Train Rides Through Europe – Which Changes Do the Passengers Need?

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Abstract. In view of climate change, the expansion of European rail transport is important. Compared to air travel, comparatively few people travel by train on trans-European routes. This paper summarizes findings from a focus-group study which was conducted to explore problems and requirements of European train travelling. During the focus group discussion, five participants aged 24–61 years were asked about their experiences with European train travel and the problems they face today. Additionally, they discussed which changes and potential measures could increase their train usage in the future. Results from the study show that the participants would like to travel by train through Europe, but some obstacles prevent them from doing so. They mentioned the high ticket prices, the lack of an integrated European booking platform and the lack of comfort at stations and on the trains. They also criticize long in-vehicle travel times, long transfer times, missing information, and overcrowded trains. Their stated requirements for using rail for inner-European journeys more often include a unified and consistent ticketing system, faster travel times, coordinated connections, and accessibility to rural areas, rather than just big cities. For longer journeys, participants prefer comfortable stations and trains where they can work, better information, consistently-available contact persons and the possibility to drop-off their luggage.

Keywords: European rail transport · international travel · travel behavior · European green mobility

1 Introduction

Rail transport is one of the most environmentally-friendly means of transport and is therefore seen as a transport mode that will be used more often in the future [1, 2]. Especially in view of climate change, the railway system should be increasingly supported in the upcoming years. This has become a consensus in the European Union [1]. In reality, however, the passenger volume of airports in the European Union (EU) has increased from 750 million to over one billion in the last 10 years [3]. On the contrary, cross-border rail travel still comes with a lot of problems and does not have much to offer compared to low-cost airlines and the private car on longer journeys [4, 5]. However, many short distance flights and car journeys within the EU could be replaced by train [6]. In order for people to consider train rides instead of car rides, the conditions for using

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trains have to improve. Therefore, according to the EU Commission and many national governments and in view of climate change, rail travel should become more attractive on longer routes in Europe, so that emissions from short-haul flights and private cars can be reduced [7]. The EU is also pursuing this goal and has, for example, declared 2021 the "Year of Rail" and held several events and conferences [8]. The aim was to find possibilities to strengthen the railroads in Europe and thus achieve the self-established goals of doubling rail transport from the European Green Deal and Fit for 55 programs [1, 8].The overall goal is to make rail travel in Europe more attractive so that users will prefer the train over other means of transport. In the following section, research on travel mode choice and train travel in general is summarized. Afterwards, the study method is explained and results are provided. In the final section, the results are discussed in the context of the findings from literature.

2 Influencing Factors of Travel Mode Choice

Theoretically, there is great potential for trans-European train travel [6]. Studies show that the availability of good railway services allows people to switch modes from plane to train trips [9, 10]. However, this potential is reduced by the unavailability of direct train connections, expensive prices, complicated ticket booking, high travel times and the respective advantages of driving by car or flying [4, 9, 11]. Furthermore, other factors such as comfort at the stations and in trains, the accessibility to the train station, the frequency and reliability of trains, safety, and the positive perception of stimuli like appearance or smell [12–14] are also influencing the choice of mode of transport. All these factors and advantages of the train are in competition with the advantages of the plane, which is faster; the car, which is more flexible; and the bus, which is cheaper [15].

In addition, however, there are additional psychological factors like habits, personal attitudes towards transport modes, environmental awareness, social influence, culture and morals [15–18]. All these factors may differ in how they influence the travel mode choice of potential users. For example, one factor which is usually rated negatively, is the longer travel time on a train compared to a car drive. This factor can be positively framed in such a way that it is possible to use the free time to read and work [15, 19]. Of course, this option of working/reading should then be supported by e.g. the cabin-design (e.g. through quiet areas, technological equipment). Depending on who are potential target users, different barriers have to be addressed [19].

There has been research about ticketing to counteract some disadvantages of train rides in Europe [20]. They found that various national railway providers do not cooperate and are not interested in relinquishing sovereignty over their network. Nevertheless, new private railway companies are entering the market creating competition, but making ticketing for international travel even more complicated [20, 21]. One study shows that booking multiple tickets on international journeys with the different rail operators is often the only option [20]. This makes the journey more expensive and if the connecting train is missed due to a delay, a new ticket must be bought as there is no transfer guarantee [11, 20]. In her qualitative study, she concludes that a check-in/check-out system, where customers can use any train in Europe would make the train much more attractive [20]. With that system, the passengers do not have to buy a ticket; they just have to put a

smartcard on a reader when entering the first station (check in) and leaving the last station (check out) and a standardized price will be automatically deducted from their bank account [20].

