

## **SHARED-USE VEHICLE SERVICES: A SURVEY OF NORTH AMERICAN MARKET DEVELOPMENTS**

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### **SUMMARY**

Shared-use vehicle services provide members access to a fleet of vehicles for use throughout the day, without the hassles and costs of individual auto ownership. From June 2001 to June 2002, the authors surveyed 28 North American shared-use vehicle service organizations on a range of topics, including business model approach, organizational size, strategic partnerships, pricing strategies, and technology applications. While survey findings demonstrate a decline in the number of organizational starts between June 2001-2002, the rate of operational launches into new cities, membership, and fleet size continue to increase. Several growth-oriented organizations in Canada and the U.S. are responsible for the majority of this growth and innovation. The authors also note several factors that could facilitate or inhibit shared-use vehicle market growth in North America, such as high capital investment (or start-up costs), dramatic hikes in insurance rates, grant programs and other supportive public policies, and technology developments.

Based on survey findings, the authors conclude that the public and private sectors can play a key role in optimizing the economic potential and social benefits of shared-use vehicle systems in North America. Further, the authors recommend that policymakers and transit organizations continue monitoring shared-use vehicle program benefits and smart technology applications (particularly integration with transit fare collection) and fostering long-term system growth and sustainability through grant making, supportive public policies (e.g., parking), and strong public-private partnerships.

### **INTRODUCTION**

Travel choices are often limited by lack of connectivity among travel modes, such as transit services. Shared-use vehicles (linked to key activity locations and transit) can help to expand the mobility options of individuals who prefer to use transit, walk, or cycle, but still require access to a personal vehicle for a portion of their trip. The principle of shared-use vehicles is simple:

Individuals gain the benefits of private car use without the costs and responsibilities of ownership. Instead of owning one or more cars, a household or business accesses a fleet of shared-use vehicles on an as-needed basis. Individuals gain access to vehicles by joining an organization that maintains a fleet of cars and light trucks in a network of locations. Generally, participants pay a fee each time they use a vehicle (1, 2).

Shared-use vehicle services can be classified into two main operational models: station car and carsharing programs (3). Station cars are often shared, although not always. They facilitate transit access either on the home- or destination-end of a trip. Carsharing can be thought of as organized short-term car rental—often located at or near transit stations—accessible in convenient locations throughout neighborhoods, office parks, and college campuses. Carsharing organizations are most often found in dense metropolitan areas and distributed throughout neighborhood lots. Increasingly, the concepts of carsharing and station cars are “merging” so that they include both elements: transit linkages and distributed lots (3, 4). One can envision a shared-use vehicle continuum, ranging from carsharing to station cars, in which several new models fall in between these classifications. (For an in-depth discussion of this shared-use vehicle classification system, see (3).)

Many organizations in North America operate similarly to the majority of European carsharing organizations: Individuals access cars from nearby neighborhood lots and return them to the same lot (not typically linked to transit). This European approach, which started as a grassroots, cooperative effort in Switzerland, represents “classical” carsharing (1). In contrast, “station cars” have their roots in the United States and serve transit/rail commuters primarily, often using electric vehicles. Station cars typically provide a demand-responsive extension to fixed-route rail services and may or may not be shared by multiple individuals (1, 2, 5).

Common goals among North American shared-use vehicle organizations (as reported in the authors’ 2001-2002 survey) include:

- Facilitating more efficient land use (e.g., shared-use vehicles reduce the number of parking spaces needed);
- Providing cost savings since customers pay per use, sharing the costs of the vehicle lease, maintenance, repair, and insurance;
- Addressing pollution if the vehicle complements an alternative travel mode—e.g., commuters using transit can augment their travel with a shared car, often avoiding a personal vehicle purchase—or the fleet consists of “clean fuel” vehicles; and
- Increasing mobility options and connectivity among transportation modes.

