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**Creating a New Future for Public Transportation:  
TCRP's Strategic Road Map**

*This digest summarizes the findings from TCRP [Project J-8A](#), "New Paradigms for Public Transportation: A Scoping Study." A future-search conference was held May 12-14, 1997, to identify research that could lead to new paradigms for a better future for public transportation. The future search process, findings, and recommendations follow. The Eno Foundation was retained to conduct TCRP Project J-8A and organize the future search. Richard Daft of the Center for Change Leadership, Owen Graduate School of Management, Vanderbilt University, and Robert Lingual of the University of Texas served as the facilitators at the future search and are the authors of this digest along with Consultant, Glenn Perdue.*

**INTRODUCTION**

The public transportation industry in the United States is on the threshold of major change. In response to the crisis of reduced ridership, declining finances, and waning public support, the TCRP is sponsoring innovative research initiatives to direct fundamental change in transit organizations toward a broader "mobility management" mindset. The road map outlined in this report shows how TCRP's J-8 Task Group is generating momentum for transit industry adaptation to the changing needs of its public stakeholders.

**PURPOSE OF PUBLIC TRANSPORTATION**

The mission of public transportation in the United States reflects its important position in a complex transportation network. Public transportation has the potential to provide low-cost mobility to citizens, to facilitate a healthy environment and strong metropolitan areas by reducing traffic congestion and pollution, and to support pedestrian-oriented communities. This mission can be served via seamless integration among transportation systems,

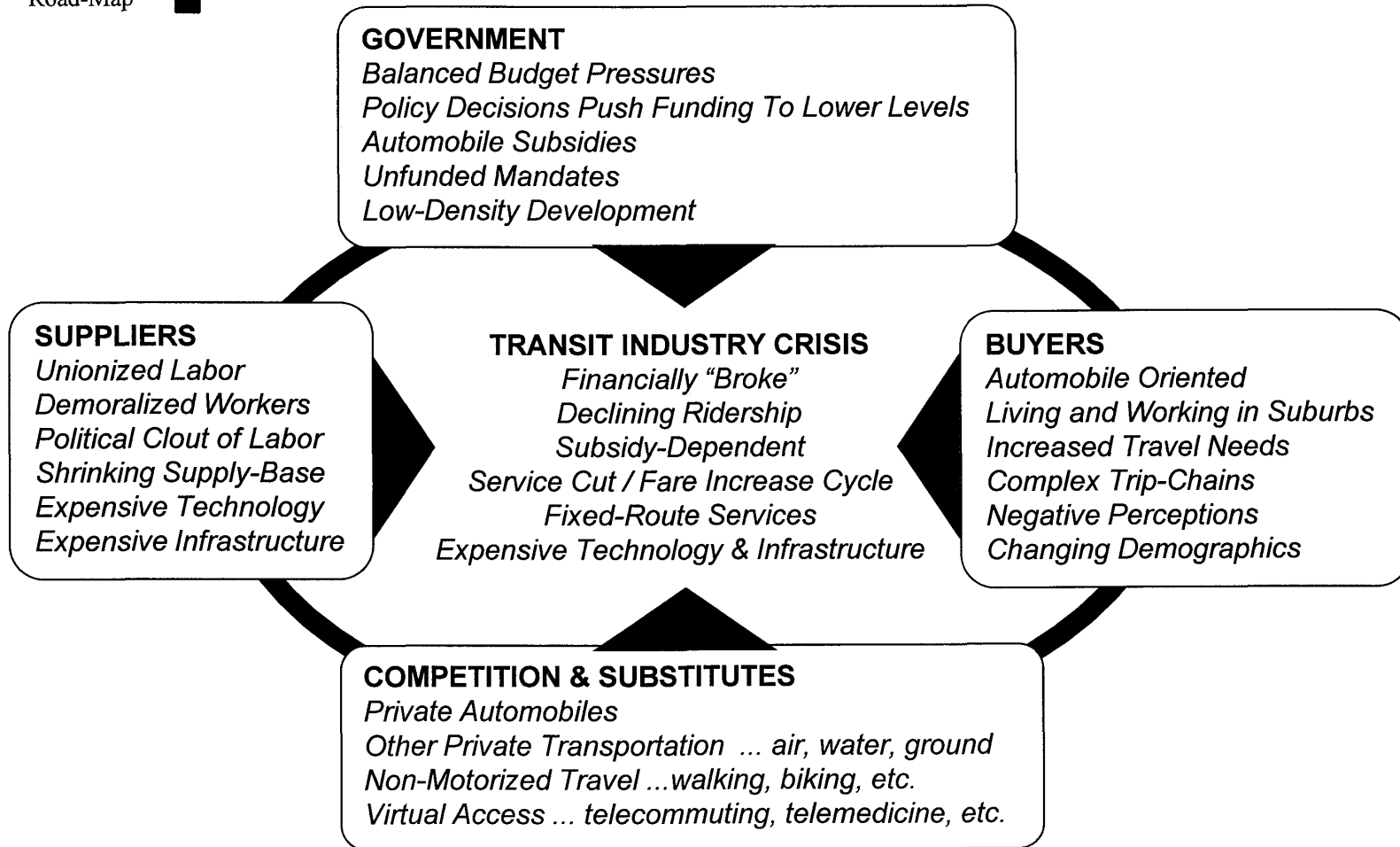
cooperation with other mobility providers, and broad community support and access. The social mission is both desirable and feasible, but the crisis facing the public transportation industry suggests that the mission is nowhere close to fulfilling its desired role in a mobile society.

**Crisis in Public Transportation**

The crisis facing the public transportation industry is well known and well documented. Pressure has been building over several decades. One framework for understanding the environmental forces on public transit is illustrated in Figure 1. The forces on public transit are organized by competition, suppliers, buyers, and government. This type of analysis is frequently undertaken in the corporate world as a foundation for potential new strategies.

The transit industry is characterized by dramatic trends in the potential population of buyers--riders who are automobile-oriented, live and work in the suburbs, have complex travel needs because of dual careers, travel in patterns distributed around the clock, and represent ever-changing demographics. The suppliers to public transportation include

## Figure 1: Environmental Forces Impacting Transit Industry



unionized labor and employees who are often frustrated and demoralized. Further, most new technology and infrastructure purchases are large and expensive. Competition comes in the form of private transportation, including taxis, shuttles, jitneys, and private buses, as well as transit substitutes, such as walking, biking, or the increasing prevalence of telecommuting. Finally, the force of government is significant, with its often politicized funding; demand for balanced budgets; policy decisions to pass funding to lower government levels; automobile subsidies; unfunded mandates; and tolerance for low-density development. These forces spell disaster for a traditional industry that finds itself financially "broke," dependent on government subsidies, subject to declines in ridership, focused on fixed-route services, and frequently engaged in the cycle of service cuts and fare increases.

