住宅自我意識與鄰近性對通勤運具選擇的影響

－以台北捷運為例－

(國科會專題計畫名稱與實際發表論文不同)

**Impacts of Residential Self-Selection and
Rapid Rail Transit Proximity on Commute Mode Choice:
A Study of Taipei Rapid Rail Transit**

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摘要

在永續發展之大眾運輸導向的土地發展政策（Transit-Oriented Development）背景下，本研究探討二居住區位變數對選擇捷運為通勤運具之影響：住宅區位選擇的自我意識（Residential Self-Selection）（在此定義為搬遷於捷運車站地區的意願），與住宅與車站鄰近性(Proximity)(如住宅至捷運車站的距離)。研究假設有二：一、自我意識與鄰近性二居住變數皆對通勤運具選擇具有影響性；二、此二居住變數皆對選擇捷運為通勤運具有正面影響;因此，二變數同時存在時，其影響性最大，反之亦然。本研究以台北都會區捷運系統乘客為研究對象，抽樣方法採多段結叢抽樣(Multistage Cluster Sampling)，調查於 2004 年九月完成，樣本數 558 份。分析方法含羅吉特模式(Binomial Logit Model)，判別分析(Discriminating Analysis)，及空間分析（Spatial Analysis）。預期成果除研究假設驗證外，另為敘述性資訊，包含捷運旅次特性（目的、起訖與轉運工具等）、住宅與工作區位空間分析，及台北捷運地區住宅供給是否滿足現有捷運乘客的需求。研究成果或許可為未來台北捷運旁土地政策(如大眾運輸導向發展)與捷運交通政策的訂定或修正參考依據。

關鍵詞：住宅自我意識、住宅鄰近性、運具模式、羅吉特模式、大眾運輸導向發展

Abstract

The current of transit oriented development (TOD) was developed to a large degree for achieving the goal of sustainable development.　Within this context, this empirical research explores the impacts of two home- and workplace-*location*-related variables on traveling by rapid rail transit for work and non-work trips: residential self-selection of living near rapid rail transit stations (residential self-selection for short), as well as residential and workplace proximities to rapid rail transit stations (residential and workplace proximities for short.)　Research hypotheses are threefold: first, both residential self-selection and residential and workplace proximities influence workers' decision on commuting by rapid rail transit.　Second, both residential self-selection and proximities increase workers' probability of riding rapid rail transit for work.　Third, the travel behavior of commuting by rapid rail transit increases the chance of the taking advantage of it for other trip purposes.　To conduct this research, Taipei Rapid Transit Cooperation rapid rail transit system was selected to conduct a station-area passenger survey in September 2004, with responses from 558 passengers.　The sampling method was multistage cluster sampling.　Analysis results show that Analysis methods include binomial logit model and spatial analysis.　Other than hypothesis testing, research results are also expected to reveal descriptive information on trips (purposes, origins and destinations, and transportation modes to/from transit stations), spatial pattern of residential and workplace locations, and unmet residential needs near transit stations.　Policy implications would then be developed for land use plan around transit station areas such as TOD, and for transportation policy for rapid rail transit system.

Keywords：Residential Self-Selection, Residential Proximity, Workplace Proximity, Logit Model, Transit-Oriented Development

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1. Introduction

In the current of building rapid rail transit in major metropolitan areas in Taiwan, it satisfies the desire for transit proximity of those station-area residents with residential self-selection, defined in this study as people intended to ride rapid rail transit and hence move consciously to transit station area defined as 400-meter walking distance from station in this study (residential self-selection, for short).   Other than this transportation policy, transit-oriented-development (TOD) land use policy provides opportunities to non-station-area residential self-selectors to vote by foot to gain transit proximity. Transit proximity to a large degree makes rapid rail transit riding possible.

Though plenty of past studies have gauged the impact of residential and workplace impacts on transit riding, limited research (Cervero, 2002) has addressed the impact of residential self-selection on travel behavior. In Cervero's study, residential self-selection and residential proximity are defined as the same factor to evaluate its impact on travel behavior.   However, residential self-selectors might live out of the station area for such reason as lack of economic capability and favored housing types.   In the meanwhile, they could still have the same level of affinity of transit riding as their counterparts living in the station area, or higher intention than their counterparts living in their neighborhood.   Hence, the impacts on transit riding of residential self-selection and residential proximity to transit station are yet clear.

Research hypotheses are threefold: first, residential self-selection and residential and workplace proximities affect commute mode choice and use of rapid rail transit.   Second, both residential self-selection and proximities increase workers' probability of riding rapid rail transit for work and non-work trips.   Third, the travel behavior of commuting by rapid rail transit increases the chance of the taking advantage of it for other trip purposes.   If the hypotheses a person with all three of high residential self-selection, residential and workplace proximities is more likely to commute by rapid rail, and vice versa.

