Carsharing: From Pilot Project to Implementation

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Shared-Use Vehicle Systems (a.k.a. carsharing, station cars):

- organized short-term vehicle rental
- joint access to a fleet of vehicles
- vehicles are used multiple times by multiple users

Key Benefits:

- improves transportation efficiency:
  - reduces number of vehicles to meet total travel demand
  - results in better land use (reduces parking requirements)

- user cost savings compared to personal car ownership: vehicle payments, insurance, maintenance, etc.

- environmental benefit: lower vehicle emissions/energy

- transit ridership: improves access to transit
Basic Shared Vehicle System Models:
Carsharing

- started primarily in Europe
- car sharing organizations (CSOs)
- small CSOs growing into larger systems
- most trips are round trips
- primarily reservation based
- most prevalent type of shared vehicle system
- www.carsharing.net
- www.ecoplan.org/carshare
Basic Shared Vehicle System Models: Station Cars

- initial concept was to deploy at transit station (i.e., transit feeder service)
- station cars concept now has cars placed at any high activity location
- other terms for stations: ports, pods, hubs, lots, etc.
- national station car organization: http://www.stncar.com/
Basic Shared Vehicle System Models: Multiple-Station Shared-Use Vehicle Model

- not necessarily transit based
- suited for resorts, campuses, large parks
- trips can be one-way or round-trips
- vehicle distribution issues
**Shared-Use Vehicle System Typology:**

- more formal structure will help identify key elements and differences
- help clarify many terms and usage
- identifies various models in the shared vehicle continuum
- identifies key attributes, similarities, dissimilarities, and success factors

**Key Elements of Classification System:**

- definition of basic objectives; links with other travel modes; size of target area and group to be served; organization, services offered, payments; vehicles; service; technological sophistication; sources of support

Shared Vehicle Systems

- nodes placed at transit stations
  - connections at trip starts/ends
    - commuting use
      - purely services commute trips
        - classic station cars
        - enhanced station cars
      - non-commuting use
        - with non-commute trips
          - corporate campus
          - academic campus
          - national parks
          - gated communities
          - resorts
          - city visitors
          - fleet vehicles
          - classic CSOs
        - campus setting (day-use)
        - resort/park setting
          - business use (mostly)
          - residential use (mostly)
    - hybrid designs
  - short-term non-commute trips
    - non-commuting use
  - inter-nodal travel allowed
    - no inter-nodal travel allowed

- distributed nodes without transit
  - non-commuting use

Station Cars

Car Sharing Organizations
Intelligent Transportation Technology can play key role in fostering shared-use vehicle systems:

- dispatching and reservation systems
- smartcard technology (i.e., keyless technology)
- intelligent communication and tracking systems
- on-board navigation and travel information

North America Carsharing has limited technology penetration:

- 39% have advanced operations
- 17% have partially automated services
- 44% have manual operations

(as of mid-2002, from: (Shaheen, Meyn, and Wipyweski, 2002])

Continental Differences in Carsharing

• **Europe:**
  - largest organized carsharing groups
  - interoperability is a key element of their organization (i.e., Mobility Switzerland)
  - large push toward integrating with other transit modes (i.e., trains)
  - technology penetration is slowly increasing

• **North America:**
  - neighborhood carsharing systems dominate
  - steadily increasing in numbers (7/2003: 15 major systems, 25,000 members, 800 vehicles)
  - successful in high density cities: Boston, Washington, Seattle, Chicago, San Francisco, Philadelphia, etc.
  - recent U.S. Transit Cooperative Highway Research Project

• **Asia:**
  - Japan: tend towards high technology, hybrid systems
  - Other systems in other areas are beginning to appear (Singapore)
  - high potential for shared-use vehicle systems in China
Shared Vehicle System Interoperability

- It is desired to have individuals use multiple shared-use vehicle services with minimal hassle.

- **Customer Interface Issues:**
  - Users could benefit by having similar system procedures.
  - Important for linking multiple systems and other transit modes.

- **Operational Issues:**
  - Difficult to have standards here that span all carsharing models.
  - Should not stifle new innovative operational methods.
  - Important to collect critical data for evaluation.

- **Vehicle Issues:**
  - Many automobile standards already exist.
  - Standardization here can be beneficial to vehicle OEMs.
  - Could be based on current IDB (intelligent data bus) development.
# Recent Carsharing in Japan