General problems with national rail services, such as the high prices and frequent transfers are well known [4, 9, 11]. However, other, previously unknown problems may exist which are particularly prevalent on trans-European railway journeys and have not yet been considered in the literature. Furthermore, the requirements of the passengers on these journeys must also be considered from a user perspective. With the knowledge of the problems from the user's perspective, it is possible to see urgent need for change and whether the measures which are planned in relation to the European Green Deal, can contribute to the benefit of the passengers. The following study explores possible problems and requirements for trans-European rail transport in detail and from the user's point of view.

3 Study Design

3.1 Method

For the purpose of exploring the topic of trans-European railway network a focus-group method was selected in order to detect new ideas and possible barriers for using trains on European journeys [22]. One advantage of performing a focus group is that new creative ideas can be generated collaboratively, which may have remained hidden in individual interviews [23]. Through group dynamics, ideas can be further discussed, extended, and directly evaluated by several potential users. While it is true that focus group studies cannot be representative as they are a qualitative method with few participants, they provide the potential for insights into topics that are under-researched so that they can be further investigated in future research.

The focus group discussion took place online and in German. The participants were guided through the different topics, which are described in Sect. 3.3, with a PowerPoint presentation that included questions and images. For one question Mural (a digital bulletin board) was used to brainstorm ideas. Amberscript software was used for transcription of the material and MaxQDA for coding the transcripts.

3.2 Participants

Five participants were recruited for the focus group. As shown in Table 1, three of the participants were aged 24–26. Of these, one uses the car as the main mode of transport, one uses the bicycle and one uses public transport. All of them often use the train for shorter journeys, and two out of three also use it for longer journeys through Europe. Two of them have an academic degree and work now in a full-time job. One is still studying. In addition, there was also a participant in her 60 s who has a higher position in a larger business group and a participant in her 40 s who has a larger family with children. Both of them use the car as their main mode of transport and do not travel at all or only very rarely by train.

Table 1. Participants

Participant 1	Age: 24	Cologne, Germany	Full-time Job	male Main mode of transport: Car and public transport
Participant 2	Age: 25	Ulm, Germany	Student	female Main mode of transport: Public transport
Participant 3	Age: 26	Stuttgart, Germany	Full-time job	female Main mode of transport: Public transport
Participant 4	Age: 45	Esslingen, Germany	Part-time job	female	two kids Main mode of transport: Car
Participant 5	Age: 61	Nuremberg, Germany	Full-Time Job	female Main mode of transport: Car

3.3 Procedure of the Focus Group Discussion

As mentioned above, the focus group was conducted using a PowerPoint to give structure to the discussion. The following steps were taken during the discussion:

1. Welcome and introduction of the participants.
2. First general discussion on past experiences with longer train journeys including international trips.
3. Discussion of problems and possible barriers for travelling by train in Europe.
4. Collection of ideas with online tool Mural on how deficits could be eliminated. Ideas were sorted into three categories: “Before the journey”, “During the journey,” and “After the journey”.
5. Collection of needed changes in the railway system, using the example of their way from home to their favorite holiday destination in Europe.
6. Opinions on three ideas for modern train travel in Europe were discussed. The three ideas included modern sleeping cars in the night-trains of the ÖBB, a universal European booking system with low prices and a check-in/check-out system like in the Netherlands.
7. Final comments about future travelling by train were discussed.

4 Results

The results of the study can be sorted into two categories. First, the barriers that, according to the participants, exist in today’s trans-European rail transport, and their needs and expectations for using the European rail transport mode more often in the future.

4.1 Barriers

There are many factors identified by participants that currently prevent them from travelling by train and which can be divided into three categories: Station, Information, and Services.

Station. One important point that was mentioned is the comfort of the train station in many (not all) European countries. Participants compared the atmosphere and the feel-good factor with airports, which have more shops, relaxing zones, and comfort to offer. On the contrary, it was mentioned that at many railway stations there are almost no opportunities to pass the time with only few warm places to sit, especially in the winter. One participant said: "And especially in the winter, it is very unpleasant if you had to wait for half an hour on the platform and would like to read" (translated from German). The presence of strange people and the resulting feeling of insecurity was also mentioned.

