



# Displaying of Train Utilization on Bahn.de and its Implications

The Combination of Big Data and Online Survey Data

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Long-distance passenger rail transport in Germany is characterized by a complex network structure



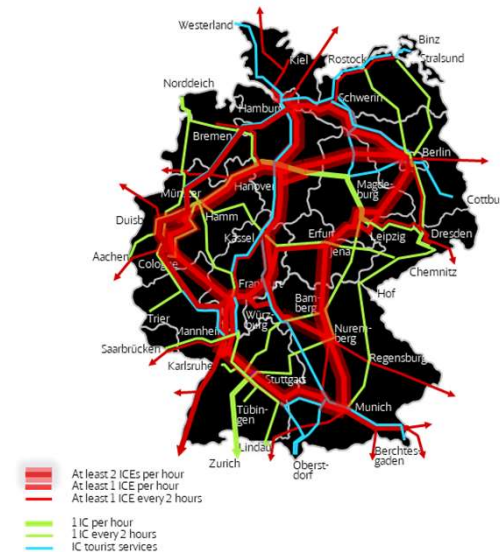
### Airline Revenue management



- Closed system (mandatory seat reservation)
- Hub-and-spoke infrastructure
- Only few stops



### Rail Revenue management at DB



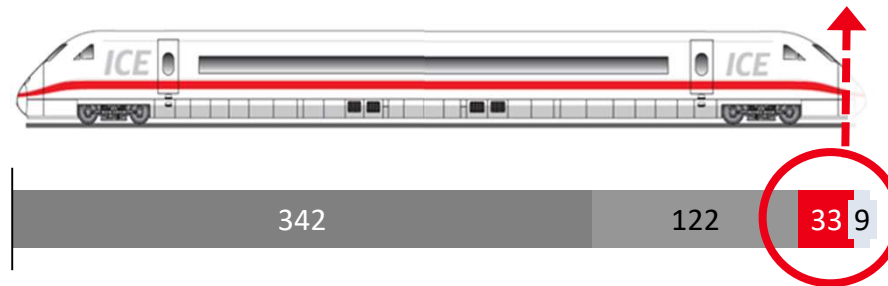
- Open system (no mandatory seat reservation)
- Network infrastructure with several interchanges
- Many stops (on average 13 per train run)
- On average 56% train load in 2019

In an open access system demand smoothing and accurate forecast are of utmost importance



### Peak train Friday afternoon Frankfurt to Berlin

Train load = 97% (2<sup>nd</sup> class)



- Flexpreis (flexible fare)
- BahnCard 100, train pass
- Sparpreis (saver fare)
- Vacant

#### Fully/semi-flexible tickets:

prices are the same for all trains on the same day



#### Steered tickets:

only valid for a specific train connection, limited availability

- Flexpreis (flexible fare)
- BahnCard 100, train pass

- Sparpreis (saver fare)

Transparent and clearly structured utilization information are available on bahn.de and DB Navigator App since April 2019



## Five different levers to avoid overcrowded trains



Additional capacity



Price discrimination



Reduce customer's search costs



Booking stop



Customer information



Outward journey on 18.09.20

| Station/Stop                                                               | Time           | Duration                           | Chg. | Products                           | Demand | Savings fares              | Flexpreis  |
|----------------------------------------------------------------------------|----------------|------------------------------------|------|------------------------------------|--------|----------------------------|------------|
| <div>^ Earlier</div> <div>Price for all travellers, Outward journey*</div> |                |                                    |      |                                    |        |                            |            |
| Frankfurt(Main)Hbf<br>Berlin Hbf (tief)                                    | 15:02<br>18:58 | 3:56                               | 0    | ICE                                |        | No special fares available | 126,90 EUR |
| <a href="#">Show details</a>                                               |                | <a href="#">Choose return trip</a> |      | <a href="#">To offer selection</a> |        |                            |            |
| Frankfurt(Main)Hbf<br>Berlin Hbf                                           | 15:14<br>19:28 | 4:14                               | 0    | ICE                                |        | No special fares available | 126,90 EUR |
| <a href="#">Show details</a>                                               |                | <a href="#">Choose return trip</a> |      | <a href="#">To offer selection</a> |        |                            |            |
| Frankfurt(Main)Hbf<br>Berlin Hbf (tief)                                    | 15:20<br>19:51 | 4:31                               | 1    | ICE                                |        | No special fares available | 126,90 EUR |
| <a href="#">Show details</a>                                               |                | <a href="#">Choose return trip</a> |      | <a href="#">To offer selection</a> |        |                            |            |
| <a href="#">Show details for all</a>                                       |                | <div>^ Later</div>                 |      | <a href="#">Print view</a>         |        |                            |            |