<table>
<thead>
<tr>
<th>Name of Organization</th>
<th>Name of Project</th>
<th>Begin</th>
<th>Service Area</th>
<th>No. of Station</th>
<th>No. of Vehicle</th>
<th>No. of Member</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 CVE Sharing Co., Ltd.</td>
<td>ITS/CEV City Car System</td>
<td>Sep-99</td>
<td>Yokohama City/Kanagawa Pref., Kawasaki City/Kanagawa Pref., Chiyoda Ward/the Metropolis of Tokyo</td>
<td>11</td>
<td>27</td>
<td>around 500 individuals</td>
</tr>
<tr>
<td>2 Toyota City</td>
<td>Toyota City Small Electric Vehicle Sharing Experiment</td>
<td>Mar-01</td>
<td>Toyota City/Aichi Pref.</td>
<td>5</td>
<td>17</td>
<td>33 corporations (around 860 individuals)</td>
</tr>
<tr>
<td>3 Eco Park and Ride Promotion Council</td>
<td>Atsugi Eco-Park and Ride Project</td>
<td>Jan-00</td>
<td>Atsugi City/Kanagawa Pref. and Vicinity</td>
<td>1</td>
<td>12</td>
<td>9 individuals and 4 companies</td>
</tr>
<tr>
<td>4 West Japan Recycle Movement Citizens’ Group</td>
<td>Car Sharing Network Non Profitable Organization</td>
<td>Oct-02</td>
<td>Fukuoka City/Fukuoka Pref.</td>
<td>6</td>
<td>24</td>
<td>232 individuals</td>
</tr>
<tr>
<td>5 Ido Support Ltd.</td>
<td>Business Use Vehicle Sharing System (mobi-system)</td>
<td>Feb-03</td>
<td>Mitaka City/the Metropolis of Tokyo</td>
<td>1</td>
<td>1</td>
<td>17 individuals</td>
</tr>
<tr>
<td>6 Nishio Rent All Co., Ltd., Sacos Co., Ltd.</td>
<td>Park City Tokyo Bay Shinurayasu Car Sharing System</td>
<td>Mar-04</td>
<td>Urayasu City/Chiba Pref.</td>
<td>3</td>
<td>6</td>
<td>150 individuals</td>
</tr>
<tr>
<td>7 Hankyu Saito Development Co., Ltd.</td>
<td>Saito Car Sharing System</td>
<td>Apr-04</td>
<td>Ibaraki City/Osaka Pref.</td>
<td>1</td>
<td>3</td>
<td>20 individuals</td>
</tr>
<tr>
<td>8 Station Rent-a-car Kansai Co., Ltd., Japan Railway West</td>
<td>Car Sharing &quot;Choinori Club&quot;</td>
<td>Apr-04</td>
<td>Shin-Osaka Station, Shin Kobe Station</td>
<td>2</td>
<td>6</td>
<td>no information</td>
</tr>
<tr>
<td>9 User, Shiki-no-wa Non Profitable Organization</td>
<td>Shiki &quot;Handmade Car Sharing&quot;</td>
<td>May-04</td>
<td>Shiki City/Saitama Pref.</td>
<td>1</td>
<td>1</td>
<td>5 individuals</td>
</tr>
<tr>
<td>10 Kyoto University Campus Car (C-Car) Operation Committee</td>
<td>Kyoto University Campus Car Experiment for Practical use</td>
<td>Aug-04</td>
<td>Kyoto City/Kyoto Pref., Uji City/Kyoto Pref.</td>
<td>4</td>
<td>10</td>
<td>15 Lab.</td>
</tr>
<tr>
<td>11 Tokai Kyujin Service Co., Ltd.</td>
<td>Linkul Car Sharing</td>
<td>Oct-04</td>
<td>Nagoya City/Aichi Pref.</td>
<td>4</td>
<td>10</td>
<td>around 10 individuals</td>
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<tr>
<td>12 Sugahara Automobile Industry Co., Ltd.</td>
<td>Windcar</td>
<td>Nov-04</td>
<td>Sapporo City/Hokkaido Pref.</td>
<td>3</td>
<td>3</td>
<td>42 individuals</td>
</tr>
<tr>
<td>13 Ube Pallet Rental Leasing Co., Ltd.</td>
<td>UPR Car Sharing System</td>
<td>Dec-04</td>
<td>Minato Ward/the Metropolis of Tokyo</td>
<td>3</td>
<td>3</td>
<td>in the firm</td>
</tr>
</tbody>
</table>

Source: Tuenjai and Atsushi Fukuda, Department of Transportation Engineering and Socio-Technology, College of Science and Technology, Nihon University
Transportation in China

- China has had tremendous economic growth, presenting many challenges:
  - social
  - environment
  - transportation
- as per capita income increases, so does amount of motorization
- infrastructure cannot handle increases in vehicles, but people want mobility and accessibility
- multi-modal approach (emphasis on public transportation) should be taken, shared-use vehicle systems can play an important role
Potential for Shared-Use Vehicle Systems in Asian Cities

- **Neighborhood Carsharing**: can apply towards apartment buildings in city
  - shopping, education, work typically located nearby
  - occasional excursions required: public transit? taxis?
  - carsharing can fill role where public transit doesn’t reach

- carsharing has lower cost than personal car ownership
- parking hassles are eliminated

- **Multi-Station Shared-Use Vehicle Systems**:  
  - academic and corporate campuses
  - expandable small settlements (i.e., “new towns”)
  - tourist areas
Carsharing Successful Factors

- existing mobility problems
- high population density (e.g., Shanghai vs. Los Angeles)
- system should capture as many travel modes as possible (e.g., cars, bike, scooters)
- hybrid models tend to be the most successful
- forward-thinking community
- government support
- high penetration of technology
- integration with other transit modes (e.g., trains, bus, etc.)
Carsharing Potential Barriers

• low cost of current mobility
• lack of community support
• lack of government buy-in
• insurance problems (high rates)
Summary

• shared-use vehicle systems could offer a flexible mobility alternative to many locations around the globe

• type of shared-use vehicle system should be customized for specific city attributes

• potential for success for developing cities:
  • high degree of success will come in cities that don’t have any deep-rooted notions of personalized ownership in terms of automobile usage
  • success will occur for cities that have the strength of governance that would enable it to establish supportive automobile use policies

• All national, regional, and municipal governments should consider incorporating shared-use vehicle systems into their comprehensive development and traffic management plans
Thank you!

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