To conduct to this empirical research, the passengers of Taipei Rapid Transit system are selected as a case study.   A station-area passenger survey was conducted in September 2004, with responses from 558 passengers.   The sampling method was multistage cluster sampling.   Analysis methods include binomial logit model and spatial analysis.   Other than hypothesis testing, research results are also expected to reveal descriptive information on trips (purposes, origins and destinations, and transportation modes to/from transit stations), spatial pattern of residential and workplace locations, and unmet residential needs near transit stations.   Policy implications are then developed for land use plan around transit stations such as TOD, and for transportation policy for rapid rail transit system.

2. Methods

To evaluate the impacts of residential self-selection, residential and workplace proximities, a survey was compiled for Taipei Rapid Raid Cooperation (TRTC) passengers. The survey population was targeted at TRTC passengers, as opposed to whole Metropolitan Taipei residents, which were serviced by TRTC. This was because surveying latter would lead to an extremely large sample size in order to gauge information on the relatively small size of TRTC passengers and, in particular those with residential self-selection. This survey design hence limits such research findings as impacts of residential self-selection and latent residential demand around TRTC station areas on TRTC groups alone.

To examine the TRTC passengers in general and to ensure a significant sample size of the sub-group of passengers with intentions to move within TRTC stations areas after TRTC plans were revealed in 1988 (section 4), two versions of survey questionnaires were compiled--general and residential-self-selection versions, respectively. The residential-self-selection version is the same as the general version except for a screening question to incorporate only those with residential self-selection to participate in the survey. The sampling method was multistage cluster sampling by day of week (weekdays vs. weekday), time of day (peak vs. off-peak), and station. The survey was conducted during September 8 and 11 on 57 of 60 TRTC stations.[i] For the general survey, one station was surveyed for three periods--weekday peak (7-9am or 5-7pm), off-peak, and weekend to collect three questionnaires for each periods, respectively. For the residential self-selection version, three questionnaires were planned to be surveyed for each of 57 stations. Business reply mail service was also provided for the interviewees. The weather during the four survey days were all rainy. Passengers exiting gates were approached to participate in the survey. To reduce interviewee's arbitrary judgment on choosing interviewers, the second passengers exiting gates were selected each time of survey. A total of 469 and 94 valid questionnaires were collected for the general and residential self-selection versions, respectively.

Secondary data include number of TRTC monthly passengers for the survey month (2004, Taipei City Government, Department of Transportation), and number of residents by a Taiwan's neighborhood-level geographic unit—"Lee" (2004, Taipei City Government, Department of Civil Affairs; 2004; Taipei County Government, 2004).

To reflect the population information of TRTC passengers at large, weightings were applied in proportion to passengers egressing at each station. Analysis tools include descriptive statistics, logistic regression modeling for commute mode, regression analysis for trip frequencies via TRTC, and geographic information systems (GIS) for spatial analysis.

**3.	Classification of TRTC Patrons, by Residential Proximity and by Residential Self-Selection**

TRTC patrons are classified into six groups by residential proximity and by degree of residential self-selection for two primary reasons (six proximity-and-residential-self-selection passenger types, for short).   One reason is to gauge the latent housing demand (of residential self-selection) for the TRTC station area. The other is to understand the socio-economic characteristics of patrons with different residential proximity and residential self-selection.   Both could be applied to develop land use or housing policies for the TRTC station area, in terms of quantity and types of housing.

TRTC patrons are first dichotomized by whether they lived within the 400-meter radius (i.e., five-minute walking distance) from stations, and then further broken down by time of moving and by degree of residential self-selection.   Groups one and two are those living within the station areas, but different in terms of time of moving.

Group 1--Station-area TRTC beneficiary group: Group one is composed of the patrons who lived within the station area during the survey, and moved in by 1988 when the TRTC plan was made official.   The proportion of these original residents of the station areas was eleven percent of TRTC patrons at large (Table 1). In terms of chances of taking TRTC rapid rail transit, this group of patrons was the beneficiary due to the residential proximity to TRTC services brought by the TRTC plan.

Group 2--Success residential self-selection group: The second group is composed those patrons who moved into the station area after TRTC plan was officially approved.   They can be regarded as self-selecting to move to take the best advantage of TRTC rapid rail transit services.   Besides, they were economically capable of moving.   The proportion of this group is 23 percentage points (Table 1).

The above two groups altogether constitute one third of TRTC passengers.   The following four groups are those living out of the station area, and then broken down by degree of residential self-selection.

Group 3--Talking-with-realtors residential self-selection group: Group three consists of those intended to move into station area and *physically talked with realtors, housing owners, or the like*.   Among those who were intended to move into the station areas (i.e., groups three, four and five), this group had the highest degree of self-selection.   They constituted one fourth of the TRTC patrons at large (Table 1), which makes it the second largest group of all.

Group 4--Collecting-housing-information residential self-selection group: Group four is composed of those with lower degree of residential self-selection than group three since they were willing to move *but collecting housing information at most*, as opposed to talking with realtors.

