in the project "European Travellers Club (ETC)" and responsible for conducting the German pilot. On their side, AVV has included Aachener Straßenbahn und Energieversorgungs-AG (ASEAG) as a public transport company that operates cross-border bus lines and provides the required service for the pilot. The project aims at finding a solution for the interoperable use of electronic tickets in cross-border public transport. As a technical solution, the approach of ID-ticketing is pursued. This approach allows identifying a customer only by an identification number that is stored on the chip card. In this context the scheme logic lies in the background, meaning tickets will no longer be saved on the chip card, but in an Online Ticket Stock to which the terminal has access via an online connection.

The cross-border pilot took place between 1st October 2017 and 31st March 2018 and included the cross-border bus lines 44 (Aachen – Heerlen) and 350 (Aachen – Maastricht) as well as all ASEAG buses operating in the City of Aachen. During the pilot phase, the pilot users tested the system under everyday conditions. The pilot users were able to travel with their technically enhanced chip card on both national and cross-border lines. Meaning that

_____

the German participants could use their German chip card also in Dutch buses (in the pilot limited to the designated pilot lines) easy and seamlessly.

1.3. The Luxembourg pilot

The city of Luxembourg is home to a large number of enterprises and organisations employing people from all of over the region. A large number of people commute daily into the city by car from the other side of the French – Luxembourg border, resulting in traffic congestion within the city. Part of a solution for this is to have people switch to public transport in P+R (Park and Ride) facilities. One of such facilities is the Belval parking area. To offer an incentive for people to sequentially use the parking facilities and public transportation, travellers who on a regular basis use public transportation while having their car parked receive a discount on their parking subscription. Therefore, travellers need to be able to proof that they are indeed using the facilities as intended.

Functionally, the following system was therefore designed:

1) People enter the parking with their electronic public transportation card on which a monthly pass is loaded;
2) People travel by public transport outside the immediate surroundings of the parking, paying with their electronic public transportation card;
3) By travelling and showing their presence they collect points: they can follow the accumulation of points with an app on their phone;
4) Having collected sufficient points users can exchange those points for a discount on their future monthly pass.

To allow for a good user experience, the following conditions exist:

a. Users must be able to use one electronic card for their activities, in practice meaning that the M-kaart as already used in Luxembourg is the medium of choice;
b. The application on the card should be accepted in both the parking as the public transport environment;
c. Users should be able to collect a discounted monthly parking pass if their usage of public transportation justifies this.

The pilot focussed on testing the technology to make this possible.

In Luxembourg Verkéiersverbond was the lead consortium partner. Verkéiersverbond involved train operator CFL in the pilot.

The pilot took place in 2016. After that it was decided to continue with the technical systems, meaning that the systems were kept alive in order to further test and be able to demonstrate the system.

1.4. Setup of the report

The purpose of the pilots for the participating regions/authorities/schemes has been laid out in objectives (chapter 2). In general the focus of the pilots wat to test Account-based Ticketing (ABT) in practice, but also to develop practical solutions to implement ABT in existing systems and ensure interoperability across schemes and borders.

All pilots used a smartphone app in which the traveller could track all transactions made. In the evaluation of the pilot there was attention to this topic (traveller in control and privacy) in the questionnaire that was put forward to the travellers. Examples of questions that were asked:

- It is useful to see my travel and parking usage in real-time in the mobile app (for Pilot in Luxembourg).
- Data security is important to me.
- Privacy is important to me.
- It is useful to directly see my travels in the app (for Pilots in Germany and the Netherlands).
- What issues in governance can be identified in case of further roll out? In reconciliation of payments? In acceptance of alien travellers? With regard to the privacy of travellers and the ownership of data?
- Perceived privacy: The right of an individual to control the information held about them by third parties.
- It gives me confidence to immediately see my travels in the app.

For a detailed description of these objectives and further background on the setup and design of the pilots the reader is referred to deliverables D10.1 Pilot Design Document and D10.2 Project Plan Pilots.

This report elaborates on the results of the pilot, as part of work package 14 of the European Travellers Club. This report also covers, or includes Deliverable 13.2: Pilot Report Luxembourg.

The report starts with the sub-objectives of the pilots in chapter 2. Then the evaluation methodology is described in chapter 3. The pilot results are discussed in chapter 4. Conclusions key lessons are part of chapter 5.

_____

2. Objectives of the pilot

The proposal states the high-level objectives for all of the three pilots. In the Pilot Design Document and the Project Plan Pilots these have been operationalized. Those operationalized sub-objectives are listed in the table below.

It must be noted that the pilot-objectives are minimum hurdles to ensure a working system. For evaluation of those objectives it suffices to describe whether a sub-objective has been met or has not been met. Much more interesting the light of the roll out of the system in the future are how we have come to achieve the sub-objectives and what hurdles were experienced.

Nr	Pilot	Sub-objective	Target metric
1	Germany	Acceptance of the accounts of Dutch travellers by a German PTO (or authority)	ASEAG/AVV allows Dutch pilot participants to travel if they have a payment method linked to their account
2	Germany	Acceptance of a Dutch payment method by AVV to travel in Germany	AVV accepts a Dutch payment (method) to allow Dutch travellers to travel
3	Germany	The inclusion of on-line created tickets in the account of travellers	Achieved when tickets are linked to the ID's of Dutch travellers
4	Germany	The inspection of tickets in the account of travellers by a German PTO	The PTO can inspect the traveller's account and the ticket(s) in use
5	Germany (also to support Dutch pilot)	The issuance of contactless cards with German transit application (VDV-KA) and a generic ETC token	The traveller can be offered one card including the VDV-KA application as well as the GST
6	Germany (to support Dutch pilot)	Signing-up German travellers on a payment method accepted for pay-as-you-go fares in the Netherlands	German pilot participants can sign up to a payment method offered by ASEAG that is accepted as a payment method for pay-as-you go fares by Arriva in the Limburg region
7	Netherlands	Acceptance of the accounts of German travellers by a Dutch PTO/scheme	Translink allows German pilot participants to travel if they have a payment method linked to their

_____

			account
8	Netherlands	Acceptance of a German payment method by a Dutch PTO or Translink Systems	Translink accepts a German payment (method) to allow German travellers to travel
9	Netherlands	The inspection of the right to travel in the account of travellers by a Dutch PTO	The PTO can inspect the traveller's account and whether they have a valid travel right
10	Netherlands	The calculation of fares by the Translink Systems back office for ABT travellers	The PTO is able to calculate the correct fares based on the pay-as-you-go principle
11	Netherlands	The invoicing of fares by Translink Systems to a German PTO	TLS can invoice ASEAG/AVV based on the pay as you go fares accrued by German travellers (the invoicing process will be performed manually)
12	Netherlands (also to support German pilot)	The issuance of contactless cards with a Dutch transit application (OV-chipkaart) and a generic ETC token	One card including the OV-chip application as well as the GST functions in a lab environment.
13	Netherlands (to support German pilot)	Signing up Dutch travellers on a payment method accepted for tickets in Germany	Dutch participants can sign up to a payment method offered by TLS that is accepted by the German PTO
14	Luxembourg	Acceptance of generic ETC token in both transit and parking environment	Travelers can use their contactless card to enter/exit the car park and collect loyalty stamps in transit
15	Luxembourg	The application of transit behaviour as recorded through ABT principles to determine eligibility for non-transit products	Travelers are eligible for a discounted parking subscription based on their public transport usage
16	Luxembourg	The issuance of contactless card with a Luxembourg transit application (VDV-KA) and a generic ETC token	The traveller can be offered one card with two applications: one for public transport and the other (ETC token) to enter/exit the parking lot + collect stamps

_____

_____

3. Evaluation methodology and metrics

To measure the extent to which the pilots achieved their objectives and to get beyond these validations to learning points, three evaluation methods were used:

1. interviews,
2. questionnaires, and
3. data analysis.

Each method involved a different data source and included different data metrics. This chapter describes the methods in more detail and the metrics that were used as part of these methods.

3.1. Interviews

To determine the pilot performance from a scheme and Public Transport Operator (PTO) point of view, interviews were held. There are two types of interviews: (1) a high-level interview to cover the ABT concept and the governance, and (2) a technical interview to cover the technical design and implementation of the pilot.

Interviewees

For each pilot the aim was to interview at least one person from the scheme side and one person from the PTO side who was involved during the design and implementation phase. Also, it was desirable to have at least one person covering the high-level part, as well as a person for the technical part.

Structure

Both types of interviews were semi-structured, meaning that a list of pre-defined questions was used, as well as some questions conceived on the spot. The structure of both interviews consisted of five parts:

1. Opening
2. General questions
3. Content questions – part 1
4. Content questions – part 2
5. Closing

The opening, general questions and closing were the same for both interviews while the content related questions were different. For the high-level interview, they covered the interoperable ABT concept. For the technical interview, the content related questions were divided in a part about setting up the ABT systems and a part about using and operating the ABT system.

_____

3.2. Questionnaire

Questionnaires were used to measure the travellers' opinion about Account-Based systems. These questionnaires were distributed at the end of each pilot.

To determine how positive or negative the participants rate the ABT concept, a Likert scale will be used. Here, participant will be asked to specify their level of agreement on a symmetric agree-disagree scale for a series of statements based on the nine evaluation factors. To calculate the average, the following quantification was used:

Agreement	Score
Completely disagree	1
Disagree	2
Neutral	3
Agree	4
Completely agree	5

The questionnaires used for the different pilots are presented in Annex A.

Luxembourg pilot

In the Luxembourg pilot, the questions of the questionnaires were based on nine factors derived from the technology acceptance model (TAM) and the unified theory of acceptance and use of technology (UTAUT). These theories are often used to analyse how users come to accept and use a new technology. An overview of the factors is presented in Table 1.

	Factors	Definition
1	Perceived usefulness (PU)	The degree to which a traveller believes that using ABT would enhance his or her performance
2	Perceived costs (PC)	The extent to which an individual believes that using ABT is costly
3	Perceived trust (PT)	A psychological state comprising the intention to accept vulnerability based upon positive expectations of the intentions or behaviour of ABT
4	Perceived privacy (PP)	The right of an individual to control the information held about them by third parties
5	Perceived ease of use (PEOU)	The degree to which a person believes that using ABT would be free of effort
6	Perceived enjoyment (PE)	The degree to which an individual believes that using ABT is fun

_____

7	Perceived attractiveness (PA)	The degree to which a person believes that the ABT interfaces are aesthetically pleasing to the eye
8	Social factors (SF)	The degree to which an individual consumer perceives how important others believe it is that he or she should adopt ABT
9	Compatibility (CO)	The degree to which ABT is perceived as being consistent with existing values, needs, and experiences of potential adopters

Table 1: The nine factors derived from TAM and UTAUT

Dutch and German pilot

The Luxembourg pilot was concluded and evaluated first. Because of the limited number of responses obtained in the Luxembourg pilot, we aimed to make the questionnaire for the Dutch and German pilot simpler and shorter. As such, we pragmatically culled the question list of similar but nuanced questions and rephrased the questions for clarity. In the end, we grouped them into three categories: 'Advantages (of ABT)', 'User experience' and 'Concluding'.

3.3. Data analysis

During the pilots lots of data is gathered, which can be used to analyse the user and system behaviour. For privacy purposes, all user related data is tokenized/stored anonymously.

The two main data sources for the data are the hubs that ETC operates and the data analytics tools from Google and Apple. Based on the available data, three categories of valuable data were identified: general statistics, travel usage and application usage.

The most important data elements that we can retrieve from the hubs are the v-receipts, which contain for each transaction the anonymized token id, the date and time of the tap, type of transaction, service type, line and location.

Luxembourg pilot

The data analysis for the Luxembourg pilot is based on the v-receipt data from the Luxembourg hub for the period of the 30th of August 2016 up to and including 30th of May 2016. The data file 'vreceiptreport.xls' containing these v-receipts were supplied by ACCEPT.

Dutch and German pilot

The data analysis for the Dutch and German pilot is based on v-receipt data from both the Dutch and German hub for the period of the 1st December 2017 up to and including the 31st

_____

March of 2018. The data files 'pilotvreceipts-dehub.xls' and 'pilotvreceipts-NlHub.xls' containing these v-receipts were supplied by ACCEPT.

Due to the architecture of the Dutch side, no v-receipts of Dutch travellers traveling with Arriva are present. Travel data of Dutch travellers in December 2017 and January 2018 containing the number of travels per token was supplied separately by TLS.

	Travels with ASEAG	Travels with Arriva
German token	Present in DE hub	Present in DE hub and NL hub
Dutch token	Present in DE hub and NL hub	No v-receipt data available

Table 2: Overview of transactions that are present in German and Dutch hubs

The absence of part of the v-receipts provides an unexpected benefit that all anonymized token id's can be assigned to either German or Dutch travellers. All CiCo actions present in the files were made by German travellers. Additionally, by taking the difference of both files, all travel actions of the German traveller with ASEAG can be identified (see Table 2 above). All other German tickets are necessarily bought and used by Dutch travellers.

_____

4. Pilot results

This chapter covers the evaluation results of the three pilots.

First the achievement of the sub-objectives is reported on. The remaining part of this chapter elaborates on the pilot results.

Three perspectives are used:

1. the user perspective,
2. the technological perspective and
3. the organisational and governance perspective for the stakeholders involved.

The user perspective focusses on the user experience and pilot usage. The technology results focus on the technical design and implementation. And finally, the organisational perspective focusses on the evaluation of the interoperable ABT concept and how the system proved to contribute to the challenges the stakeholders and future steps those stakeholders see.

In a final paragraph learning points purely relating to the organisation and project management of the pilots themselves are mentioned.

The Dutch and the German pilot, in practice being one integrated pilot, are discussed together. The Luxembourg pilot is discussed in a separate section.

4.1. Achievement of the sub-objectives

The table below lists whether the sub-objectives as mentioned in chapter 3 have been met or not met (because they have been put out of scope). For a clarification of the sub-objectives the readers is referred to this chapter.

German pilot		Dutch pilot		Luxembourg pilot	
1	PASS	7	PASS	14	PASS
2	PASS	8	PASS	15	PASS
3	PASS	9	OUT OF SCOPE	16	PASS
4	PASS*	10	PASS		
5	PASS	11	PASS		
6	PASS	12	PASS**		
		13	PASS		

All sub-objectives have been fully achieved except for:

9. The inspection of the right to travel in the account of travellers by a Dutch PTO;

_____

This objective has been left out of scope, because in the pilot situation an attempt to realize those sub-objectives was driving up complexity of the entire project to an unacceptable level at the time.

Sub-objective 4 (marked *) - the inspection of tickets in the account of travellers by a German PTO - has been passed to the extent that the inspection device has been developed, but ultimately has not been deployed in the field.

Sub-objective 12 (marked **) - the issuance of contactless cards with a Dutch transit application (OV-chipkaart) and a generic ETC token - could not be realized in the way it was initially planned because adding the generic ETC token to the OV-Chipkaart in a live (production) environment requires a formal change-request in the Dutch OV-chipkaart scheme and therefor needs to be accepted by *all* PTO's in the Netherlands. For this pilot this was no possible route. Technically there are no limitations and it was demonstrated in a Lab environment with the production of a smart card (*NXP SmartMX processor card*) that contains both the OV-chipkaart application as well as the GST.

4.2. The Dutch and the German pilot

4.2.1. User perspective

Overall observations

Travellers and experts making use of the line made a number of observations:

- In the German busses the validators are located at the backdoors. This makes that first-time travellers do not immediately understand where to validate their ticket as they expect this to happen somewhere in the vicinity of the driver upon boarding the bus.

- The transaction time of the equipment was too long. This resulted in users removing their card too quickly.

- Travelling back and forth on the same line, but on a different bus – one operated by ASEAG, the other operated by Arriva – it was odd that a check-in and a check-out was needed on the Arriva-bus, but the ASEAG-bus only needed a check-in. However, users also understood that this was prime-example of the flexibility of the ABT-system: in principle, every transport operator can apply its own, local rules on how users should travel. A lesson is that this should be properly communicated to the visiting traveller, for example by means of the app.

- Bus drivers were not always aware of the pilot and in some cases travellers were denied boarding. Training of the bus-drivers is therefore essential: all drivers should be aware of the different forms of ticketing they may see so visiting travellers are always allowed to board the bus.

_____

- The app is an essential part of the ABT-system: it is not an optional add-on. Getting direct feedback gives users the trust needed to use e-ticketing systems connected to a home-account in unknown transport regions, such as another country or city. This brings up the question whether it is acceptable to make an app an integral part of your ABT-system while a small portion of travellers are not in the possession of smart phone (because they are elderly or cannot afford one)? Among experts there is no consensus on this: some say public transport should by definition cater to everyone and make investments so everyone has the same level of information. Another statement is that the 99% of travellers should not be declined information because a very small portion would not be able to access this too.

Questionnaire results

To gauge the user experience, each pilot participant was asked to fill in a questionnaire.

In total almost 200 participants filled in and returned the questionnaire, representing a total of almost 42% of all participants.

141 participants on the German side and 48 on the Dutch side filled in the questionnaire. To get a better understanding of the participants, they were asked to fill in their current public transport usage as well as their usage of their ETC card. The results are shown in the table below.

