TRANSPORTATION PLANNING, POLICY, AND DATA: INTEXTRICABLE LINKAGES

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I. INTRODUCTION

My subject, loosely defined, will be the past, present and future of transportation planning, policy and data; and how the three are inextricably linked, as seem from my vantage point over the years.

That vantage point, now approaching 35 years of work in the field, began quite by accident. I certainly can not say that my first employment in the transportation profession at the Tri-State Transportation Commission in New York fulfilled a career ambition, rather it filled an ambition to feed my new family.

Tri-State at that time contained what then was certainly a very large and significant part of the transportation planning talent in America, and started me, personally, on a long love-affair with my subject.

I have sometimes called transportation "The collision of demography with geography," but that doesn't really do it justice. Transportation is a fascinating interaction of sociology, economics and technology. It is so interwoven with the social and economic structure of all societies, and most conspicuously our society, that its connections and impacts are inextricable from the understanding of the society itself.

Over the years we have all heard politicians use all of the biological metaphors for transportation "the lifeblood" -- "the backbone" -- "the nervous system" -- "the left ventricle" -- of the society. All of which suggests that we highly value transportation in an amorphous, sloppy kind of way -- and despite these metaphors, in a bloodless kind of way -- but do not really understand it in any quantitative sense, and are not capable of assessing and describing its real value in our society. Clearly the cavalier way in which we approach transportation today suggests that a large segment of the society disdain its merits, although their actions belie their words - kind of like flying all over America to tell people that airports are useless.

What we expect from transportation today has changed sharply from the past. Today there are a whole list of "musts" and "must nots" that define the context in which transportation functions. Transportation is implicated in everything and seems to be the universal lever for accomplishing public goals. Part of that is because transportation programs have money, part of it is because

many of the other federal programs of the past are now defunct or in senescence, part of it is because of the penchant of planners for indirection, and part of it is because its true.

Data,[i] illuminates the past by telling us what happened; provides insight on the present by telling us what's going on; and provides guidance for the future by telling us something about trends and provides some answers to what-if kinds of questions.

Because we expect more of transportation today than ever; we need more from our data sources and presumably from planning and policy - probably more than they are capable of giving - and that is the story of my 35 years.

II. THE ROLES PLAYED BY DATA IN TRANSPORTATION

(I was warned to stay out of the "dead-end" data part of the transportation planning and policy world early in my career and am happy that I didn't take the advice.)

How policy and planning processes use data tell us a great deal about whether they are to be respected or not. Working with data everyday forces one to confront the failures to define our subject clearly and to place bounds on it and to get it stated correctly. That lack of precision has damaged the development of serious analysis and understanding over time. Some of the fundamental topics of concern have been:

- **The need for objective statements of reality - there is simply a great amount of ignorance about transportation about. We need to spend a tremendous share of our efforts heavily focused on objectively describing what exists and how it relates to other elements of society and the economy, without hyperbole, without selling an angle, just stating what is.**

- **The nature of transportation data - we get very involved these days with the terms data/information/statistics/wisdom, etc. and try to describe this evolution as if it were a nice clean sequential process. I have never seen this actually work that way. Data banks (more deposits than withdrawals and still bankrupt) and now data mining and information systems are the buzz. We are more and more capable of rapidly transferring and effectively manipulating less and less accurate information. Most transportation policy and planning is just as much about other subjects as it is about transportation. What makes it viable policy and planning data is that it is transportation and demographic data, transportation and economics data, transportation and resources data, etc.**

- **The decline of a valid vocabulary. The rise of marketing as a component element in public sector transportation policy and planning (which seemed to be a positive step at the time) has been a disaster for reality. The need to sell programs, linked strongly with the felt need to change people's behavior created marketing, created hyperbole, created lying. The definitions of terms expand for the programs we wish to support, and shrink for the others - kind of like neighborhoods that pick up on the name of nearby desirable locations. Transit, no longer "mass", is now anything where**

the traveler doesn't operate the vehicle, carpooling refers to any group of more than one in a vehicle, a mother taking her child to day care on the way to work is a carpool; anyone taking a briefcase home at night is "working at home" or "telecommuting". We have now changed congestion pricing to value pricing and think we can sell it because it somehow sounds better. The whole notion of seeing metropolitan transportation policy as a marketing exercise is bankrupt. This is not just the rant of an old-timer... the loss of meaning in words corrupts statistics.

