

Measuring customer satisfaction with public transport: comparison of the Net Promoter Score (NPS), the Customer Satisfaction Score (CSAT), and the Satisfaction with Travel Scale (STS)

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Extended abstract:

When performing a structured literature review on marketing terms like the net promoter score (NPS) or customer satisfaction score (CSAT), these typical marketing terms are not all used when addressing customer satisfaction with public transport. In contrast, the concept of well-being related to satisfaction with the travel itself, i.e. the satisfaction with travel scale (STS), is more often debated. Therefore this paper contributes to the state-of-the-art by analysing the determinants of these marketing based indicators and comparing them with the STS.

In particular, this paper assesses customer satisfaction in public transport of the two public transport providers operating in Flanders, i.e. the SNCB (rail transport) and De Lijn (bus, tram and metro transport). To this end, 388 respondents completed an online survey. Respondents were recruited via Facebook and were selected based on residence location, age, and sex. Respondents who never used services from the SNCB and De Lijn were screened out of the survey. Of the 388 respondents, 71.13% used services from both public transit operators at least a few times per year, 18.56% used only the services from De Lijn, and the remaining 10.31% used the services from SNCB.

With respect to the net promoter score, which gives a value between -100 and +100, the higher values indicate much higher satisfaction with the service; the survey indicates strongly negative NPS values for both rail (-34.81) and bus transport (-50.29), indicating a serious image problem of public transport. Since the data collection was held from Mid-February until the end of March 2022, the dissuasion by Ministers to use public transport during the pandemic might still play its aftermath. The average values of the individual NPS (6.06/5.49, on a 0-10 scale), CSAT (3.39/3.12, on a 1-5 scale), and STS (4.64/4.46, on a 1-7 scale) show that for respectively train and bus transport satisfaction is only very moderate.

A key question that is raised is to assess to what extent NPS, CSAT and STS are measuring similar things. The Pearson correlations show that the correlation between NPS and CSAT is strong ($\rho = 0.73/0.70$). In contrast, the correlation between NPS and STS ($\rho = 0.36/0.44$) and CSAT and STS ($\rho = 0.38/0.43$) is only moderate (for respectively train and bus transport).

To evaluate which (perceived) service quality indicators play a role, two approaches are followed. On the one hand, the perceived importance was queried on a 5-point scale. Based on this question, the top 5

service quality indicators for rail transport the most important service quality attributes are: (i) sufficient seating on board, (ii) information on board, (iii) information in the station, (iv) punctuality, and (v) reliability. For bus transport, the five most important service quality attributes are (i) easy access to the stop, (ii) information at the stop, (iii) frequency, (iv) punctuality, and (v) reliability.

Besides, regression models were built to verify which factors play a significant role in predicting NPS, CSAT and STS. In total, 24 perceived service quality indicators were assessed. Using only these perceived service indicators, five indicators were significant in predicting the CSAT of the rail operator, i.e. satisfaction with respect to (i) punctuality, (ii) reliability, (iii) on-board comfort, (iv) information on board, and (v) ease of transferring to another line. Using only these indicators, 56% of the variation in CSAT was explained. Using the same set of 24 predictors for predicting the (individual) NPS scores, 36% of the variation is explained by the following factors: (i) feeling of safety on board, (ii) feeling of safety on the platforms, (iii) travel speed, (iv) reliability, (v) vehicle cleanliness, (vi) friendliness of the staff, (vii) sufficient lighting in the station. Finally, the set of 24 predictors accounts for 16% of the variation in STS, only (i) the feeling of safety on the platforms, (ii) travel speed, and (iii) reliability being retained as significant predictors. Note that even in the full model with all predictors, the VIFs were all smaller than 4, indicating no serious problem of multicollinearity.