This paper provides an overview of North American shared-use vehicle system growth and market developments from 1994 to the present. From June 2001 to June 2002, the authors surveyed 28 operational shared-use vehicle programs in North America to monitor trends and developments. Organizations were surveyed by a combination of e-mail questionnaires and telephone interviews three times throughout the year. In addition, researchers also updated data from each organization’s web site, if available. During this period, several new organizations were added and several programs ended, growing from a total of 24 in 2001 to 28 programs in 2002. The predominant reason for program termination was a significant increase in insurance

rates (some reported as high as a 500 percentage point increase in rates following 9/11 events and changes in insurance policies). Data reported in this paper only reflect those 28 organizations that were active at the end of June 2002.

This paper includes two main sections. The first is an overview of market growth since 1994, in which the authors explore the emergence of more growth-oriented organizations, total membership and vehicle trends, and early findings related to business model approach. Next, the authors discuss innovative market developments, including partnerships, rate structure differentiation, and advanced technology developments. Finally, the authors provide a summary of key observations and conclusions from this one-year survey. The authors conclude that while indications of a shared-use vehicle market niche are encouraging, the ability of this emerging sector to actualize its collective environmental, economic, and social goals, may be limited without the support of private industry (e.g., automakers, insurance providers) and public agents (e.g., transit, governmental agencies). Indeed, public-private partnerships may play a key role in accelerating the deployment of shared-use vehicle systems in North America.

### **NORTH AMERICAN SHARED-USE VEHICLE SERVICES: 1994 TO PRESENT**

Shared-use vehicle services were largely popularized in Europe in the late-1980s. In its nascent stages, North American shared-use vehicle organizations have looked to European experience for guidance. Prior to the 1980s, European carsharing was experimental and limited to small, localized organizations. Two influential carsharing organizations were formed in the late-1980s—StattAuto in Berlin and a Swiss program now called “Mobility CarSharing Switzerland.” Mobility CarSharing Switzerland has continued to grow—now claiming over 50,000 members—while StattAuto’s growth began to stagnate in the mid- to late-1990s (1). Switzerland’s success has been credited to a more business-oriented approach, which has been emulated by many North American organizations.

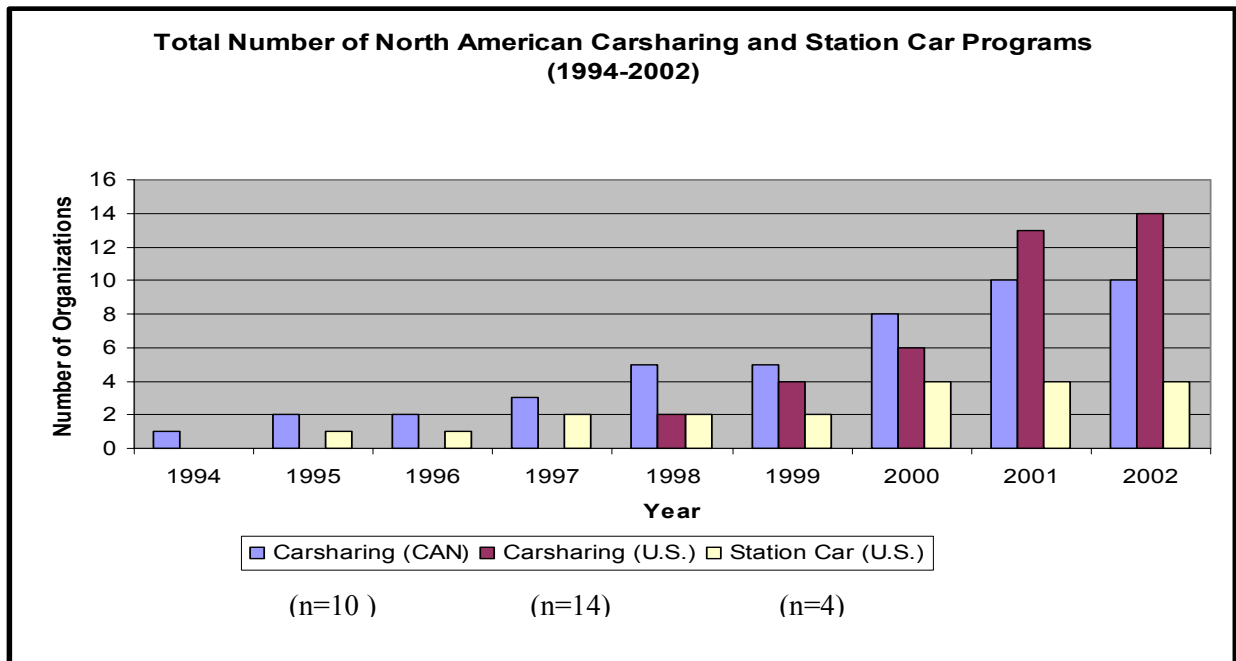
In North America, carsharing was first successfully established in Canada in 1994 by a cooperative that later became a commercial enterprise (CommunAuto). By 1998, there were four carsharing organizations in Canada (three of these non-profits or cooperatives) and another four non-profit organizations had emerged in the U.S. Furthermore, in the mid-1990s, rail transit operators seeking to relieve parking shortages at stations launched several electric station car programs (1). Since these early developments, the number of shared-use vehicle organizations has grown to a total of 28 in North America. In the U.S., there are now 14 carsharing organizations, four station car programs (two are located in California; the others are in New York and New Jersey); three shared-use vehicle research pilots (all located in California); and approximately 12 shared-use vehicle operational deployments planned for the future. (See Figure 1 below.) As of June 2002, U.S. shared-use vehicle programs collectively claimed approximately 11,500 members and operated 567 vehicles. In Canada, ten carsharing organizations collectively claimed 5,065 members and 311 vehicles, and several are in planning stages. Not surprisingly, the majority of carsharing members in the U.S. (80 percent) and Canada (100 percent) live in the 25 most densely populated cities in these nations.