Low to medium



High



Very high



Exceptional high

New design in Oct. 20

The core of the analyses are two different empirical studies: Survey of ticket bookers and visitors of bahn.de who abandoned their search



Methods for empirically determining the main effects of the load display

*For Validation*

Secondary data:  
customer satisfaction

Secondary data:  
External surveys

Secondary data:  
Sales data

Secondary data:  
RM data



Online survey ticket  
buyers (saver and flex  
tickets); bahn.de

View: people who have  
booked a ticket (FP or  
SP/SSP), saver ticket or  
full flex tickets

Basis: approximately  
12,400 interviews

Study 1



View: People who have  
tried to book a ticket or  
searched for information  
but have not made a  
booking

Online survey  
dropout bahn.de

Basis: approximately  
1,200 interviews

Study 2

*For Validation*

Secondary data:  
Previous surveys

Secondary data:  
External surveys

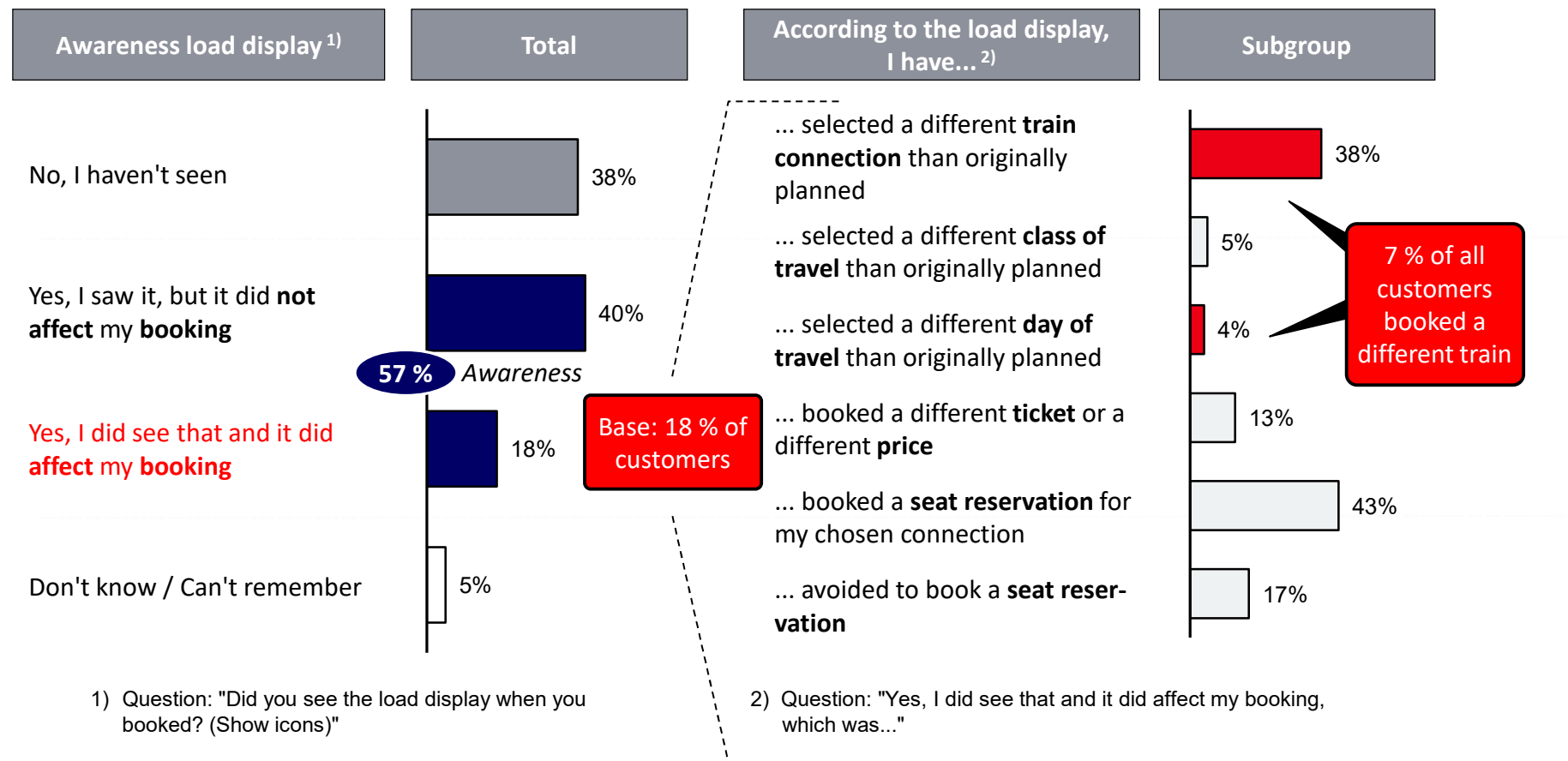
Secondary data:  
Sales data

booking data bahn.de

# 18 % of ticket bookers confirm that the load display had influenced their booking behavior - train connection and seat reservation are mainly concerned



Customer perception of the load display and reaction patterns, May - Oct. 2019 [% of respondents]





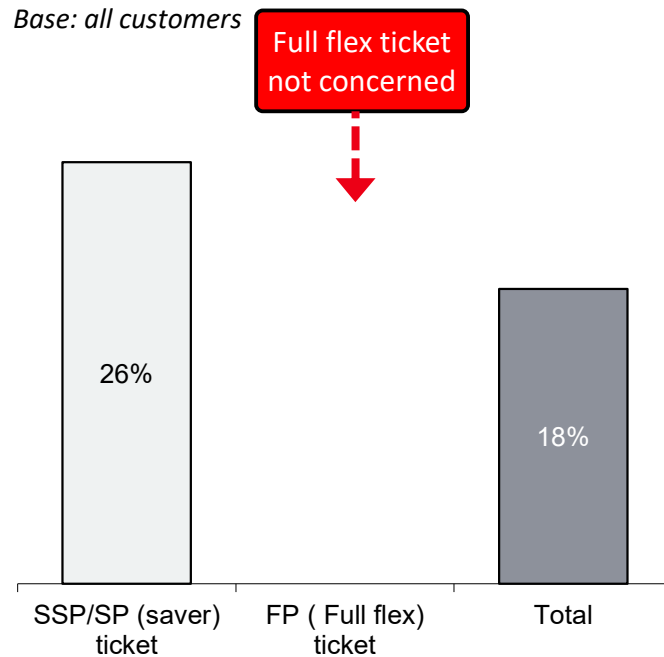
In addition to the effects of revenue management, demand smoothing is possible through capacity utilization display



Control of demand through prices / ticket availability and through the load display, May - Oct. 2019

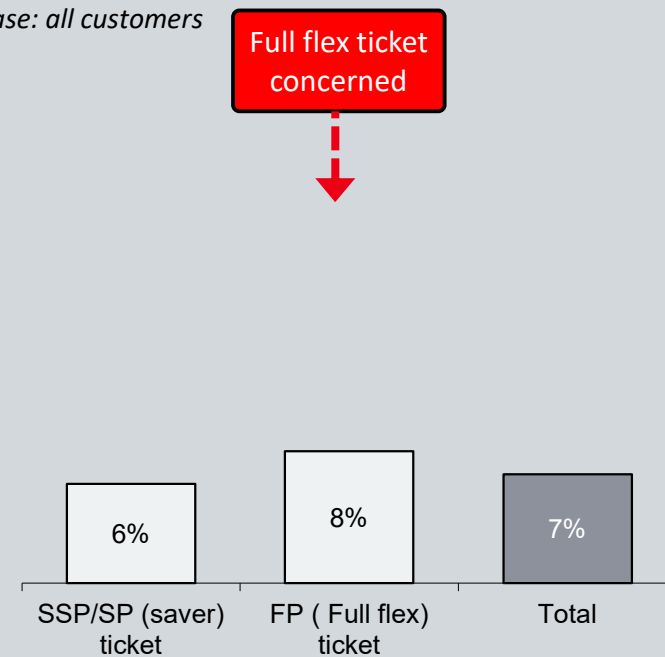
**Demand control due to availability restriction for SP / saver tickets** (% other train / train on other day selected)