For bus transport, 23 perceived service quality indicators were assessed. Note that this is one indicator less than for rail transport, given that for bus transport, no distinction was made between the station and platform safety. Six indicators were significant in the CSAT model, which account for 57% of the variation in CSAT, i.e. (i) punctuality, (ii) reliability, (iii) on-board comfort, (iv) directness (few transfers), (v) ease of transferring to another line, and (vi) smooth handling of problems by the customer service. In terms of (individual) NPS scores, 39% of the variation is explained by the following significant factors: (i) travel speed, (ii) punctuality, (iii) reliability, (iv) friendliness of staff, (v) ease of buying a valid ticket, (vi) smooth handling of problems by the customer service, and (vii) availability of amenities at the stop. Finally, 19% of the variation in STS is accounted for by the following indicators: (i) punctuality, (ii) directness (few transfers), and (iii) ease of carrying luggage.

If the declared importances are compared with the contributing factor models in the regression models, especially punctuality and reliability are accentuated as common factors. The regression models show that (perceived) service quality attributes mainly account for the variation in CSAT, whereas they play a much smaller role in the STS. The fact that different factors are linked with the three investigated scales (CSAT, NPS, and STS) underline the importance of considering these different facets in analysing customer satisfaction with public transport.

In terms of STS, the study verified whether STS was a unidimensional concept when applied to public transport systems. A single factor solution was retrieved from the factor analysis of the nine items for rail and bus transport ($KMO\text{-}MSA = 0.89$ for both train and bus transport).

Besides the (perceived) level of service indicators, the effect of a series of socio-demographic variables (age, sex, degree, profession, income, household size, province), access and regular use of transport modes (weekly use of bus/tram/metro, train, foot, bike, micro-mobility, car as driver or passenger; possession of a driving license and or season ticket; availability of different bikes, micro-mobility devices and car(s) within the household; distance to the most nearby bus/train/metro stop), trip motives for using public transport, activities during the trip, as well as negative experiences with public transport are evaluated.

In terms of the model predicting the CSAT of rail, only a single indicator was added at this stage, i.e. the declared mood during the last trip (1: bad-tempered, 5: in a good mood), increasing the fit only to 57%. Note that none of the considered socio-demographics was significant at this stage. Concerning the model predicting the NPS score, age played a role; younger people are less satisfied. Besides, also the availability of transport modes impacts satisfaction: closer proximity to a train station results in higher satisfaction, having a season ticket for public transport and having a bike or micro-mobility device also increase satisfaction. Concerning trip motives, especially using the train for leisure motives seems to make travellers more satisfied. In terms of the original variables, reliability and cleanliness remained to have a positive effect. Adding the broader range of variables increased the explained variation to 44%. Regarding the model predicting STS, the R^2 increased up to 56% by considering the broader range of variables. In terms of socio-demographics, only age was added. Similar to NPS, younger people are less satisfied. Besides, especially the mood again played a crucial role.

Regarding the model predicting CSAT for bus transport, the R^2 increased to 61% by including the broader range of variables. People that do not carpool frequently seem to be more satisfied. And the mood also accounts for a bit. Besides the perceived service quality indicators included in the original model, in terms of activity during travel, people reading on the bus are more satisfied. In terms of NPS, including more variables increases the R^2 to 51%. Mood and reading play a similar role as in the CSAT. Younger people are less satisfied. Persons with a season ticket for public transport or weekly users of an electric bike have higher customer satisfaction. Finally, with respect to the model predicting the STS, the proportion that the model accounts for amounts to 56%. Younger people are less satisfied with their bus trips. Proximity to the bus stop increases satisfaction, as does the availability of a bike within the household. Using the bus to go to the hobby location makes the travellers happier.

This paper compared different customer satisfaction scales often used in marketing, i.e. CSAT and NPS, with a scale that is used for the satisfaction with the travel itself, i.e. STS. The results show that each of the scales attributes its own importance and that, ideally, these scales are used as complements in studying satisfaction with public transport. In our study, the role of socio-demographics appeared only to be minor. Nonetheless, younger people seemed to be less satisfied. In terms of (perceived) service quality attributes, especially punctuality and reliability were indicated as important factors. Adding the mood to satisfaction surveys is important. However, ideally, longitudinal research should ascertain the direction of this effect, is it your mood that makes you (dis)satisfied, or vice-versa.

