MAN_05: Modernize and increase the attractiveness of digital sales channels and private sector partnerships

Description of the measure and main outcomes expected

The measure involves the upgrade of Rhein-Neckar-Verkehr's (rnv) sales, billing, and accounting systems to support the nationwide €49 monthly public transport ticket (Deutschlandticket, D-Ticket) based on the VDV-KA standard. This upgrade will ensure interoperability, secure digital ticket inspection, and facilitate the transition from conventional to digital ticketing. The main expected results are the implementation of an Electronic Fare Management (EFM) module compatible with the VDV-KA standard and an increase in the share of digital monthly and annual tickets compared to conventional tickets.

Preparation of the measure

RNV has taken thorough processes to successfully implement the D-Ticket as an e-ticket. By digitizing and integrating the system on a centralized platform and introducing standardized barcodes readable across all devices, passengers can now enjoy seamless, flexible access to public transportation in the region and throughout Germany.

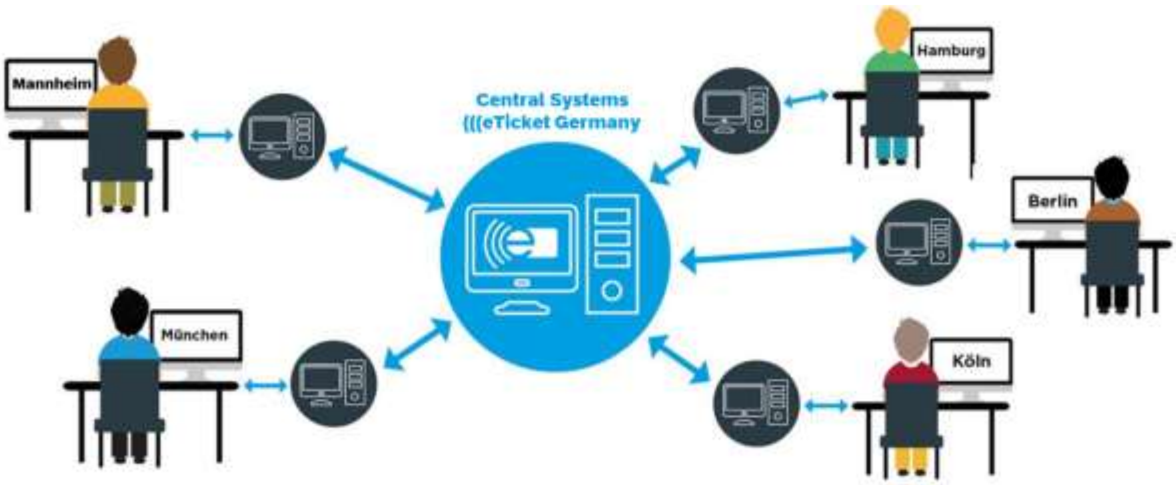

Figure 1. Scheme of centralized D-Ticket platform in accordance with VDV-KA standard[1].

The preparation of the measure involved a series of steps, each of which contributed to the seamless implementation of the upgraded D-Ticket sales, billing, and accounting systems.

Firstly, a comprehensive analysis of the existing business processes was carried out to identify areas for improvement or adaption along the system upgrade. At the same time, market research was conducted to identify available technical solutions that could meet the VDV-KA system requirements as well as integrate successfully with rnv's existing sales and ticketing IT-systems. Key results showed that there are several companies on the market, that offer sales and aftersales software solutions feasible

[1] Source: Own illustration based on VDV eTicket Service GmbH & Co. KG https://www.vdv.de/der-weg-zur-einheitlichen-fahrkarte-eticket.aspx

for the German PT-industry. All companies offer implementations in accordance with VDV-KA standard. The limiting factor found during market research, was the level of compatibility with systems in place. Even though the EFM-module is a very important component in PT-ticketing, there are a variety of subsystems and parallel systems that need to interact. Those include especially all sales systems, ranging from mobile printers in busses to vending machines at stops to digital channels like apps and the online store. This groundwork was essential to ensure that the chosen solutions could be integrated seamlessly and without disruption.

Based on the results of the market research, the procurement specifications including technical requirements regarding compatibility were detailed out. The specifications were refined and validated through stakeholder consultation, which promoted consensus on the system requirements and specifications. After the requirements were in place, data collection was undertaken from the existing sales, billing, and settlement systems.

Figure 2. Scheme of roles & functions in line with the VDV-KA standard[2].

The new Electronic Fare Management system, according to VDV-KA standards, features multiple processes, that not only have to be in-line with the standard, but on technical level need to ensure the integrity and security of the (personal) data processed:

- Issuing Chip Cards: Load necessary security keys, and issue tickets that can be used multiple times.
- Issuing Barcodes: Provide barcodes on paper or through an app, valid for one month.
- Controlling Chip Cards: Authenticate tickets with security modules, with detailed checks starting in 2026.
- Controlling Barcodes: Verify tickets by comparing passenger data with ID documents to prevent misuse.

[2] Source: Own illustration based on VDV eTicket Service GmbH & Co. KG https://www.eticket-deutschland.de/magazin/das-rollenmodell-beim-elektronischen-fahrgeldmanagement/

Figure 3. Chip Card and barcode.