North American shared-use vehicle programs continue to grow. However, just a few are responsible for the majority of this growth in the U.S. and Canada. Several growth-oriented organizations have emerged that are pioneering new market segments and diversified rate structures, partnerships with the public and private sectors, and advanced technology applications to support their systems.

### Emergence of Growth-Oriented Organizations

While survey findings demonstrate a decline in the number of organizational starts between June 2001-2002 (see Figure 1 below), the rate of operational launches into new cities (i.e., existing organizations replicate and expand into new regions) and total membership and fleet size (Figures 2 and 3 below) continues to increase. This indicates a number of possible trends: 1) an unmet demand for short-term vehicles that supplement existing transportation networks in multiple cities; 2) emergence of several carsharing organizations with growth-oriented models, who can more quickly meet demand; and 3) change in market forces experienced by start-up carsharing organizations (e.g., initial fixed costs such as vehicles, insurance, and technology have increased or start-up grant funding has declined or both).

**Figure 1**



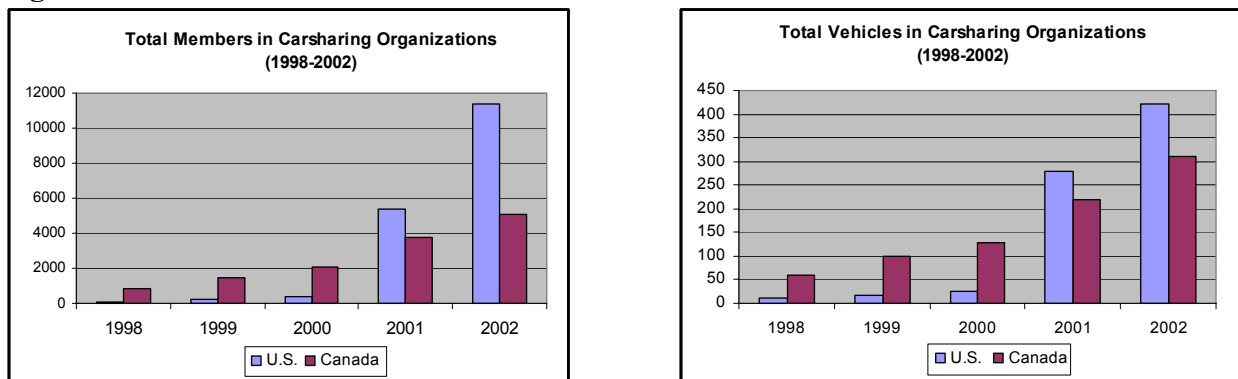
As mentioned earlier, a few organizations serve the majority of carsharing members in multiple regions in the U.S. and Canada. For instance, City CarShare, Flexcar, and Zipcar each operate in several cities in the U.S. Collectively these organizations serve 92 percent of all U.S. carsharing members. A few of these organizations are also beginning to provide support to smaller, start-up organizations (e.g., reservations systems). Similarly in Canada, CommunAuto, Co-operative Auto Network (CAN), and Autosshare Toronto serve 93 percent of all Canadian carsharing members. Furthermore, several organizations in Ontario have begun to coordinate their services to allow members of one program to conveniently use the services of another without the hassle

