

# Tangible and Intangible Service Attributes: Quantifying the Importance of Image and Perception to Bus Rapid Transit



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# Study Background

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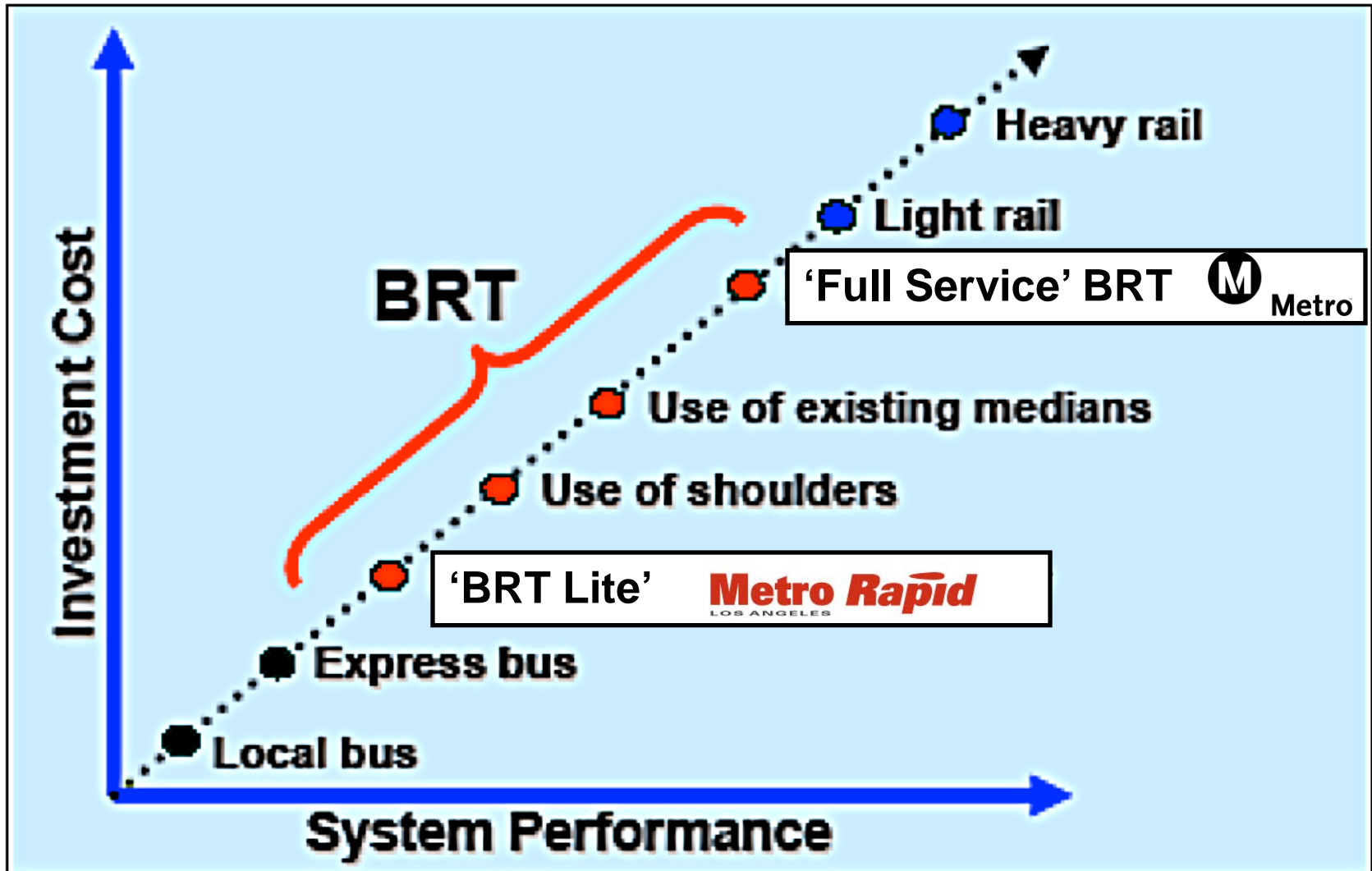
- In order to attract discretionary riders, transit must:
  - Offer competitive travel times
  - Provide high-quality service
  - Convey an attractive image
- BRT: create an image separate from local bus
- Bus-based public transit in the U.S. suffers from a severe image problem (inferiority complex)
  - Unreliable
  - Time-consuming
  - Inaccessible
  - Inconvenient
  - Crowded
  - Dirty
  - Unsafe