With the requirements clearly defined, the procurement process began. The goal was to find the best supplier to provide the software solution, complete necessary adjustments and to support the implementation and successful migration at rnv.

Hence, rnv was able to implement the technical and operational processes relating to the issuing of authorizations on chip cards, static barcodes, and their verification for the D-Ticket. Therefore, processes comply with the requirements of the VDV-KA. This included adjustments to our sales background system and our digital applications „Abo-Online“ and „Handy-Ticket“. Those adjustments now allow rnv to provide VDV-KA QR-codes as a ticket, enabling rnv's ticket inspectors to verify the validity of a ticket instantly, no matter where the ticket was originally sold.

Figure 4. Screenshots of the rnv/ VRN app ticket view with the CDC-KA conform QR-code.

To also technically enable rnv's ticket inspectors, the verification system also had to be upgraded to be able to read and interpret VDV-KA QR-codes. This includes checking the validity of the ticket itself through verifying the certificate contained as well as checking the available blacklist for blocked/ stolen tickets. This process can now be concluded within seconds during ticket inspections. Technically this is implemented through a barcode scanner for tickets in the app as well as an NFC reader for tickets on chip cards. In order to give out those standardized chip cards, rnv also procured so-called Reader/Writer Devices that can issue and store these authorizations to the chip card at the point of sale.

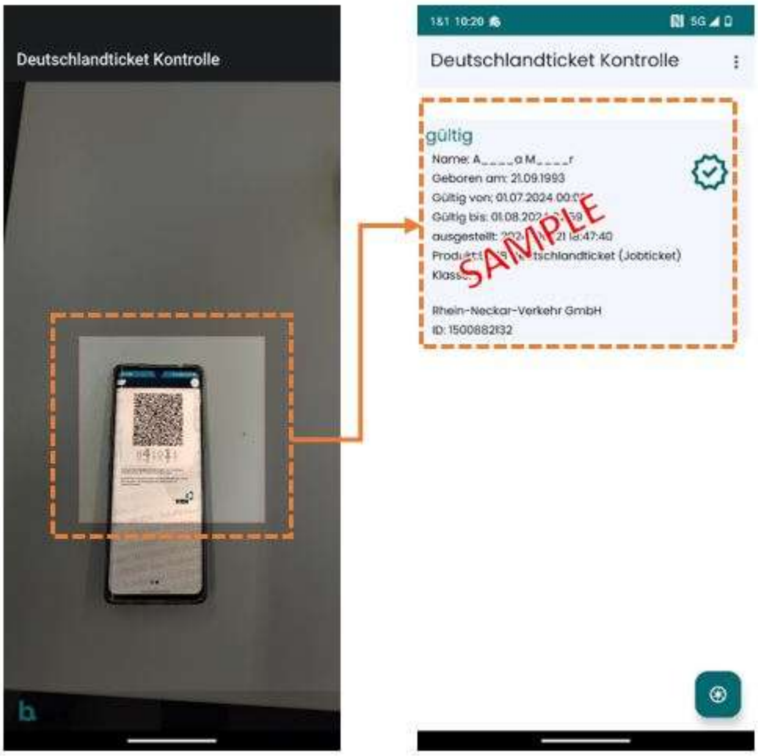

Figure 5. Screenshots of the ticket inspection view of a valid VDV-KA conform QR-code ticket.

The new EFM module was integrated in the existing sales, billing, and settlement systems, while maintaining the highest level of data confidentiality. Central aspects of the implementation, including the issuing of VDV-KA conform tickets as chip cards & barcodes, are already operational.

Challenges & Mitigations

There have been only minor challenges during the preparation of this measure. With the goal clearly set by the introduction of the D-Ticket as well as with a standardized technology based on the VDV-KA, no larger challenges regarding content of this measure occurred. However, fluctuation in staff at rnv as well as lengthy procurement procedures resulted in some delays. The delays in an early phase of the preparation were mitigated through bringing on additional staff to support colleagues in the development and testing of the IT-solution. Hence the overall project is still within the timeline.

One other aspect that arose during implementation, was the rising numbers of fraud connected to the D-Ticket. While cases of fraud based on the current lack of (technical) design consistency will be avoided through the EFM-module, with its nationwide validity and millions of users, there will always be cases of fraud. Therefore, additional defensive measures outlined by the VDV as standard organization had to be considered even when the implementation was already ongoing.

Next steps towards implementation

The implementation of the systems´ upgrades and enhancements so far were a success. The implementation of the secure digital ticket verification is currently being tested to ensure reliable functionality as well as interoperability. This last step will bring the project to a successful conclusion and pave the way for a fully digital, interoperable, and secure ticketing system. After all steps are finalized, the measure preparation is finalized, and the new functionality will be taken into operation across all sales channels. From 2025 onwards, all monthly and yearly tickets issued by rnv will be VDV-KA conform and fully compatible across Germany.

Figure 6. News article on 50.000 yearly pass passengers migrating from analogue to digital ticketing.

First insights from sales show the potential of this measure. The updated digital sales channels are already used by an additional 50,000 passengers (Figure 6). Among other things, customers can order the D-Ticket via rnv’s “Abo-Online” web platform and have it displayed digitally in the rnv/VRN mobile ticket app. The proportion of mobile ticket subscriptions increased to currently 20% and is expected to grow significantly more over the coming years.