	Public transport usage	ETC usage	
German participants	59, 33, 9, 29, 11	26, 29, 18, 40, 28	(Almost) every day; Several times per week; A few times per week; A few times per month; Less than this
Dutch participants	16, 12, 7, 11, 2	13, 8, 16, 10, 1	

_____
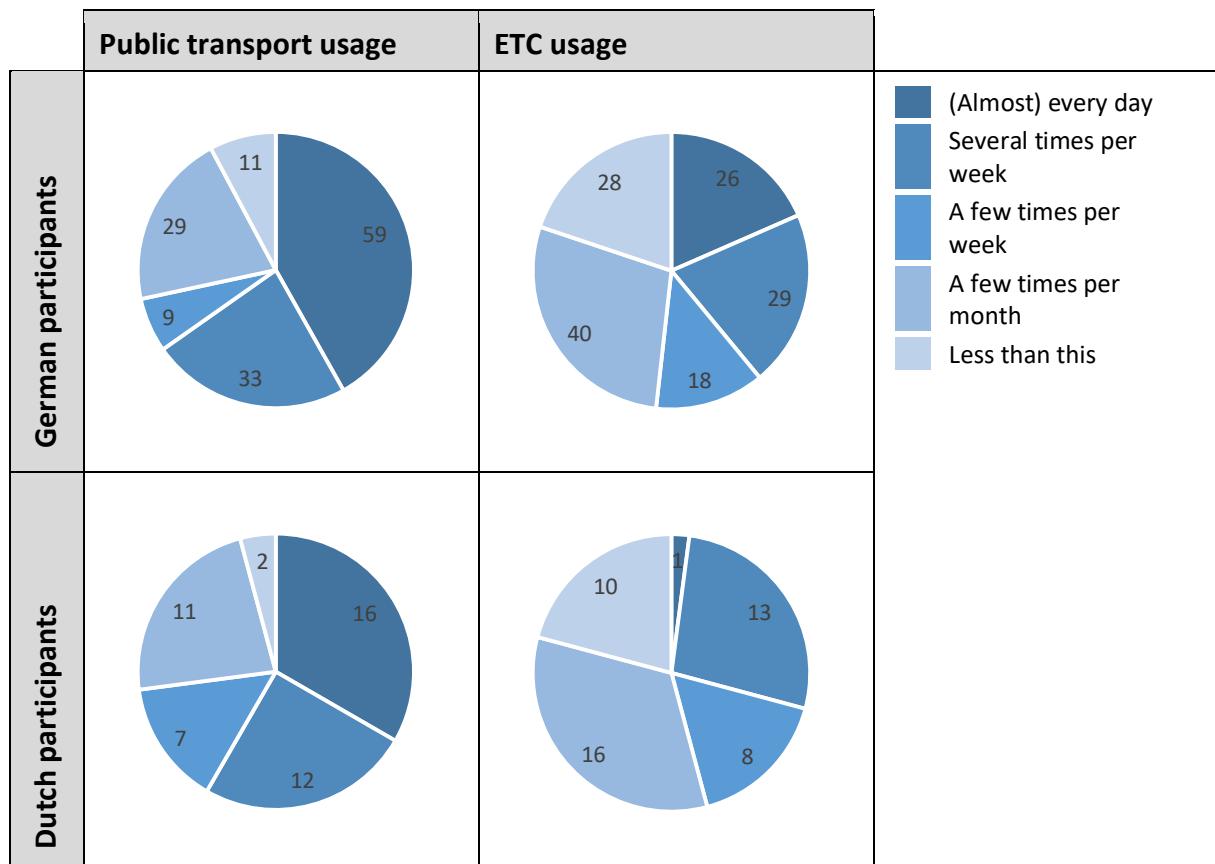
Besides that, the age of the participants was also recorded. An overview of the results is shown in the table below.

German participants	Dutch participants	
		■ >20 ■ 20-29 ■ 30-39 ■ 40-49 ■ 50-59 ■ 60<
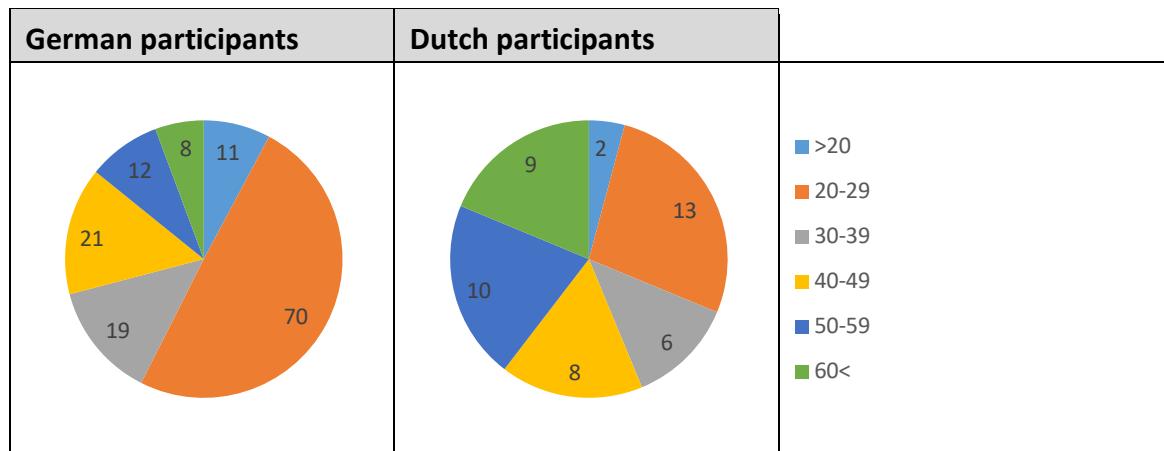
The questionnaire contained 12 questions which the users could answer on a Likert scale. Based on these results, we can conclude that participants are overall very positive about the advantages that cross-border and mobile-enhanced travelling can bring them. The user experience was less positive, but still above average. This is expected in a pilot setting and in line with the issues brought up in other evaluations regarding the stability of the validators on the busses. Interestingly, half of the respondents indicated that they used public transport abroad more often thanks to the card.

#	Statement	German		Dutch	
		Avg.	Dist.	Avg.	Dist.
	Advantages				
1	It is useful to travel in two countries with one card.	4.8		4.8	
2	It is useful to directly see my travels in the app.	4.6		4.8	
3	It gives me confidence to immediately see my travels in the app.	4.3		4.4	
	User experience				
4	Registration for the pilot went well.	4.4		4.1	
5	Checking-in and checking-out with the ETC card went well.	3.5		3.5	
6	Using the ETC card abroad went well.	3.5		3.5	

7	Seeing my travels in the app went well.	3.9		3.9	
8	The app gives me all the information I need.	3.7		3.5	
9	The customer service was helpful.	3.7		3.9	
	Concluding				
10	The pilot met my expectations.	4.0		4.0	
11	Thanks to the card I've used public transport abroad more often.	3.5		3.7	
12	I would recommend the ETC card to others .	4.2		4.4	

In addition, three open questions were asked.

- *Why did the pilot meet or not meet their expectations?*
- *How could the user experience be improved?*
- *Are there any additional suggestions to improve cross-border travelling?*

Below, we highlight some of the subjects that were touched upon more frequently.

- **Training of personnel**. A number of participants mentioned that both bus drivers as well as customer service were not well informed about the pilot.

- **Slow, unreliable validators**. Many users remarked on the slowness and the (un-)reliability of the validators.

- **Missing transactions**. Some participants remarked that they did not see all their transactions in their mobile app. However, some note that this seemed to improve over the course of the pilot.

- **Validator in the back**. Many users remarked on the hassle caused by the fact that they could not use their card on the 'standard' validator in the Arriva busses and instead had to use the blue validator in the back. Some bus drivers were also not informed of this, which caused some issues as well.

- **Better branding**. Some participants suggested to improve the ETC branding on the card so they could more clearly indicate this to the bus driver.

_____

- **App improvements**. Some participants mentioned that the German app could be further improved (reduce jerking, integration with other app, English support, remove bugs, semi-offline capabilities).

- **One card instead of two**. Because Dutch travellers did not have a combined card where both their original OV-chipkaart and ETC card were combined, some travellers recommended moving to a single card in the future.

- **Product proposition in Germany**: Some participants were displeased with the fact that they were only able to use a daily ticket in Germany. This was considered overly expensive for their usage (caps, subscriptions and single tickets were suggested), and people recommended to introduce additional products, including half-price tickets for children.

- **Fare harmonization**. Some participants indicated that they did not like the fact that prices were different and found it confusing, and suggested to align the terms and conditions on line 44.

- **Expansion to other countries/lines/regions**. Many participants suggested to expand this initiative so they could use the card in other countries, lines, regions and/or modalities.

Travel usage

In the following sections the data collected during the Dutch and German pilot will be used to give an overview of the travels during the pilot, presented in various ways. Additionally, errors and inconsistencies during the pilot operation are identified.

Data of the following test cards are excluded from the analysis:

Token id (German Hub)	Card number	Note
0FB5D695-8F12-43DB-8DB0-F48A8046FB90	6.073-30.060.061-7	TLS test card
E5CFFFF5-B534-4B2B-9F4D-71DC23753F3D	6.073-30.060.062-5	TLS test card
CE02CD27-0E50-470C-BF0C-CE25E1D56C48	6.073-30.060.060-9	TLS test card
17988853-BFF9-4788-97ED-6B5E39F2513B		177 daytickets

893DC28B-BFB6-49A3-9F47-B55EAE8775F5		46 daytickets on single day

Table 3: Excluded tokens

_____

<u>Total trips</u>

In Table 4 an overview is shown of the number of travels performed, broken down by the card origin, operator, travel type and month.

Number of transactions	year	2017	2018			Grand Total
	month	12	01	02	03	
German tokens		**524**	**862**	**850**	**1050**	**3286**
ASEAG		**455**	**651**	**684**	**663**	**2453**
Purchase and use single ticket line 44		12	31	9	16	68
Use existing single ticket line 44		1	8	4	2	15
Purchase and use day ticket Aachen		250	283	387	345	1265
Use existing day ticket Aachen		192	329	284	300	1105
ARRIVA		**69**	**211**	**166**	**387**	**833**
Tap-In		34	106	83	199	422
Tap-Out		35	105	83	188	411
Dutch tokens		**82**	**117**	**120**	**97**	**416**
ASEAG		**82**	**117**	**120**	**97**	**416**
Purchase and use single ticket line 44		32	24	26	20	102
Use existing single ticket line 44		7	15	6	4	32
Purchase and use day ticket Aachen		30	43	62	54	189
Use existing day ticket Aachen		13	35	26	19	93
Grand Total		**606**	**979**	**970**	**1147**	**3702**
Number of Dutch travels with Arriva		485	454			

Table 4 Number of transactions in Dutch-German ETC pilot

_____

A selection of the number of different transactions is also shown graphically in Figure 1.
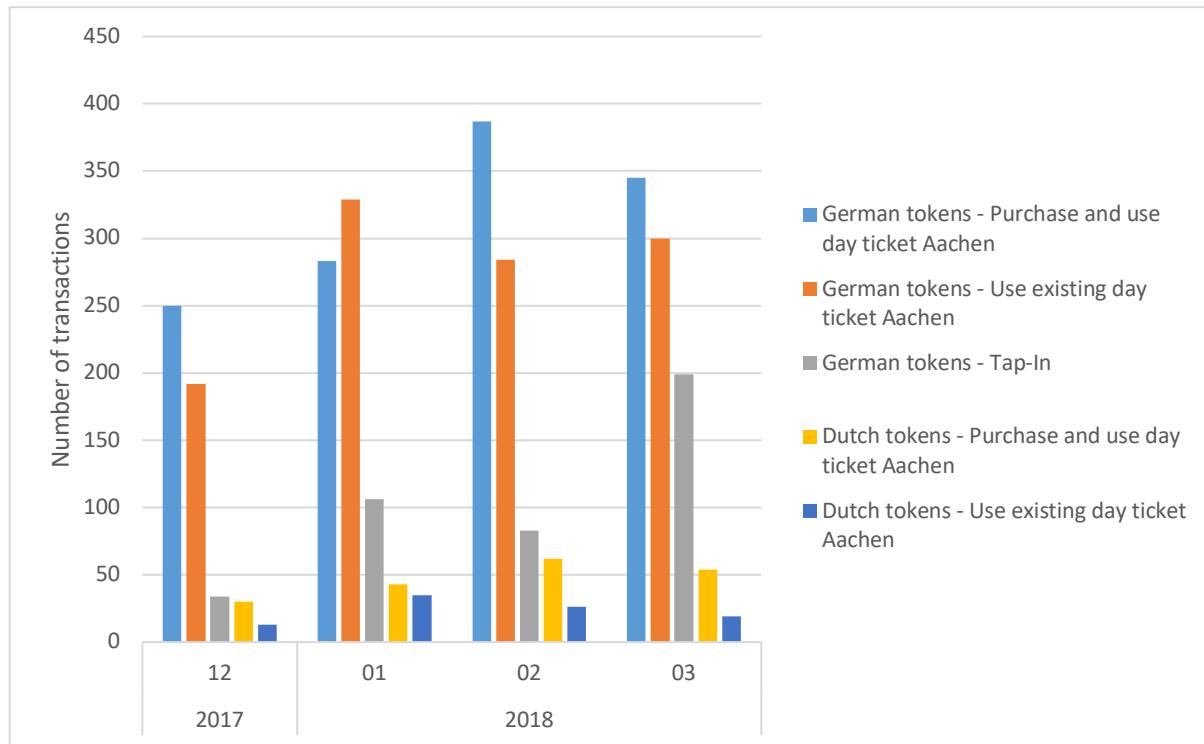
Figure 1: Graphical representation of transactions during the Dutch-German ETC pilot

In the last month of the pilot, the number of transactions more than double compared to the first month of the pilot. Especially the day pass for Aachen was used a significant number of times, but mainly by German travellers.

Dutch travellers used Line 44 more than German Travelers, while the use of Aachen day tickets was an order of magnitude lower.

_____

As can be seen in Figure 2, 39% percent of users only ever used the day ticket once per day, while 45% of travellers used the day card between one at three times per day on average.
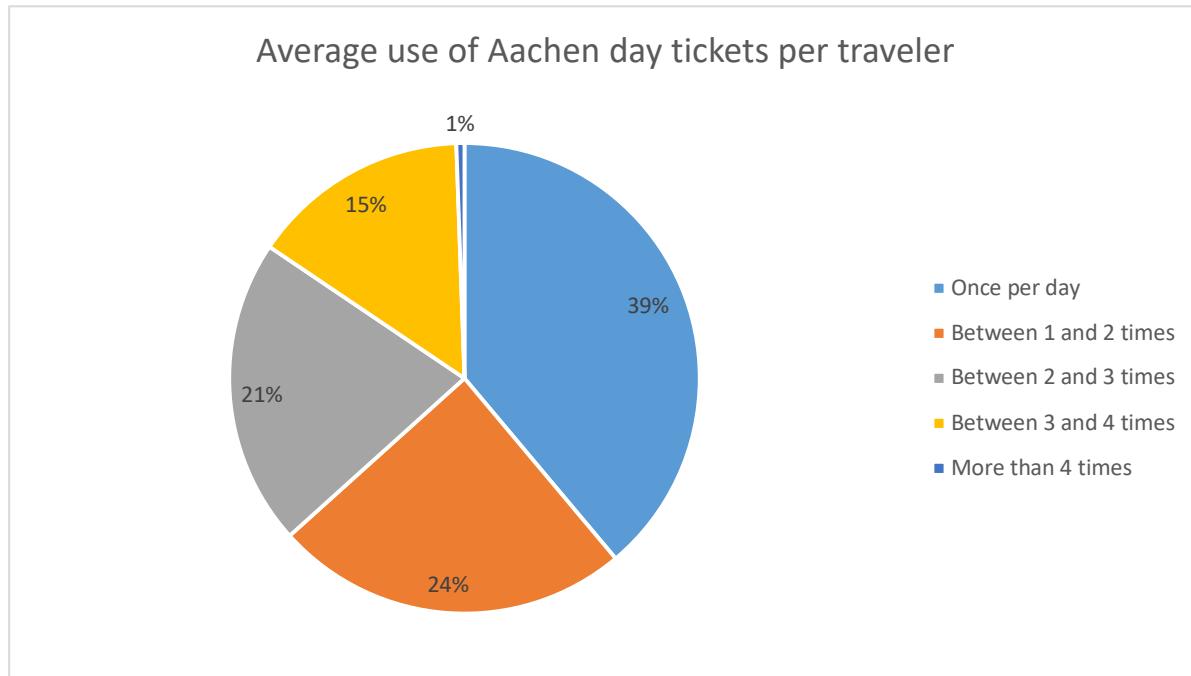

Figure 2: Average use of Aachen day tickets per traveller

_____

Number of users

The pilot had 275 pilot participants in Germany. In the Netherlands, 209 cards were produced, of which 6 were used as test cards: so in total 203 users in the Netherlands.
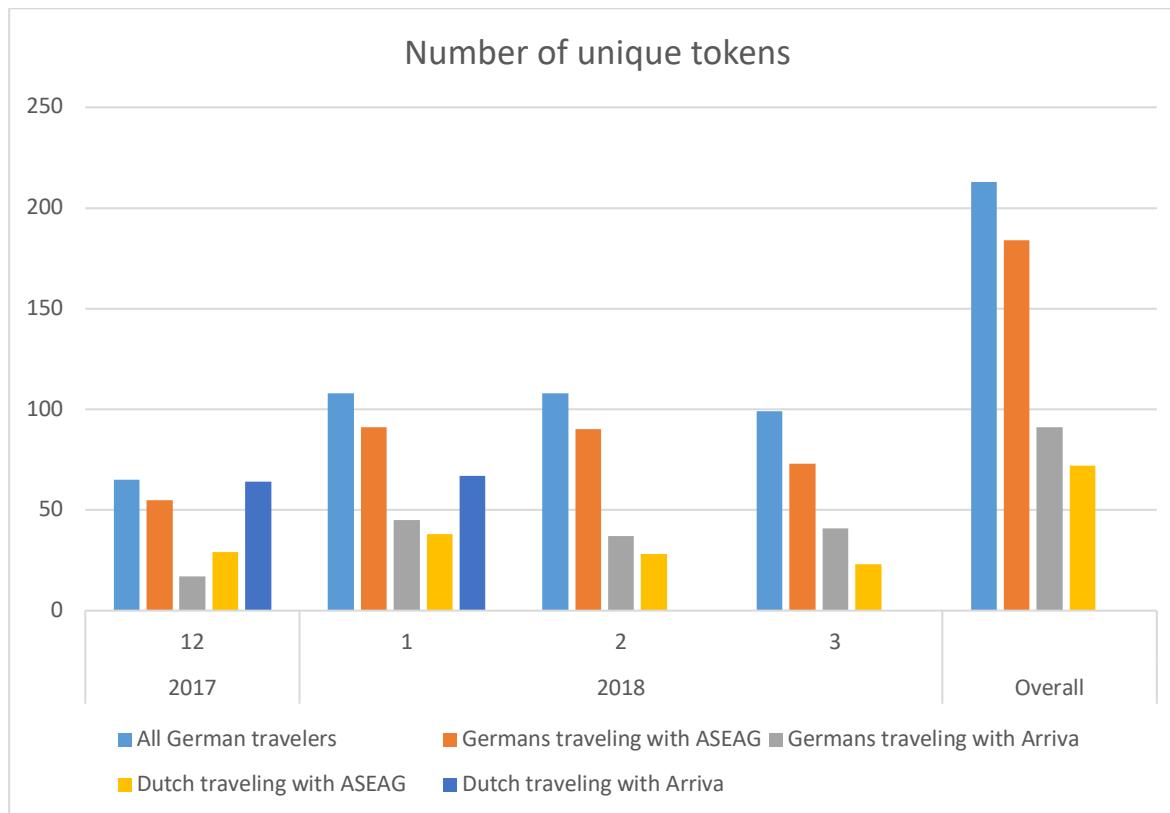

Figure 3: Number of unique tokens

Figure 3 shows the number of unique users per month and in total, separated by token country and operator.