3

Group 5--No-action residential self-selection group: Group five is made of those with the lowest degree of residential self-selection since they *reported being interesting in moving but had no physical action for moving at all*.   Groups four and constitute six and eight percentage points, respectively, the two smallest groups (Table 1).

Group 6--No residential self-selection group: Group six is composed of those with no intention of moving into station area.   It constitutes 26 percentage points of all TRTC patrons--the largest group of all (Table 1).

Table 1   TRTC Patrons, by Residential Location, Time of Moving, and Residential Self-Selection   N=330

Types of TRTC patrons		Percentage	
Patrons living within 400-meter radius from TRTC stations who were	(1) original residents (moving in by 1988*) -- Group 1--Station-area TRTC beneficiary group.	11%	34%
	(2) new residents (moving in after 1988)** -- Group 2--Success residential self-selection group.	23%	
Patrons living out of 400-meter radius from TRTC stations who were	(3) intended to move into the 400-meter radius of TRTC station, and *actually talked with realtors, housing owners, and the like*--Group 3: Talking-with-realtors residential self-selection group.	25%	66%
	(4) intended to move into the 400-meter radius of TRTC station, and *actually collected real estate information*--Group 4: Collecting -housing-information residential self-selection group.	6%	
	(5) intended to move into the 400-meter radius of TRTC station, but *had not physical action at all*-- Group 5: No-action residential self-selection group.	8%	
	(6) not intended to moving into 400-meter radius of TRTC station-- Group 6: No residential self-selection group.	26%	
Total		100%	100%

* Year 1988 was the time when the TRTC plan was officially approved.

** It is unknown whether they lived within or out of the 400-meter radius from TRTC stations before they moved to the current location.

4. Taipei Rapid Transit Patrons' Characteristics

TRTC Station Area Housing Demand: Fulfilled vs. Latent Demands

Table 1 also reveals information about the ranking of residential self-selection, and fulfilled and latent demands for living within the TRTC station areas.   Ranging from groups two to five, their degrees of station-area residential self-selection are from the highest to lowest levels; group six had no intention of residential self-selection.   Put housing style aside, the housing demand of residential self-selection of group two can be regarded as be fulfilled since they had moved into the station area.   The latent housing demand for moving into station area, in a narrow sense can be defined by group three.   In a broader sense, groups three, four and five constitute the latent demand, which sums up to 39 percentage points of all TRTC patrons.

The residential self-selection status of group one-- station-area patron group is worth discussing since as original station area residents their intension of living with station area cannot be examined.   However, if residential self-selection is driven to certain degree by the intention of taking TRTC rapid rail transit, they can be assumed to have higher level of residential self-selection than those station area residents who did not take TRTC transit.   It cannot be ruled out, however, that some station area patrons took TRTC rapid rail transit because of their residential proximity to TRTC stations.   To dichotomize this group by residential self-selection, they are classified as patrons with residential self-selection.

4.1 Travel Characteristics

Commute Mode

Table 2 reveals information about TRTC patrons' commute mode.   First, TRTC rapid rail transit was the primary commute mode across all six types proximity and residential self-selection passengers, ranging from 51 and 63 percentage points of station-area patron and Success residential self-selection groups, respectively, to 31 percentage points of no residential self-selection group.   Interestingly, the higher the degree of residential self-selection, the higher the proportion of commuting by TRTC is; the proportions of commuting by TRTC from groups one to six is quite in the high-to-low order.   In addition, the high residential proximity, the higher the proportion of commuting by TRTC is; Two station area patrons group have higher proportions than the four non-station area patrons groups.

Second, buses are the second primary commute mode for most TRTC patrons at the level of between 11 and 28 percentage points.   Comparing with the portions of two station areas patrons (11 and 16 percentage

points), three residential self-selection non-station area patrons has the possibility to switch from buses to TRTC if they moved to the station area since their proportions are more than ten percentage points higher.   Third, with TRTC and buses combined as public transit market share, Table 2 shows that no residential self-selection group is less public-transit oriented than the other five residential self-selection groups; the proportions combined of no residential self-selection group were 57 percentage points, some ten percentage points lower than most other groups.

Then, the proportions of riding mopeds to work reveals that mopes were an important transportation mode for non-station area patrons expect for talking-with-realtors residential self-selection compared with the station area patrons 20 something vs. some 10 percentage points .   This might imply two conditions.   On the one hand, collecting-housing- information and no-action residential self-selection groups who rode mopeds to work might switched to TRTC if they had a chance to move into station area.   On the other hand, talking-with-realtors residential self-selection group's lowest percentage of riding mopeds to work might explain why they had the strongest intention of moving into the station areas.   Hence, land use and transportation policies may need to be modified to fulfill their demand. Finally, the levels of driving, walking or biking to work are similar across all six groups.

