Bicycle Share Planning and Operations
Lessons Learned from Cabi and Hubway

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Presentation Overview

• Introduction to Bicycle Sharing
• Planning for a Bicycle Sharing System
• Operations and Data
• User Characteristics
Bike Sharing in North America

...plus a few small and university-based systems
Why Share Bikes?

• Environmental Benefits
• Extends range of transit system
• Increases viability of other modes
• Benefits local businesses
Environmental Benefits

- Over 80 percent of respondents increased bike use since joining Capital Bike Share
- 41 percent of members substantially reduced their use of a car
  - 5 million reduced VMT, annually
  - Also, reduced use of bus, metrorail, taxi
Extends Reach of Transit
Extends Reach of Transit
Extends Reach of Transit
Viability of Other Modes

• Addresses “last-mile” problem
  – Over 50 percent of survey respondents used bike share to access a metrorail station, and 20 percent to access a bus station
  – Used more frequently traveling FROM transit than TO transit

• Provides means for getting around during lunch hour

• Provides a ride home if too late for transit
Benefits Local Businesses

• Over 80 percent of respondents said they were more likely to patronize an establishment accessible by bike share

• Induced Trips:
  – 44 percent of bike share users used Capital Bike Share to make a new trip.
  – 95 percent of induced trips were social trips, restaurants, entertainment, or shopping

– Source: User Survey
Bike Sharing Today

Capital Bikeshare:

• Started September 2010 in Arlington, VA
• Over 2.3 million trips through July 2012
• 2.8 million miles traveled
• 190 Stations in Washington, Alexandria, and Arlington
Bike Sharing Today

Hubway:

• Launched August 2011
• 350,000 trips through July 2012
• 370,000 miles traveled
• Stations retracted for winter
• 96 stations in Boston, Brookline, Cambridge, and Somerville
• Introduction to Bicycle Sharing
• **Planning for a Bicycle Sharing System**
• Operations and Data
• User Characteristics
Questions to Consider

• **Program Goals**
  - Financially sustaining operations, no public money, transparency between operator and public agency, etc.

• **Physical and Demographic Considerations:**
  - Climate, topography
  - Resident, employee, and visitor populations
  - Extent of transit and bikeway network

• **Support:**
  - Is there political and policy support?
  - Is there someone willing to take ownership?
  - What are the roles of other stakeholders?
Physical, Demographic Considerations

- **Live** — Population density
- **Work** — Employment density
- **Play** — Retail corridors, landmarks, mixed use
- **Transit** — Bus, subway, ferry, trains
- **Intersection Density** — Street connectivity
- **Physical Geography** — Slope
- **Methodology** — Metrics used to generate a composite score. This provides a **good starting point** for station planning
Demand Estimation

Live

Work

Play

Topography
Composite Model

The suitability analysis is based on six (6) metrics. Each metric is scored on a scale of 1 - 5. A composite model is based on the sum of these six (6) metrics, with a maximum possible score of 30.

**Composite Model Output**

Sum of LIVE, WORK, PLAY, TRANSIT, INTERSECTION DENSITY and SLOPE scores.
Demand Models

Elements of Demand Considered:

• Number of trips starting and ending at a particular bike share station
• Number of members within a given area
Regression Analysis

Significant factors determining membership in an area:

• Population Aged 20-39
• Employment Density
• Multi-family housing
• Income $50,000 - $100,000
• Separated Bicycle Facilities
• Proximity to Center of System
Public Involvement

Welcome to the Cincinnati Bike Share system. You can suggest bike share stations and comment on others' recommendations. Here are the steps:

1. Click "Suggest a location" and move the red pin to where you want a station.
2. Click the "Confirm Location" button.
3. Give us more information by creating a station name, providing a description, and your name. You must leave a name for your point to appear on the map.

Share your station recommendations on Facebook, Twitter, and email them to others.

**At this time we are only accepting suggestions for station locations in Downtown, Over the Rhine, and Uptown.**

Close this window to get started!
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Bicycle Sharing Operations

Maintenance:

• Occurs in real time
• Alta Bike Share Warehouse
• Mobile Bike Checking
Bicycle Sharing Operations

Rebalancing:

• Alta Bike Share Vans
• Management Console
• Provide incentives for return trips
Trip Reporting Data

• User ID (Casual vs. Subscribed)
• Duration
• Starting Station
• Ending Station
• Land Use, Parks, Transit, Roadway Networks
What we have done

• Simple reporting
• Bicycle Miles Traveled
• Vehicle Miles Replaced
  – BMT and VMR by Network Distance?
  – Round Trips (currently not considered)
• Development of Demand Models
Simple Reporting

Trips Between Stations
Hubway, March - April 2012

- < 15 Trips
- 16 - 50 Trips
- 51 - 100 Trips
- 101 - 200 Trips
- 200 < Trips

- Stations
- Parks
- City Limits
Capital Bike Share Use over Time

Trips and Distance in Miles

- Distance
- Trips

Month:
- October
- November
- December
- January
- February
- March
- April
- May
- June
- July
- August
- September
- October
- November
- December

Year:
- 2010
- 2011
- 2012
Hubway Use over Time

Trips and Distance in Miles

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Winter Shutdown

- Trips
- Distance
Trip Distance

Trip Length

Average Distance in Miles

2010 2011 2012

October November December January February March April May June July August September October November December January February March April May June July

Capital Bike Share
Hubway
Time of Day

![Bar chart showing the percentage of usage by time of day for bicycle sharing services.]
Who is using Bike Share?

• Approximately 80 percent of trips are made by subscribers, increasing over time

• More casual users during winter months
Frequent Users

Number of Trips Taken per Member, December 2011

- 1-10: 2531
- 11-20: 6509
- 21-30: 1268
- 31-40: 561
- 41-50: 296
- 51-60: 105
- 61-70: 32
- 71-80: 22
- 81-90: 12
- 91-100: 3
- 101-110: 2
- 111-120: 2
- 121-130: 1
- 131-140:
- 141-150: 1

Total trips: 6509
Future Developments

• GPS
  – Route Choice: Bike Sharing can help to inform other bicycle planning activities

• Pricing Considerations
  – Demand-responsive pricing to help with redistribution
  – Multi-city subscriptions?
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• **User Characteristics**
Bike Share User Survey

• Conducted in 2011 for users of Capital Bike Share
• 5,464 Respondents (31% response rate)
• Respondents were more likely to be young, highly educated, white and male, and less affluent than the D.C. population as a whole.
Key Findings

• Increased bicycling use among members
• Bike share used most often for social trips, entertainment, errands and appointments
• Members experienced an annual personal travel expense reduction of $819
Increased Bicycling Use

Change in Bicycle Use since joining Capital Bike Share:

- Much less often: 0%
- Less often: 1%
- About the same: 17%
- More often: 46%
- Much more often: 36%
Trip Purpose

- Social / entertainment: 67% all trips, 22% most recent trip
- Go from work: 59% all trips, 19% most recent trip
- Go to work: 55% all trips, 19% most recent trip
- Errands / personal appointments: 64% all trips, 13% most recent trip
- Restaurant / meal: 56% all trips, 7% most recent trip
- Exercise / recreation: 36% all trips, 7% most recent trip
- Go to a meeting: 31% all trips, 6% most recent trip
- Shopping: 40% all trips, 4% most recent trip
- Other: 5% all trips, 3% most recent trip
Conclusion

• Bike sharing systems have provided tremendous benefits to their members
• Will continue to mature as an effective transportation option
• Data provide powerful analytical information for transportation practitioners
Thank you!

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