In any given month in 2018 the German pilot had more than one hundred unique travellers, while in total 215 unique token IDs were registered in Germany.

For both countries the majority of participants used the card just in their own country. This is shown in Figure 4 as well; 57% of Germans only used the card in Germany itself. However, the token gives them the opportunity to also use the public transport system in the neighbour country seamless.

_____

Use of token abroad

- 62; 29% — ■ Germans traveling with Arriva and ASEAG
- 29; 14% — ■ Germans only traveling with Arriva
- 122; 57% — ■ Germans only traveling with ASEAG
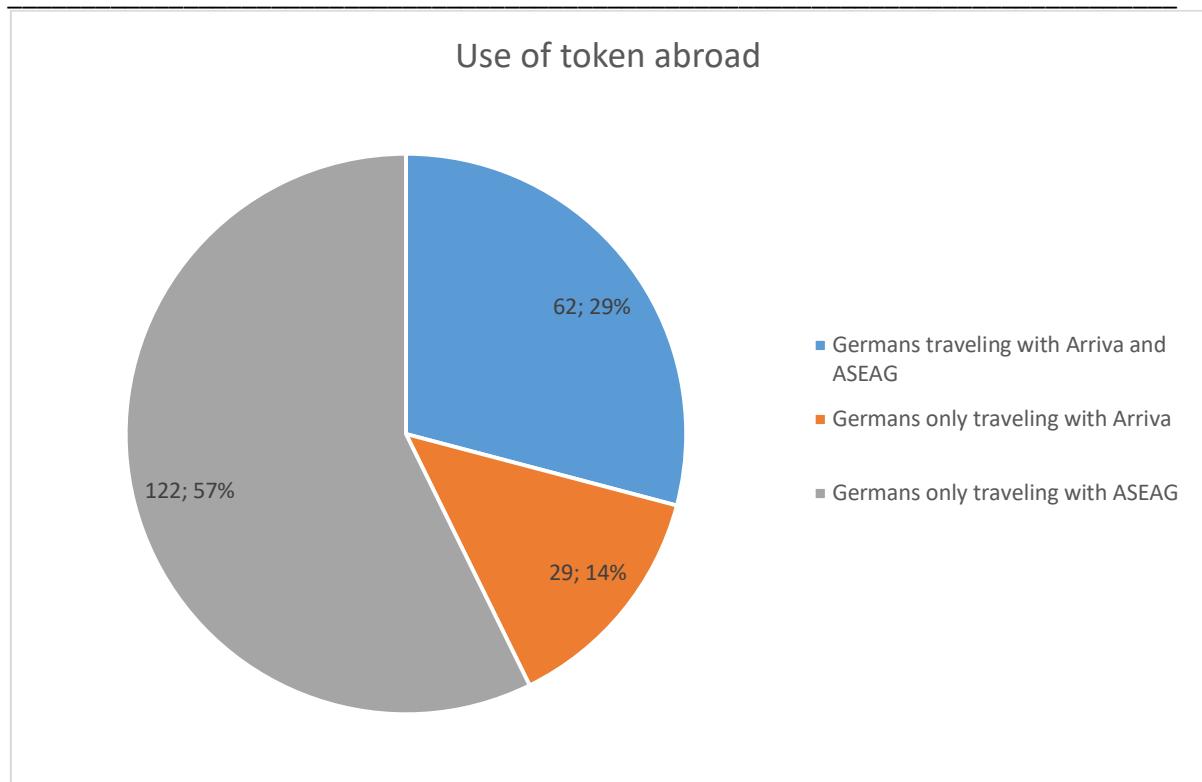
Figure 4: Use of token abroad

_____

Trips per user

Figure 5 shows a distribution of the percentage of users against the number of travel actions.

The total number of users identified in the v-receipt data is 278, with the side note that that Dutch users that have only travelled in the Netherlands are not present. The 'travel actions' shown here contain the purchase and use of day tickets, the purchase and use of single trip tickets, and tap-ins. Tap-outs are excluded. From the data it can be seen that 46% of the users did more than five travel actions during the pilot. 5% of participants did more than 50 travel actions.
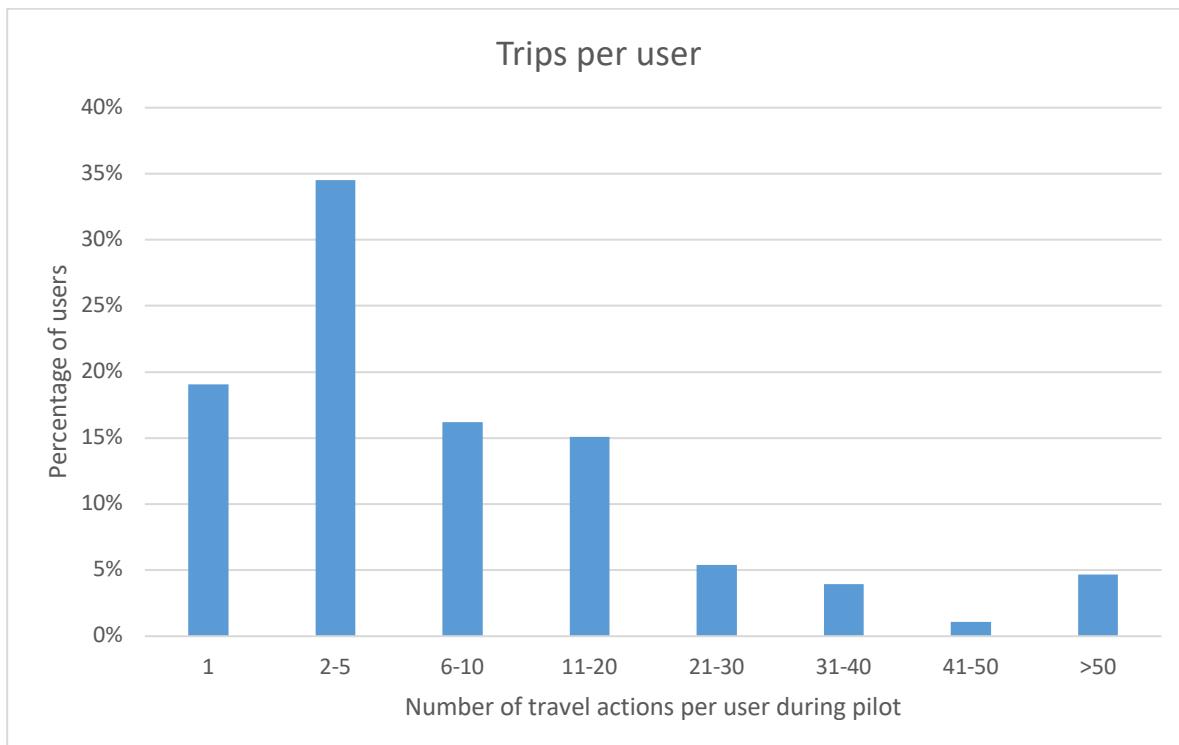
Figure 5: Trips per user

Errors and anomalies

Multiple errors and anomalies of different type and cause were identified in the v-receipt data, which are detailed below.

Unknown location

Occasionally, but for the whole duration of the pilot, the stop location of the Arriva busses could not properly be determined, showing instead 'Linie 26350,Unknown' or 'Linie 26044,Unknown'. In total this occurred 151 times, of which 115 times was a tap-out. Generally this meant that no fare could be charged, although in two instances still €4 euro was charged.

Payment on tap-in

In the data 15 tap-ins with an associated fare of €4 were found, which is due to a missing tap-out within the defined time limit. Underlying reasons can be a forgotten tap-out, but also in at least one case, a tap-in was the very last transaction done with this specific token. A case to further investigate is the out-of-order arrival of tap-ins and tap-outs of vrid 5919 which also resulted in charging on tap-in.

No payment on tap-out

A total of 411 tap-outs by German travellers were registered during the pilot, of which 156 were not charged. This is partly due to the 'unknown location' problem mentioned above. Removing these cases, 43 tap-outs without payment are left. There can be two reasons for this;

- Double taps. 10 of the 43 cases above are due to double-taps, which occurs when a traveller taps the terminal twice at the same stop. In the whole pilot, for German travellers, double taps occurred 11 times on tap-in and 19 times on tap-out.
- The initial tap-in occurred at unknown location. The following tap-out cannot be charged because the fare cannot be calculated.

_____

Mismatched number of tap-ins and tap-outs

The number of tap-ins and tap-outs does not always match, with the main reason being forgotten tap-outs. In Figure 6 below, a distribution of anomalies is shown.

For almost two-thirds of the users the number of tap-ins and tap-outs exactly matches. The other cases are worth further investigation, especially the seven tokens that only experienced tap-out(s).
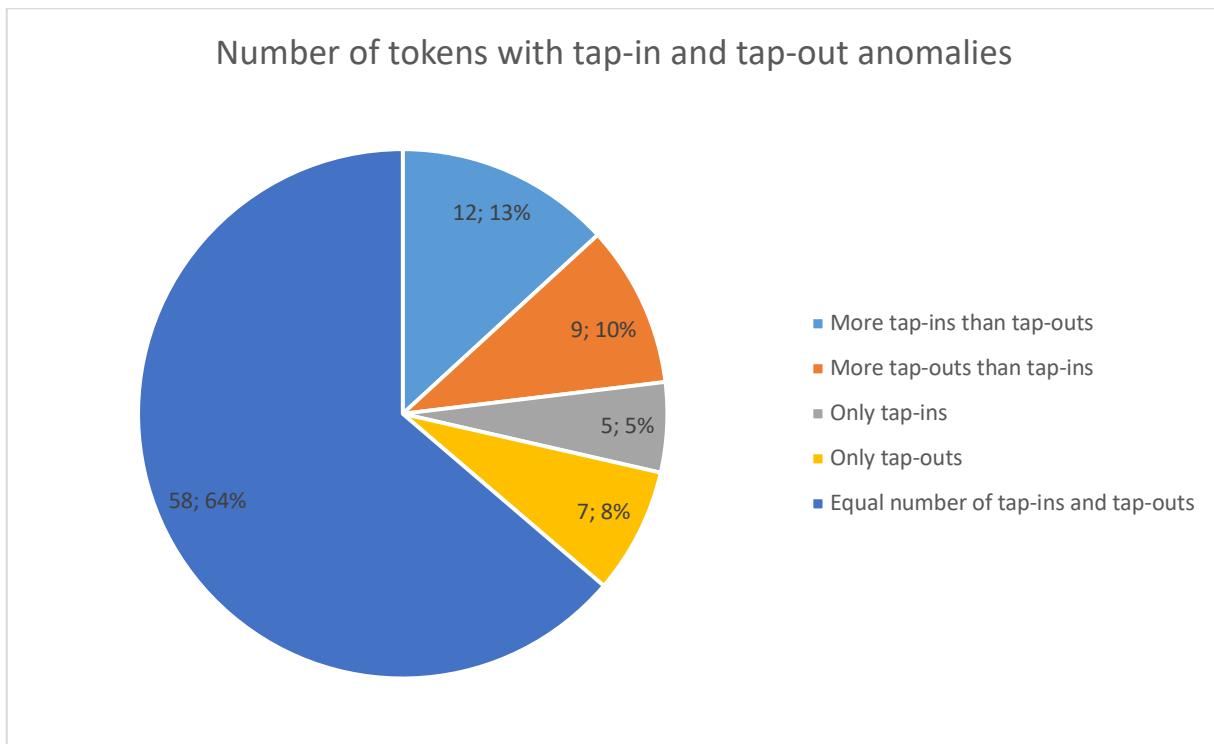

Figure 6: Number of tokens with tap-in and tap-out anomalies

'General error'

There were five occurrences that produced a FAILED: GENERAL_ERROR message. This was with German tokens, in December 2017 and March 2018 on German and Dutch lines. Despite this error a fare was calculated.

V-receipts missing

When comparing the data form the German and Dutch hub it was found that not all cross-border v-receipts were present in both hub data sets on the 24th and 25th of January 2018. This was due to an error with the hub that was later resolved. Ten transactions are missing from the German hub data, while an unknown number are missing from the Dutch hub. This may have affected the attribution of transactions to specific traveller groups, slightly affecting the results that are shown in this section.

_____

Popular times

Figure 7 shows the total number of travel actions during per hour of the day, for the whole duration of the pilot.

Peaks during commute times are visible for the Aachen day ticket. Additionally, these tickets seem to be purchased and used around mid-day as well. Another finding is that many people use the day ticket effectively, by traveling again later on the same day.
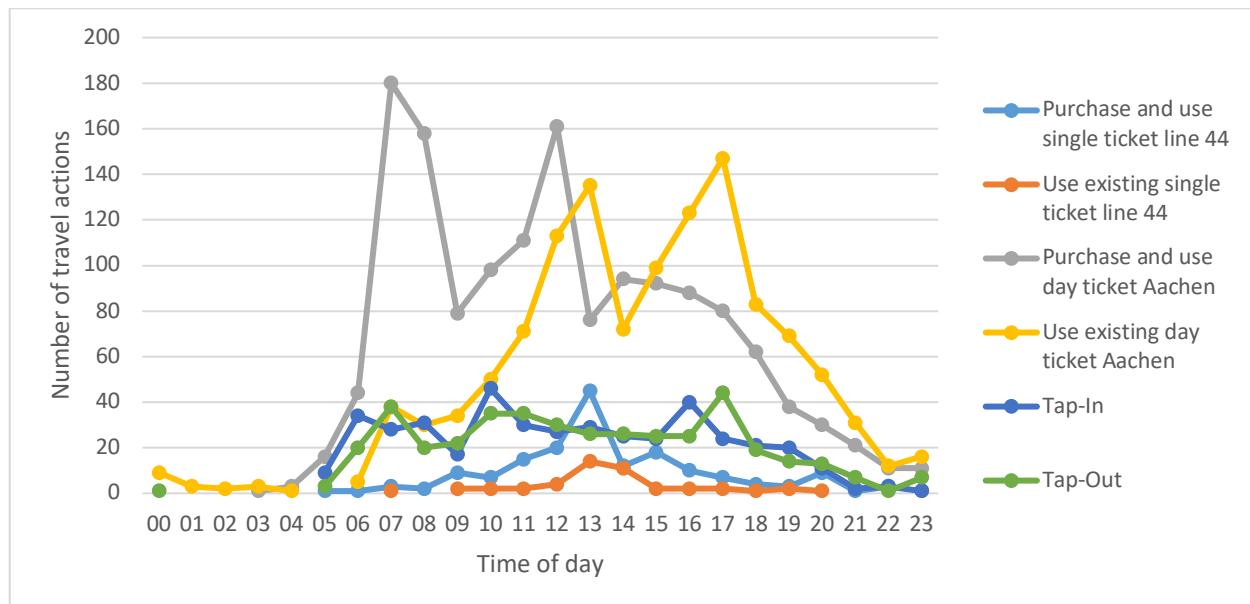

Figure 7: Number of transactions per hour of the day

_____

Application data

The Android version of the ETC Pilot App was installed a total of 241 times, of which 176 times by German users and 56 times by Dutch users. It was uninstalled a number of 127 times.

The iOS version was downloaded a total of 134 times, of which 114 times by German users and 12 times by Dutch users. This is summarized in Table 5 below.

	Android	iOS	Total
German app			
• German users	176	114	**290**
• Dutch users	56	12	**68**
• Others	3	0	**3**
Dutch app	*75*	*34*	*109*
Total	**310**	**160**	**470**

Table 5: ETC Pilot App installs

4.2.2. Technological perspective

Interviews regarding the technological perspective

This part of the report relies fully on interviews with person who have played a key role in implementing the pilots. Therefore the interviews have been published fully.

_____

Interview Onno van Drunen (Arriva)

General

Onno van Drunen (product manager payment systems at Arriva) was responsible for delivering the project tasks of Arriva within the Dutch-German ETC pilot and managing the internal Arriva project around the pilot. This included the installation of validators in the busses. Arriva joined the ETC pilot at the end of 2016, coinciding with Arriva acquiring the concession of the pilot region.

Setting up ABT systems

Validators

Shortly before the start of the pilot, Prodata, the validator supplier of Arriva, was acquired by Kapsch. Kapsch provides a wide range of products and services aimed at rail and public transport, but unfortunately Kapsch was less inclined to cooperate and not able to supply resources for this pilot. Arriva found a new party experienced in Prodata/Kapsch equipment to develop the necessary validator software. The rest of the process went very well, with the collaboration coordinated successfully by Translink.

Due to their design, the existing bus validators could only accept either the ETC token or existing OV-chipkaart, meaning a separate validator was needed. Having two validators installed in the busses is not ideal in practice.

Back-office

Arriva was not involved in setting up back-office systems.

The (cross-border) back-office systems were found to function well within this pilot. However, the systems are not yet ready for production. For example, in the pilot, the settlement of transactions needed to be done manually. In a production system this would need to be set up differently.

Arriva did provide the input for the fare calculation system, in a very practical way. This worked well for the pilot, but would need to be improved for production.

Using and Operating ABT systems

Issues during operation

Initially, the error "Halte onbekend" (Unknown stop) occasionally occurred, meaning that no fare could be calculated in those cases. The validator software was updated during the pilot to ensure 100% correct transactions.

There were a number of non-critical issues in the validator software. However, this was in line with expectations. The issues were not any more difficult to solve in this ABT system as compared to the OV-chipkaart system.

Onboarding, Invoicing and Monitoring

Translink was responsible for the onboarding; Arriva did not have specific comments on this.

Translink created invoices from their back-office, which Arriva sent onwards to their customers.

There was no specific monitoring of operations; this was done just by the invoices. Arriva did not yet utilize this data in a specific way, partly because the number of pilot-related travels was limited.