The industry analysis in Figure 1 suggests that radical change is needed. The transit industry is under extreme pressures that block it from achieving its higher social mission. Indeed, critics can claim the industry is deteriorating in its ability to serve the needs of its stakeholders.

## COMPARISON WITH OTHER INDUSTRIES

The crisis facing individual transit systems and the industry as a whole is not the first of its kind. The public transportation industry is not alone. In the last two decades, several industries have faced intense pressures from changing government regulation, globalization, digitalization, and hyper-competition. The banking, insurance, and financial services, and the airlines were all thrust into intense competition. Software, electronics, retail, and defense-related industries have grown, declined, or restructured rapidly depending on specific circumstances.

Companies in these industries were forced to acknowledge that the world needed speed, productivity, capability, innovation, flexibility, and quality far beyond their current abilities. Unrelenting pressure from the environment combined with ever-increasing demand for higher performance was met with a variety of responses, including restructuring, reengineering, mergers, acquisitions, joint ventures, and new strategic plans. Each company and each industry adapted in its own unique way.

Within this diversity of change, one theme stood out--the shift in mindset required for renewal and revitalization. Managers had to accept on a broad scale that the old way of doing business was no longer

adequate. This general change in attitude and behavior can be characterized as a "paradigm shift." A paradigm is an industry's shared way of thinking, perceiving, and understanding its world.

A paradigm is a set of habits, implicit rules, and mental boundaries that make up the mental box within which managers and stakeholders think, believe, and act. People within a paradigm discount other perspectives as mistaken good intentions.

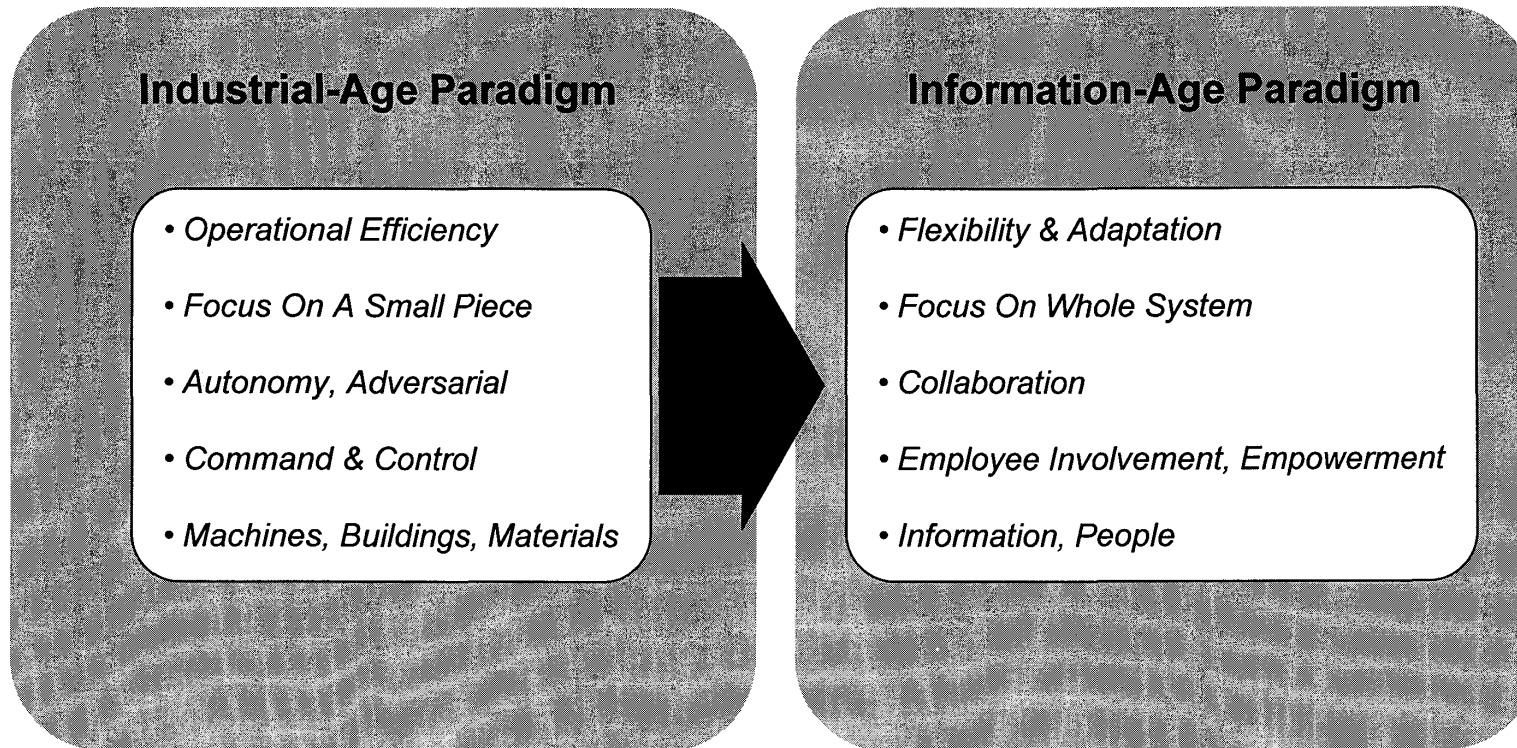
In corporate America, the general paradigm shift can be characterized as a move from Industrial Age thinking to Information Age thinking. This transition in corporations, and many not-for-profit organizations, is summarized in Figure 2. Most organizations today were created under assumptions that reflect Industrial Age values. The Industrial Age was the advent of organizations based on efficiency, hierarchy, and routinization of people and resources. Scientific management provided an engineering efficiency mindset that pervaded organizations of all kinds. The goal was mass production with super-efficient assembly lines. The dream was higher and higher production at lower and lower cost.

Winston Churchill said that we shape our buildings; and thereafter they shape us. In response to the Industrial Age and mass production mindset, organization structures were designed to divide things into small pieces (via division of labor), direct people with command and control authority structures, and value individual and organization autonomy. This view also encourages conflict within and between organizations over scarce resources, and shows a preference for machines, buildings, and materials.