- **<u>The nature of transportation data collection</u> - we have established little to guide us about what to collect, with what detail and precision, how often and why. The most important aspects of transportation are time and cost and we know little or nothing about them. (Think of performance measures without time or cost elements!) Transportation data collection is literally a moving target. It is difficult to think of where we have done well with measuring it. Maybe the airline industry - air travel is certainly the most data intensive transportation industry - but still there are problems there. Recent efforts have shown us all of the negatives of performance measurement when it is sloppy or grinding an ax and has set us back about a decade.**

  When I left the U.S. Department of Transportation in 1978, I observed that no Secretarial Officer was capable of answering three questions:

  1. **Are things getting better or worse?**
  2. **What do I mean by better or worse?**
  3. **Did I (or my program) have anything to do with their getting better or worse?**

  We may have made some progress, with these three questions, since then, but it is still worth querying ourselves about the answers from time to time.

- **<u>The dilemmas of public policy related statistical programs</u> Large scale statistical programs take lots of time and money. Most programs do a bad job of justifying the need for data expenditures. The benefit/costs of transportation data have not been established. Like the rest of transportation we are better at counting costs than identifying benefits. Because data collection takes time Secretarial officers who invest in a data collection program are probably investing in something**

from which they will derive no benefit. They are generating a bequest to their successors.

Being "relevant" is a particularly delicate concern. Its like a campfire: too far from the policy "flame" and you risk irrelevance and being frozen out; too close and you risk being badly singed.

- **"Anticipation of data needs is the key" Transportation statistics programs are about 5% statistics and 95% logistics; they are complicated exercises in organization and planning. The central aspect that makes them a professional exercise is not the statistical skills involved or the logistical capabilities, it is the ability to anticipate the policy and planning data needs of the future. What policy questions will be significant? What planning horizons matter in the future?**

  Certainly in the U.S. DOT, when policy issues arise, but also in MPO's, State DOT's and the private sector as well, it is usually too late to begin data collection then. For example, few congressionally-mandated studies have permitted the time for new data collection. You cannot say "hold on for a year or so, I'll be right back!" When a policy question arises data people can usually answer in:

3 minutes	**if its on the shelf**
3 hours	**if a little searching is required**
3 days	**if some manipulation is required**
3 weeks	**if a computer program is involved**
3 months	**if major data processing is required**
3 years	**If new data collection is required.**

  Given that is true you then are typically forced to work with what you have in the data cupboard when a policy issue arises. Thus all policy will be made with the extant statistical data set. We must design our statistical programs with that in mind.

III. A BRIEF HISTORY AND SOME LESSONS

III.A. THE EARLY STAGES -

My career, like that of so many others, has been a creature of the 1962 Highway Act. My first work in transportation planning and data collection with the Tri-state Transportation Commission was in 1964, a few years after the legislative act that mandated the "3C process" of: "continuing, comprehensive, transportation planning process carried out cooperatively." If one reads the legislation it is multimodal and recognizes land use transportation interactions, suggesting that those topics are not exactly new[ii].

Tri-state had just been started and the then Bureau of Public Roads, BPR, was concerned that the mandate for all metropolitan areas over 50,000 to have a planning process in place as a condition of receiving federal funds could founder in New York, an immense area in population size and geographic scale - more important then than today, and more different from the rest of America than today. J. Douglas Carroll Jr., who served as Director of Tri-State, said the typology of American cities was "New York" and "Other". Carroll was arguably the best in America at that time. He had started the metropolitan transportation planning process, first in Detroit and then Chicago at CATS.[iii] The BPR assembled around him the best talent they had in America - Lee Mertz and J.J. McDonnell to mention only those who are deceased. People willingly took less pay to have the opportunity to work with those great people and called it "tuition." The profession (and I) benefited immeasurably from the opportunity to learn from people of such great dedication, skill and integrity.

The nature of the process at that time was immensely data intensive. About 50 percent of the Tri-state budget, and that of most metropolitan transportation planning agencies, went to data collection. It was all something very new and it was a time of great excitement with discrete goals and discrete progress steps along the way. There was that great big five year work plan chart on the wall to tell you what steps you were in and where you were going next. The Tri-state household travel survey was gargantuan by current standards - about 60,000 households in some very difficult areas.

(At that point I made a great discovery - that given that the urban planning process was about the same everywhere, why not do it in a nice place to be? That thinking brought me to Washington and the Metropolitan Washington Council of

Governments. I was simply an early demonstration of the "Sunbelt Shift")

It was really while at Wash COG that my career-long interest in describing travel behavior developed. There is a tendency in many metropolitan planning activities to short-change the descriptive in favor of focusing on modeling and forecasting. Many of our problems and conflicts today in metropolitan planning stem directly from our failure to understand and transmit that understanding of the community's travel behavior to decision-makers and the general public. That lack of understanding leads to a lack of respect for the public and its needs, and a view of public behavior as a mere product of public policy. As a result there is much wishful thinking and assertion on all sides of the issue.