Information. This category addresses the absence or lack of various types of information. It was mentioned that people are forced to wait on the cold platform because that is the only place where information about the train is available: "There was a storm, which means that everything took forever. And then you couldn't actually leave the […] platform because you were always dependent on the information on the platform about what to do next, even if it was raining through the roof and it was totally cold." (translated form German). In addition, the information reported was often contradictory across various information channels or simply not available. Regarding stations in non-German-speaking regions, the information is sometimes only available in the national language. Also, stations in other countries have a different structure, which leads to confusion when the track cannot be found. Moreover, the person to contact in case of difficulties is not clear when you buy tickets from several railway companies. Changing between two stations, such as in Paris, was also viewed negatively if the effort is not explicitly known.

Service. It was also criticized by participants that in some countries, trains can be overbooked and therefore a few people have to stand in the long distance trains for hours. This leads to overcrowded trains and even for passengers with reservations it turns into awkward and stressful situations to squeeze through the crowds, especially with children and big suitcases. It is even more difficult, when the train arrives in another order than indicated. Additionally, concerning suitcases, it is also noted that it is particularly stressful on longer journeys with a lot of luggage and several changes. This is especially the case when going skiing or on other activity-based holidays, when you need lots of luggage. It is also noted that arriving in the touristic areas like mountains or coasts by train becomes a problem because it is difficult to get around in these rural areas and driving from home by car is more pleasant. The participants also mentioned that it is difficult to book trans-European tickets in general. One of the participants said that to get to Spain from Germany, it is necessary to buy three tickets: one for the German operator, one for the French operator, and one for the Spanish operator. This leads to more expensive tickets and no guarantee of connecting trains. In addition, the connections are not coordinated, and the transfer times are too long and make the time advantage of the flight even greater. Together with the low-cost plane tickets, the train seems unattractive for the passengers. All these barriers mentioned above are summarized in the following Table 2.

Table 2. Barriers

Station	Insecure und uncomfortable feeling
	Cold and uncomfortable waiting areas at the platforms
	Gate areas in Airports are more attractive
Information	Only in the local language and on the platforms
	Complicated to find the correct platform
	Incorrect wagon-order indicators on the platform
	Assistance only from the specific train operator
Services	Overcrowded trains
	Different operators → More than one ticket → No connection guarantee
	Expensive tickets
	No coordinated connections → Long transfer and travel times

4.2 Needs and Requirements

The needs and requirements from the participants can be sorted into basic requirements which are necessary for them to travel with the train through Europe, and additional requirements which make the train ride a journey that is comfortable and feels good.

Basic Requirements. The basic requirements are mainly related to the points of services and accessibility and are necessary for the participants to use the train on European routes at all. A European booking platform, with which one ticket can be bought for directly getting to the destination, allowing easier enforcement of passenger rights in the event of a delay was mentioned. In addition, the connections should be better coordinated. For the younger price-conscious participants, the rail prices for the entire journey should be cheaper or more competitive with air fares, especially with low-cost airlines, so that they consider travelling by rail. On the other hand, participants who have already been working for a few years state that they would like to travel more flexibly and not be tied to specific times. Regarding the travel time during the day, one participant mentioned 8–9 h as the limit for train journeys, other participants are more open if the comfort of travelling by train is increased in the future. For long distance routes, diverse night train connections should be available, where you arrive at your destination well-rested with sufficient comfort, privacy, and silence. A high density of accessibility to the railway system, especially in rural areas, is also noted. Not only the large cities should be easily accessible; there should also be good public transport connections to destinations in rural regions so that the train is more attractive than the car. In addition, there should be car-sharing and rental car providers at all larger stations, so that people who need the car at their destinations can rent one directly after arrival.

Additional Requirements. The additional requirements will make the train ride more attractive and comfortable so that the journey is pleasant, and people enjoy travelling by train trough Europe, even on longer journeys. The participants would like to have a

significant improvement in the condition of the stations. They mentioned an extra area where only passengers with a valid ticket have access and where a variety of opportunities to spend time and eat are available, as is the case at airport transfer areas. The participants would like to have warm places to sit and work in silence, shops, and sufficient food options. People without a ticket should not have access to these spaces, so that the passengers feel safer. In this passenger-only area, all information on all connections should be given via display boards and loudspeaker announcements, exactly as on the platform. Nevertheless, there should also be enough comfortable waiting areas on the platform, including warm ones in the winter.

The same can be transferred to the in-train design. Opportunities inside the train should also be created so that working on the move is possible without any problems. There should also be a good choice of food aboard for longer journeys. In addition, the space for sitting should be sufficiently large and comfortable, the Wi-Fi should work permanently, and only as many tickets as seats inside the train should be sold. There should be enough quiet compartments for participants who need to rest. A board entertainment system was also desired. In order to simplify the boarding process, everyone should be assigned a seat and so everyone can be directly at the right carriage of the train, e.g., with the help of electronic carriage position indicators. There should also be enough staff available at boarding to simplify the process and to answer questions at any time. As far as luggage is concerned, participants would like to be able to either drop off larger luggage at the station and pick it up again at the destination station without having to lug it along every time they change trains, or to have it delivered directly to their accommodation at their destination. At the same time, more storage space for luggage should be available, especially on night trains.