# Conventional Industry Wisdom

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- Rail is a necessity to convey image of premium service
- Rail is inherently more attractive than bus service, even if all quantifiable service attributes are equal
  - This advantage is explained by qualitative factors for which rail is assumed to be superior
- Premise: difficult-to-measure, subjective factors underlie an innate preference for rail
  - Bias constants in mode choice modeling
  - Capture unmeasured impact of qualitative factors

# The Conventional View of Ridership Attraction across Different Transit Modes



# Lessons from the Literature

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- When functional service characteristics and infrastructure are comparable, high-quality bus alternatives should attract riders at a level similar to rail (Ben-Akiva and Morikawa, 2002; Currie, 2005)
- Similar to rail, a significant portion of BRT ridership gains cannot be explained by quantifiable service improvements (Henke, 2007)
- ★ Jointly, these studies lay the theoretical framework for our research

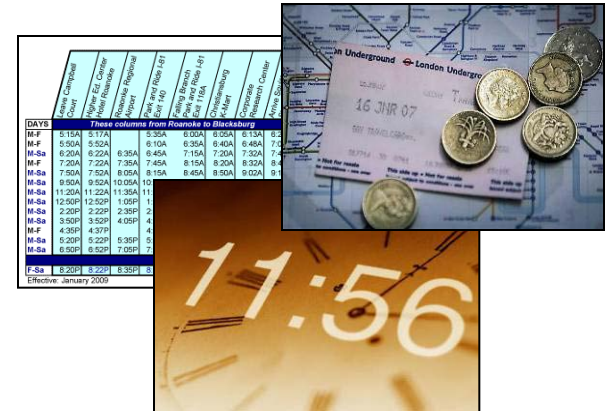
# Theoretical Framework of Our Research

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- Service attributes (both tangible and intangible), not an innate mode preference, explain the relative passenger attractiveness of alternative rapid transit modes
- If BRT is to attract riders at a level similar to rail, it must be comparable to rail in terms of both functionality (tangible attributes) and image (intangible attributes)
- To investigate these issues, we designed a study to:
  - Assess BRT's ability to convey the high-quality image typically associated with rail-based transit
  - Examine and quantify the tangible/intangible factors that drive perceptual differences between alternative transit modes

# Can BRT capture the quality image typically associated with rail-based modes?

- **Tangible Service Attributes**
  - Functional
  - Objectively quantifiable
  - Typically used in mode choice models
  
- **Intangible Service Attributes**
  - Abstract
  - Subjective
  - More difficult to measure and quantify