In corporate America, the Industrial Age paradigm worked fine so long as the world remained orderly, predictable, and stable. This paradigm assumed that managers could understand, predict, and control things through logic, data, and cost-efficiency. Managers and employees alike were socialized into a system of rationality and authority that solved operating problems of the day.

As the world became more chaotic and unpredictable in industry after industry, many organizations and companies took tentative steps toward a new paradigm, called the Information Age paradigm. In this new view, value was added through intangible services rather than machines and buildings. Managers found they could gain even greater productivity and effectiveness by focusing on whole systems, and integrating system parts through collaboration. Experiments in employee involvement and empowerment were undertaken to soften

## Figure 2: Industrial-Age & Information-Age Paradigms



command and control hierarchies. Managers and organization designers learned to focus on information and people rather than buildings and materials. Companies involved in the new paradigm, such as Hewlett-Packard, Quad Graphics, Wal-Mart, Saturn, State Farm, IBM, or Packard Electric, achieved astonishing revitalization or production results in an increasingly hostile and competitive world. Collaboration, partnerships, employee involvement, and a systemic perspective enabled companies to operate at higher levels of capacity and output, often with fewer people.

### WHY HASN'T THE PUBLIC TRANSIT INDUSTRY CHANGED?

In face of the crisis summarized in Figure 1, and the changes sweeping other industries, why hasn't the public transportation industry changed? A valid criticism of the transit industry is that despite the crisis it faces, it is not making fundamental changes fast enough to deal with the hostile forces acting on the industry. The real crisis is not listed in Figure 1. *The real crisis is the traditional mindset held by public transportation operators, participants, and stakeholders.*

Changing the paradigm of the industry is a challenge. A paradigm is not a single idea or silver bullet that will instantly change everything and save the industry. A paradigm change is in the assumptions, habits, and beliefs that people within the industry take for granted.

Paradigm change in a company or industry needs **four ingredients** to occur successfully. First is a **crisis** that increases peoples' readiness to change. Second is a **vision** for the future that is an attractive target toward which a company or industry can move. Third is a defined method or **action steps** to achieve the vision. Fourth is **leadership**, which seizes the crisis as an opportunity to articulate the vision, define the action steps, and provide necessary support and facilitation to move forward.

#### **Crisis x Vision x Action Steps x Leadership = Overcome Resistance**

The public transportation industry has not changed because only two of the four ingredients are present. The ingredient of crisis is certainly there, as was illustrated in Figure 1. The second ingredient, vision, has been developed by the American Public Transit Association's Transit 2000 and Mobility 21 projects, and by the exploratory work of TCRP

Projects H-15, "Projects to Support Mobility for the 21st Century" and J-8A, "New Paradigms for Public Transportation: A Scoping Study." The general outline of a potential new paradigm for public transportation is illustrated in Figure 3.

The traditional industry paradigm is labeled "Efficient Transit Performance" in Figure 3. This is a mindset that grows from subsidy dependence and the inability to influence revenues. It also assumes that a transit system's goal is to get the greatest efficiency from a fixed-route service and physical infrastructure. The goal of management is to control cost through a strong operational orientation, and to build an organization characterized by hierarchy, rigidity, and autonomy, which often produces labor-management conflict.

The outline of a new public transportation paradigm, on the right side of Figure 3, is labeled "Change, Growth, and Mobility" mindset. In this mindset, operators would think in terms of a broader revenue base, flexible routes, and information as being the key resource. The primary goal is to increase revenue via a customer service orientation. In this new paradigm, a new kind of organization is needed, in which partnerships and connections replace autonomy and conflict, even to the point of labor and management collaborating for the good of the whole system.

Given the crisis and emerging vision of a new paradigm, the public transportation industry remains stuck because the two remaining critical ingredients have not manifested themselves: action steps and leadership. Changing the public transportation mindset is a huge undertaking. The inability of the industry to move toward its desired future is frustrating because the crisis is clear. The new vision of the future, by itself, is not catalyzing change. Leadership and doable action steps are urgently needed to move the industry through a thicket of immediate resistance, which has several branches.

The visioning efforts undertaken by APTA and TCRP have identified five barriers:

1. *A sense of overwhelming complexity and fragmentation within the industry.* The transit industry is characterized by diverse stakeholders groups, each with its own agenda and needs, as illustrated in Figure 4. To many operators, it seems impossible to make substantive change when so many diverse stakeholders are involved.
2. *System change is perceived to involve massive change* The fragmented relationships in Figure 4 are