A question worth examining is how did so many MPO's around the country falter after great starts. Aside from the natural let-down that occurs after the heady initial start-up phases, many of the programs in the late seventies and eighties turned their attention from the long range view to the short term managing of programs, car pooling programs and the like. Thus the skills demanded of people changed. The process had somehow lost interest in examining the future and in evaluating truly regional scale long term investments.

One of the signal losses in the process was that the federal government never followed through on the "continuing" part of the "3C" process. A continuing operations plan was developed as early as 1968 by FHWA to guide the long term continuing process. This operations plan called for an annual report and an updated forecast and plan every five years by the MPOs with a strong surveillance element supporting the process that monitored changes in population characteristics, area development patterns, and travel behavior. It looked a lot like our Performance Measurement thinking of today. Unfortunately, although this process was very attractive, the levels of funding required to sustain it were never forthcoming and many MPOs became little more than meeting organizations using federal funds to meet federal requirements.

It was in this environment that ISTEA sought to revivify the metropolitan planning process. While it has seen great progress, weaknesses remain. These are most notable in the area of economics. As more and more transportation development issues center on moving freight across America, to our ports and to our borders, it is amazing how limited are the skills and resources

available to the process. The broad ability to produce benefit/cost analyses in these areas especially as we ask ourselves about trade-offs between modes serving very different functions needs substantial support.

As the public consensus on transportation investment breaks down, justifications based on vaguely positive assertions fail, and the need for rigorous, quantified, economic and social arguments will increase. This means we need to quantify better the value of transportation in our communities.

III.B. THE HISTORY OF DATA AND POLICY/PLANNING IN DOT AND NATION

In its 32 years of existence it is amazing that the US DOT has often been able to function for long periods in a data-free environment. Perhaps this says positive things about the skills and knowledge of the policy makers, or says negative things about what we in the profession think we need in the way of data - or it may just tell us a lot about the relevance of the Department. We can characterize the history of the Department in data terms in its linkage to three periods:

CENSUS OF TRANSPORTATION ERA 1962 - 1977 Characterized by a period of the rise of the Census of Transportation, the conflicts between comprehensive transportation policy and planning data collection and regulatory data collection. Most national transportation policy data were derivative of Census data and the regulatory process, although neither had been designed to serve such a need.

NIGHT OF THE LONG KNIVES 1977 -1990 the end of an era, and the advent of a long relatively dismal period of disinterest in data and analysis. It was ushered in by the losses of regulatory data, a decline in funding availability to support the economic census, a shift from planning facilities to a belief in managing what we had, the sense of an era of limits, and sustained thereafter by a strong belief in private sector solutions. In the 12 year period between the publication *of National Transportation Trends and Choices*[iv] in 1978 and *Moving America*[v] in 1990 the Department did not undertake a major nation-wide look at transportation. Both the National Transportation Policy Study Commission[vi] and the U.S. Chamber of Commerce[vii] sought to fill the vacuum. In the Census Of Transportation there was no national travel survey and no commodity survey in 1982, 1987, and 1992.

ROSY-FINGERED DAWN 1990 - FOREVER MORE - THE BTS ERA
Characterized by a reawakened belief in the value of information, and a certain recognition of the need for greater understanding of transportation and the society, the Department began reestablishing a statistical base aimed, effectively, at getting the state of transportation data back to where it had been in 1977.

At DOT the great dilemma has always been time. The story goes that when the staff of first DOT Secretary Alan Boyd told him that his plans for data collection would take years, and that he would not likely benefit from them, he answered: "We'd better get started then shouldn't we!" Not many have been so altruistic.

The potential strength of the BTS (DOT's new Bureau of Transportation Statistics) is time - - more than money -- time to be separate from the day-to-day clamorings of the Department's in-basket, time to establish longer term programs that eventually benefit all, and it is hoped, time to think about what needs to be done.

Despite Secretary Boyd's emphasis the Department's statistical programs[viii] fared badly from the very beginning. Roughly 30 years ago the House Committee on Appropriations said:

> **"The program has progressed slowly...Last year the Committee called on the Department to 'develop a more coherent and effective assignment of the responsibilities within the Office of the Secretary and among the administrations for Transportation Information and statistics functions." There is no evidence that this has been done."[ix]**

This state of affairs continued until apparently remedied by the publication of the "Redbook"[x] in 1969 in response to the Congress's demand, that laid out "an initial five-year program for meeting the critical transportation information needs of industry and government at national, state and local levels." The remedy was no remedy! Despite the fact that it had requested the document the Congress took no action. The Department has yet to fully implement the Redbook.