# Core Research Questions

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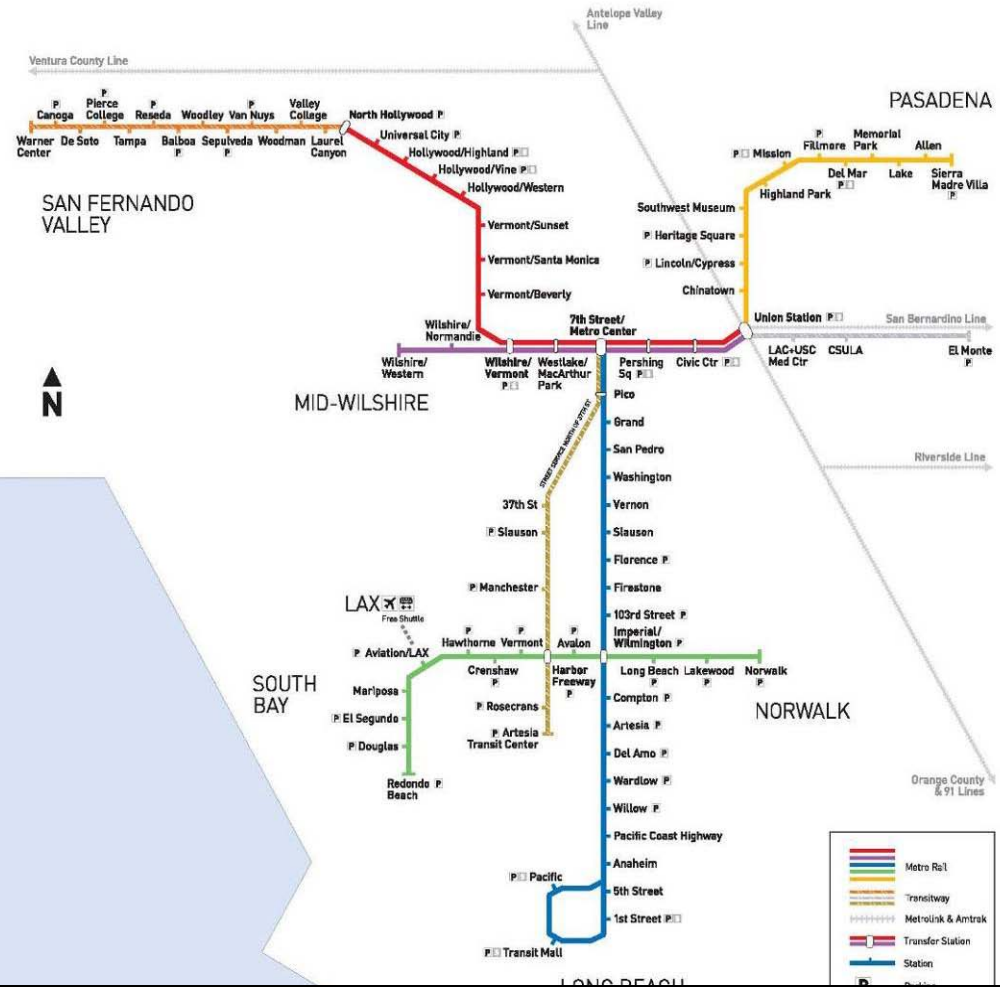
- Do people perceive alternative rapid transit modes differently?
- If differences exist, where do they originate?
- Can ridership attraction be attributed to specific tangible and intangible service attributes?
- What variations exist with regard to socio-economic / geographic factors?