## Figure 3: An Emerging Paradigm For Public Transportation

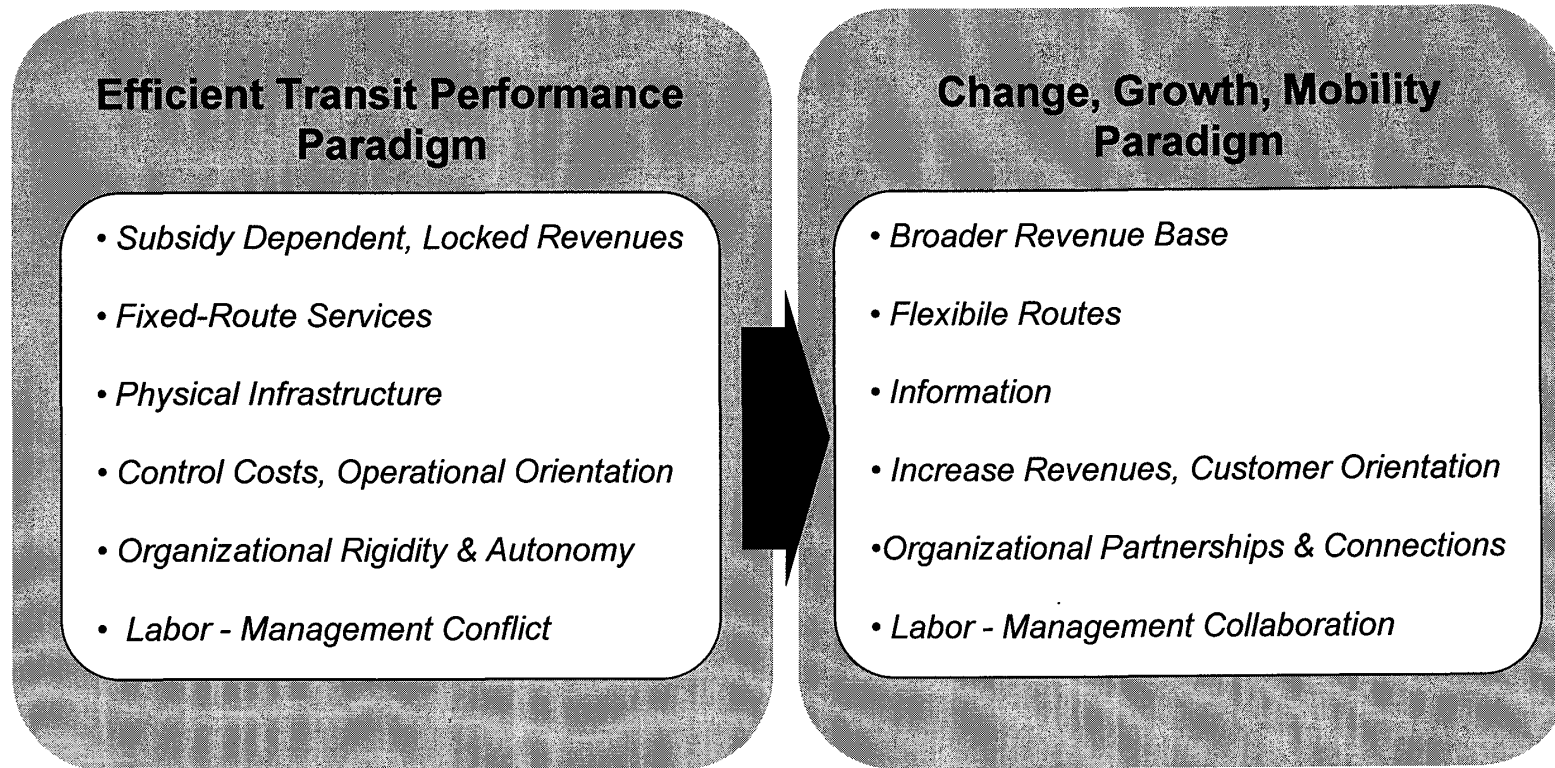
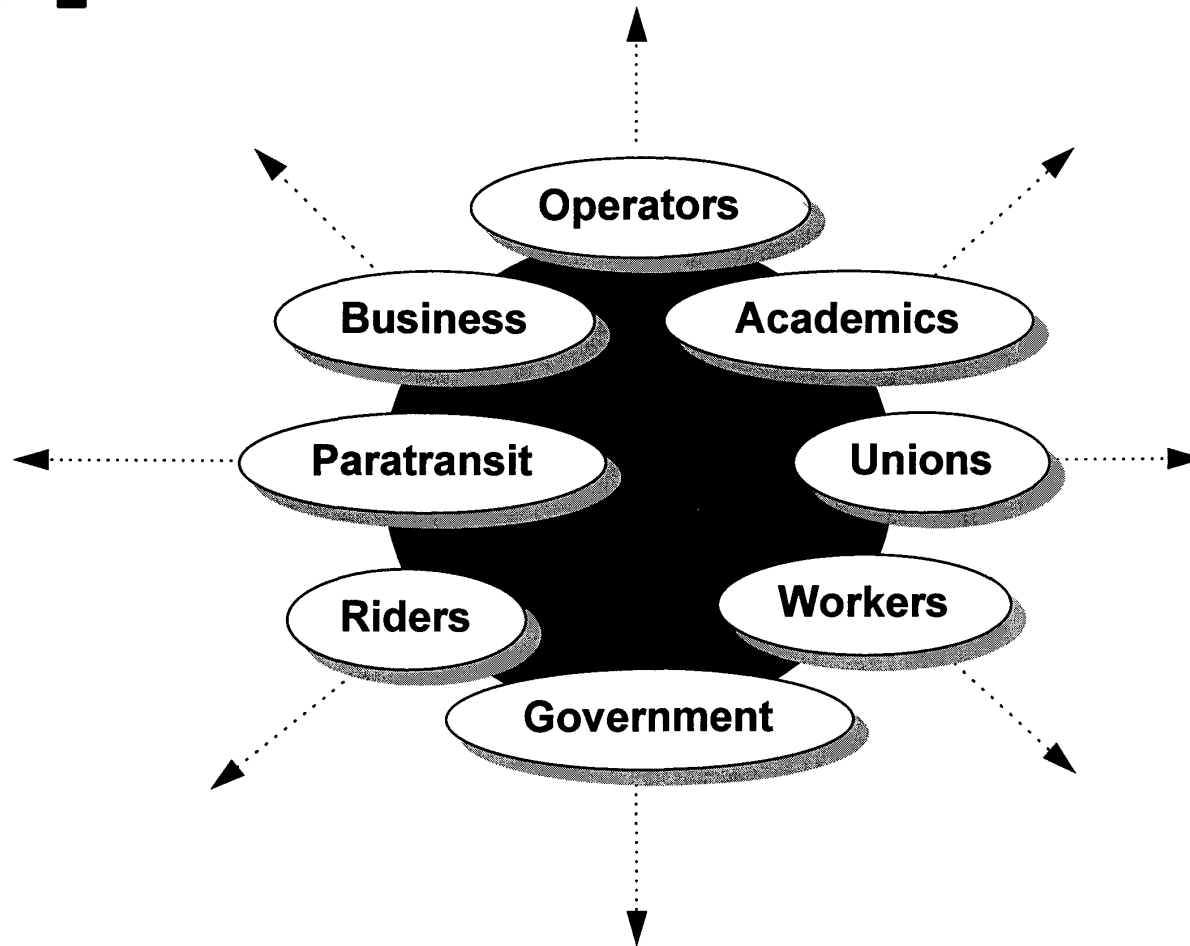


Figure 4: Transit Industry Complexity & Fragmentation



reinforced by the old paradigm and by competition for funding. The scope of trying to change an entire system or industry at once seems so large and expensive as to be incomprehensible. The change seems far too big, even by changing one transit system at a time.

3. *Cynicism about potential for change.* Various stakeholders are cynical, with good reason, about the forces on the transit industry that limit its ability to perform. These forces are outside of the industry's control, and transit industry stakeholders have little experience in facilitating change toward a new paradigm. How can operators whose careers have been in a traditional paradigm be expected to change their systems to cope with urban sprawl, labor conflicts, land use, telecommuting, and other uncontrollable forces?
4. *Low industry morale.* Morale is low, because of negative public image, continued financial problems, the stress of low ridership, and poor public support.
5. *Previous efforts at strategic planning.* Previous plans to create a more positive future for public transportation have not led to action.

These impediments to change overwhelmed previous initiatives for change.