Travel behavior

In general, the use of public transport is seen as a sort of difficult or complex by the

general public. The cross-border ABT concept can help to make it more accessible. In the current pilot a complication is that registration is necessary, which means that the incidental traveller is easily excluded.

Another downside of the current pilot implementation is that no travel products can be chosen, as is possible with the OV-chipkaart. Joining this pilot means travelling at regular fares. This might exclude part of the potential user base, for example the people travelling with subscriptions and or travellers who do not want to pay afterwards.

Personnel and Customer experiences

Bus drivers received explanation about the hardware, the card and the pilot itself. The drivers did not notice much use of the pilot, as perhaps only 1 out of 1000 travellers would use the token card.

There were no specific questions registered at customer service, at least through the official channels (e-mail, telephone). It must be noted that the scope of the pilot was limited.

The customer experience was found not to be very different to using the OV-chipkaart. The app that shows the travels however, was perceived as a new and welcome addition to the travel experience.

Conclusions and lessons learned

The general conclusion of Arriva on this ETC pilot is that the token technology and hubs work, and that the concept of cross-border ABT was proven and has further potential. Moving from a pilot to a production ready system would require further front- and back-office development.

A possible variation next to the pilot implementation is to replace the token card by a payment card (EMV). This is the same concept, with the same advantages, but using a different carrier as a token. Using an existing bank card would be appreciated by travellers. Other kind of tokens could be thought of as well.

Arriva specifically appreciated the good collaboration between all parties; authorities, Translink, foreign parties, developers and suppliers. This is perceived as something quite unique within the business.

The end goal or wish of Arriva is the creation of generic software to accept multiple fare media in public transit, and this pilot definitely contributed to achieving that.

_____

Interview Dominik Elsmann

General

Dominik Elsmann (AVV) is the head of the department for cross-border public transport at AVV, responsible for all cross-border topics, such as contracts, tariff negotiation and ticketing schemes. Tasks include marketing, procurement and securing 3rd party funding. For the ETC pilot he served as project manager and single point of contact for the German pilot, supporting the communication flow and agreements between partners on the Dutch and German side.

AVV led the German pilot, got ASEAG onboard, organized and designed the system architecture for the German side (beyond hub infrastructure architecture from the project). This included almost anything affecting the pilot, such as onboarding participants, troubleshooting and making arrangements around fares and framing conditions. AVV and Dominik have played a major role in this pilot.

Dominik got involved in the pilot at the end of 2015. In early 2016 there was a challenge to bind together the consortium, which is why a memorandum of understanding was signed to help give trust and make the project a success.

Since mid-2017 the national VDV-KA standard was introduced in Aachen. For now, only a check-in based system and subscription products are supported, e.g. monthly or yearly passes. Adding single journeys will be the next step, and further in the future a check-in/check-out solution is aimed for.

Setting up ABT systems

Validators

At the beginning of the ETC pilot, AVV was already in a tender process for a conventional fare management system (with ASEAG as the tendering party). The ETC token was included in this tender, which helped to get the ETC token accepted on the German side. Multiple parties showed their ability to deliver on the ETC part, but supplier IVU won the tender.

The systems were quite easy to implement in the end. A lot of coordination was necessary however, leading AVV to organize a series of meetings with all system suppliers, to help everyone understand the architecture and their tasks with regards to implementation. This process was the key to success, to fit all ends together.

Back-office

The design of the ASEAG back-office was also included in standard tender documents. Setting up this back-office was not very difficult from AVVs point of view. There were some delays, but Dominik cannot judge whether it was due to complexity or their workload. In any case it did not seem to be tied to the system architecture of ETC. A pending task is creating an invoicing system for the customer. Extra rules need to be implemented, for example that subscription holders are not be charged for day tickets.

The Online Ticket Stick (OTS) was tendered together with the Automated Fare Management System (AFMS) of AVV. Cubic made the best offer in the tender process. AVV discussed the design and implementation with Cubic, and it was decided to follow the German VDV standard within the ETC architecture. Dominik describes the collaboration with Cubic as 'near to perfect', with very fruitful discussions. AVV is proud of the solution, and happy to move forward with it. AVV is even discussing with a German

_____

standard body to bring the OTS into German standards.

The efforts of AVV on integration with the ETC hub were mainly concentrated to help all parties understand the hub architecture. Some structuring was necessary from AVV, and they defined interfaces and the stubs.

Using and Operating ABT systems

Issues during operation

In the first week of the pilot some issues with the terminal occurred where the signatures process led to frozen displays. 42Tech and IVU communicated about this and solved the issue. Afterwards the pilot ran quite smooth. There is however still a challenge with recognizing both a VDV-KA ticket and ACCEPT token on the same terminal: it takes a second or two before the terminal checks for the ETC token after the initial tap, meaning the token needs to be presented a bit longer than the user might expect. The system supplier IVU states that this is due to the pilot conditions and can be optimised (shorter reading time) once this solution should go into a rollout.

The German Hub was down once. After restarting, one of the services did not restart automatically, resulting in the app not working. Restarting this service fixed the issue. These are issues that are difficult to find during testing.

Additional minor issues were that check-ins were not recognized at some points, solved by restarting the Dutch back-office. On Dutch lines, occasionally the location of bus stops were not recognized but showed 'Unknown location'. This issue has been addressed with the system supplier of the Dutch back office and is solved in the meantime.

Not all busses were initially equipped with terminals that could accept ETC tokens, because of interference with an update to the conventional infrastructure that was simultaneously rolled out. The affected terminals were updated later, after the start of the pilot. In case the terminal could not accept ETC tokens, the bus driver allowed travellers on when they could present a recognizable card.

Some of the bus drivers were not aware of pilot, although notifications were send. This was unfortunate, but understandable, due to the difficulty of coping with multiple different electronic fare management systems and an added ETC system. Customers also do not really distinguish, they just want a working system. The combination of conventional and ETC systems in a single terminal was a challenge, and proved to both have advantages and disadvantages.

Onboarding, Invoicing and Monitoring

Getting a large number of pilot participants onboard takes resources and effort. AVV has undertaken multiple measures; a website was set up, a video clip was made, social media campaigns were executed, ads were taken out in newspapers, posters were put in busses and the city, flyers were distributed and a short clip for the cinema was made. Besides the general public one more specific target group was students. The campaigns were successful in the end, with 275 pilot participants on the German side. This is a good result, taking into account that it takes time for the participant, and that there is not a big advantage or incentive for them (14 days for free, reduced fare). AVV is more than satisfied with the number of sign-ups.

At the end of the pilot it was decided that there would be no invoicing of the German travellers from Dec 1 to 31st March, as a 'thank you' to the participants. Starting from April they will be charged.

Monitoring was done passively, there was no system in place to identify directly if something is going wrong. The process was that feedback from customers was investigated, which then potentially moved into a troubleshooting phase.

Travel behaviour

AVV is convinced that the cross-border concept will affect travel behaviour in positive way. It is much easier to travel cross-border with your own home chipcard, meaning that no foreign card needs to be purchased and there is no topping up; the customer does not have to be a public transport expert. Something of interest is that Germans generally are not used to CiCo systems, so there is trust to be generated. Generally, enabling people to use a single card can definitely change travel behaviour. People want to travel worry-free, and for these this is a perfect solution.

Personnel and Customer experiences

Bus drivers were instructed by their usual notification system. There was no specific feedback from them about this pilot. ASEAG does not want to involve driving staff more than needed, as they already have many tasks.

AVV did not receive questions from travellers about travel on the Dutch side. AVV explained this well, e.g. with the video clip, and people are aware of how to use it. However, trust in system needs to be generated, as most come in contact with this specific concept of an e-ticket for the first time.

A question about the German side that was heard multiple times was why day tickets are sold instead of doing it like the Dutch partners. This observation is taken seriously by AVV, and CiCo is actually a direction that they want to go in. These distance based system are very complex however.

Another question was why a smartphone could not be used instead of a plastic card. This is also something that AVV is considering.

Some complaints were received that the system was not working. Oftentimes this was due to the customer not presenting the token long enough to be recognized. This duration is something to be improved.

AVV received active feedback from participants asking if they can keep using the cards after the pilot officially ended. People would like to continue using it, showing the success of the concept and the implementation.

Conclusions and lessons learned

A key lesson that was learned is to have common wording for system architecture, to make sure that all parties understand each other. For example, 'e-ticket' means something quite different in Germany and the Netherlands. It was necessary to establish understanding of a CiCo and e-ticket system, and think about how to bring these different concepts together.

Another takeaway for AVV was that the willingness of partners is crucial. The success depends on creativity and finding common solutions. For this pilot it was also important to have an active view, do quick troubleshooting and be flexible (e.g. around invoicing). The pilot period is continued, without EU funding, showing the success of the concept and implementation. All partners see added value of what was done. It showed that AVV can move forward, exemplified by a train service (Aachen-Maastricht) that will be included. Next to this, it is to be extended to all busses in Limburg, which would be a huge step from the current two cross-border lines.

_____

Although the system is not perfect yet, there is certainly an added value to both the idea and system architecture. AVV would like to develop it further, and is now working on a letter of intent to see how to proceed with this. This will need funding, but there is good preparation to achieve it based on this pilot.

The pilot serves the initial idea to facility travel cross border, and it achieved this goal.

Interview Jochen Westensee

General

This interview was conducted with Jochen Westensee of Cubic. Cubic provided the Online Ticket Stock (OTS) which connects to the ETC service API.

The ETC part of the OTS was fully implemented and works as expected. The OTS also has other aspects besides those for the ETC pilot, which are not yet in use. The use case for these is that a customer buys a ticket in the AVV web shop, after which the ticket itself is delivered by the OTS.

Cubic started the project in summer 2016, when they received the contract from AVV for the OTS. Cubic joined the ETC kick-off workshop in July 2016.

Cubic

Cubic has a lot of business in Germany, for the traditional chip card system. Cubic automates the sales process and handles the data that goes along with it. This involves dealing with subscribers and facilitating payments.

Cubic also supplies transaction processing systems for the German VDV-KA standard. One of these is actually for AVV, as part of the contract of 2016.

Another area Cubic is active in, is so-called "handy tickets" (smartphone tickets). With this solution, travelers can select a ticket in a smartphone app, which then shows a representation of the ticket to be shown to the conductor.

Outside of Germany, Cubic serves London and larger American cities. Interesting to mention is that in Chicago, Cubic has supplied a full account based ticketing solution, with some aspects similar to ETC. The similarities are the account concept and having a fully secure token. A difference is that ETC is also a concept for providing an infrastructure to integrate very different operators and different ways of doing the processes, whereas the Cubic Chicago solution is more geared to a single big city, which gets a complete system from Cubic.

Setting up the OTS

Building the piece of software was not very hard. It however took some time to get the idea of how the ETC concept was supposed to work, and to understand what different parts of the system were supposed to do (and not do). This is partly due to it being a very distributed system, with separate systems in the bus, hub, service provider and payment part.

Integration with the ETC-hub went quite smooth as well. This was a strength of the concept. Once the interfaces to the hub were correct, everything was good.

Regarding how different the rules or specifications are to other account based systems, Jochen mentioned that this is not that different. The way it is organized however, is. One example is that the processing of payments is done elsewhere in case of the ETC concept. As a matter of fact, ETC builds an environment for many participants, bringing their own

_____

systems. In case of the Chicago example, everything is consolidated into one system. The advantages of a distributed concept such as the ETC concept, are that it is open to multiple participants, which are able to bring their own systems (albeit adapted). An advantage of a single system by a single party is that it is easier to manage, because it is one system. When it is up and running, it runs. There are no multiple participants that can each have their problems or challenges.

Using and Operating the OTS

In the beginning there were some small hiccups in the data of the validation events. There were maybe 3 to 5 issues that were resolved quickly. The small number of issues might be due to the fact that this was a relatively small project, with not that many participants and only two kinds of tickets, which makes it less complicated.

There was a system in place that stored messages in case an error was detected. This system was and is regularly checked for new events. The software itself sits in a data center, which is subject to automated health checks.

Conclusions and lessons learned

A lesson for the future that Jochen mentioned was to spend plenty of time on the specifications, and create a 'cookbook' or tutorial to help the suppliers get going. For the pilot this was done instead using the workshops, but it took multiple workshops for everyone to get going.

In general, Jochen was very positive about the project.

Conclusions regarding the technological perspective and future steps

The interviewed parties all agreed that the pilot was a success, and that the concept of interoperable ABT works and has further potential. Transport authority AVV is very proud of the solution, and happy to move forward with it.

The interviewees mentioned that the pilot ran smoothly, with only a few minor hiccups in the validation and the back-end systems at the beginning of the pilot. These issues were resolved during the pilot, with good collaboration of multiple pilot participants and suppliers.

An issue that presented itself on the German side is that the user generally needed to present the token longer than they might expect for successful validation. This is something to improve before going into production. The Dutch systems with a separate validator inherently did not exhibit this problem, but from both a user and bus driver perspective having two terminals is not ideal either.

Before going to production, an automated way of settling transactions would need to be implemented. Redundancy, monitoring and issue-detection should also be improved. Additionally, creating tutorials for system suppliers would ease the implementation process.

Next to this, expanding the functionality of the system with different travel products would be a welcome addition. According to Arriva the travel experience itself already is up to par

_____

with existing solutions such as the OV-chipkaart. The app is a welcome addition. On the German side, travellers asked for distance based ticketing, and to use their smartphone for ticketing.

The pilot serves the idea to facility travel cross border travel, and it achieved this goal.

- There was good collaboration between all parties involved in the pilot. However, proper coordination was necessary to help everyone understand the architecture and their tasks. Additionally, early involvement of suppliers is essential to successfully implement such a system.
- Arriva noted that this new scheme was very quickly developed and at very low cost. This may change the way the firm looks at investments in payment systems. The very short time to market really is a game changer.
- Implementing the system components such as the validators, OTS and ASEAG back-end was not very difficult. They were implemented fully and working as expected. Any delays were not due to the ETC system architecture.
- The combination of conventional and ETC systems in a single terminal was a challenge, and proved to both have advantages and disadvantages. The reading time for the ETC token was longer than desired, but the system supplier IVU states that this can still be optimised.
- Having two separate validators in busses was not ideal for a travelers perspective.
- In the beginning of the pilot the error "Halte onbekend" (Unknown stop) occasionally occurred, there were some hiccups in the data validation and a signature issue occurred that led to frozen displays. These issues were all solved quickly during the pilot.

Future steps:

- Moving from a pilot to a production ready system would require further front- and back-office development. For example, a proper invoicing and settlement system. AVV would like to develop the system further.
- The validation time of the ETC token needs to be improved on the German validators.
- Extra rules need to be implemented, for example that subscription holders are not be charged for day tickets.
- A possibility to offer multiple travel products would expand the possible user base. A possible variation next to the pilot implementation is to replace the token card by a payment card (EMV).

A lesson for the future would be to create a 'cookbook' or tutorial to help the suppliers get going quickly. More common wording for the system architecture would also help the understanding.

_____

4.2.3. Organisational perspective: the concept of interoperable ABT and future steps

This chapter is based on interviews with executives of the participating transport authorities/schemes, an evaluation session with experts and a survey among the same experts. For a full list please refer to the annex.

<u>International and cross-border innovation in e-ticketing</u>

Transport authorities and transport operators alike, agree a major (if solely technical) step has been taken in the development and acceptance of interoperable Account Based Travelling. Both the transport authorities who have participated in the pilots as well as authorities who have had the chance to experience the concept in the field are very enthusiastic. One important reason for this is that it is technology agnostic: the concept works with all current technologies and this way neither the authorities/operators as the travellers are locked in.

Many of the stakeholders recognized that this pilot has paved the way for more (regional) political involvement in making seamless cross border travel possible. Also among the stakeholders at the different sides of borders themselves an important achievement is that it is shown that it is possible to create a bilateral agreement between PTO's/PTA's. This worked very well at the pilot level.

Further deployment of the system in border regions will increase this catalytic effect and will help to conclude discussions on issues like cross-border tariffs.

<u>Future steps</u>

In the interviews further steps to be taken were extensively discussed. The following was mentioned:

- A governance structure must be created that is acceptable for all and is trusted by all partners, both existing as future. This requires a neutral (operational) steering body, managing the standard. This body must be supervised by an assembly of the participating schemes. Subject of study is how to take decisions in this structure. The approach taken with the ETC is convincing, but governance remains unclear.

- Viable business models must be found and tested in a next step. The pilot was successful but focussed on technology only. At the time and also for the next phase it will require public funding to move forward.

- Scalability should be an explicit aspect of a next phase. Aspects such as the handling of invoices are currently not scalable. This also holds for integration with the OV Chipkaart.

_____

- In cross border travel two factors are majorly affecting ridership: complexity and availability of tickets and complexity and level of tariffs. The pilot has shown that the first barrier can be solved. The system creates possibilities for resolving the latter and also creates the urgency to do so. Options are for example enabling distance-based pricing which in a cross-border situation is no different from any other situation.

- True cross-border (or cross PTO) functionality was not part of the scope of the pilot, but should be part of a future roadmap. It should be possible to 'tap in' once in a train in one country and then 'tap out' once in a different modality in another country. This requires a very intelligent trip-reconstruction system, approval of this system by all PTO's and solid agreements on payments.

_____

4.3. Luxembourg pilot

To evaluate the Luxembourg pilot, four interviews were performed, an online questionnaire was send to the pilot participants and usage data from the hub was analysed.

4.3.1. User results

In the following to sections the insights gathered through the online survey and usage data are presented.

Questionnaire results

To gauge the user experience, each pilot participant was asked to fill in a questionnaire. Of these, 37 people (partially) filled in the questionnaire. The results of the multiple choice questions are shown in Table 6. Besides the multiple choice questions, one open question was asked: "*I am willing to pay [...] on top of the usage of services to create an account.*" Out of the 14 answers received, 3 people were willing to pay an amount.