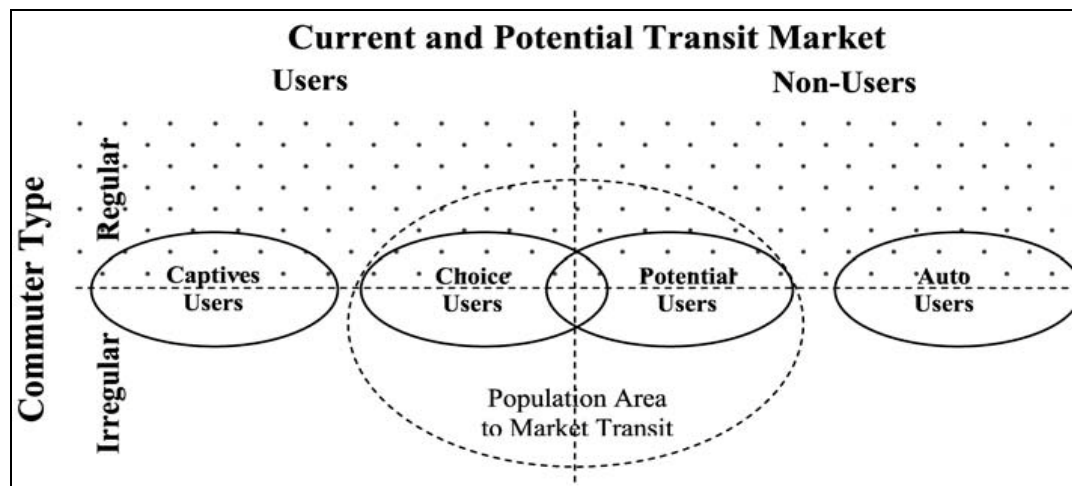
# Study Methodology

- Literature Review
- Los Angeles selected as case study location
- Focus groups in 2007
- Attitudinal survey in 2008
- Final report in 2009



# Focus Groups

- Objectives:
  - Identify different tangible and intangible factors
  - Understand the issues that influence the relative attractiveness of different rapid transit modes vs private auto
  - Inform survey design process
- Group composition:
  - Mostly choice users with some potential users
  - Users of local bus, Metro Rapid, Orange Line, Gold/Blue Line, Red Line



Source: Krizek, K., and El-Geneidy, A. 2007.

# The “Shame Factor”

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*“And last, but not least, there is another factor called the shame factor. I would be very embarrassed to tell my friends who know what kind of living I make ... I’m ashamed to tell that I am taking buses ... they would think, ‘Did he lose his job? Has he gone mad?’”*

-Male, 43, Metro Rapid user