Income and Housing Tenure vs. Residential Self-Selection

This section reveals that unaffordable housing near TRTC station hindered residential self-selection from moving or purchasing a residence in the station area.   Among the non-station area residential self-selection patrons, the higher the economic capability (income per household adult) (Figure 3) and residence ownership (Figure 4), the higher the degree of residential self-selection is.   Even all three talking-with-realtors, collecting-housing information, and no-action residential self-selection groups were intended to move to the station area, the degree of their residential self-selection seems to be positively associated with their income level.   This might imply the high housing prices in station area affect their degree of self-selection.

Table 2   Percent of TRTC Patrons' Commute Mode,
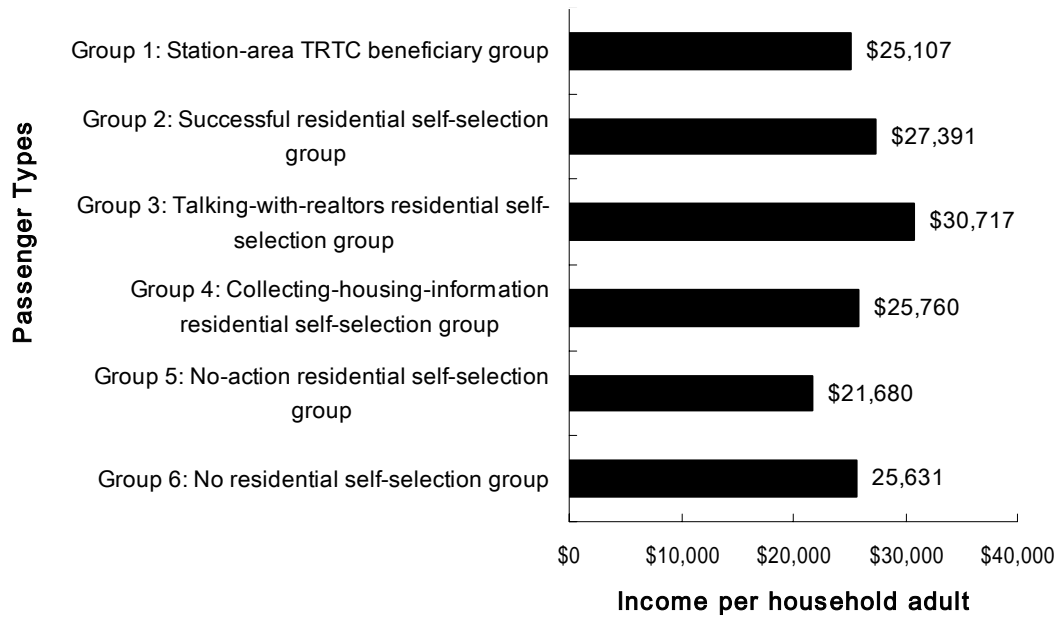**by Six Proximity-and-Residential-Self-Selection Passenger Types**

N=389

Types of TRTC patrons		Commute Mode						
		TRTC	Buses	Autos	Mopeds	Walking /Biking	Others	**Total**
Station area patrons	Group 1: Station-area TRTC beneficiary group	63%	11%	7%	7%	13%	0%	100%
	Group 2: Success residential self-selection group	51%	16%	7%	10%	15%	1%	100%
Non-station area patrons	Group 3: Talking-with-realtors residential self-selection group	48%	26%	7%	7%	13%	0%	100%
	Group 4: Collecting-housing-information residential self-selection group	36%	18%	7%	28%	11%	0%	100%
	Group 5: No-action residential self-selection group	37%	28%	5%	21%	11%	0%	100%
	Group 6: No residential self-selection group	31%	26%	7%	22%	12%	2%	100%

Summary Statistics:

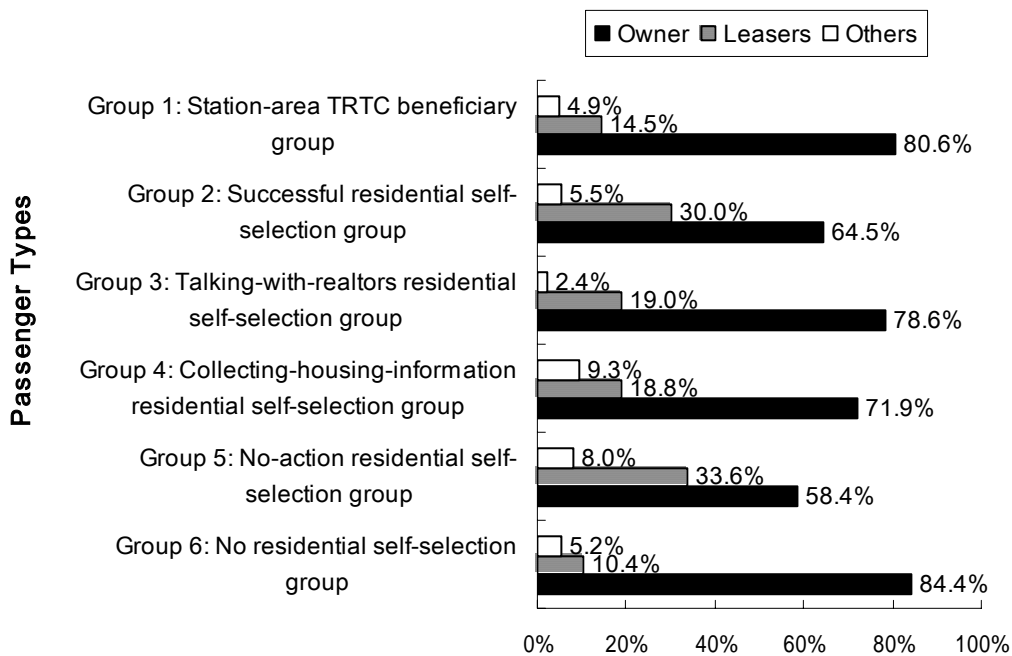Pearson Chi-Square Test: 0.077 (2-sided)