#	Question	Avg	Distribution
1	How well known are you with the Luxembourg public transport?	3.5	
2	It is useful to use my mKaart for other services such as parking, e-Charging and bike rental.	3.9	
3	It is worthwhile to set up an account to be able to use the mKaart for other services such as parking, e-Charging and bike rental.	3.8	
4	It is useful to use my account to keep track of all the services that I use and see my usage in real-time via a mobile app.	3.2	
5	It is useful to have all my account information available via a mobile app or website.	3.6	
6	It is useful to enrol to additional services via a mobile app or website and directly make use of these services.	3.4	
7	It is worthwhile to install an app on my mobile phone to manage my account information, see real-time usage information and enrol to new services.	3.5	
8	It gives me trust to see how my card is used in real-time.	3.2	

#	Question	Avg	Distribution
9	I think that an account-based system will not threaten my privacy.	2.9	
10	It is useful to integrate public transport and parking services.	4.2	
11	It is useful to receive a discount on the monthly passes by using public transport while my car is parked.	4.1	
12	It is useful to see my travel and parking usage in real-time in the mobile app.	3.3	
13	It is useful to see the monthly passes I have in the mobile app.	3.3	
14	It is useful to see how far I am with collecting stamps to receive a discount on the purchase of a new monthly pass.	3.6	
15	Because of the integration of public transport and parking services, I am more inclined to use Belval P&R than using my car only.	3.5	
16	Because of the integration of public transport and parking services, I am more inclined to use Belval P&R than using a separate parking and public transport service.	3.7	
17	It is worthwhile to create an account.	3.3	
18	It is worthwhile to install the mobile app.	3.3	
19	It is easy to: Apply for the Belval P&R service.	3.7	
20	It is easy to: Register for the Belval P&R service by using the mobile application.	3.4	
21	It is easy to: Binding your card to your account.	3.4	
22	It is easy to: Enter/Exit the parking garage.	4.0	

#	Question	Avg	Distribution
23	It is easy to: Collect stamps by using public transport.	3.3	
24	It is easy to: Check your travel history.	3.1	
25	It is easy to: Reach out to Belval P&R (in case you reached out fir help).	3.3	
26	I enjoyed collecting stamps to receive a discount on the purchase of a monthly pass.	3.0	
27	Belval P&R fits my travel behaviour well.	3.6	
28	The Belval P&R mobile app looks good.	2.8	
29	I don't mind using my personal information to use Belval P&R.	2.8	
30	I feel confident that my account information is safe.	2.8	
31	I feel safe that my parking history is safe.	3.0	
32	I trust that good customer support is provided when I need help.	3.6	
33	I would recommend the Belval P&R service to others.	3.9	

Table 6: Results of the participant questionnaire

Travel usage

Total clicks/stamp/month passes/vouchers

In Table 7 an overview is shown of the number of vouchers earned, month passes bought, city clicks performed (including those who resulted in a stamp), car park entries and exits. Note that vouchers could be earned by performing a city click while parked, eight times during a month.

Year / month	Voucher	Month pass	City click		Car park entry	Car park exit
			With stamp	Without stamp		

Year / month	Voucher	Month pass	City click With stamp	Without stamp	Car park entry	Car park exit
2016	8	158	108	670	1042	985
- 08		3	2	4	2	2
- 09		18	4	81	32	25
- 10	1	41	22	113	163	170
- 11	3	51	35	205	446	392
- 12	4	45	45	267	399	396
2017	9	75	102	555	733	721
- 01	4	42	53	249	364	367
- 02	5	23	44	294	347	339
- 03		10	4	7	17	11
- 04					2	1
- 05			1	5	3	3
Grand Total	**17**	**233**	**210**	**1225**	**1775**	**1706**

Table 7: Overview of the usage statistics in the Luxembourg pilot

_____

The number of different transactions is also shown graphically in Figure 8.
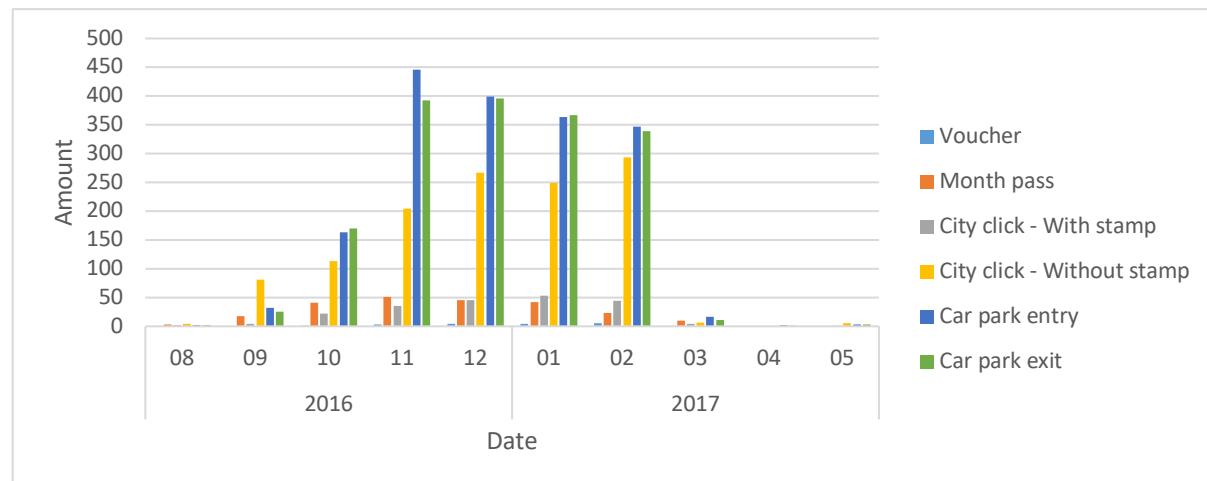

Figure 8: Total transactions per month per type

Clicks/stamps per user (categorized, distributed)

A total of 79 people joined the pilot and received a token. Of these people, 12 did not use their token at one of the public transport terminals and did therefore not collect any city clicks. Of those who did receive at least one city click, 8 were not able to collect a stamp (either by not clicking during parking or by clicking outside the valid zone). A distribution of those people who were able to collect city clicks and stamps is shown in Figure 9 and Figure 10.
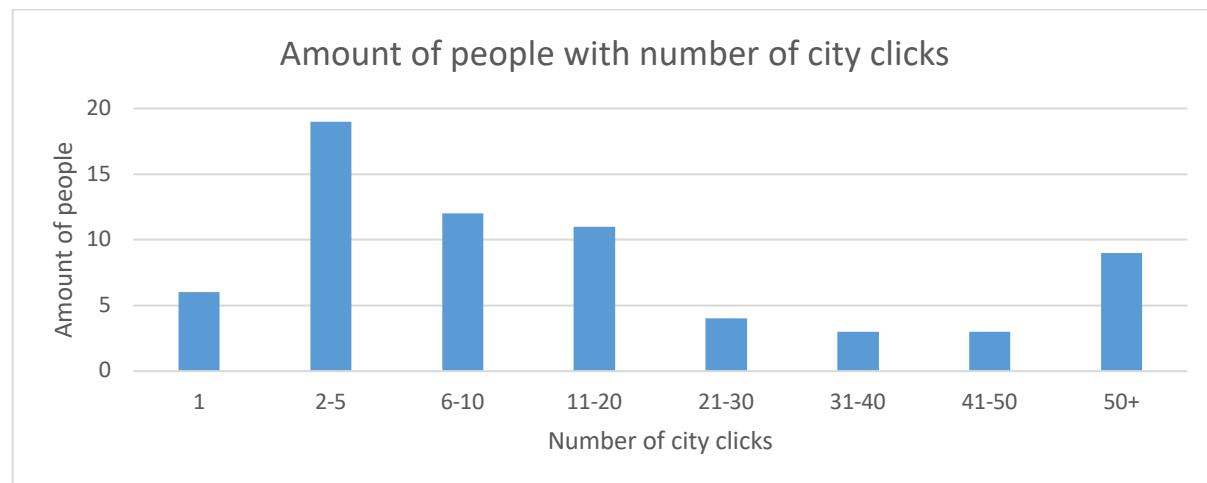

Figure 9: Histogram showing the distribution of people by the number of city clicks collected

_____
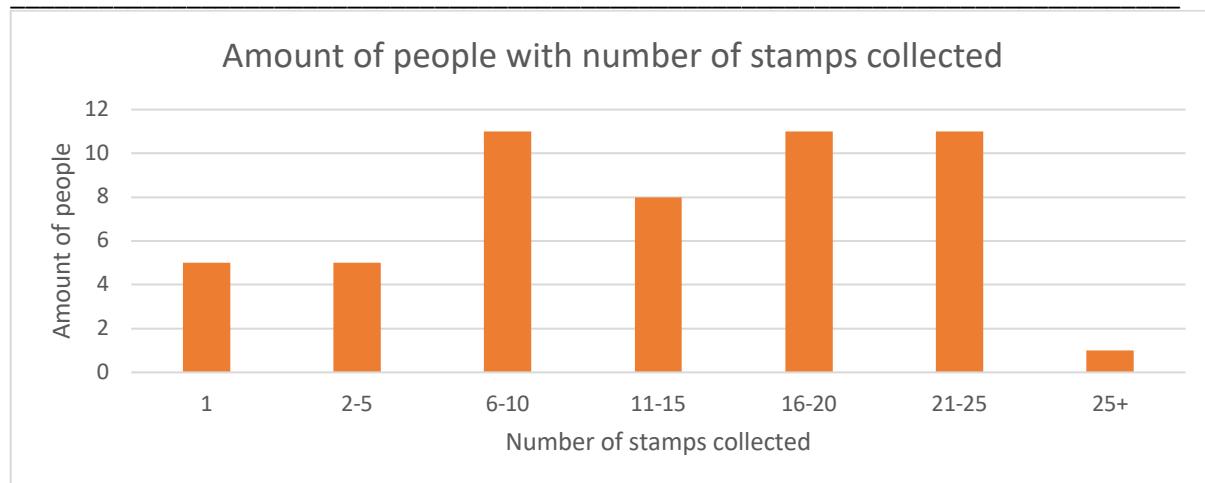
Figure 10: Histogram showing the distribution of people by the number of stamps collected

Success rate stamp collection (parking + correct bus zone)

At most, one stamp can be collected each day. To determine the success rate of stamp collection we divide the number of stamps collected by the number of days in which a car was parked at least once. In addition, an in-between state was identified where users did perform the combination of parking their car and collecting a city click. This state does not always result in a stamp because the city click may not be performed during parking or may be performed outside the valid zone. An overview of the success rate is shown in Table 8.

	Entries	Combinations	Stamps
Amount	1370	467	210
Percentage		**34%**	**15%**

Table 8: Overview of the stamp collection success rate

Common errors / fails (enrolment, usage, etc.)

From the data we could identify one specific erroneous use case: people who are declined at the car park entry gate because they do not have a month pass. This happened a total of 101 times, to 24 users. After being declined by the gate to enter the car park, people responded in several ways. The effect of a decline can be categorized as follows:

- Good; the user retrieves a new month card on that or the following day and continues to use it.
- Medium; the user doesn't retrieve a new month card immediately, but ends up buying one at a later point in time, after which they use their new month card.
- Bad; the user stops using the card after one or more failed attempts to enter the car park.

_____

Figure 11 shows the distribution of the different ways people respond after being declined entry.
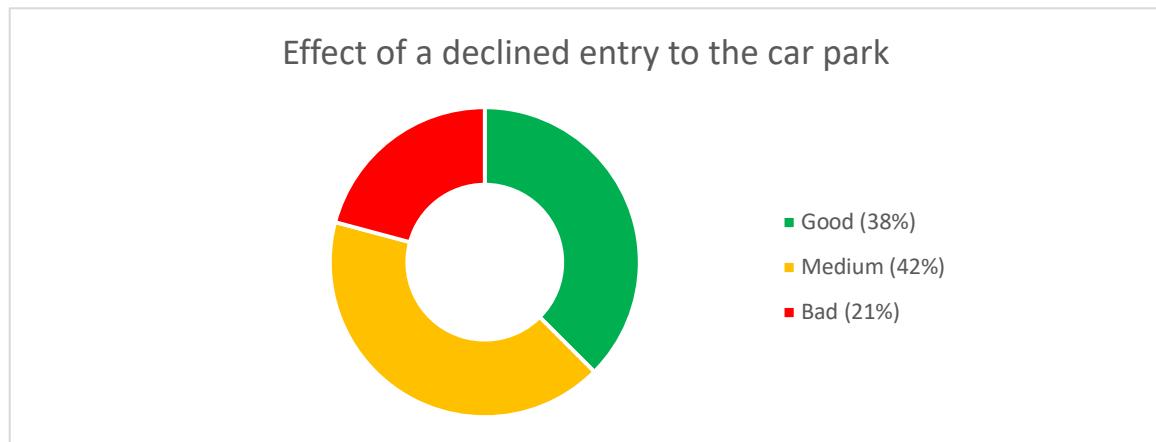
Figure 11: The different ways people respond after being declined entry to the car park

Parking/bus terminal performance (card-terminal response time)

This data was not available.

Popular destinations (percentage)

Most city clicks were performed in Belval-Lycée (44%) and Luxembourg (32%). Four percent of the city clicks were performed in 19 other locations (less than 10 times per location). An overview of all city clicks in the different areas are shown in Figure 12 on the left pie chart. In the right pie chart, the number of collected stamps is shown. Note that city clicks in both the Belval-Lycée as well as the Belval areas never result in a stamp and are therefore not represented in the left pie chart. After the Luxembourg area, the most popular destinations where stamps could be collected are Audun-le-Tiche and Bettembourg.
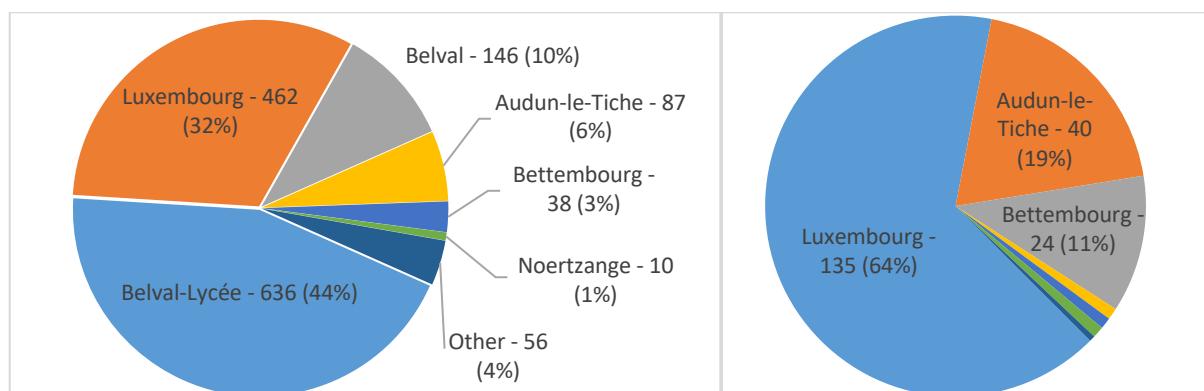

Figure 12: Breakdown of total number of city clicks per location (left) and total number of stamps per location (right)

Popular time periods (entry/exit)

_____

As expected, the most popular time periods to enter and exit the car park for the pilot participants is around respectively the morning and evening peak hours. City clicks were collected in two distinct peaks as well. An overview of the usage numbers throughout the day is shown in Figure 13 and Figure 14.
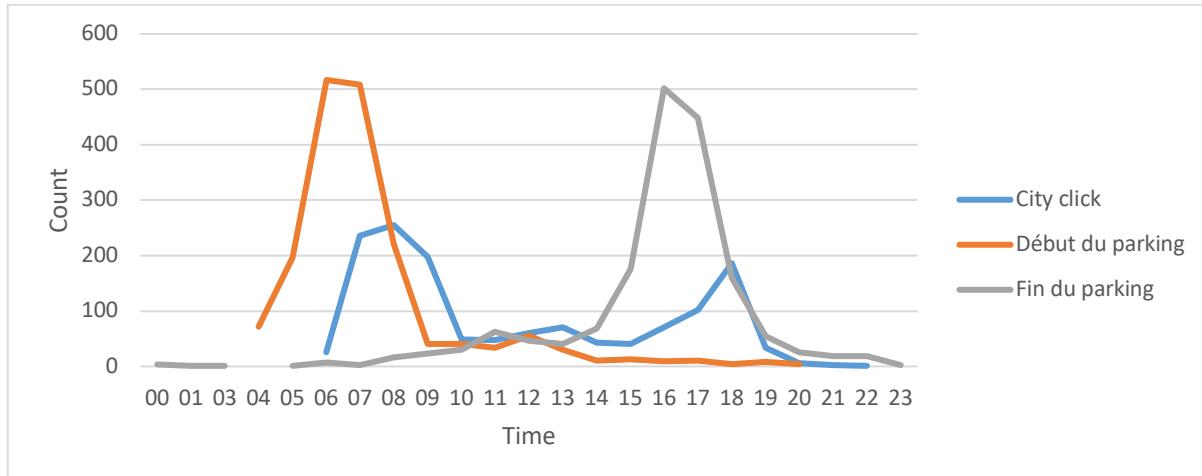
Figure 13: Number of city clicks, park entries and exits per hour of the day
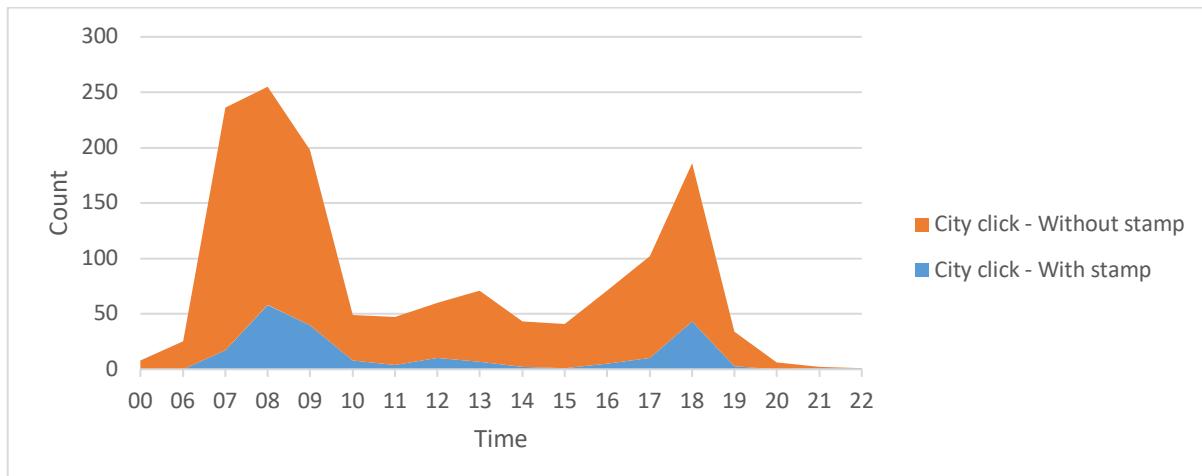
Figure 14: Number of city clicks with and without stamp per hour of the day

Application usage

During the time of the pilot, the Android version of the Belval app was installed a total of 32 times. The iOS version of the Belval app was installed less than ten times. The iOS Belval app was used an average of 9 times throughout the pilot. No further data was obtained about the application usage.