# Tangible Service Attributes

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- Travel Cost – transit fares, plus related costs like parking
- Door-to-door travel time
- Frequency of service – how often the service runs
- Hours of service – how early or late service runs, and/or weekend hours
- Convenience of service – goes where you need to go/parking availability
- Reliability of service – does the service run on time?

# Intangible Service Attributes

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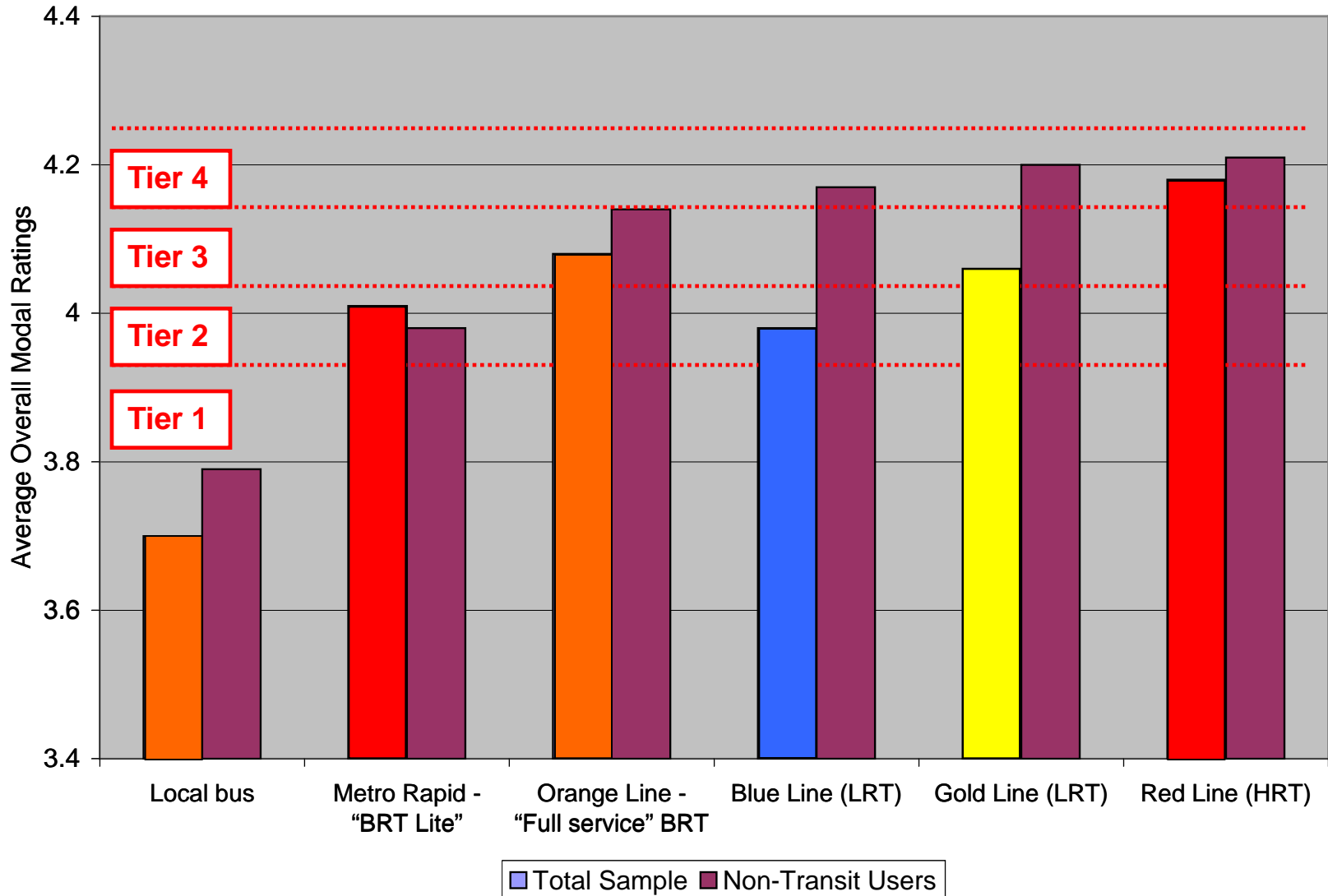
- Safety while riding – safety from accidents and/or crime
- Comfort while riding – seats available, temperature, smooth ride, cleanliness, etc.
- Safety at the station/stop – safety from accidents and/or crime
- Comfort at the station/stop – shelter from weather, amenities, etc.
- Customer service – provided by drivers and other transit service staff
- Ease of service use – clear service info, routes easy to figure out, etc.
- Other riders – feeling secure/at ease with others using the service
- Avoid stress/cost of car use – traffic, parking, accidents, tickets