The high housing prices in the station area might also lead to relatively low residence ownership for the new station area's emigrants.   Among the two station area patron groups, those who moved into after 1988 possibly due to the TRTC implementation had lower portion of owing a residence; only 64.5 percentage points of Success residential self-selection group, as opposed to 80.6 percentage points of station-area TRTC beneficiary group, owned a residence (Figure 2).   Cross-analyzing it with income per household adult, it might reflect the fact that it is economically difficult for new station emigrants to purchase a residence; this is because that even though Success residential self-selection group is higher than station area TRTC beneficiary group, their percentage residence ownership was lower.

ANOVA Test: 0.082

N=419

Figure 1   TRTC Patrons' Income per Household Adult,
by Six Proximity-and-Residential-Self-Selection Passenger Types

Pearson Chi-Square Test: 0.000 (2-sided)

N=518

Figure 2   Percent of TRTC Patrons' Housing Tenure,
by Six Proximity-and-Residential-Self-Selection Passenger Types

Alternative Mobilized Transportation for Survey Trips

Interestingly, the station-area TRTC beneficiary group had the lowest rate of alternative transportation for the survey trips (35 percentage points), as opposed to those of other five groups ranging from 50 to 69.8 percentage points (Figure 3).   This could be the result of the condition that some trips being made possible to the original station area residents due to the TRTC implementation, such as those with no transportation, or trips could not made without TRTC.

■ Had Alternative Transportation □ No

Group 1: Station-area TRTC beneficiary group — 65.0% / 35.0%

Group 2: Successful residential self-selection group — 40.4% / 59.6%

Group 3: Talking-with-realtors residential self-selection group — 30.2% / 69.8%

Group 4: Collecting-housing-information residential self-selection group — 41.9% / 58.1%

Group 5: No-action residential self-selection group — 50.0% / 50.0%

Group 6: No residential self-selection group — 44.8% / 55.2%

Passenger Types

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

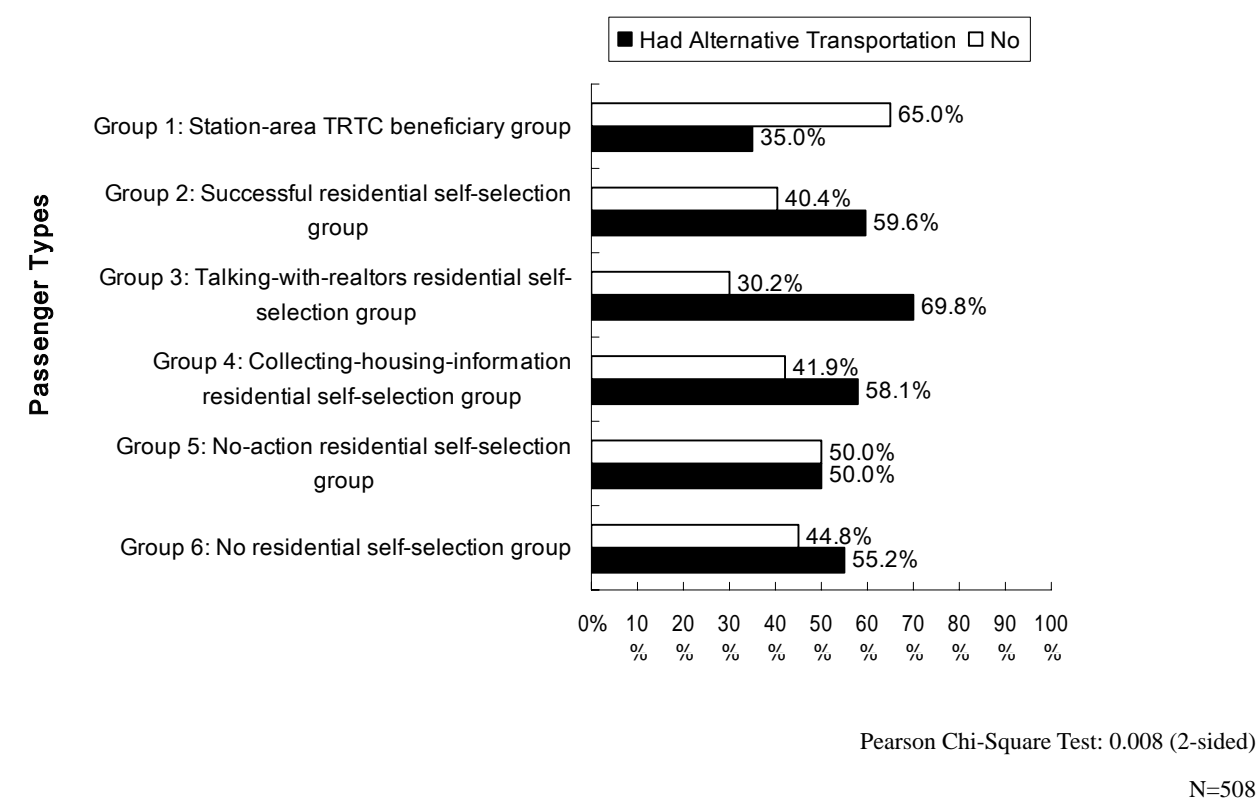Pearson Chi-Square Test: 0.008 (2-sided)