of re-registering. Reportedly, overall carsharing membership in the Ontario region has grown as a result of this collaboration.

### Total Membership and Fleet Growth Trends

Almost exponential growth in U.S. carsharing memberships and high growth rates in Canadian programs further demonstrates that existing organizations are developing effective strategies to attract a growing membership base (see Figures 2 and 3 below). In the U.S., carsharing membership grew by approximately 210 percentage points between 1998-1999; 97 percentage points between 1999-2000; 1,174 percentage points the following year; and 112 percentage points to date (between 2001 and June 2002). Membership in Canadian carsharing organizations also has continued to grow. Membership grew by 74 percentage points between 1998-1999, 43 percentage points between 1999-2000, 81 percentage points the following year, and 35 percentage points to date (between 2001 and June 2002). Growth in total carsharing vehicle fleets reveal a similar trend (see Figure 3).

Figures 2 & 3

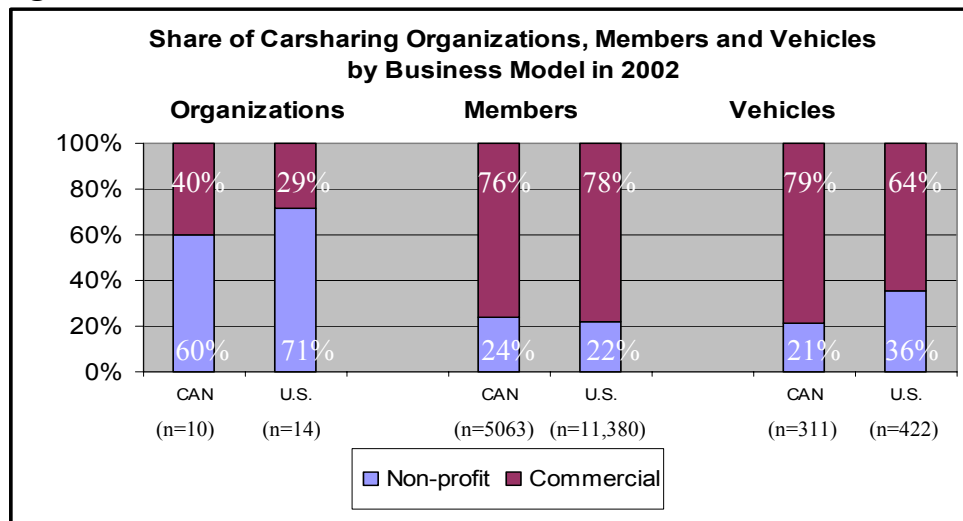


### Business Model Approaches: Early Findings

In this section, the authors explore the relationship between organizational share and business model (i.e., for-profit vs. non-profit). While non-profits programs represent a higher proportion of total organizations, survey data indicate that for-profit organizations are capturing a larger market share than non-profits comparatively. As Figure 4 (below) illustrates, 60 percent of all Canadian organizations and 71 percent of all U.S. organizations are non-profits. However, non-profits in Canada and the U.S. serve only 24 and 22 percent of total membership and maintain 21 and 36 percent of total vehicles (respectively).