# Attitudinal Survey

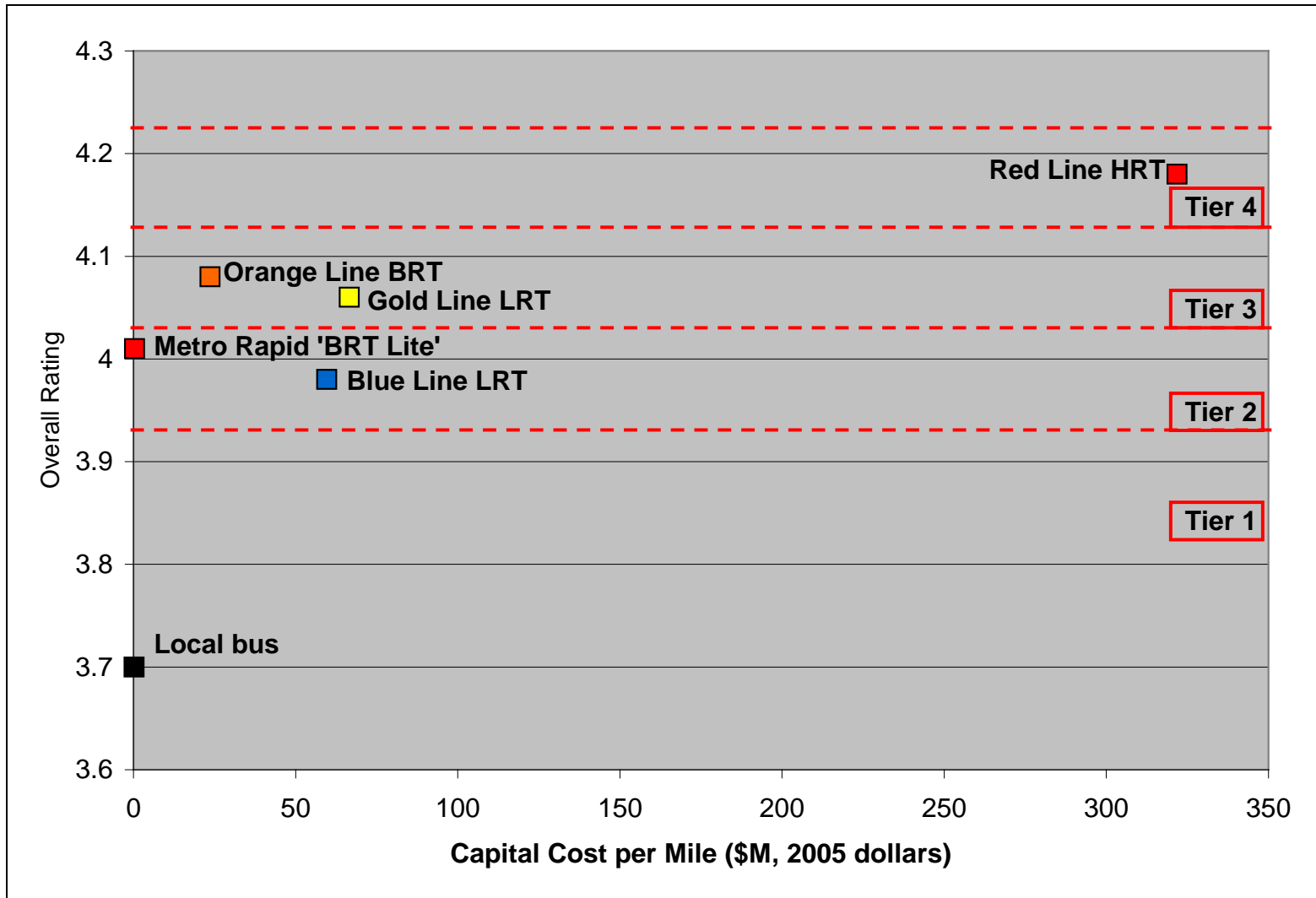
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- Survey objectives:
  - Quantify the relative importance of each tangible and intangible factor
  - Compare average overall ratings across each mode
  - Assess impact of socio-economic / geographic factors
- Redhill Group hired to collect and analyze data
- Data Collected in Fall 2008
  - Telephone survey sampled approx. 400 non-transit users
    - Auto captive
    - Potential users
  - Hybrid on-board / telephone survey sampled approx. 400 users of each transit mode
    - Regular bus
    - Orange Line (“Full BRT”)
    - Gold Line (LRT)
    - Metro Rapid (“BRT Lite”)
    - Blue Line (LRT)
    - Red Line (HRT)