Over the years the information function drifted from Assistant Secretary to Assistant Secretary through any number of organizational arrangements - an Office of Information Policy, an

Information Division, a program under the wing of a Special Assistant in the Office of the Assistant Secretary for Policy, and ultimately banishment to the then Transportation System Center in Boston. In a period of about nine years the program had about seven changes of organization and direction. Part of this was attributable to being a step-child with no money or support; but part of was certainly exactly the opposite. There was belief that knowledge really was power and that the program was sought after and fought over in the often Byzantine machinations within the Department, e.g. the move to Boston was clearly a move to try to give some clout and vigor to the TSC, newly transferred in from NASA.

Two important periods typify the data program's vagaries during this time:

The Energy Crises

The energy crises, first in 1974 and again in 1979 were an extraordinary period for the Department. From a data point of view and a policy point of view it was a period when ignorance was OK - one knew nothing about energy but it was OK because no one else knew anything either - we were all in the process of getting educated fast. The Department benefited immensely by the presence of Claude Brinegar, a mathematical statistician and a former oil company executive. He was probably the only senior executive in government who knew how many gallons were contained in a barrel of oil!

There was a rapid and urgent need to have data on many aspects of transportation that had eluded us before. (Only 6 months earlier when we had discussed the question of energy statistics for transportation in a meeting of The UN Group of Experts in Transport Statistics in Geneva we were informed that the energy statistics experts met at another time and place. A year later there was a United Nations Sub-committee on Transportation Energy Statistics.)

Government took over some market functions in the US approach to the shortage of fuels, rapidly establishing our ignorance about the scale and scope of travel, e.g. the first draft of allocations of diesel fuels left out railroads, because there was no one in the White House who knew that they used the stuff. It did illustrate how easy it is to go to a centralized system in government -- and how hard it is to get back. The government quickly assumed many market functions setting gas station hours, fill-up limits, etc. - very much a replay of the

World War II approach to shortages - in fact rationing cards were printed, but never used. In Europe many countries, less renowned for their dedication to free markets than we, let market prices rise and let the oil companies manage supply and allocation.

Other observations of the period:

- **the first occasions in my view of "trip chaining." One didn't leave home until you had constructed a number of chores to be done and a "minimum-path-solution" to the chain of activities.**

- **The Congress was astonished that the public was already economizing on fuel and the government hadn't passed any laws yet. We described to them from our surveys that "overnight" the public had parked their behemoth station wagons and shifted over to their econo-boxes. A sharp savings in fuels with no change in anything but consumer behavior.**

- **This was the period in which we created the national speed limit on fuel economy grounds with some pretty pathetic information at our disposal. The first DOT proposal went to Congress with proposed limits for Cars at 55 and Trucks at 60mph!**

- **We saw how quickly civility breaks down in a society and how easily governments take over control. We are seeing in Russia today how difficult it is to go in the other direction. The creation of a society and its mostly private institutions that act in a civilly correct fashion, based on mutual and reciprocal understanding of expected behavior, is not a casual accomplishment. (We are finding that out as we now are forced to exhort people to stop at red lights! When did this happen?)**

Deregulation

Deregulation of carrier transportation was a miracle. Theoreticians had worked at it for years, writing papers and talking to each other, pointing at some anecdotal examples of successes abroad and in intrastate regulation. But that the public institutions, most notably the Congress, but also the associations and the unions bought it -- accepted it with all the immense costs and colossal losses to many "stakeholders" (thank heaven we didn't know that word then) -- was, and still is, astonishing to me.

Part of it was that the process had gotten so cumbersome as to become a real impediment to the functioning of the society -- it had taken years to get approval for railroads to buy larger grain cars and coal cars because of the endless consideration of their "competitive impact;" and it was recognized that airline prices were basically set by the costs of the least efficient carrier. The energy crises flagged the absurdity of trucks required to return empty from a trip while another vehicle carried the load - one way. Another major factor, in my view, was the advent of the computer. People began to be able to construct systems that could show the benefits of logistical policies. But most notably, the probable one trillion tariffs in force at the Interstate Commerce Commission, ICC, could not be explained or described to a computer in any rational way.

The aftermath of deregulation in data terms was immensely significant. We are still in its shadow. The ICC saw that the warrant for its mandatory data programs was its regulatory role - no regulatory role, no data. They quickly moved to cut back on mandatory reporting data activities. Much of this was no loss - the regulatory statistical system had been a pathetic patchwork and was desperately in need of a good attic cleaning. However the existence of the ICC and its program had precluded the Bureau of the Census from doing many things because the Bureau was forbidden to collect data nominally collected by others. This had stymied the development of anything resembling a rational transportation statistical system.