Changes in the industry paradigm require more than a vision and a crisis. Change in public transportation requires a focus on leadership to move through the resistance listed above. Leadership is needed to show the way. An organized leadership thrust to facilitate change in public transportation systems is clearly required.

### TCRP'S J-8 INITIATIVE

In its short history, TCRP has funded research to improve operational efficiency within transit systems. This research was not designed to change the transit system itself or its prevailing mindset for dealing with industry pressures.

In recognition of the huge problems facing the industry, the desire for a better future, the vision of a new paradigm, and the belief that something could be done, TCRP created the J-8 Task Group. The J-8 Project was given a no-holds-barred mandate to break out of the box of traditional transit industry thinking in an effort to facilitate and implement real change. The J-8

Project involved a searching assessment of where the industry was and where it could go. And it was free to use whatever radical research method, topic, or approach would generate change toward defining and moving the industry into a new paradigm. The J-8 Task Group was to provide open-minded research leadership and continuing support that would create sustainable change.

The J-8 Task Group adopted a new paradigm for applied research, which is illustrated in Figure 5. Traditional TCRP topics were focused on incremental steps that improved efficiency in operational systems using engineering, economic, and social science research and analysis that can be defined as "normal" applied science.

J-8's new approach was designed to be dramatically different. Rather than funding research topics about operational efficiency, the new research would focus on the public transportation system itself, its paradigm, new opportunities, and barriers to change. In this new paradigm of J-8 research, the box within which the public transportation had worked now becomes the subject of research rather than a limiting boundary. This opens the door to striking new research methods, which include action research to directly involve transit systems in the experience of change, bringing diverse constituents together, conducting demonstration projects in the field, and confronting the very barriers that inhibit change, including the old mindset.

### Research Step 1: A Future Search

After initial scoping studies to clarify its approach, the J-8 Task Group decided to undertake a future search. The future search is a social innovation designed to bring disparate groups together to find common ground, collaborate on shared problems, develop a joint vision of the future, and define action steps to achieve the vision. The future search was organized by the Eno Transportation Foundation and facilitated by Richard Daft of Vanderbilt University, and Robert Lengel of the University of Texas at San Antonio, who are recognized in the area of group dynamics and organizational change.

The future search was held May 12-14, 1997, and included about 80 individuals representing public transportation organizations as well as a broad array of other interested parties. It included transit managers, local leaders, riders, drivers, labor leaders, political leaders, community residents, and almost every voice that has a stake in the success of public transportation. Participants also included experts in transportation



## Figure 5: J-8 New Research Paradigm

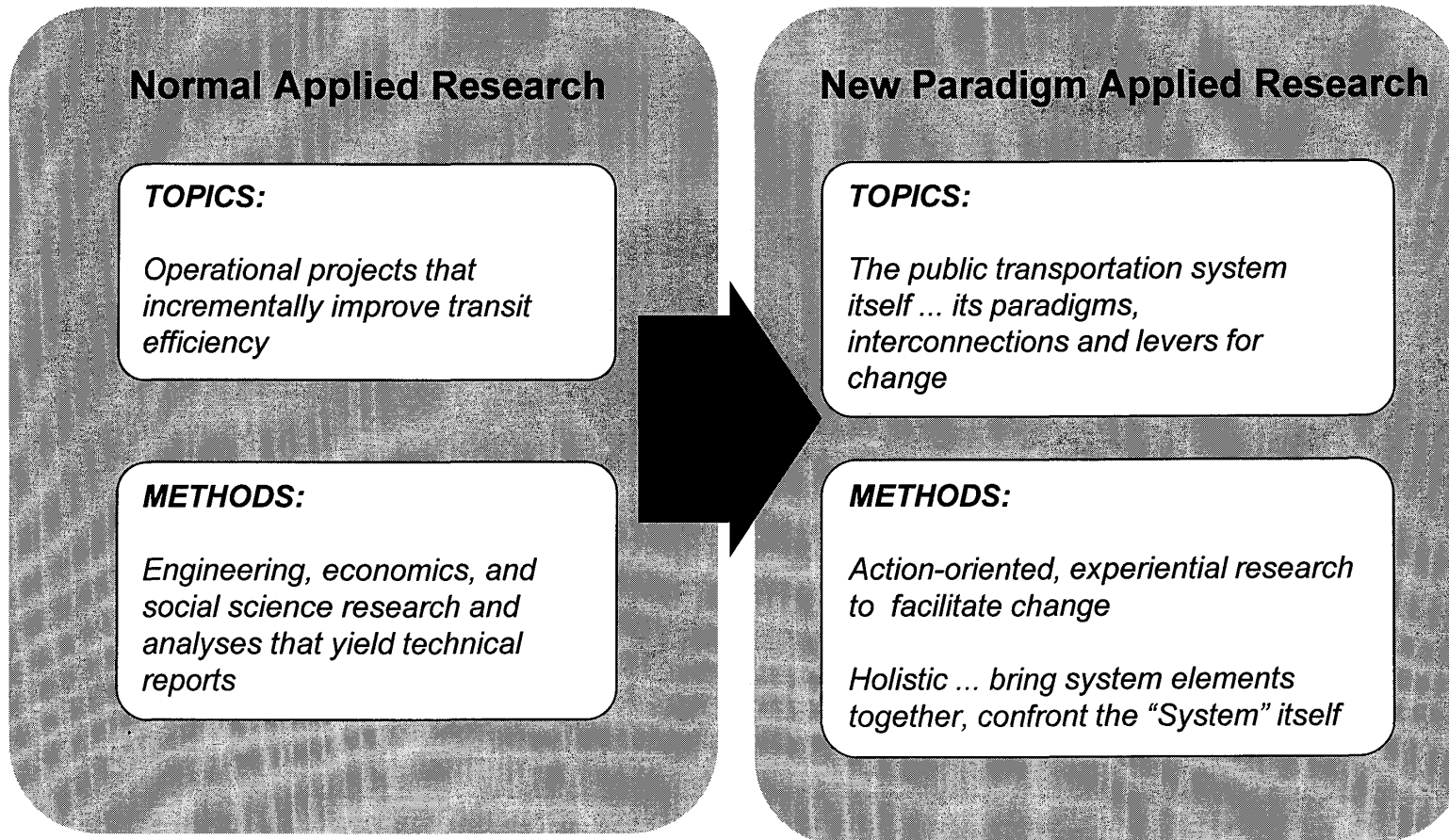
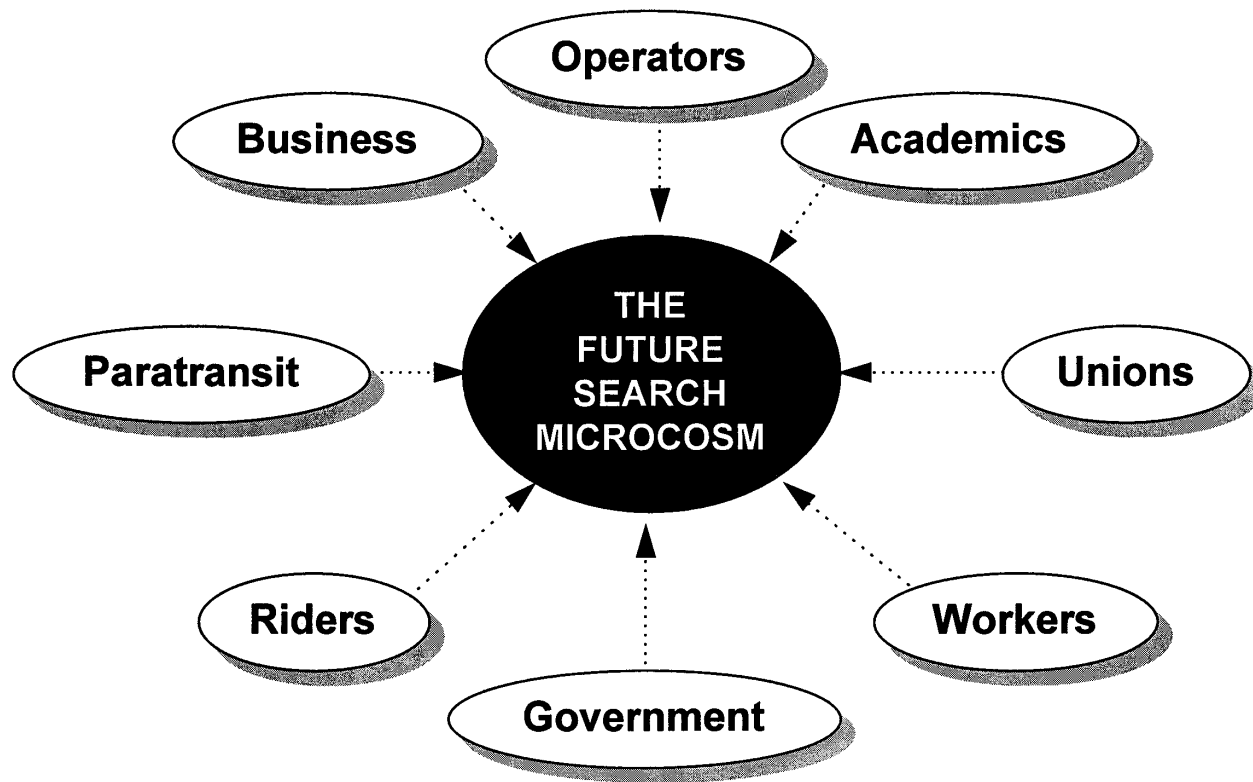