# Do people perceive alternative transit modes differently?



# Overall Rating vs. Capital Cost per Mile

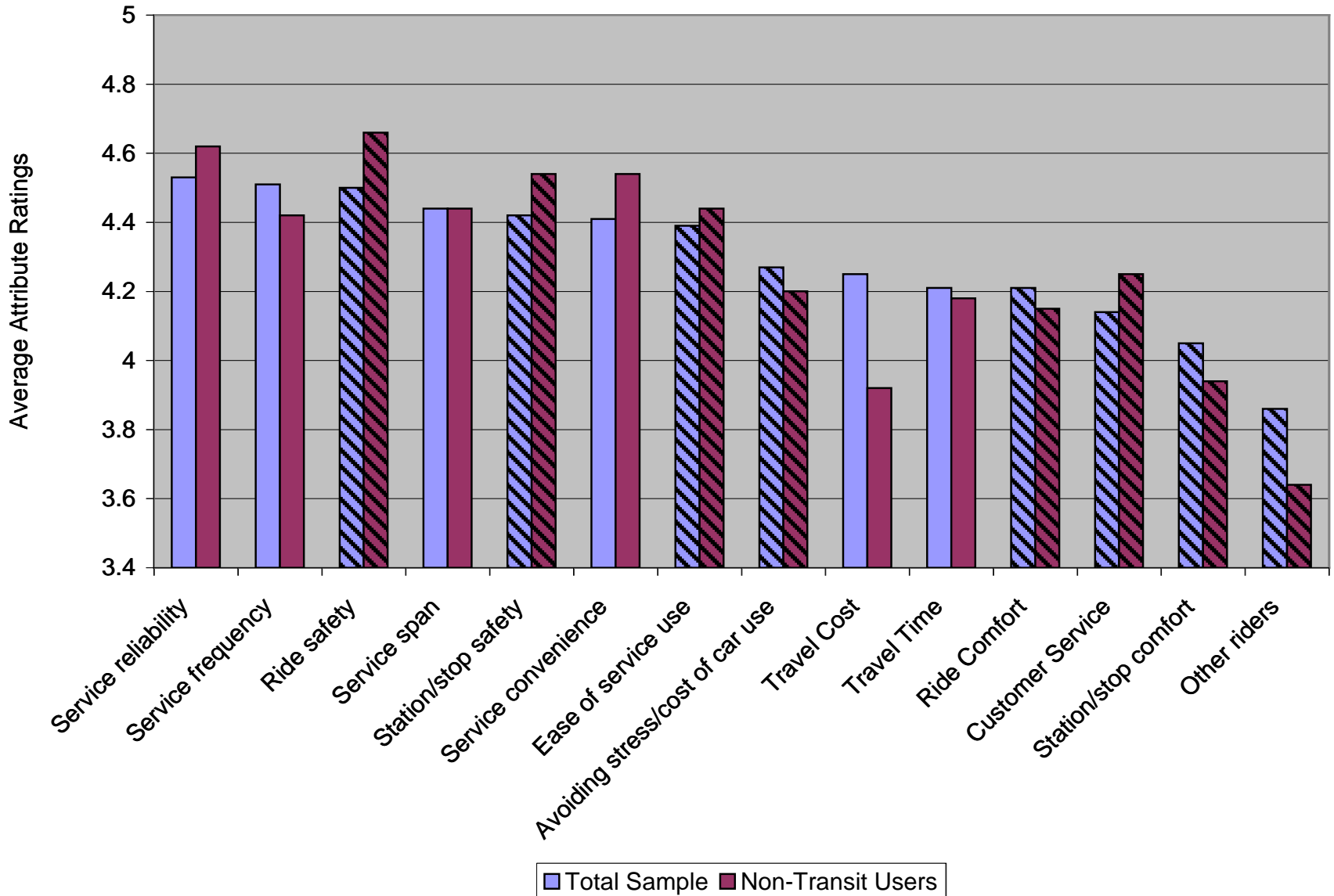




# Where do the modal differences originate?

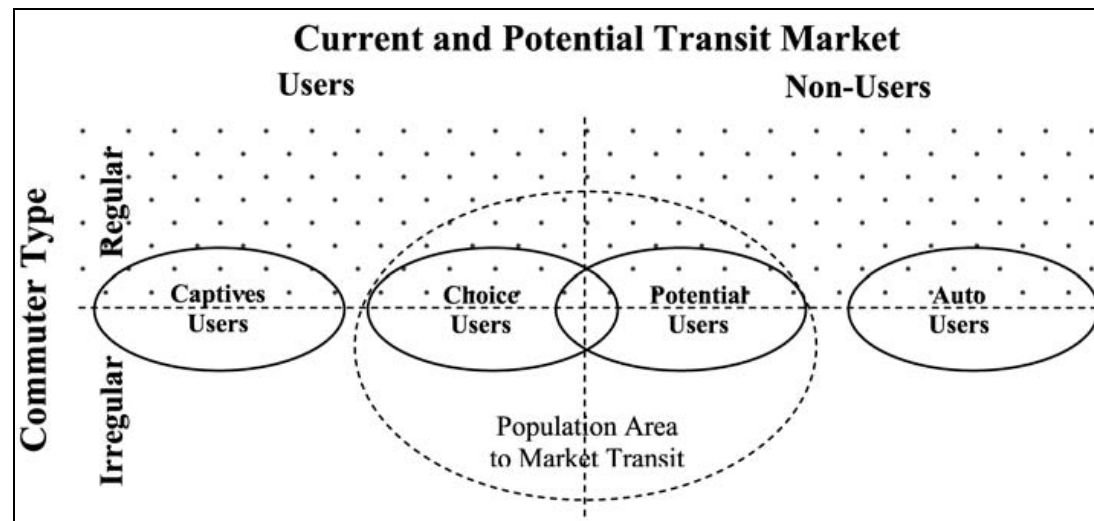
Modal Comparisons	Summary Analysis
Gold Line LRT vs. Blue Line LRT	Higher overall ratings achieved by Gold Line compared to Blue Line were primarily due to <b><i>intangible attributes</i></b> : - safety at station, safety while riding, and other riders
Orange Line BRT vs. Blue Line LRT	Higher overall ratings achieved by Orange Line compared to Blue Line were primarily due to <b><i>intangible attributes</i></b> : - safety at station, safety while riding, and other riders
Gold Line LRT vs. Orange Line BRT	Similar overall ratings were due to comparable <b><i>tangible and intangible attribute</i></b> ratings
Orange Line BRT vs. Metro Rapid BRT	Higher overall ratings achieved by Orange Line compared to Metro Rapid resulted from higher <b><i>tangible and intangible attribute</i></b> ratings: - Most significant difference related to station/stop comfort
Metro Rapid BRT vs. Local Bus	Higher overall ratings achieved by Metro Rapid compared to Local Bus were due primarily to higher <b><i>tangible attribute</i></b> ratings like travel time, frequency, and reliability

# Relative Importance of Different Tangible and Intangible Service Attributes



# What are the variations across socio-economic / geographic factors?

- Overall average rating of each transit service was generally consistent across socio-economic / geographic variables
- Overall average rating of each transit service was positively correlated with level of familiarity with that service
- Travel cost more important for transit captive users
- Travel time more important to transit choice users
- Transit users (choice and captive) put more weight on service frequency, travel cost, station comfort, and other riders)
- Non-transit users (potential and auto captive) put more weight on reliability, safety while riding, safety at station/stop, convenience, and customer service