In summary, participants would be willing to choose the train as their means of transport more often in case of the changes mentioned. The required changes are summarized in Table 3. One participant described appropriately as follows: "I mean, I would leave from Cologne […] to Paris and it takes about three and a half hours. If you have an on-board restaurant there, you have your seat, that's comfortable. You could maybe have a nice dinner there, then watch a series in your seat, then arrive in Paris and at the same station there would be a night train to Spain […] You'd leave at 6 p.m. in Cologne, then travel from Paris to Spain by night train at 10 p.m., and then I would perhaps be in Spain in the morning. I would think that would be much more pleasant than flying because my holiday would kind of already start when I leave Cologne. If it all works out. If everything is coordinated and I'm well rested the next morning at my holiday destination and don't have to get on a plane in the evening than I would take the train." (Translated from German).

5 Discussion

The barriers people reported in this study concerning today's trans-European train network are similar compared to the literature which focused on national and international rail services [4, 6, 11, 24]. These are mainly factors related to comfort, time, price, and availability which keep many passengers from travelling by train today.

Table 3. Basic and Additional Requirements

Basic Requirements	Services	European-ticket-booking platform
		Coordinated international services
		English-speaking assistance/information everywhere
		Competitive price and flexible booking
		Less travel time (max. 8–9 h)
		Comfortable night trains (for longer journeys)
	Accessibility	Accessibility in rural areas
		Car-sharing/Car-rental at train stations
Additional Requirements	Stations	Access only for passengers
		Comfortable and warm seating and working areas
		Shopping, eating and entertainment
		Electronic carriage position indicator at platforms
	Trains	Comfortable seating
		One seat for each passenger
		Good food at restaurants
		Working possibilities (quiet area with Wi-Fi)
		Board entertainment system
		Enough storage space
	Services	Luggage drop off

Additionally, slight differences to findings from the literature are recognized with regard to the requirements. For example, the participants of this study would like to have one European booking platform through which all railway companies are obliged to sell tickets with which is similar to findings from another study [11]. The big advantage of the booking system would be that train connections can be easily compared and booked simply as is the case with well-known air travel sites. In contrast to the private train sites, the booking fee could be saved, no extreme price would be charged, and the guarantee of a connection would be granted. Van Overhagen on the contrary, concludes a different result [20]. As described earlier in Sect. 2, her study supports a "check-in/check-out" system for passengers. This type of system was not preferred by participants in this study. This may be due to the fact that she conducted her study in the Netherlands, where the check-in/check-out system has been a standard for a long time.

The introduction of a European timetable is also being discussed in the political arena, i.e. connections with short transfer times that are coordinated throughout Europe. The expansion of night trains is now being promoted jointly by several European railway companies [25]. The ÖBB (Austrian Railway) is therefore ordering new night trains, which will be available in the near future.

The requirements concerning the comfort of the equipment is comparable to the results of Lee et al. [24]. According to the participants, it is not only the comfort on the trains that is prioritized, but also at the station before and after the journey, and when changing trains. With a good internet connection on the train and at the stations, the train could also be an option for business trips longer than 4 h. The shopping and dining options mentioned would also add to the enjoyment of train travel for private journeys, as Lee et al. has already mentioned [24].

6 Conclusion and Further Work

The willingness to travel by train on longer European routes exists for almost all participants, although to varying degrees. But to do so, they need the mentioned basic requirements like the European booking platform and lower ticket prices to be able to drive by train trough Europe. With the above-mentioned additional requirements, they imagine rail travel as an attractive means of transport of the future, which they would always like to use. As the study gives a purely German view of a very small sample size of five participants, results could be different with other German users and vary from country to country. Therefore, more data should be examined in further qualitative and also quantitative studies in more European countries. Furthermore, the requirements mentioned by the participants only refer to objective factors like travel time and comfort. However, the psychological factors such as habits, social influence, and attitudes might not be changed by measures that address the mentioned requirements of the participants. Therefore, further studies should aim at integrating a wider variety of factors which can then be positively influenced regarding trans-European rail travel.

Finally, the measures discussed in this study, such as the European mobility platform, European passenger rights, and the European timetable of the European Commission provide a first impression of possible steps towards promoting sustainable travel.

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