Although non-profits appear to grow more slowly than for-profit shared-use vehicle operations, differences in organizational size are not necessarily strongly correlated to business model. Distinctions may be related to a combination of factors, such as the organization's goals, financing, and environment. Indeed, several non-profit carsharing organizations exist in smaller communities where membership growth has natural limitations; consequently, their goals and opportunities for growth are not as aggressive as those of commercial or metropolitan organizations. Given the limited sample (n=28) and timeframe of this analysis, it is still too early to draw conclusions on business model role in overall market growth.

**Figure 4**



To summarize, the reduced number of organizational launches amidst continuing membership and fleet expansion indicates that entry barriers likely exist and could be increasing. The high fixed costs of vehicle lease/purchase, technology development, and insurance could be significant deterrents to new organization’s market entry. Those organizations that have passed the planning phase have established valuable expertise and networks and are more competitive in applying for start-up funds. Many currently in the planning phase, are looking to existing organizations for expertise and the provision of several high-cost services (e.g., reservation systems, vehicles, and insurance). While insurance was not listed as a major cost or concern in the 2001 survey, by June 2002 researchers found increased insurance costs a major obstacle to expansion and sustainability for the vast majority of North American organizations. This is largely due to three main factors: 1) insurance economics changed after the 9/11 event, resulting in expected industry costs of at least \$40 billion (6); 2) a recent court decision ruling that essentially no generic parts can be used in auto repairs (affecting overall premiums); and 3) accident awards rose by 44 percentage points industry wide between 1994 and 2000 (7). The next section explores innovative market developments reflected in partnerships with transit agencies and developers, diversified rate structures, and advanced technology.

### **INNOVATIVE MARKET DEVELOPMENTS**

Based on the shared-use vehicle survey, the authors note several innovative market developments among a number of North American shared-vehicle organizations. Market expansion is occurring by means of public and private partnerships, differentiated rate structures, and potentially, through advanced technology developments. In this section, the authors describe several new developments.

## Partnership Management

In the last year (2001-2002), automakers, air agencies, housing developers, transit providers, rental/fleet service providers, and policymakers have become more engaged in the North American shared-use vehicle sector, particularly in the U.S. Several examples of these partnerships exist and are described below.

***Automakers and Air Agencies:*** Increasingly, auto manufacturers, such as Honda, Toyota, Ford, Nissan, and DaimlerChrysler, have become more involved in the deployment of shared-use vehicle fleets in the last few years. In March 2002, for instance, Honda purchased an 18 percent equity share in the Flexcar business. Furthermore, auto manufacturers potentially have a greater incentive to engage in shared-use vehicle markets due to proposed revisions to the California Zero-Emissions Vehicle Mandate (ZEV Mandate) (for more details see (4)). As proposed, revisions to the ZEV Mandate would award automakers additional ZEV credits for placing clean-fuel vehicles into shared-use vehicle systems. These amendments could potentially place between 2,500 to 3,500 clean-fuel vehicles into shared-use vehicle operations in California by 2008. Other states may follow suit, further increasing the total national fleet of shared-use vehicles.

***Housing Developers:*** In addition, shared-use vehicle organizations and automakers have collaborated with housing developers in recent years to implement carsharing in planned communities and multifamily housing complexes. Through such partnerships, stakeholders have discovered mutual benefits: 1) developers receive parking variances that allow them to construct more housing with fewer dedicated parking spaces, optimizing their returns; and 2) shared-use vehicle providers realize increased market share from residential communities. Several examples of this already exist. City CarShare has partnered with developers to locate vehicles within tenant garages. In spring 2002, Zipcar launched carsharing services at an elderly home in Greenberg, Maryland. In addition, General Electric Motors (GEM), a DaimlerChrysler company, is working with planned communities to incorporate shared neighborhood electric vehicles (NEVs) into their designs in California.