4.3.2. Technology results

Three interviews were performed to evaluate the technical design and implementation of the Luxembourg pilot. UL performed the interviews with David Viaggi (Verkeiersverbond),

_____

Frederic Foeteler (Verkeiersverbond) and Norbert Leisch (CFL). The highlights of the interview are presented below.

_____

Interview David Viaggi

What went well?

- Mobile application: The development of the two mobile applications, one for customers (to collect / show clicks) and the other for the clerk (to personalize the M-Kaart), by 42Tech
- Inspection: This was no problem, as the inspection equipment was able to read the existing transit application on the M-Kaart (that also contained the GST application).
- Onboarding: Using the Samsung Galaxy S7 to personalize the M-Kaart over the NFC interface at the clerk worked well.
- Monitoring: David was able to monitor the status of the pilot via the online dashboard (supplied by 42Tech), by contacting the clerk and by checking the INIT back office

What was challenging?

- Parking terminal: Setting up the terminal (by S&B) to read the M-Kaart and send the correct information to the central management system / Luxembourg Hub (by 42Tech)
- Transit terminal: Initially, it took around 5 seconds for the transit terminal (gate and validator) to read the VDV and GST application on the M-Kaart. Later, this was improved to around 0.8 seconds.
- Transit terminal: It was difficult to implement the correct GST Graphic User Interface (GUI) on the gates and validators, while not impacting the existing GUI.
- Pilot participants: About 50/60 people participated in the Luxembourg pilot, while 100 were expected. This was probably caused by the location of the parking, which was not ideal. It was not located close to the city centre and the parking was already free of charge.
- Onboarding: The technical onboarding with Samsung S7 went well, but explaining pilot participants how they could receive clicks and how the pilot worked was more challenging. It seemed as if the concept was too difficult.
- Hub: The Luxembourg hub did not anticipate to a certain date (change from October to November), which caused a problem during the onboarding / personalization of the mKaart with the Samsung S7 at the clerk. This required some attention from 42Tech and was solved in one day.
- Transit terminal: After an update during the pilot, the terminal could not connect to the network anymore. This had to be manually fixed in the field by INIT.
- Monitoring: Maybe in the future it will be more difficult to monitor the travel behaviour of customers due to data privacy restrictions.

Lessons learned?

- The location of the parking should be chosen more wisely.
- It was difficult to explain pilot participants how the pilot really worked and when they would receive clicks. There should be more guidance or the concept should be simplified to improve the on boarding and potentially, increase the usage.
- It is difficult to implement new software on an existing terminal.
- Perform regression tests when updates are deployed during the pilot.

Interview Frederic Foeteler

What went well?

- 42Tech was able to step in to help S&B with the implementation of the GST
- The quality of the ACCEPT specifications may be accurate, but they are hard to understand for a company from outside

What did not go well?

- S&B was not able to implement the original GST in the parking terminal, as it was too difficult to implement a new standard in an existing terminal, so they implemented a simplified version (with 42Tech)
    - CFL + Verkeiersverbond were not informed about the simplification of implementation
    - S&B was paid for the full/deluxe implementation, but received a simplified version
- Pilot participants did not always receive clicks, while they were eligible, as the zones/location IDs were not implemented correctly by VV
- Making combined usage of parking and public transport attractive, as the parking was already free and the parking location was not ideal to function as a transfer hub

Lessons learned?

- It is very difficult to change existing parking terminals to accept a new protocol
- Make sure that designed value proposition actually adds value to the users (referring to the location and pricing of the parking)

_____

Interview Norbert Leisch

What went well?

- The testing went well; the quality of the delivered systems was according to the requirements
- The final results of the pilot were alright and the pilot was a success

What did not go well?

- Scheidt & Bachman (S&B) had to redefine the use cases as it was too difficult to implement the original GST spec
- CFL / S&B had to wait during the development, as they found out that the ACCEPT documentation was not complete
- Delays were caused by communication problems between the parties involved in the installation (ACCEPT, S&B, VV and CFL)
- Network integration between CFL and ACCEPT was difficult due to protected networks; CFL and ACCEPT has a strict security policy
- The test cards did not work after the new readers were installed, as the tokens and IDs were changed
- During the pilot there was a general network problem, unrelated to the pilot. CFL had to open the gates, as people were not able to enter/exit the parking anymore

Lessons learned?

- Make sure that the contractor is able to implement the GST specification beforehand
- Have a clear governance structure to prevent miscommunication

Do not underestimate the amount of effort to connect different networks

4.3.3. Organisational perspective: the concept of interoperable ABT and future steps

Verkéiersverbond aimed for implementing a dynamic multimodal mobility scheme and was in need for a solution which is interoperable across services. The pilot was used to verify if the interoperable ABT-solution indeed fulfils those requirements. The conclusion is that it did do so indeed. Verkéiersverbond managed to integrate to existing systems: the national e-ticketing system and a parking-management system. The additional value of not only being interoperable across services but also across schemes is an extra perk for Luxembourg because of its geographical position.

In future steps attention should be given to the setup of a central organisation. This organisation should establish and manage the rules and regulations of the participating schemes. Typical topics are security aspects, fraud management, transaction format and transmission characteristics and delays etc. ETC would be the appropriate body to fulfil such a role.

_____

4.4. Overall lessons learned

To help drive the discussion and set the direction for future policies a number of discussions were organized with experts from scheme's across Europe who had been following the pilot. In these discussions several hypothesis were tested. The results of this discussion is described below:

Hypothesis 1: "It's about Travelling not Ticketing."

- The pilot was still very focussed on ticketing, so this hypothesis was not properly tested. But 50% of the people who participated said they used public transport in the other country more often, implying that fragmented ticketing may have led to less travel, while participation with the support of the single card and app did help to ease travelling.

Hypothesis 2: "It's more about the app than the token."

- This was not confirmed: almost everyone agreed that the single card / token was an improvement, as well as seeing your transaction in the app. Note that some 20% experienced difficulty with tap-in/tap-out and some 15% did not find the present app easy to use. On the other hand, the app was still limited in scope, as no journey planning or travel companion was included as yet. This will increase its usefulness for the customer. Note that one token per passenger does not mean that readers don't accommodate multiple tokens. Note also that different customers may have different preferences.

Hypothesis 3: "A roaming model allows for travelling across Europe."

- This was demonstrated in the pilot. Using Account-Based solutions and trusted relations, there is no need for fragmentation between national or regional schemes.

Hypothesis 4: "National ticketing schemes simplify cross-acceptance."

- This was demonstrated by two findings: In the Netherlands, where the OV-chipkaart was already in general use, it was easier to get users for the pilot, while Germany achieved this after a successful marketing effort. In both countries, the existence of schemes with established supplier and transport operator relations created a 'single point of contact.' This helped to structure and implement the project and trust each other's handling of transactions.

_____

Hypothesis 5: "Authorities have to be careful not to fossilize old structures with new technology."

- This was not tested in the pilot.

Hypothesis 6: "Virtualization creates new business roles."

- Perhaps it is better to say that it opened up business role, as the Netherlands now collected revenues from AVV customers and vice versa, whereas both could issue accounts to passengers that they could use elsewhere. The co-operation also required as 'scheme of schemes' provided by the ETC.

Hypothesis 7: "An active travel authority can use ABT for sustainable mobility."

- This was not tested, but is indicated by the appreciation of customers of the transaction ticker. This establishes a communication channel and data that can be used for targeted incentives and custom-made offers. As such it can be a building block towards sustainability.

Hypothesis 8: "Sustainable mobility requires more than public transport: an app/account that both car drivers use as well."

- In the Luxembourg pilot, car users are offered parking in combination with public transport into the city. The question is how to get this information to car uses.

Hypothesis 9: "Cost reductions can follow from simplifying or eliminating validators and sharing tokens."

- This was not tested. In fact, all the existing card-centric infrastructure was used in the pilots. But it did prove feasible to use just a token to produce transactions, moving intelligence to the back-office. The next step would be to reliably virtualize the CI/CO process.

Hypothesis 10: "Member States can remain free in organizing their Public Transport sectors."

- The pilots were carried out in different Member States without requiring them to change their internal organization.

_____

4.5. Lessons with regard to the organization of the pilots themselves

The pilots were originally planned to be completed earlier in the project. Eventually, they were successfully implemented by December 2017 and lasted – as a pilot under this program - until March 2018 and are being continued because of the success and the very positive response of travellers.

There are several reasons for the incurred delays which provide us with lessons with regard to the organization of similar pilots in the future:

- Allow time for actually planning the work which needs to be done.

- Allow sufficient time and accommodate in project planning to get to know and understand each other when undertaking complex cross border project. It is important to get to a common language and definitions of what you are working on. For example e-ticketing has a completely different meaning in Germany (traveling with a smart card) then in the Netherlands (traveling on an online purchase and possibly printed ticket with a barcode).

- Set-up a steering group which reflects the (financial) stakes partners have in the project.

- Create a framework in which cooperation can take place, for example by making use of Letters of Intent, MoU's etc.

- Accommodate sufficient time for procurement procedures, involve suppliers as early as possible

- Expand the pilots with the making of a financial (and societal) business case. Implementing new technologies drive by ambition proved difficult. It has only been possible by making it a management priority and by reducing scope. Working from a business case would make this easier.

_____

5. Conclusions and key lessons

The objective of the pilots has been to test the technological feasibility of interoperable Account-Based travelling across schemes and across service. It can be concluded that these tests were successful. 275 participants in Germany, 203 participants in the Netherlands and 79 people in Luxembourg made use of the service bringing the total to 557 participants.

The apps were installed on a total of 510 devices.

In Germany and the Netherlands 3700 transactions were made, with increasing usage towards the end of the pilot. Luxembourg accounted for 2900 transactions.

Users are overall very positive about the advantages that cross-border and mobile-enhanced travelling can bring them although usage of the particular products (app and card) offered in the pilot allows room for improvement. Still half of the respondents claimed they used public transport abroad more often as a result of the ETC card. This holds for all countries in which the pilot was executed. People are eager for a better range of products/propositions, especially in Germany. It can be concluded that people were very positive about the pilots and one of the most common suggestions was to expand the pilot with additional lines/regions/modalities/services, which is a positive sign. Interoperability across services and schemes was received very positively.

The road to getting the pilots operational however was not an easy one. Initial planning did not recognize the complexities of setting up a joint system between entities across borders in a real live (production) environment. This took more time than expected. Having passed this however is major achievement and shows that such cooperation is possible. For future pilots it is recommended to have steering group governing the process in which all of the parties which have stakes in the projects have a seat to secure commitment.

Another challenge was to procure the equipment and software. Both in Luxembourg as well as in the Netherlands it was shown that implementing the GST-protocol on existing hardware (validators in Dutch busses and the parking entry equipment) was challenging, mainly because by nature you are locked in to one supplier. Instalment on the existing validators in Luxembourg did yield a positive result. The experience in the project, with now 3 suppliers having implemented the GST-protocol provides relevant experience for potential future pilots or projects.

From the moment the system was live and operational all has run smoothly from a technological point of view, with only a few minor hiccups in the validation and the back-end systems at the beginning of the pilot. These issues were resolved during the pilot, with good collaboration of multiple pilot participants and suppliers. An issue that presented itself

_____

on the German side is that the user generally needed to present the token longer than they might expect for successful validation. This is something to improve before going into production. The Dutch systems with a separate validator inherently did not exhibit this problem, but from both a user and bus driver perspective having two terminals is not ideal either.

Looking at the concept and the pilots from a higher level a number of key lessons have been derived:

- Seamless ticketing solutions translate into more seamless travel resulting in more use of public transportations;

- A roaming model works for travelling in Europe, helps transport authorities cooperate and prevents further fragmentation;

- The roaming model opens up new business roles, as schemes in one country are now also catering to travellers in another country;

- Interoperable ABT can contribute to more sustainable means of travelling;

- Using this interoperable ABT concept does not require any regulation from the level of the EU, and therefore no conflict with the subsidiary principle arises when supporting and promoting the concept.

_____

6. Annexes

A. Questionaires

The following questionnaire was used for the evaluation of the Dutch and the German pilot:

Vielen Dank, dass Du uns in den zurückliegenden Wochen und Monaten im Rahmen des Projektes "European Travellers Club" als Pilot-Tester unterstützt hast. Dein Feedback ist besonders wichtig, um das System zukunftsfähig weiterzuentwickeln.

Bitte bedenke bei der folgenden Bewertung des Pilotsystems, dass Deine Nutzung unter Testbedingungen stattgefunden hat. Einschränkungen im Funktionsumfang (bspw. nur Kauf von Tagestickets in ASEAG-Bussen) sind diesen Testbedingungen geschuldet. Daher möchten wir Dich bitten, die grundsätzliche Funktionsweise des Testsystems unter Berücksichtigung der pilotbedingten Einschränkungen zu bewerten.

Allgemein

#	Frage	Antwort
1.	Wie alt bist Du?	(Zahl)
2.	Wie oft bist Du mit der ETC-Karte gefahren?	• (Fast) jeden Tag • Mehrmals pro Woche • Einige Male pro Woche • Einige Male im Monat • Weniger häufig
3.	Wie oft nutzt Du im Allgemeinen öffentliche Verkehrsmittel?	• (Fast) jeden Tag • Mehrmals pro Woche • Einige Male pro Woche • Einige Male im Monat • Weniger häufig
4.	Hast Du eine ASEAG/AVV-ETC-Karte (grau) oder eine Arriva-ETC-Karte (blau)?	• Arriva-Karte (blau) • ASEAG/AVV-Karte (grau)

Vorteile

#	Frage	Antwort
5.	Es ist praktisch, mit nur einer Karte in zwei Ländern fahren zu können.	Skala (stimme absolut zu, stimme zu, neutral, lehne ab,

_____

#		
		lehne absolut ab)
6.	Es ist praktisch, meine Fahrten direkt in der App sehen zu können.	Skala (stimme absolut zu, stimme zu, neutral, lehne ab, lehne absolut ab)
7.	Es gibt mir Sicherheit, meine Fahrten direkt in der App sehen zu können.	Skala (stimme absolut zu, stimme zu, neutral, lehne ab, lehne absolut ab)

Nutzererfahrung

#	Frage	Antwort
8.	Die Anmeldung für den Piloten verlief reibungslos.	Skala (stimme absolut zu, stimme zu, neutral, lehne ab, lehne absolut ab)
9.	Das Ein- und Auschecken mit der ETC-Karte verlief reibungslos.	Skala (stimme absolut zu, stimme zu, neutral, lehne ab, lehne absolut ab)
10.	Der Gebrauch der ETC-Karte im Ausland verlief reibungslos.	Skala (stimme absolut zu, stimme zu, neutral, lehne ab, lehne absolut ab)
11.	Die Einsicht in meine Fahrten in der App verlief reibungslos.	Skala (stimme absolut zu, stimme zu, neutral, lehne ab, lehne absolut ab)
12.	Die App liefert mir alle Informationen, die ich brauche.	Skala (stimme absolut zu, stimme zu, neutral, lehne ab, lehne absolut ab)
13.	Hast Du den Kundenservice genutzt?	Ja / Nein
14.	Falls ja, war der Kundenservice hilfreich?	Skala (stimme absolut zu, stimme zu, neutral, lehne ab, lehne absolut ab)
15.	Wie könnten die Nutzung verbessert werden?	(offen)

Abschluss

#	Frage	Antwort
16.	Der Pilot erfüllt meine Erwartungen.	Skala (stimme absolut zu, stimme zu, neutral, lehne ab, lehne absolut ab)
17.	Warum ja / Warum nicht?	(offen)
18.	Dank der Karte habe ich häufiger im Ausland öffentliche Verkehrsmittel genutzt.	Skala (stimme absolut zu, stimme zu, neutral, lehne ab, lehne absolut ab)

_____

19.	Ich werde die ETC-Karte anderen weiterempfehlen.	Skala (stimme absolut zu, stimme zu, neutral, lehne ab, lehne absolut ab)
20.	Hast Du noch andere Vorschläge, um das grenzüberschreitende Reisen mit nur einer Karte zu verbessern?	(offen)

_____

The following questionnaire was used for the evaluation of the Luxembourg pilot:

Welcome!

Thank you for participating in the Belval P+R Pilot. To improve our services, we would like to ask you some questions. It will take around 5 minutes to fill in this questionnaire. This will help us a lot.

General questions (page 2)

#	Question	Answer
1.	What is your gender?	M/F
2.	What is your age?	Number
3.	How often did you travel with Belval P+R?	Number
4.	How familiar are you with the public transport in Luxembourg?	Scale

Belval P+R (page 3)

Please indicate to what extent you agree with the following statements:

#	Statements	Answer
5.	I enjoyed using the Belval P+R service (PE)	Scale
6.	I would like to use the mKaart for other services as well (e.g. bike rental) (PU)	Scale
7.	I would like to use the mKaart for public transport services in other countries as well (PU)	Scale
8.	I like to receive a discount for public transport when I park my car outside the city centre (PU)	Scale
9.	Belval P+R suits my needs (CO)	Scale
10.	I would only use the Belval P+R service when it is free of charge (PC)	Yes / No

Mobile app (page 4)

Please indicate to what extent you agree with the following statements:

#	Statements	Answer
11.	The mobile app is useful (PU)	Scale
12.	The mobile app is easy to use (PEOU)	Scale

#	Statements	Answer
13.	The mobile app looks good (PA)	Scale
14.	I prefer to use a mobile app or website to order new services, rather than going to a physical shop (PU)	Scale

Ease of Use (page 5)

How easy was it for you to…?

#	Statements	Answer
15.	Apply for the Belval P+R service (PEOU)	Scale
16.	Register for the Belval P+R service via the mobile app (PEOU)	Scale
17.	Link the mKaart to my online account	Scale
18.	Enter/exit the car-park (PEOU)	Scale
19.	Collect stamps by using public transport (PEOU)	Scale
20.	Check your travel history (PEOU)	Scale

Final statements (page 6)

Please indicate to what extend to agree with the following statements:

#	Statements	Answer
21.	The customer service of Belval P+R was sufficient	Scale
22.	Data security is important to me (PT)	Scale
23.	Privacy is important to me (PP)	Scale
24.	I would recommend the Belval P+R service to others (SF)	Scale
25.	I would like to sign up for the Belval P+R service when the pilot ends (PC)	Scale

Suggestions (page 7)

Thanks you for filling in this questionnaire!