N=508

Figure 3   Percent of TRTC Who Had Alternative Mobilized Transportation for the Survey Trips, by Six Proximity-and-Residential-Self-Selection Passenger Types

4.2   Residential and Workplace Characteristics

In such a dense metropolitan area like Taipei, it is not surprising that the residential densities of the neighborhoods are high (i.e., "Li" of Taiwan's census geographical unit) where trips begin, end, TRTC patrons live, or work.   The mean residential densities of these four groups of communities were all higher than 23,500 persons per squared kilometers during the survey (Table 3), which is about twice that of Manhattan of New York City.

Table 3   Residential Densities of Neighborhood (i.e., "Lee"),
by Trip Origin, Destination, Home, and Workplace

Location	Residential Density (persons per KM^2)	Standard Deviation
Trip Origin	25,513	23,093
Trip Destination	24,570	20,800
Home	30,914	28,782
Workplace	23,673	24,908

Distance from Workplace to TRTC Stations

The mean distance from workplace to stations for TRTC employed patrons was some 1.3 kilometers.   In addition, Figure 6 shows that the proportions of distance from TRTC stations to workplace within 400-meter walking distance across all six proximity-and-residential-self- -selection were all less than forty percentage points   This proportion seems to be positively associated with degree of residential self-selection since no-action, and no residential self-selection groups had the lowest proportions (about 21 percentage points); the proportions of the other four stronger residential self-selection ranged from 31 to close to 39 percentage points.
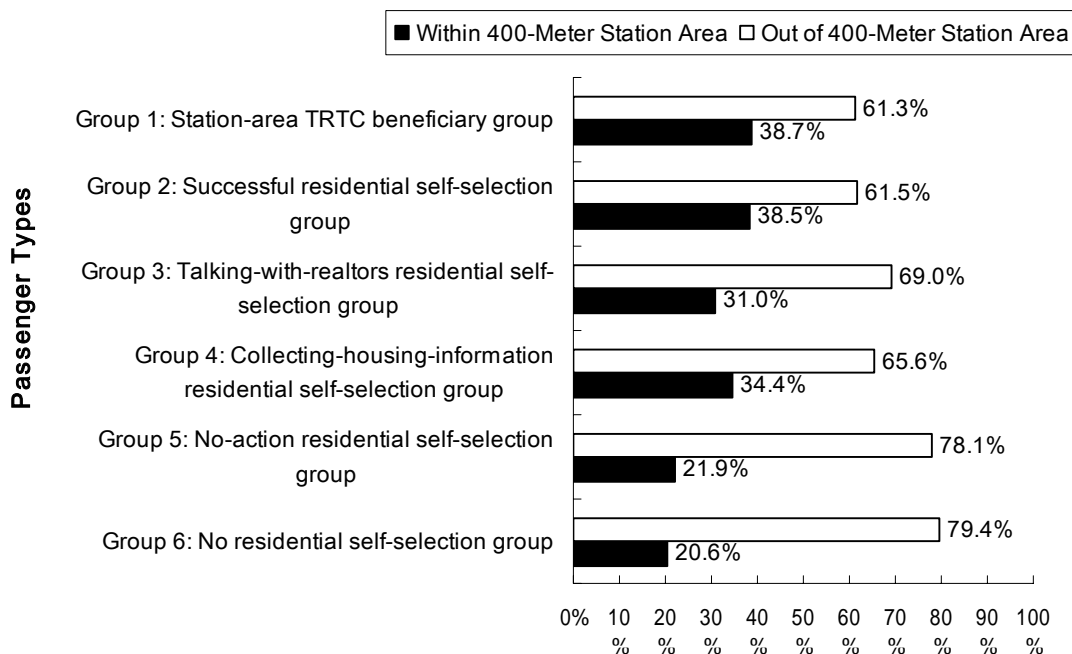
Figure 3   Percent of TRTC Workplace Locations, by Six
Proximity-and-Residential-Self-Selection Passenger Types

