WHERE IS THE HAPPY TRANSIT RIDER?
Evaluating satisfaction with regional rail service using a spatial segmentation approach

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ABSTRACT

Ensuring riders' satisfaction in a rapidly changing and highly competitive transport market has led several public transit agencies to adopt various marketing strategies.

However, most previous studies have ignored spatial and contextual factors related to the transit network and the built environment of where users reside, resulting in network-wide policies.

This study proposes a new segmentation approach that incorporates spatial and contextual factors in addition to riders' preferences and satisfaction levels with commuter rail service in the Greater Toronto and Hamilton Area, Canada.

This research presents a spatial segmentation approach that can be used to maximize the benefits of service improvements intended to increase satisfaction with public transit among certain groups of users in a region.

CONTEXT

Data was collected by GO Transit, the regional public transit provider of the Greater Toronto and Hamilton Area.

GO Transit train network

Projection: NAD 1983 UTM Zone 17N — Data: GO Transit & Statistics Canada

FACTOR ANALYSIS

Principle component analysis was used to identify sets of highly correlated variables. Six factors were generated from 28 variables.

FACTORS	SURVEY QUESTION OR VARIABLE	LOADING
1. Satisfaction with service and train stations	How satisfied are you with your personal safety in train stations?	0.818
	How satisfied are you with the cleanliness of stations (other than Union Station)?	0.789
	How satisfied are you with GO Train stations overall?	0.585
	How satisfied are you with helpful and friendly staff (at train stations other than Union Station)?	0.770
	How satisfied are you with helpful and friendly staff (Union Station)?	0.752
	How satisfied are you with the lighting in the parking lots?	0.786
	How satisfied are you with your personal safety in the parking lots?	0.778
	How satisfied are you with helpful and friendly staff (on-board trains)?	0.729
	How satisfied are you with the cleanliness on board trains?	0.700
	How satisfied are you with the temperature on trains?	0.646
	How satisfied are you with communication of service delays?	0.588
	How satisfied are you with sufficient fare inspections?	0.564
	How satisfied are you with the availability of seats?	0.437
2. Loyalty and overall GO Train satisfaction	How likely you will be to recommend GO transit to a friend/colleague?	0.795
	How likely you will be to continue to take GO Transit?	0.698
	How would you rate your level of satisfaction with GO Transit overall?	0.787
	How satisfied are you with GO Train service overall?	0.763
	How satisfied are you with trains running on time?	0.622
3. Accessibility and commuting behaviour	Number of jobs accessible within 45 minutes by regional transit service.	0.941
	Number of jobs accessible within 45 minutes by GO train service only.	0.915
	Average commuting distance of census tract.	-0.595
4. Level of service	Hourly GO Train frequency during the morning peak (6 - 9 AM).	0.757
	Accessibility to parking spaces.	0.711
	Ratio of regional transit accessibility and accessibility by GO transit.	-0.629
5. Financial status and personal travel behaviour	What is your total household income before taxes? (Over $100,000)	0.656
	What time of day do you typically board your GO train? (Peak periods: before 8:30 AM, 3:30 PM to 5:30 PM)	0.614
	What is your current employment status? (Student)	-0.593
6. Satisfaction with parking and parking occupancy	Average parking occupancy at nearest 3 stations within 10km.	0.820
	How satisfied are you with the availability of parking spaces?	-0.479

CLUSTER ANALYSIS

K-means cluster analysis was used to segment the respondents. Seven distinct and recognizable clusters of GO Train riders were found in our sample.

Legend: Satisfaction with service and train stations; Loyalty and overall GO Train satisfaction; Accessibility and commuting behaviour; Level of service; Financial status and personal travel behaviour; Satisfaction with parking and parking occupancy

Cluster 1 LOYAL UNDERSERVED USERS; Cluster 2 FRUSTRATED YET DEDICATED RIDERS; Cluster 5 CONNECTED CHOICE RIDERS; Cluster 6 LONG-DISTANCE COMMUTERS; Cluster 3 UNSATISFIED YOUNG URBANITES; Cluster 4 SPATIALLY CAPTIVE RIDERS; Cluster 7 INFREQUENT YOUNG STUDENTS

CLUSTER-SPECIFIC RECOMMENDATIONS

LOYAL UNDERSERVED USERS
- Address frustration with parking availability at train stations
- Develop policies to encourage sustainable means of station access: local transit service, walking, cycling or car-pooling

FRUSTRATED YET DEDICATED RIDERS
- The majority of these users frequently take the busy Lakeshore East Line, and would benefit from the introduction of short turn trains at peak hours, to reduce the levels of crowding along busy train corridors

UNSATISFIED YOUNG URBANITES
- Increase levels of service at off-peak hours and weekends as well as service frequency for reverse commuters
- Fare integration with the TTC may increase the ridership among these young urban travelers and/or attract similar potential riders

SPATIALLY CAPTIVE RIDERS
- Spatially captive users are among the most loyal GO Train users
- Continue to monitor the satisfaction levels of these users, to ensure they remain regular and happy riders

CONNECTED CHOICE RIDERS
- Short-turn trains may be an effective strategy to alleviate crowding
- As these users live under 4 km on average from a train station, they are an important group to encourage to cycle to stations

LONG-DISTANCE COMMUTERS
- Efforts are recommended to minimize frustration and confusion in the event of a delay
- Reducing crowding levels through increased train service, especially along the Lake Shore corridor (which many of these riders regularly use)

INFREQUENT YOUNG STUDENTS
- Increase service frequency at off-peak times
- Higher service frequency for reverse commuters
- Greater financial incentives or concession passes for students

DISCUSSION & CONCLUSION

Summary of recommended policies and their expected impact on each cluster

Implications

- The results of this study have demonstrated how geographic data can be incorporated into the public transit segmentation approach to recommend geographically sensitive strategies that can improve customer satisfaction.

- The ability to identify spatially targeted interventions for service quality improvements is expected to be very relevant and applicable for transit agencies, particularly those with scarce resources.

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