Feel free to provide any additional feedback:

Have a wonderful day!

_____

B. Structure of interviews

Guidance for interviews:

For the interviews on the organisational perspective the following interview guidance was used:

Opening

Thanks for participating in the ETC pilot. This interview is part of the evaluation and the governance and strategic aspects of the ABT pilot. The goal of the interview is to identify your experiences (good and bad), which can help with the future roll out of the concept of interoperable ABT and the ETC. This interview will mainly look forward, as challenges in governance may not have materialized yet in the pilot. We will start with a number of general questions.

General questions

- What is your name / role / responsibility?
- How long have you been involved in the pilot?
- What is the existing e-ticketing system in your region/country? Is an e-ticketing system in place? If so, is it account-based or card centric or other…

Your perspective

- How do you look back at this pilot? What has been achieved from your perspective?
- What has been very successful? What was more difficult then you expected?
- In a potential roll out: what would you do differently?
- What are conditions for you organization to participate in a further roll out?
- What aspects of cross border ABT have not been part of the scope of the pilot but are essential for further roll out? Do these need further piloting?
- Rolemodels in future situation?

ABT concept and fit with the strategy

- What was the reason to join the ABT pilot? What added value did you recognize?
- Has its added value indeed been proven during the pilot?
- How did (interoperable) ABT fit in your strategy?
- Has (interoperable) ABT indeed contributed to reaching strategic objectives?
- Does (interoperable) ABT has a place in the future strategy? What do you hope to achieve with this?
- Is it possible to mention key success factors when pursuing a further roll out?

_____

Governance

- Is the system scalable from a governance perspective: can the framework which has been agreed with the partner schemes - eg. to allow for payments and the acceptance of alien travellers - be applied to a true operational phase as well?
- If not, why?
- What issues in governance can be identified in case of further roll out? In reconciliation of payments? In acceptance of alien travellers? With regard to the privacy of travellers and the ownership of data?
- Where should those issues be addressed? Which parties are involved in this?
- What kind of oversight is needed?

Please reflect on the following lessons-learned

- It's about Travelling not Ticketing
- It's more about the app than the token
- A roaming model allows for travelling across Europe
- National ticketing schemes simplify cross-acceptance
- Be careful not to fossilize old structures with new technology
- Virtualization creates new business roles
- An active travel authority can use ABT for sustainable mobility
- Sustainable mobility requires more than public transport: an app/account that both car drivers use as well
- Cost reductions can follow from simplifying or eliminating validators and sharing tokens
- Member States can remain free in organizing their Public Transport sectors

Closing

Thank you very much.

_____

For the interviews on the technological perspective the following interview guidance was used:

Opening

- Thanks for participating in the ETC pilot. This interview is part of the evaluation and focuses on setting up and operating ABT systems. The goal of the interview is to identify your experiences (good and bad) with the technical part of the pilot implementation so this can be improved in the future. We will start with a number of general questions.

General questions

- What is your name / role / responsibility?
- How long have you been involved in the pilot?
- What is the existing e-ticketing system in your region/country? Is an e-ticketing system in place? If so, is it account-based or card centric or other…

Setting up ABT systems

- How difficult was it to enable the acceptance of ETC tokens at a terminal? (PTO (and its supplier))
- How difficult was it to setup the following systems to provide account based services?
    - Germany: ASEAG back-office, online ticket stock
    - Netherlands: TLS back-office
    - Luxembourg: Belval back-office
- How difficult was it to setup a system to process cross border transactions?
- How difficult was it to integrate with the ETC-Hub?
- How difficult was it to integrate or combine your current ticketing infrastructure with ABT?
- What is your experience with the testing process?

Using / operating ABT systems

- What is your experience with accepting the ETC token (validation and inspection)? (PTO)
- What is your experience with onboarding (account registration, card issuance) of travellers?
- What is your experience with invoicing travellers and other PTOs/schemes?
- How did you monitor your operations?
    - Was it more / less difficult than the current ticketing system?
- Did you experience any issues during operations?
    - If yes, how did you manage them?

_____

- Does the availability of the interoperable ABT solution affect travel behaviour in your opinion?
- What was your approach and experience with training your personnel to adapt to the ABT system/processes?
- What were the most prominent traveller questions, and were they more difficult to solve than with the current transit service?

Closing

- Thank you very much.

_____

C. List of parties and persons who participated in the evaluation

People have been interviewed (marked with a *), have personally been selected for a survey or participated in an evaluation workshop.

Organisation	Name
AFIMB	Bernard Schwob
Arriva	Klaas Steffens
Arriva	Onno van Drunen*
Arriva	Thomas Clemens*
ASEAG	Frank Standke
AVV	Mr. Geulen*
AVV	Dominik Elsmann*
BMC	Michel Genot
BMC	Tim de Schrijver
BMC	Koen van de Cloot
BMC	Pierre-Paul Bertieaux
Calypso	Ralph Gambetta
CFL	Norbert Leisch*
Cubic	Jochen Westensee*
IONAS	Frode Færø
ITSO	Steve Wakland
NTA	Barry Dorgan
NVR	Andreas Warnecke*
Rejsekort	Gregers Mogensen
Rejsekort	Peter Kristiansen
Rejsekort	Ole Vildrik Thougaard
Samtrafiken	Kimiko Sörensen
Samtrafiken	Laila Berkhahn
SBB	Daniel Galley
SBB	Silvio Ciccone
SBB	Cristoph Almer
TLS	Arco Groothedde*
TLS	Roy Lunter*
TLS	Annefloor ter Weer*
TLS	Peter Schonewille
Transport for Scotland	Mary Docherty
Transport for Scotland	Stephen York
VDV eTicket Service	Sjef Janssen*
Verkeiersverbond	Christian Mousel*
Verkeiersverbond	David Viagi*
Verkeiersverbond	Frederic Foeteler*

D. Results of the governance interviews

In accordance with the agreement made with interviewees on the governance their answers have not been included in an integral way. In this annex the results have been grouped and ordered per category of questions.

Persons whose answers have been included are:

Arriva	Thomas Clemens, Consultant
AVV	Mr. Geulen, Managing Director
AVV	Dominik Elsmann, Project Manager
TLS	Arco Groothedde, CEO
TLS	Roy Lunter, Project Manager
TLS	Annefloor ter Weer, Business Role in project team
VDV eTicket Service	Sjef Janssen, Managing Director
Verkeiersverbond	Christian Mousel, COO

General questions

- [names and functions differ]
- The Netherlands has an e-ticketing system called the OV Chipkaart in place. This is a card-centric system.
- The region of Aachen is currently implementing an e-ticketing system, the VDV-KA. This is a card-centric system.
- Luxembourg deploys the M-Kaart, based on the the german VDV-KA standard. The system is card-centric.

Your perspective

- The transport authority is very much enthusiastic about the concept of Account Based Traveling in an technology-agnostic way: it does not lock users in in any way, as they are only connected to their account.
- It was noted that when working cross border it is important to get to a common language and definitions of what you are working on. For example e-ticketing has a completely different meaning in Germany (traveling with a smart card) then in the Netherlands (traveling on an online purchase and possibly printed ticket with a barcode).
- In Germany it proved very difficult to get pilot participants to join. Probably because the system was completely new.
- In Germany connecting the bank account was a major hurdle because of privacy and data laws.
- Implementing new technologies driven by ambition proves difficult. It has only been possible by making it a priority and reducing scope.

_____

- Initial project planning should allow for sufficient time to align the different participants and stakeholders.
- The programme was very succesfull, but focused on the technology only. An important next step is to seek viable business models and find a business case and clarify the roles of the different participants.
- Future, cross border projects like these require project governance based on (financial) commitments made by the stakeholders.
- Another point of attention are the privacy considerations.
- Pricing in border regions is also a major point of discussion, also in the future. However, having the technology makes the discussion on pricing more urgent/logical.
- The pilot has paved the way for political commitment and involvement.
- It is great that the token can be easily implemented on a reader, but in the end the PTO is locked in with its validator supplier.
- There are opportunities when the system is better embedded locally/in the region.
- A first step however is to make the system stronger. Take for example steps to improve the way payments are handled: this was not really part of the scope of this pilot but is essential for further roll-out.
- While attention is needed for arranging payment between PTO's, and technical functionalities should be extended to decrease reliance on physical infrastructure the privacy was already well taken care of. No issues or questions did arise but operators are confident they would have been able to cover those.
- True cross-border (or cross PTO) functionalitity was not part of the scope of the pilot, but should be part of a future roadmap. It should be possible to 'tap in' once in a train in one country and then 'tap out' once in a different modality in another country. This requires a very intelligent trip-reconstruction system, approval of this system by all PTO's and solid agreements on payments.
- In cross border travel two factors are majorly affecting ridership: complexity and availability of tickets and complexity and level of tariffs. The pilot has shown that the first barrier can be solved. The system creates possibilities for resolving the latter and also creates the urgency to do so. Options are for example enabling distance-based pricing which in a cross-border situation is no different from any other situation.
- The Pilot is a success. VDV-KA in combination with a side token works: therefore account-based ticketing in the VDV-KA works.
- Risk was the combination of the introduction of the VDV-KA and the ETC pilot in the Aachen region. Tender procedure was longer then expected: caused a delay in the start of the pilot.

_____

- Pilot is not the end situation. Still some things to improve (for the traveller). In the pilot only 1 product was available for the traveller.
- For a potential roll-out the set-up of the pilot was a good one. We would not do it differently: VDV-ETS acts as the standard body and AVV (or any other transport authority) will act as the responsible pilot partner (in combination with the public transport operator).

ABT concept and fit with the strategy

- It was important to gain experience in ABT
- It was important to join, because of the cross border part: there are a lot of borders in Germany with neighboring countries
- The framework; a research and development project was suitable to achieve the goals set
- A pilot in an operational environment suited well to prove ABT in VDV-KA can work
- Interoperable ABT fits within the future strategy: the results will be incorporated in the into the German VDV-KA standard
- It remains the responsibility of the transport authorities to implement ABT in the region(s)
- The system fits the strategy because it is planned to extend 'e-ticketing' also to several other services, both in Germany as in Luxembourg
- In the Netherlands this pilot fits the strategy because TLS is moving up to token-based traveling. This pilot was a chance to develop his further. It also supports the ambitions in the southern Limburg region to improve cross-border transportation

Governance

- From a governance perspective the main achievement was that it was shown that it is possible to create a bilateral agreement between PTO's/PTA's. At least for the pilot this was successful. A major point for future roll out is to create a governance structure that is acceptable for all and is trusted by all partners, both existing as future. This requires a neutral (operational) steering body, managing the standard. This body must be supervised by an assembly of the participating schemes. Subject of study is how to take decisions in this structure. The approach taken with the ETC is convincing, but governance remains unclear.
- In any way it is important that financial commitments of participants are sufficiently reflected in the any steering body, being for the entire ETC as a concept or particular projects only. This will guarantee commitment of parties.
- The pilot is not immediately scalable to full roll out. In particular the payment systems are not properly developed yet.

_____

- Settlement is still an issue: this should be addressed in further roll out, as well as settlement which was now pushed out of the scope. Also: integration with OV Chipcard.
- It is clear that the system requires significant public funding to be able to take the technology to the next phase.
- The system is scalable.
- It should be clear for partners what its role will be in the future governance. This is also part of what will be incorporated in the VDV-KA. Not only the technical specifications should be part of it, but also how it will be managed. In other words: it needs to be clear for participants of the VDV-KA how they can be part of it (the European framework)
- Furthermore it should also be clear what role the partners will play in the ACCEPT governance: who will be part of the ACCEPT council?

_____

E. Conditions for the pilots

Germany:

Vorwort

Im Rahmen des europäischen Forschungs- und Entwicklungsprogramms Horizon 2020 arbeiten die Aachener Verkehrsverbund GmbH (AVV) und die Aachener Straßenbahn und Energieversorgungs-AG (ASEAG) gemeinsam mit Partnern aus den Niederlanden, aus Luxemburg und aus Deutschland im Projekt European Travellers Club (ETC). Ziel des Projektes ist die Entwicklung einer Lösung für den interoperablen Einsatz von elektronischen Tickets über Landesgrenzen hinweg.

Als technischer Lösungsansatz wird das sogenannte ID-Ticketing verfolgt. Dieses ermöglicht es, neben den bereits bestehenden (((eTicket Deutschland-Lösungen, das Ticketing über eine dem Kunden zugehörige Identifikationsnummer abzuwickeln. Die gesamte Systemlogik liegt hierbei im Hintergrundsystem. Das heißt, die Tickets werden nicht mehr auf der Chipkarte gespeichert. Sie liegen vielmehr in einem Online-Ticketspeicher, auf den zugegriffen wird. Aufbauend auf diesem Lösungsansatz, wird das Ziel verfolgt, die Nutzung des ÖV jenseits der Landesgrenzen maßgeblich zu erleichtern. Entsprechend dem aus dem Mobilfunk bekannten „Roaming"-Prinzip, sollen Fahrgäste zukünftig mit ihrem heimischen Nutzermedium auch den ÖV im Nachbarland nutzen können. Diese Nutzungsbedingungen regeln die Pilotphase zum Test des Systems.

Nutzungsbedingungen für die Teilnahme am Pilotprojekt European Travellers Club (ETC)

1. Geltungsbereich

(1) Die nachstehenden Bedingungen gelten für die Teilnahme am Pilotprojekt European Travellers Club (ETC). Für die Teilnahme/Bestellung müssen sich die Teilnehmer über die Website www.avv.de/etc registrieren. Soweit sich aus diesen Bedingungen keine Änderungen ergeben, kommen die Tarifbestimmungen für den AVV und die Beförderungsbedingungen Nahverkehr NRW in der jeweils gültigen Fassung zur Anwendung.

Ihr Vertragspartner ist die Aachener Straßenbahn und Energieversorgungs-AG (ASEAG).

(2) Teilnehmer können nur natürliche Personen mit einem Mindestalter von 18 Jahren sein.

(3) Die vorliegenden Nutzungbedingungen haben ausschließlich Gültigkeit für den Zeitraum der Pilotphase vom 01.12.2017 bis 31.03.2018.

(4) Die ASEAG behält sich die jederzeitige Anpassung der Nutzungsbedingungen vor. Maßgeblich ist die jeweils bei Vertragsschluss gültige Fassung. Der Kunde kann die jeweils gültige Fassung der Nutzungsbedingungen auf der Internetseite www.avv.de/etc einsehen, herunterladen und ausdrucken.

(5) Entgegenstehenden oder abweichenden Bedingungen des Kunden wird ausdrücklich widersprochen.

2. Vertragsabschluss

2.1 Angebot

_____

Der Abschluss des Registrierungsvorgangs durch den Kunden stellt ein für den Kunden bindendes Angebot dar. Hierdurch ist noch kein Vertragsverhältnis zur Teilnahme am Piloten zustande gekommen.

2.2 Annahme

Nach erfolgreichem Abschluss der Registrierung kommt durch Zusendung des im Piloten eingesetzten Nutzermediums (Chipkarte) oder durch schriftliche Bestätigung das Vertragsverhältnis zustande.

2.3 Kauf von Produkten

(1)   Der Kauf eines Ticketproduktes in ASEAG-Bussen ist ausschließlich über einen aktiven CheckIn des Pilotkunden in den ASEAG-Bussen möglich und erfolgt ausschließlich im Hintergrundsystem.

Hierbei werden folgende Produkte im Piloten angewendet:

- Tageskarte Stadtgebiet Aachen zum Sonderpreis von 5,00 € (Tages-Ticket 1 Pers.)
- Einzelfahrt auf der Linie 44 zum Sonderpreis von 2,80 € (Einzel-Ticket H3)

Pro Kalendertag werden im Stadtgebiet Aachen nach dem Erwerb einer Tageskarte bis Betriebsschluss keine weiteren Berechnungen vorgenommen.

Bestehende Abo-Kunden der ASEAG mit gültigem Ticket für das Stadtgebiet Aachen müssen die Fahrten im Stadtgebiet von Aachen im Rahmen des Piloten von ETC nicht bezahlen. Hierzu muss bei der Anmeldung die ASEAG-Kundennummer im Registrierungsformular angegeben werden. Neben der Pilot-Chipkarte ist dann aber das AVV-eTicket mitzuführen und bei Kontrolle vorzuzeigen.

Für Einzelfahrten auf der Linie 44 in eine Richtung wird jeder Check-In berechnet, wobei die maximale Fahrzeit in diese Richtung 180 Minuten nicht überschreiten darf.

(2)   Der Kauf eines Ticketproduktes in Arriva-Bussen (Linie 44 und 350) ist ausschließlich über einen aktiven Check-In und Check-Out des Pilotkunden in den Arriva-Bussen möglich und erfolgt ausschließlich im Hintergrundsystem.

Hierbei werden folgende Produkte im Piloten angewendet:

- Einzelfahrt auf der Linie 44 zum Sonderpreis von 2,80 € (Einzel-Ticket H3)
- Einzelfahrt auf der Linie 350 zum OV-chipkaart-Tarif, rabattiert um 34%

Für Einzelfahrten auf der Linie 44 in eine Richtung wird jeder Check-In berechnet, wobei die maximale Fahrzeit in diese Richtung 180 Minuten nicht überschreiten darf.

(3)   Alle Check-In-Aktivitäten werden dem Pilotkunden auf der für das Projekt bereitgestellten APP als Ticker-Meldung in Echtzeit angezeigt.

(4)   Da es sich um ein Pilotprojekt handelt, werden die teilnehmenden Pilotkunden gebeten, sich unverzüglich an das ASEAG-Kundencenter zu wenden, sofern Ticker-Meldungen für sie nicht nachvollziehbar sind.

_____

(5)　　　Allen Pilotkunden werden ab dem ersten Check-In die Fahrten innerhalb der ersten 14 Tagen auf allen Pilotlinien wieder gutgeschrieben. Den Testkunden wird somit ein kostenfreies Testen in den ersten 14 Tagen ermöglicht.