Figure 6: The Future Search Microcosm



policy, local and federal government representatives, and academicians.

The power of a future search is the commitment to action and its ability to surmount the barriers inhibiting change in the transit industry. The future search was an experiment in assessing the potential for systemwide change in public transportation. In response to the industry barriers described above as complexity, fragmentation, diverse interests, cynicism, low industry moral and lack of leadership, the future search started by bringing elements of the whole system together into a working microcosm, as illustrated in Figure 6. The 80 people were brought together from diverse stakeholder groups to achieve a working microcosm of collaboration, problem solving, visioning, and action. The future search was designed to identify simplicity within complexity and to harness the motivation of participant's dreams and hopes in addition to achieving strategic objectives. The future search enabled people to voice their cynicism and frustration, thereby lowering emotional resistance to change. The future search provided a mechanism to identify modest actions that constitute "small wins" to start the change process moving, with follow-up large-scale projects in line to maintain momentum. The future search identified the desired future, limitations of the past, and opened people's minds to ideas and concepts that interpolate toward that future rather than limiting themselves to the incremental steps of the past.

The future search involved 2-1/2 days of intense, structured exercises. The first exercise examined the history of participants, and the history of the transportation industry, providing people with a sense of their common past and common ground. Industry trends were identified and mapped onto a huge "mindmap" that showed branches and interconnections among major trends affecting public transportation. The trends of greatest concern included subsidy of automobiles, changing political environment, suburbanization, applying new technologies, customer focus, decreased funding, and lack of whole-system thinking.

From this analysis of environmental trends, table groups explored possible industry responses and barriers to change. This analysis was followed by an in-depth discussion and presentation of an industry vision 10 years in the future. Eight groups of maximum diversity developed and presented visions for the year 2007, which described a transit industry characterized by bold transformational change, that was customer-driven, used advanced technology, implemented new institutional structures to maximize mobility, and

developed new employee relationships. The final vision for reinventing public transportation that emerged from the future search conference is as follows:

*Dramatic change will occur in the public transportation industry. Public transportation will be a dynamic force contributing to the growth and vitality of America's communities through the provision of flexible, responsible mobility services. The hallmarks of the revitalized industry will be*

- *New institutional structures that maximize mobility opportunities in the region being served,*
- *New employee relationships that foster high-quality, customer-focused service,*
- *Innovative services that are wide ranging and flexible to meet changing market needs, and*
- *Maximum use of technology to create real-time customer information and new methods of operating and delivering services.*