***Transit Providers:*** Transit providers and municipal authorities throughout the U.S. have increased efforts to integrate shared-use vehicles along their routes (e.g., Atlanta, New York, Washington, D.C., and San Francisco Bay Area). In December 2001, after issuing a request for proposal, the Washington Metropolitan Area Transit Authority (Metro) partnered with Flexcar to offer a carsharing service to Metro riders in the D.C. area. The Metro Atlanta Regional Transportation Authority (MARTA) and eMotion Mobility also announced a partnership in January 2002 to place over 2,500 vehicles along MARTA (8). In Anaheim, California, the Transportation Management Association deployed a neighborhood carsharing program (terminated in spring 2002) and a station car program for Metrolink commuters. The New York Power Authority and the Metropolitan Transportation Association have also joined forces with Ford Motor Company to place up to 100 Th!nk vehicles along New York City train stations for commuters in 2002.

***Car Rental Agencies and Fleet Service Providers:*** Car rental agencies and fleet service providers are also testing the short-term rental concept. Car rental agencies such as Avis, Hertz, and Budget, have been involved with carsharing primarily in the United Kingdom. Partnerships in the U.S. are also developing, particularly with Hertz. In Canada, it is not uncommon for shared-use vehicle organizations to offer member discounts with rental car agencies, enabling their customers to rent cars for longer periods more economically. Forty percent of Canadian survey respondents stated that they provide rental company discounts for long-term trips. In contrast, only one carsharing organization in the U.S. is currently offering discounts with two rental companies. Nevertheless, emerging partnerships with rental companies are beginning to exhibit more vigorous service integration with transit in the U.S. In spring 2002, Hertz, which has been involved in a station car program along the BART line in the East Bay for several years, announced expansion to a second BART station in South San Francisco. Fleet service providers also see potential in the shared-use vehicle concept. In Washington, D.C., a metropolitan transportation management agency is working with Clean Cities, a fleet provider, to locate station cars at employment sites.

***Policymakers:*** In the U.S., policymakers are also making significant contributions to the development of shared-use vehicle services. Approximately 60 percent of U.S. shared-use vehicle survey respondents received some public money for start-up costs, and 30 percent are currently receiving public funding after their first-year operations. In 2000, City CarShare received \$750,000 in start-up funding from the U.S. Department of Transportation, as well as a second-year grant of \$478,000. Federal Congestion Mitigation and Air Quality (CMAQ) funding has also been granted for the deployment of shared-use vehicle operations in Chicago and Atlanta. In January 2002, the U.S. Environmental Protection Agency (EPA) awarded the city of Vancouver \$64,000 to implement a carsharing/bikesharing program in conjunction with the C-Tran rail line and Flexcar. Furthermore, the California Department of Transportation participated in a public-private partnership along with American Honda, the University of California, and Caltrain, to launch CarLink II, a pilot research project, in July 2001. At the local level, several shared-use vehicle programs are also receiving support from local government and community development funds.

In contrast, Canadian policymakers have not taken as active of a role in promoting shared-use vehicle organizations. Exceptions include city planners and officials who have helped provide discounted parking permits, start-up grants or loans (usually below \$20,000), and support in local municipal planning documents to local carsharing organizations. At the federal level, grants ranging between \$20,000 to \$40,000 also have been awarded to non-profit carsharing organizations. However, at provincial and municipal levels, support has been much more limited, with just one grant awarded to the city of Quebec, who hosts the oldest North American carsharing organization—CommunAuto. Additionally, transit municipalities in British Columbia and Quebec have participated in station car demonstrations. Limited government funding and support in Canada may be one reason that the U.S. has experienced more shared-use vehicle growth in recent years comparatively.

All of the aforementioned stakeholders, as well as increased media exposure, have supported shared-use vehicle market developments in North America in recent years. As discussed above, many North American shared-use vehicle organizations are expanding into new user markets



(e.g., residential developments), as well as fine-tuning their business plans to the needs of new consumer niches. Partnerships often result in complementary marketing strategies targeted at particular market segments, including new rate structures (as described below).

### **Diversity in Rate Structures**

Approximately 61 percent of North American shared-use vehicle organizations surveyed use a similar payment schedule that typically includes an application fee, monthly administrative fee, and variable hour and mileage fees. Since 2001, several shared-use vehicle organizations have modified their payment plans to offer more diverse payment options—customized to a range of member needs (e.g., employers, residential complexes). For example, Flexcar now offers a range of packages from which members select a plan that best reflects their anticipated hourly and mileage use per month. Many cell phone providers offer an analogous model to private customers. This approach can capture a potentially wider range of household market segments—from very occasional to more regular users.