# Findings

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1. Do people perceive alternative rapid transit modes differently?
  - Yes, analysis separated the modes into 4 statistically distinct tiers
2. If differences exist, where do they originate?
  - Level of investment
  - Urban context
  - A mixture of tangible and intangible service attributes
    - Reliability and service frequency are most important tangible attributes
    - Safety is the most important intangible attribute, particularly for non-transit users

# Findings (continued)

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3. Can ridership attraction be linked to specific tangible and intangible service attributes?
  - Tangible attributes (functionality) more important in determining attractiveness of lower-investment bus-based modes
  - Intangible attributes more important in determining attractiveness of higher investment BRT and rail modes
  
4. What variations exist across socio-economic/geographic factors?
  - Limited variation across different socio-economic/geographic groups
  - Transit market segmentation showed that some differences exist across the transit choice, transit captive, auto potential, and auto captive groups

# Conclusions

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- Differences in perception of alternative transit modes
  - Appear to be independent of any particular mode or technology
  - Are driven largely by the urban context in which they operate
- Full-service BRT can replicate both the tangible and intangible attributes normally associated with rail, but in return for lower capital cost investments
- Even a lower-investment BRT Lite service performs remarkably well in terms of overall rating achieved per dollar of investment

# Tangible and Intangible Service Attributes: Quantifying the Importance of Image and Perception to Bus Rapid Transit



Full report can be download at  
[www.nbrti.org/research.html](http://www.nbrti.org/research.html)

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