*Public transportation will be competitive and vital.*

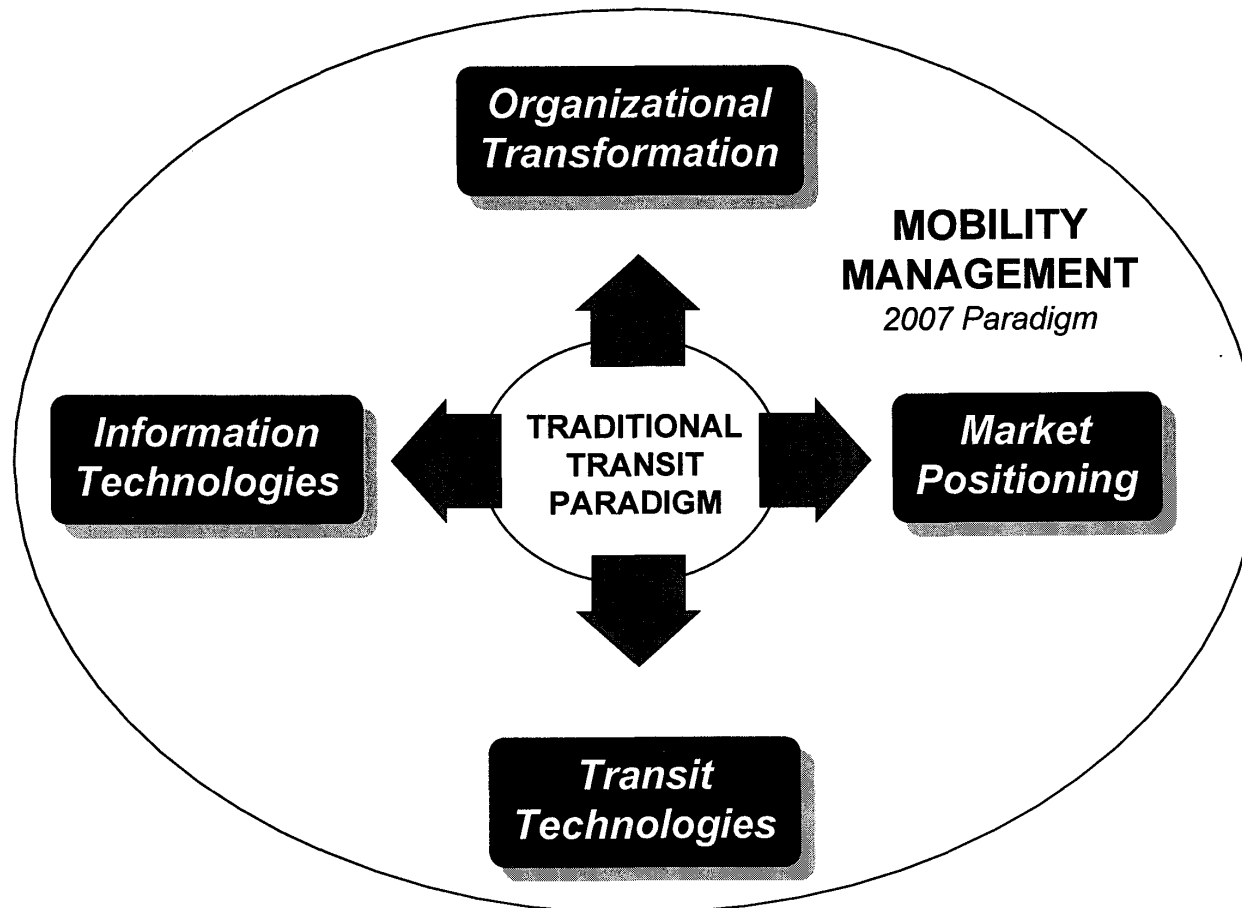
The final activity in the future search was to combine the brain power and perspectives of the 80 participants to develop specific action research projects that would lead industry toward change in the vision. Literally hundreds of projects were suggested, and these projects were clustered into categories that included regulatory reform, technology, welfare to work, pricing and payment, new age transit, institutional reform, labor and management, survey research, transit and land use, finance and lending, customer service, mobility management, and internal structure.

## **Research Step 2: The Road Map**

The future search produced an unequivocal consensus to fund action research that will provide leadership for the industry to move away from what is tentatively called the "Traditional Transit Paradigm," based on operational efficiency, toward what can be called "Mobility Management 2007," which reflects bold, transformational change toward a customer-driven industry that uses advanced technology, transforms its organizations, and builds new employee relationships.

From the huge array of potential research projects, four grand themes emerged, the funding of which will build momentum for industry movement toward the

**Figure 7:** Research Themes That Will Expand Industry Mind-Set Toward Mobility Management Paradigm



mobility management paradigm, as illustrated in Figure 7. The four themes are:

*Organizational Transformation* includes the investigation of new governance models, regional partnerships, alternatives to public ownership, new labor and management arrangements including a larger employee voice, better system integration and partnering, and new organization structures.

*Market Positioning* research projects include focusing on customer service, including the design of flexible services, and user-friendly technologies; developing a customer-oriented mindset among employees; designing transit operating models for diverse (including rural) environments; developing network alternatives to a traditional radial system; linking public transportation to quality of life issues; examining just-in-time services; and exploring new marketing initiatives and welfare-to-work options.

*Customer Information* research projects include analyzing opportunities to use telecommunications to improve customer information and transit operations management tools such as vehicle tracking, customer billing, and real-time paratransit design. Through increased use of technology, transit can expand beyond fixed-route scheduling to build service around ad hoc customer entry and dramatically improve communication with its customers.

*Transit Technology* research projects acknowledge the need to maintain and improve extant operations with research such as developing and testing service for low density suburban areas, automating fare collection devices, improving supply-chain relationships, automating maintenance, using technology in planning and system operations, adapting technologies from other industries, and instituting new approaches to lending and financing arrangements.

The J-8 Task Group has established fundamental new research directions with the future search, out of which will grow subsequent projects and events that will continue progress toward a new industry paradigm. Research funding in these four areas has the potential to expand the mindset and paradigm of the industry to become the Mobility Management industry of 2007, as illustrated in Figure 7. This road map of action research should become the catalyst for change.

Perhaps even more important than the new research topics in Figure 7 is the change in research

method, which will involve action research and demonstration projects for new technologies, new labor management relations, new customer acceptance programs, new organizational designs, new employee/management collaboration, new organizational structures, and new incentive programs. This "action research" approach together with the four grand themes of new research topics have extraordinary potential to provide the leadership to move the transit industry forward toward its new vision.

In June 1997, TCRP immediately moved to fund projects in two of the four research areas. The first research project initiative focuses on organizational transformation, and will involve developing the concept of mobility management to its ideal, redesigning an existing public transportation system to operate as a mobility manager, and designing an ideal organization structure for guidance and possible adoption by transit systems (TCRP Project J-8B, "New Paradigms for Local Public Transportation Organizations").

The second research initiative is on the theme of information technology, and has been funded specifically to find ways to increase customer convenience using state-of-the-art information technology (TCRP Project A-20A, "Increase Customer Convenience Using State-of-the-Art Technology").