In addition, over 25 percent of North American shared-use vehicle organizations surveyed have started offering business rates to employers. CarLink I, which launched in 1999 along the Bay Area Rapid Transit (BART) District line in the Bay Area, was the first shared-use vehicle operation to offer employer rates in the U.S. (9). Since most programs primarily serve individuals, who typically use vehicles on evenings or weekends, cars are often underutilized during the day. Thus, partnerships with employers can provide shared-use organizations with a steady stream of users and revenues throughout the workday. The final section addresses advanced technology developments among North American shared-use vehicle programs.

### **Advanced Technology Developments**

Managing a shared-use vehicle service for a diverse clientele not only requires differentiation of rate plans and billing, but protection against fleet mismanagement. Intelligent transportation technologies can enhance shared-use vehicle systems, making them more convenient for users and operators. Advanced technologies have been tested and implemented in research pilot programs such as CarLink II, Intellishare, and ZEVNet to enhance the operability, security, and management of shared-use vehicle services. Advanced technologies can also improve three major components in shared-vehicle systems:

***Vehicle Access:*** Smart cards and key fobs communicate user information to a centralized database that uses member IDs to track participant activities for billing and security purposes. Smart card technologies have the potential to streamline administration and fleet management and allow for a variety of transportation services (e.g., carsharing, smart parking, and transit). While modern vehicle access systems require high initial fixed costs (e.g., the installation of smart card readers in carsharing vehicles), more accurate, efficient and convenient operational processes can improve customer satisfaction and lower administration costs. Improving security through intelligent vehicle access technologies can also help decrease insurance costs (i.e., more control of vehicle fleet).

**Reservation Systems:** Automated reservations via online, voice recognition, or touch-tone telephone systems allow for quick and convenient customer scheduling in addition to decreased labor and administration costs.

**Data Collection:** Automated vehicle location technologies are used to track the carsharing fleet over a cellular communications or radio frequency network. This allows for enhanced customer services and streamlined management with automated vehicle data collection. Improved member tracking can be used for automated billing and increased security (e.g., vehicle immobilization). Satellite tracking systems, such as global positioning systems (or GPS), can also play a key role in reducing insurance costs.

To develop a streamlined carsharing system, vehicle access, registration, and data collection should be linked and coordinated. Intelligent technologies can also assist in providing more customer-friendly services (e.g., in-vehicle navigation and radio station/seating preferences). In the following section, authors review the current status of intelligent transportation system technologies in the North American shared-use vehicle market.

### Current Technology Status

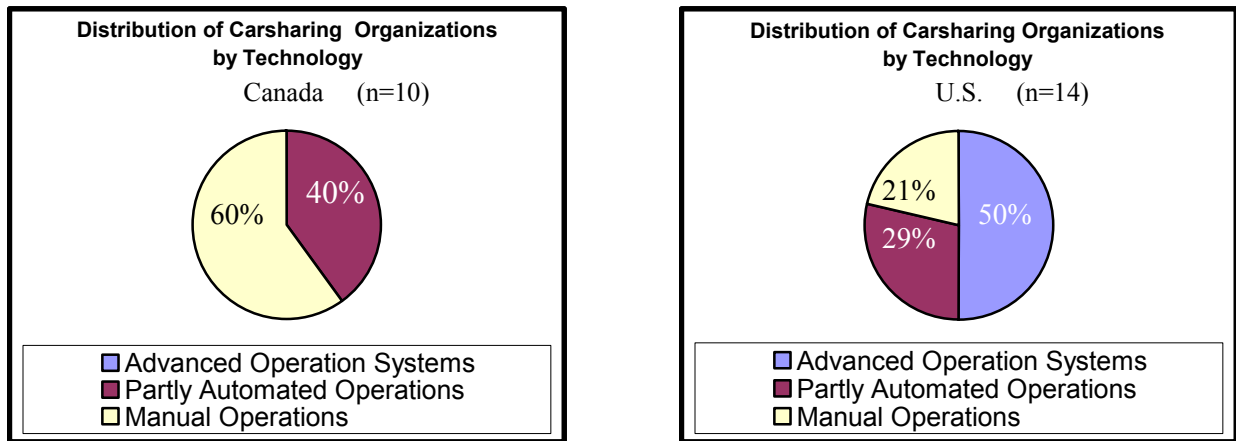
At present, the majority of shared-use vehicle service providers are challenged by technology costs, despite widely acknowledged benefits (e.g., reduced insurance rates due to vehicle tracking). Many small operators still rely on low-tech solutions that can limit expansion and service options. Throughout this survey, many respondents expressed a need for more affordable technologies, which could also facilitate one-way rentals (i.e., members are not required to return their vehicles to the same location). At present, most organizations require two-way rentals (i.e., vehicles must be returned to the same lot). Furthermore, several recognized the advantages of smart chip technologies in linking their services to other carsharing operators and transit. However, high technology development costs have deterred most organizations from developing systems, with just a few exceptions in the U.S. (e.g., City CarShare, Zipcar).