*Base: all customers*



**Demand control based on the load display** (% other train / train on the other day selected)

*Base: all customers*



Due the load display, there is a shift in demand towards trains with lower load factor - change in demand towards less utilized trains

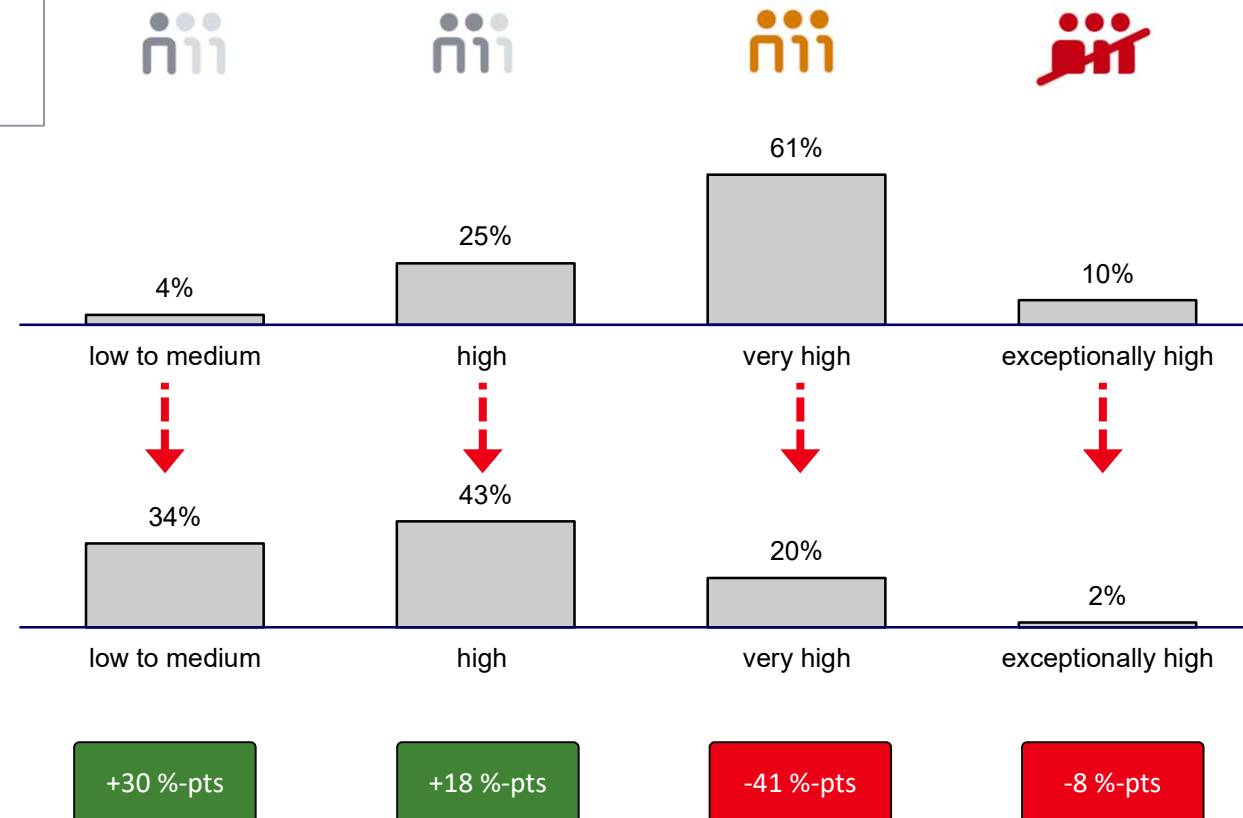


Perceived load display in the originally requested and finally booked train, Nov. 19 - Jan. 20

Filter: persons who have **seen** the **load display** and indicate that the train connection has been changed consequently

What load was displayed for the **train connection you originally requested?**

What load was displayed for the **train you booked?**





The empirical results on the load display are predominantly positive: revenues, customer experience and costs are positively affected



Conclusion on the effects of the load display based on the surveys