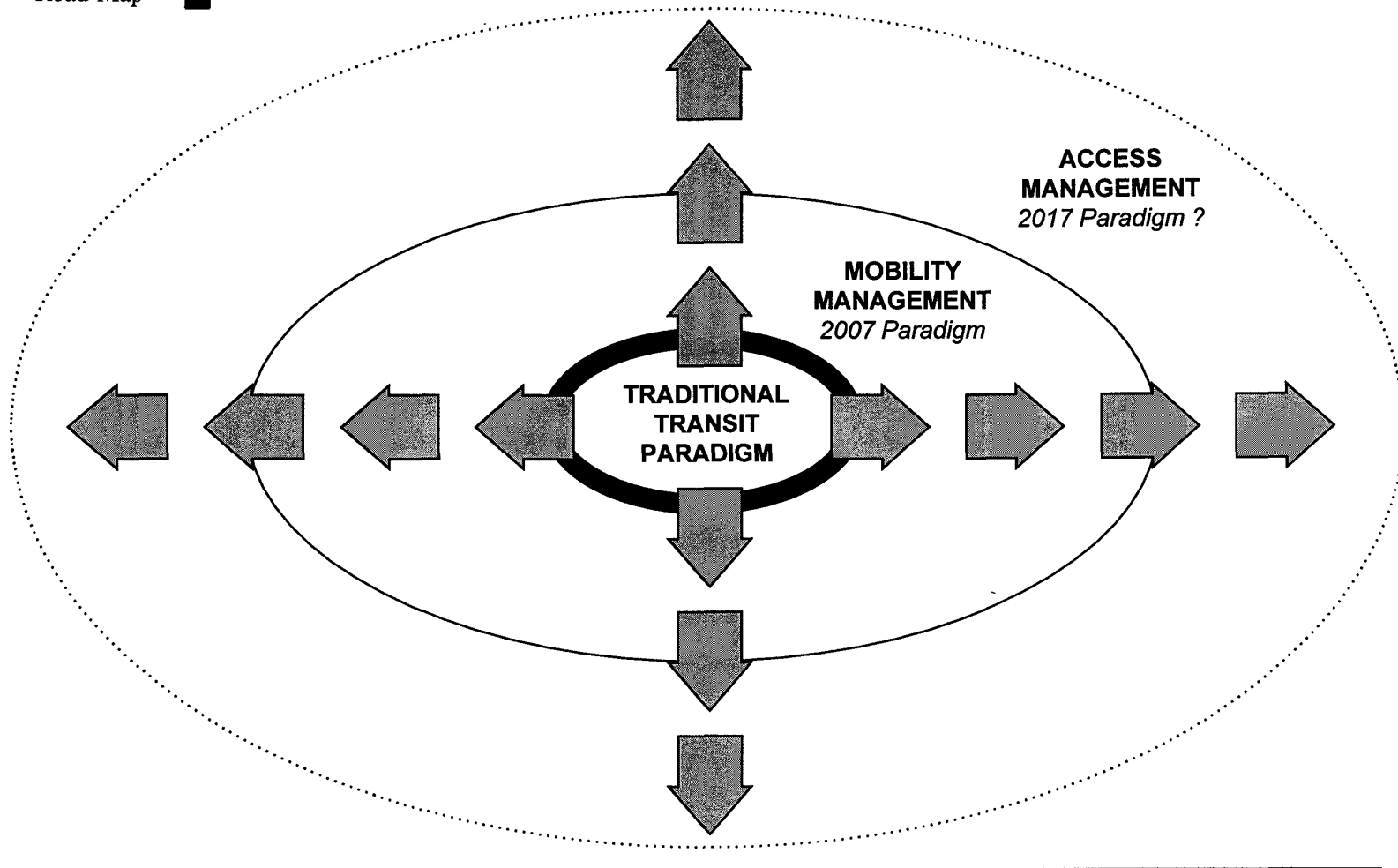
In both of these research initiatives, the methods as well as the topics fit in the new paradigm. The research will involve action research in the field, demonstration projects, and the engagement of ongoing systems in real-time change.

## WHAT WILL FUTURE RESEARCH PROVIDE?

A metaphor for the nature of change in a chaotic world is the butterfly. A tiny butterfly flapping its wings in China can affect weather patterns in France. A small change, under the right conditions of system stress, can produce monumental results in a relatively short time.

The butterfly in this case is TCRP's funding of the Projects J-8 and H-15, which occurred in a time of industry crisis and readiness for change. The ground for change is fertile, based upon the groundwork of APTA's Transit 2000 and Mobility 21 initiatives. On the basis of the responses of stakeholders during the future search, constituents in all areas welcome change toward a new paradigm labeled here as Mobility Management 2007. The future search was the wind current to begin changing the weather pattern. The funded projects in organizational transformation and

**Figure 8: Evolution Into Future Paradigms**



information technology will lead the arrival of a welcome warm front.

But movement toward a new paradigm, like the weather, cannot be stationary. Paradigms today and in the future world are ever changing. The shift to a Mobility Management paradigm is the key first step toward melting a glacier of resistance in the public transportation industry. As resistance thaws, change can become the norm rather than the exception. The research leadership and action research steps provided by TCRP are self-generative, which will have results far beyond specific research projects, setting precedents for new paradigms beyond 2007.

The image for this generative process is illustrated in Figure 8, which shows further paradigm expansion beyond 2007 toward a hypothetical paradigm tentatively labeled "Access Management 2017." In this distant future, the paradigm may shift from mobility of people toward giving people access to needed services. Access management responds to the fundamental question, "Why do we travel?" Three broadly defined possibilities emerge:

- Access to work (commuting),
- Access to health and education (quality of life), and
- Access to commerce and entertainment (consumption).

In considering these possibilities, the role of transportation may be to help people gain access to anything

they need or want. People do not travel for travel's sake alone.

As technology advances, people could make broader choices between physical and virtual access to information and services. Technology is already providing a substitute for physical travel as seen in telecommuting and telemedicine. Research that will lead the continuing evolution in paradigms might enable public transportation, through partnership with other industries, to give people freer access to needed services, both by moving people to services and by moving services to people.

## THE FUTURE IS IN THIS MOMENT

Structures of the past can be likened to a tree, and the future is also like a tree. The tree of the past symbolizes the organizations created in the past that exist today. The tree of the future can either be the continuing structure of the past or the growth of a new structure. The present moment is the seed that contains the potential for a new tree. Future research can prune the old tree, or it can provide the leadership and action research to plant the seed of a new tree for public transportation. The crisis and vision necessary for transportation industry paradigm change is at hand, and so is TCRP leadership and action research steps. Will new research initiatives plant the seed to create this new transit industry future?