Figures 5 and 6 (below) illustrate the distribution of providers in the U.S. and Canada providing smart carsharing services, ranging from partially automated (e.g., automated reservations via touch-tone telephone or Internet or both) to advanced operations (e.g., smart card access, reservations, billing, automated vehicle location, cellular/radio frequency communications). As illustrated, 50 percent of U.S. organizations have advanced operations; 29 percent provide partially automated services; and 21 percent offer manual services. In contrast, Canadian organizations have not yet launched advanced operations. Sixty percent of organizations provide manual operations, and 40 percent offer partially automated services. In the near future, a large Canadian carsharing operator plans to develop an advanced carsharing system that they may license to other organizations.

Not surprisingly, operations with sufficient start-up funding and a large fleet can attract technology provider investments. One such operation, eMotion Mobility, recently announced their selection of a California-based technology provider to supply their advanced system, which includes GPS and digital cellular and wireless local area network communications. Other

providers, such as City CarShare, plan to offer members smart key fob access that is interoperable with smart transit fare passes in the San Francisco Bay Area.

**Figure 5 & 6**



Not surprisingly, the development and testing of advanced technologies is not financially feasible for many organizations. In the near future, shared-vehicle providers may overcome such hurdles if more systems become available for purchase, costs are lowered, and start-up funds can be secured (e.g., government grants). Several small shared-use vehicle operators plan to license technology from larger organizations that have developed advanced systems. Another development includes technology-leasing services (e.g., access management and billing). Such services could be centralized and provided by larger organizations for smaller programs in the future. Both approaches could aid larger and smaller operators in further developing advanced technologies and ultimately expanding their services and viability.

## CONCLUSION

To summarize, business-oriented and entrepreneurial shared-use vehicle operations are beginning to reach more market segments. A dichotomy is emerging in North America: 1) smaller shared-use vehicle organizations, which serve the needs of a particular community group and reflect more limited organizational growth; and 2) entrepreneurial-minded organizations that have competitive growth goals, seeking to create and capture new market sectors (e.g., residential and business developers). These growth-oriented organizations appear to be pioneering new market niches among commuters, employers, developers, and stratified household segments.

The potential of shared-use vehicle service organizations to expand and address a range of social and environmental goals will likely reflect the support of the private and public sectors. The private sector can bring a competitive, business approach to shared-use vehicles operations. Policymakers and transit operators can emphasize social and environmental benefits through grant opportunities, preferential parking, related public policies (e.g., high occupancy vehicle (HOV) lane access), and outreach/marketing support. Strong public-private partnerships will likely continue to play a key role in facilitating the on-going development of viable shared-use

vehicle organizations in the U.S. and perhaps Canada. Thus, it will be important for the public and private sectors to work together to monitor system designs and impacts to assist shared-use vehicle organizations in developing strategies that manifest the greatest social benefit and long-term growth and viability.

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