3. Registrierung

(1) Für die Registrierung werden die folgenden Daten vom Pilotkunden benötigt:

- Vor- und Nachname
- Geburtsdatum
- E-Mail-Adresse
- Telefonnummer (optional)
- Meldeadresse
- IBAN

(2) Es werden nur Registrierungen von Kunden berücksichtigt, die die erforderlichen Daten inklusive Adresse und Bankverbindung angeben.

(3) Der Kunde ist verpflichtet, die personenbezogenen Daten (Name, Vorname, Geburtsdatum, Adresse und Bankverbindung) im Registrierungsprozess vollständig und richtig anzugeben.

(4) Der Kunde ist verpflichtet, während der Vertragslaufzeit eintretende Änderungen seiner persönlichen Daten (Name, Adresse, Bankverbindung) der ASEAG unverzüglich in schriftlicher Form mitzuteilen.

4. Hinweise zu Preisen

Alle angegebenen Preise beinhalten die jeweils für das Land und Produkt geltende gesetzliche Mehrwertsteuer. Bei einer Änderung des gesetzlichen Mehrwertsteuersatzes stimmt der Kunde einer entsprechenden Anpassung der Preise zu.

5. Zahlungsbedingungen

(1) Die Bezahlung im Piloten ist für die Kunden der ASEAG ausschließlich im Lastschriftverfahren (SEPA-Basislastschriftmandat) möglich. Andere Bezahlverfahren sind im Piloten ausgeschlossen.

(2) Die Abbuchung der in einem Kalendermonat erworbenen Fahrausweise erfolgt zu Beginn des Folgemonats nach Vorabankündigung (Prenotification) durch die ASEAG. Der Kunde erhält die Vorabankündigung (Prenotification) mindestens zwei Tage vor Einzug der Forderung. Die Übermittlung erfolgt auf elektronischem Wege.

(3) Der Kunde hat sicher zu stellen, dass das angegebene Konto über ausreichende Deckung verfügt, so dass die SEPA-Lastschrift eingezogen werden kann. Sollte eine SEPA-Lastschrift unberechtigt vom Zahler zurückgegeben werden oder der Einzug der Forderung bei dessen Kreditinstitut aus von ihm zu vertretenden Gründen - insbesondere wegen unzureichender Deckung, falscher oder ungültiger Bankdaten oder Widerspruch - scheitern, ist er verpflichtet, den ausstehenden Betrag inklusive Bearbeitungsentgelte zu überweisen.

(4) Der Kunde verpflichtet sich, alle für die Teilnahme am SEPA-Lastschriftverfahren erforderlichen Kontodaten, insbesondere Kontoinhaber und International Bank Account Number (IBAN:

_____

Internationale Bankkontonummer), mitzuteilen und im hierfür vorgesehenen Registrierungsformular einzutragen.

(5) Der Kunde verzichtet auf die Einholung eines schriftlichen SEPA-Lastschriftmandates. Mit Zustimmung zu den vorliegenden Nutzungsbedingungen erklärt der Kunde den Verzicht gegenüber dem Kreditinstitut des Kunden, der Gläubigerbank und dem Gläubiger. Mit der Weitergabe der Verzichtserklärung an die vorgenannten Parteien ist der Kunde einverstanden. Bei

Wegfall oder Unwirksamkeit des Verzichts ist der Kunde verpflichtet, eine schriftliche Mandatserteilung unverzüglich nachzureichen. Dazu genügt eine E-Mail an ASEAG mit der Bitte um Zusendung des SEPA-Lastschriftmandatsformulars. Der Kunde erhält im Anschluss das Formular für das SEPA-Lastschriftmandat, welches er vollständig ausgefüllt und eigenhändig unterschrieben an ASEAG postalisch zurück schicken muss. Sofern der Kunde nicht der Kontoinhaber ist, ist er verpflichtet, die Mandatsreferenznummer an den Kontoinhaber weiterzuleiten.

(6) Kunden, die für das Lastschriftverfahren gesperrt sind, sind von der Teilnahme an dem Pilotprojekt ausgeschlossen.

5. Widerruf

(1)   Alle Pilotteilnehmer und Antragssteller haben das Recht, ohne Angabe von Gründen die Teilnahme an diesem Piloten jederzeit zu widerrufen.

(2)   Um Ihr Widerrufsrecht auszuüben, müssen Sie die ASEAG per E-Mail über Ihren Entschluss, diesen Vertrag zu widerrufen, informieren.

(3)   Wenn Sie den Vertrag widerrufen, sind alle offenen Ticketkäufe zum nächsten Abrechnungstermin vom Pilotkunden zu bezahlen.

6. Haftung

Die ASEAG haftet für Schäden aus der Verletzung des Lebens, des Körpers oder der Gesundheit, für Schäden aus der Verletzung von Pflichten, deren Erfüllung die ordnungsgemäße Erfüllung des Vertrages überhaupt erst ermöglicht und auf deren Einhaltung die andere Partei regelmäßig vertrauen darf (wesentliche Vertragspflichten) sowie außerdem für sonstige Schäden, soweit diese auf einer vorsätzlichen oder grob fahrlässigen Pflichtverletzung beruhen, nach den gesetzlichen Bestimmungen. Die Haftung für Ansprüche nach dem Produkthaftungsgesetz bleibt unberührt. Im Übrigen ist die Haftung für Schadensersatzansprüche, gleich aus welchem Rechtsgrund, ausgeschlossen.

7. Datenschutz

(1) Die ASEAG ist berechtigt, die ihr anlässlich der Registrierung gemäß Ziff. 3.1 übermittelten Kundendaten im Zusammenhang mit der Abwicklung und Abrechnung des Piloten zu erheben, zu bearbeiten, zu speichern und zu nutzen. Der Kunde stimmt diesem mit Absendung der Registrierung ausdrücklich zu. Die Erhebung, Verarbeitung, Speicherung und Nutzung personenbezogener Daten durch die ASEAG erfolgt gemäß den Bestimmungen des Bundesdatenschutzgesetz (BDSG). Dabei berücksichtigt die ASEAG die Grundsätze der

_____

Datensparsamkeit und Datenvermeidung, das heißt, dass personenbezogene Daten nur in dem zur Aufgabenerfüllung unbedingt erforderlichen Umfang erhoben und verarbeitet werden.

(2) Der Kunde stimmt zu, dass die im Projekt beteiligten Forschungspartner AVV (Aachener Verkehrsverbund GmbH) und OTI (Open Ticketing Institute) personenbezogene Daten (Anrede, Straße, Hausnummer, Land, Postleitzahl, Wohnort und Geburtsjahr), die im Registrierungsprozess erhoben werden, zum Zwecke der projektbezogenen Forschungsevaluation nutzen dürfen. Der Kunde stimmt zu, dass er zur Evaluationszwecken kontaktiert und zu einer Befragung eingeladen werden darf. Die Kundendaten werden nicht für Werbezwecke verwendet.

(3) Während des gesamten Registrierungsprozesses werden grundsätzlich alle vom Kunden übermittelte Daten durch eine sichere online-Verbindung zwischen dem Endgerät des Kunden und dem verbundenen Rechner geschützt.

(4) Es wird ausdrücklich darauf hingewiesen, dass nur für die Abrechnung im Abrechnungssystem Vertragsdaten und Verkaufsdaten temporär zusammengeführt werden. Mit Ausnahme der Vertragsverwaltung der ASEAG werden an keiner Stelle im Pilotsystem personenbezogene Daten gespeichert, eingesehen oder verarbeitet.

8. Schlussbestimmungen

8.1 Anwendbares Recht

Es gilt deutsches Recht.

8.2 Gerichtsstand

Gerichtsstand ist Aachen.

8.3 Salvatorische Klausel

Sollten eine oder mehrere Bestimmungen dieser Nutzungsbedingungen ganz oder teilweise nicht rechtswirksam sein oder ihre Rechtswirksamkeit verlieren, so berührt dies die Wirksamkeit der übrigen Bestimmungen nicht.

_____

The Netherlands

Stap 4 van 5 - Pilotvoorwaarden European Travellers Club

Algemeen

In het kader van het Europese Horizon 2020 project "European Travellers Club" is een pilot opgezet om een nieuwe technologische oplossing, het zogenaamde Token-Based-Ticketing, te onderzoeken. Hiermee kan interoperabiliteit gewaarborgd worden, zodat OV-chipkaart gebruikers uit Nederland ook in Duitsland het OV kunnen gebruiken, alsook VDV-KA gebruikers uit Duitsland in Nederland het OV kunnen gebruiken, zonder dat er daarvoor een extra chipkaart nodig is. Makkelijk grensoverschrijdend reizen dus.

Gedurende de periode december 2017 t/m maart 2018 zijn specifieke buslijnen beschikbaar gesteld voor de pilot:

- 44 Heerlen – Aachen (Arriva/ASEAG, 50-50 exploitatie)
- 350 Maastricht – Aachen (Arriva)
- alle ASEAG-buslijnen binnen het gemeentegebied Aachen (incl. lijnen naar Vaals)

Voor het in- en uitchecken zijn pilot-specifieke apparaten in de bussen geïnstalleerd. Hiermee wordt het in- en uitchecken geregistreerd in zowel Nederland als Duitsland. De reistransacties die hieruit voortkomen worden opgeslagen in een account en zijn in te zien via een mobiele app. Betaling vindt plaats op basis van een maandelijkse factuur.

Specificaties
Deelname

1. Om deel te kunnen nemen aan de pilot dient u 18 jaar of ouder te zijn.
2. Via een online inschrijfformulier meldt u zich aan.
3. Het aantal personen, dat kan deelnemen, is beperkt tot 100. Bij een te groot aantal aanmeldingen vindt een selectie plaats op basis van de mate van OV gebruik. Bent u geselecteerd dan ontvangt u een bevestiging van deelname, anders ontvangt u een afwijzing. U ontvangt dit per email.
4. U dient bij de inschrijving een emailadres op te geven dat gekoppeld is aan uw google Playstore of Apple Store zodat u de mobiele app kunt installeren op uw telefoon.

Wat heeft u nodig om deel te nemen

1. Een ETC kaart. U ontvangt, na selectie voor deelname, een ETC kaart van Arriva. Bij het reizen maakt u gebruik van deze kaart. In de Arriva bussen checkt u hiermee in- en uit, in de ASEAG bussen checkt u alleen maar in.
2. Een smartphone. Om uw reistransacties in te zien dient u een mobiele app te installeren. In het geval van een iOS smartphone doet u dit via een ontvangen email, in het geval van een Android via een ontvangen link gemeld in de brief die u ontvangt bij de ETC kaart.

Geldigheid

1. De ETC kaart is geldig in de periode van de pilot, december 2017 t/m maart 2018.
2. U kunt uw reisgegevens inzien t/m april 2018.

Kosten

1. Het deelnemen aan de pilot, de ETC kaart en het downloaden en gebruik van de mobiele app zijn kosteloos.
2. De eerste twee weken van de pilot reist u gratis. Daarna is een korting van toepassing op de ritten die u maakt. Voor de verschillende buslijnen geldt de volgende tarifering:

_____

Kosten

1. Het deelnemen aan de pilot, de ETC kaart en het downloaden en gebruik van de mobiele app zijn kosteloos.
2. De eerste twee weken van de pilot reist u gratis. Daarna is een korting van toepassing op de ritten die u maakt. Voor de verschillende buslijnen geldt de volgende tarifering:

- 44 Heerlen – Aachen : €2,80 voor een enkele reis, in plaats van €3,80.
- 350 Maastricht – Aachen: 34% korting op het standaard tarief.
- alle ASEAG-buslijnen binnen het gemeentegebied Aachen (incl. lijnen naar Vaals): €5,- voor een dagkaart, in plaats van €7,50.

1. U ontvangt op de 7e van iedere maand een factuur van de gemaakte ritten in de voorgaande maand.

Betalingsvoorwaarden

1. Bij betaling in termijnen bent u gehouden aan de overeengekomen betaaltermijnen. Bij het in gebreke blijven hiervan (betalingsachterstand) wordt de vordering op u uit handen gegeven. De kosten hiervan worden op u verhaald.
2. Indien u een betalingsachterstand heeft is het niet mogelijk andere producten via Arriva aan te schaffen met een betaling in termijnen.
3. Arriva heeft het recht het abonnement onmiddellijk op te zeggen als het abonnement niet op tijd betaald is.

Privacy

1. Tijdens het registreren voor deelname dient u de volgende gegevens in te vullen: voornaam, achternaam, adresgegevens, geboortedatum, geslacht en e-mailadres. Dit emailadres wordt gebruikt

om te informeren over pilot gerelateerde zaken, bijvoorbeeld voor de factuur.
2. Arriva is de verantwoordelijke voor gegevensbescherming zoals bedoeld in de Wet bescherming persoonsgegevens (Wbp).

Verlies/Diefstal van de kaart

1. Als u uw ETC kaart verliest of deze gestolen wordt, kan de Klantenservice de ETC kaart blokkeren en beëindigen.
2. U ontvangt aan het begin van de volgende maand een laatste factuur. Daarna is uw deelname aan de pilot beëindigd.

Contact

1. Voor meer informatie of om eventuele problemen te melden, kunt u contact met ons opnemen via Klantenservice ETC, bereikbaar op klantenservice@euregiotravellerscard.nl

Evaluatie

1. Na de periode van pilot wordt met u contact opgenomen voor een evaluatie van uw beleving van de ETC dienst. Dit vindt plaats middels een vragenlijst.

Stap 5 van 5 - Privacy Statement European Travellers Club

Context
Middels de European Travellers Club (ETC) pilot wordt een nieuwe betaalwijze getest voor grensoverschrijdend reizen met het Openbaar Vervoer. Buslijn 44 tussen Heerlen en Aachen, buslijn 350 tussen Maastricht en Aachen en de buslijnen in Aachen zelf zijn betrokken. Tijdens de pilot reis je als deelnemer met een ETC kaart in zowel de Nederlandse bussen van Arriva als in de Duitse bussen van ASEAG en ontvang je achteraf maandelijks een factuur voor de gemaakte busritten. Het is dus niet meer nodig om een extra kaartje te kopen voor het deel dat je in het buitenland reist.

Reizigers die ouder zijn dan 18 jaar en geregeld gebruik maken van de betrokken buslijnen kunnen zich aanmelden voor de pilot via een online registratieformulier. Na aanmelding vindt een selectie plaats gebaseerd op de mate van gebruik van de buslijnen en wordt een bevestiging of afwijzing van deelname per mail toegestuurd.

Wie is verantwoordelijk voor je gegevens?
Nadat je hebt geregistreerd om te kunnen reizen met je ETC-kaart, is Arriva verantwoordelijk voor de correcte verwerking van je gegevens. Arriva is de verantwoordelijke voor gegevensbescherming zoals bedoeld in de Wet bescherming persoonsgegevens (Wbp).

Arriva heeft met Trans Link Systems een bewerkersovereenkomst gesloten. Translink heeft met derden sub-bewerkersovereenkomsten gesloten die betrokken zijn bij de uitvoering van de overeenkomst. Alle partijen zullen je gegevens zorgvuldig verwerken, in overeenstemming met de afspraken die in de (sub)bewerkersovereenkomst zijn gemaakt.

Welke gegevens worden van je verwerkt
Voor het reizen met een ETC-kaart worden de volgende gegevens van je verwerkt door Arriva en door de hierboven genoemde bewerkers:

- Naam
- Adres (straat, postcode en woonplaats)
- Emailadres
- Geboorte datum
- Telefoonnummer
- Bankrekeningnummer

Voor welk doel worden je gegevens gebruikt?
Reisgegevens kunnen door Arriva worden vastgelegd om vast te stellen dat reizigers reizen met een geldig vervoersbewijs voor, tijdens en na afloop van de reis. In geval van geschillen of bij uitoefenen van enig recht door een reiziger, geldt de elektronische administratie van Arriva met betrekking tot de gemaakte reizen als bewijs, behoudens uw tegenbewijs.

_____

De verstrekte persoonsgegevens worden door Arriva, of door de bewerkers van Arriva, verwerkt om de uitvoering van de overeenkomst mogelijk te maken. Deze gegevens maken het volgende mogelijk:

- Middels de verstrekte persoonsgegevens ontvangt u een email ter bevestiging of afwijzing van deelname.
- U ontvangt na bevestiging van deelname een ETC kaart per post.
- U kunt via de mobiele app de gemaakte ritten in zien
- U ontvangt maandelijks een factuur per mail`
- U kunt serviceverlening verkrijgen via Klantenservice ETC
- Een evaluatie van de pilot is bij u op te vragen.
- Op basis van de gemaakte reizen en de ETC kaartnummers kan de financiële afrekening plaatsvinden tussen Arriva in Nederland en ASEAG in Duitsland.

Bewaartermijn van gegevens
De gegevens worden niet langer bewaard dan noodzakelijk voor het doel waarvoor ze worden verwerkt met een maximum van 18 maanden tenzij er een wettelijke noodzaak bestaat om deze gegevens langer te bewaren.

Je rechten op grond van de privacywetgeving
Je hebt het recht om je gegevens voor deze verwerking in te zien. Daartoe dien je een verzoek te doen bij Arriva, vergezeld van een kopie van je paspoort of ID-kaart waarop het BSN, pasfoto en handtekening onleesbaar zijn gemaakt. Binnen 4 weken nadat je het inzageverzoek hebt gedaan ontvang je bericht over de gegevens die voor het reizen met de ETC-kaart over je worden verwerkt. Na afhandeling van je verzoek zal Arriva de kopie van jouw paspoort of ID-kaart vernietigen. Naar dit e-mailadres kun je ook andere vragen over privacy mailen.

Indien blijkt dat je gegevens niet correct geregistreerd staat, dan heb je uiteraard het recht om dit te laten corrigeren.

Arriva legt dit verzoek vast en voert het verzoek uit. Indien Arriva niet aan uw verzoek kan voldoen, wordt in overleg met u de bestaande overeenkomst ontbonden c.q. tot restitutie van uw aankoop over gegaan.

Inwerkingtreding
Deze versie van het privacy statement treedt op 13-11-2017 in werking.

Contact

Mocht je na het lezen van dit privacy statement nog vragen hebben dan kun je je wenden tot Klantenservice ETC, bereikbaar via klantenservice@euregiotravellerscard.nl.

Klachtenregeling
Klachten kun je te allen tijde doorgeven aan de Klantenservice ETC.

* = Invoer verplicht