5. Predictive Models

5.1 Commute Mode

This session presents the results of a predictive model of commute mode choice that sheds lights on the impacts of residential self-selection and residential and workplace proximities on commuting by rapid rail transit. Based on the TRTC patron survey, Table 3 presents a best-fitting binomial logit model that predict whether a TRTC passenger commute by TRTC's rapid rail transit.

The model was not terribly statistically successful, but the impacts of residential self-selection, workplace and residence proximities on commuting by TRTC rapid rail matche *a priori* expectations.   The model has marginal predictive powers with goodness of fit of 15.2%, and can correctly predict 65.9% of the survey patrons in terms of commuting by TRTC rapid rail (Table 3).   Controlling for several person- and household-demographic variables, and parking subsidy at work, residential self-selection, and workplace proximity statistically significantly affect TRTC passengers' mode choice.   Residence proximity affects mode choice too, but at a slightly less significant level.   Passengers living out of 400-meter station area and self-selecting not to move into it, had lower probability of commuting by TRTC rail.   In addition, both working within 400-meter station area and living within this area increase the odds of commuting via TRAC rail.

The model results also reveal that several socio-economic characteristics are associated with commuting by TRTC rapid transit: The signs of coefficients and odds ratios show that females, patrons with no moped and auto driver's license, low number of autos per household adult increased the odds of taking TATC rapid transit to work.   Interestingly, females with no driver's license had lower odds of commuting rapid rail, which was opposite to expectations.   The reason for this phenomenon could be that they commute not only via rapid rail but also bus services, which might not be highly appreciated by males with no driver's license possibly due to its lower level of service.   This argument could be supported by the fact that 40.8 and 30.6 percents of females with no driver's license took bus and rapid rail transit to work, respectively, as opposed to 0 and 77.8% of males with no driver's license.   Finally, free or discounted parking at work reduces the odds of commuting by rapid rail transit.

The magnitudes of odds ratio show the difference of actual odds of commuting by TRTC rapid rail transit due to the different status of dependent variables.   The odds ratio of residential self-selection is 0.5328 (Table 4), meaning that given others equal passengers self-selecting not to move within station areas has only 53.28% of the odds of those self-selecting to move within station areas in terms of commuting by TRTC rapid rail transit.   By same token, one passenger's workplace one meter father away from TRTC station than anther has a 99.96% of odds of the closer one in terms of commuting by TRTC rapid rail transit.   Also, one passenger living one meter father away from TRTC station than anther has a 99.98% of odds of commuting by TRTC rapid rail transit of the closer one.

5.2 Sensitivity Test

One way to gauge the marginal influences of residential self-selection, and workplace and residential proximity is to conduct a sensitivity test based on the scenario of a "typical employed TRTC passenger", with the only variations whether passengers self-select to move to TRTC station area, the location of workplace, and the location of residence.   In the scenarios, the mean and modal values were inputted into respective mode-choice models.   The "typical employed TRTC passenger" is female with either auto or moped driver's license, 0.38 auto in the household, no free or discounted parking at workplace, living at a place 1,310 meters from the closest TRTC station but self-selecting to move closer, and with workplace 1,186 meters from the closest TRTC station.

Table 5 presents the results of four sets of scenarios: (1) residential self-selection of moving to TRTC station area vs. otherwise, (2) "typical workplace location" vs. workplace relocated to a place which is 100 meters closer to TRTC station vs. at the border of station area, (3) "typical residential location" vs. residence 100 meters closer to TRTC station vs. at the border of station area, and (4) "typical TRTC employed passenger" vs. both workplace and residence relocated 400 and 100 meters from station.

Table 5.A shows that a "typical TRTC employed passenger", who self-selected to move to station area had a very low odds of 0.13 percentage point to commute by TRTC rapid rail transit.   If the same passenger has the intension of self-selecting to move to station area, the odds of commuting by TRTC rapid rail transit decreases to 0.07 percentage point.   Table 4.B shows that if a "typical TRTC employed passenger", whose workplace is relocated 100 meters closer to the station and to the border of station area (i.e., 400 meters from the station), the odds rises from 0.13 percentage point to 0.16 and 0.79 percentage points, respectively.   Table 4.C shows that if a "typical TRTC employed passenger", whose residence is relocated 100 meters closer to the station and to the border of station area, the odds rises from 0.13 percentage point to 0.19 and 2.9 percentage points, respectively.   Finally, if a "typical TRTC employed passenger", whose workplace and residence are both relocated to 400 and 100 meters from the station, the odds significantly rises from 0.13 percentage point to 15.5 and 52.7 percentage points, respectively.   However, if this "typical TRTC employed passenger", whose workplace and residence are both relocated to 100 meters from the station, but with no intension of self-selecting to live within this station area, the odds of commuting dropped down to 37.25 percentage point.

The results of sensitivity analysis imply that: First, both residential self- matters in terms of mode choice. Second, all three have to be implemented to achieve the maximum impact on mode choice.   Third, the latent demand for self-selectors needs to be satisfied.   Both land use and transportation policies have to be modified to.

Table 4   TRTC Patrons' Binomial Logit Model: Probability of Commuting by Rapid Rail

Variables	Coefficient (B)	Standard Error	Sig.	Odds Ratio [Exp(B)]
Residential Self-Selection:				
Living Farther Than 400 Meters from the Closest TRTC Station, and Without Intention to Move into Walking Distance. (1=Yes; 0=No)	-0.630	0.317	0.047	0.5328
Proximity:				
Straight-Line Distance from Workplace to the Closest TRTC Station (Meter)	-0.004	0.002	0.018	0.9996
Straight-Line Distance from Home to the Closest TRTC Station (Meter)	-0.002	0.001	0.123	0.9998
Socio-Economic Characteristics:				
Female (1=Female; 0=Male)	0.536	0.287	0.063	1.7099
No Moped and Auto Driver's License (1=No Driver's License; 0=Otherwise)	1.705	0.979	0.082	5.4995
Female * (No Moped and Auto Driver's License) (1=Female with No Driver's License; 0=Otherwise)	-2.028	1.056	0.055	0.1317
No. of Autos per Household Adult	0.560	0.308	0.069	1.7503
Others:				
Free or Discounted Parking at Work	-0.470	0.303	0.122	0.6253
Constant	-0.039	0.281	0.888	
Summary Statistics:				
Number of Cases	337			
-2L(c): Log Likelihood Function Value, Constant-only Model	379.7			
-2L(B): Log Likelihood Function Value, Parameterized Model	346.3			
Model Chi-Square (Probability): -2[L(c) - L(B)]	33.5 (0.0001)			
Goodness of Fit (Nagelkerke R^2)	0.152			
% of Cases Correctly Predicted (Relative to '"Flip of a Coin")	64.9%			

Table 5   Probabilities that "Typical" TRTC Passengers Commuted by TRTC Rapid Rail Transit, by Residential Self-Selection, Workplace Proximity, and Residential Proximity

5.A   By Residential Self-Selection

Variables	"Typical" Passenger (Self-Selecting to Move to Station Area)	Self-Selecting *Not* to Move to Station Area
Residential Self-Selection:		
Living Farther Than 400 Meters from the Closest TRTC Station, and Without Intention to Move into Walking Distance. (1=Yes; 0=No)	0.13%	0.07%

5.B   By Workplace Proximity

Variables	"Typical" Passenger (1310 meters)	100 Meters Closer to Station	400 Meters from Station
Workplace Proximity:			
Straight-Line Distance from Workplace to the Closest TRTC Station (Meter)	0.13%	0.16%	0.79%

5.C   By Residential Proximity

Variables	"Typical" Passenger (1186 meters)	100 Meters Closer to Station	400 Meters from Station
Residential Proximity:			
Straight-Line Distance from Home to the Closest TRTC Station (Meter)	0.13%	0.19%	2.90%

5.D   By Collective Effect of Residential Self-Selection, Workplace Proximity, and Residential Proximity

Variables	Residential Self-Selection, Workplace 400 Meters from Station, and Residence 400 Meters from Station	Residential Self-Selection, Workplace 100 Meters from Station, and Residence 100 Meters from Station	No Residential Self-Selection, Workplace 100 Meters from Station, and Residence 100 Meters from Station
Self-Selection Workplace Proximity Residential Proximity	15.55%	52.70%	37.25%

5. Policy Implications

Increasing density in a sense, bring more trip origins and destinations with station area, which can bring transit proximity to more people, and possibly in crease self-selection.   From the aspect of promoting compact development, it is better than expand transit routes.

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(六)計畫成果自評：

　　本計畫成果內容依照原計畫執行，成果與預期目標大致相符。研究成果可區分為政策應用用與學術價值兩方面：其政策應用價值在於，於大眾運輸導向發展的永續規劃理念下，由市場需求觀點探台北捷運車站地區之土地密度提高的潛在需求；其學術價值在於，探討住宅與交通自我意識與鄰近性對於交通運具選擇的影響。

　　初步研究成果已於 2005 年六月，發表於 2005 Hawaii International Conference on Social Sciences。目前正進行論文的第二階段修正，預期於近期內投稿 SSCI 國際期刊。

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i　Three major stations were excluded due to transit agency's concern about interrupting passenger traffic.