In contrast to the ICC the Civil Aeronautics Board, CAB, which had evolved with the airline industry as it had developed into a very data intensive industry recognized that the world outside their regulatory domain had become heavily dependent on them for information. They moved to reduce data collection in a much more thoughtful fashion.

The residue of these developments is still with us. The Bureau of the Census acted in 1984 to study the effects of deregulation on its statistical system[xi]. It began a program of filling the gaps identified in the following years. But many private firms and associations are still suffering from a data hangover of being highly resistant to data demands and particularly relating to fears of possible re-regulation. Thus no statistical programs have been put in place yet regarding air freight, intercity bus travel, and shortline railroads.

III.C. THE RECENT ROLE OF DATA IN THE STATES

A few years ago there was a national conference on state and local data needs[xii]. As part of that activity we made a number of visits to states and reviewed their statistical activities and needs[xiii].

The data of interest in the states were those that support the planning and policy assessment processes. The experience with the creation of state plans mandated by ISTEA has been sadly disappointing. Most are completely devoid of any quantification. This may have been simply the product of the pressures of having to respond to the ISTEA mandates in a very limited period of time. But our goal must be to supplant these rhetorical plans, largely strategic goal-stating devices, over time with more quantified approaches.

The state visits and the national data conference brought forth the point strongly that although the states benefit greatly from many national statistical programs, often state expectations are not and often can not be met by national programs - either sample size issues, confidentiality constraints, or unacceptable costs intervene. States will often have to act alone or in concert to meet their own needs.

A strong force for effective relationships here is the almost total commonality regarding data needs of states and local governments, which was so strongly indicated in the national data conference. Fertile ground then one would think for the kinds of "data partnerships" between states and local governments or states and federal establishments that are a big part of our rhetoric today.

Most of these activities and any issues they generate are best left to the states and local governments to resolve in their own specific contexts. But still as brought out by the HPMS reassessment process conducted by FHWA, the goal of true "data partnerships" does not seem to have been fully realized anywhere yet.

Areas where a productive outside role can be usefully played lie in the development of the boundaries for data collection between states and MPO's developed as part of the need for decisions on state - federal data collection boundaries.

AASHTO has played an effective role in these areas in the past but its work in the future, especially given the funding changes in planning and research in TEA-21 will have to be even more extensive. Someone needs to represent state interests as

decisions are made in central statistical systems regarding content, scale and scope.

A major role that needs to be played is as the interpreter of major world globalization trends and their prospective impacts on states. Many states lack skills in accessing the necessary data but more significantly lack resources in interpreting these trends, particularly in regard to the specific prospective impacts in their area.

The entire area of demographics and social impact analysis is one of substantial weakness in many states. Social change will be the major driver of travel demand, along with immigration factors that the transportation sector will be facing. A major program could be built around this area.

As evidenced in the national data conference it is a time of great promise for the future, but also a time of uncertainty and unrealistic expectations about what new information technology can deliver. The issues involved are all inextricably intertwined. It is difficult to know where to begin to disentangle the separate elements. Resource problems, the promise of the internet, some very unrealistic expectations about what can be done with information systems, GIS, and performance measures are all closely related in mutually reinforcing ways.

There have been what must be called draconian cuts in staffs and funding in many of the programs of interest in the states. This is not to suggest that data collection activities have been unfairly singled out for mistreatment. In many states the entire DOT has suffered substantial cutbacks, often as a part of the imposition of "downsizing" or "reengineering" management philosophies. While in some cases this may have been appropriate (some have indicated that trimming of staffs and programs was overdue in some states) overall the effect must be seen as very negative for healthy programs.

The faddish qualities of these management philosophies have, it is hoped, about run their course. The private sector, where these approaches were first applied, is already seeing a reaction setting in based on the deleterious effects of the kinds of cuts that have been made. In some cases in the public sector the application of these philosophies may have been the product of cutbacks rather than the cause, as state managements tried to reorganize and modernize their programs to deal with fewer resources.

The single greatest concern for the states, and for AASHTO, must be the level of resources being made available for data collection, analysis and planning, and the untested assumption that redesign of information systems will pick up the slack.

This management trend is inextricably tied to the original point regarding the decline in human resources in state agencies. The push to information systems as the answer is part of a view that hopes that agencies can manage with fewer people and resources as long as the people are highly computerized.

The promise of the internet and other new hi-tech computer-based tools has fostered this view, which permeates all of the institutional issues. We should not seek to discourage the application of these tools, rather the view here is that the expectations have been raised to unrealistic levels. We are at the stage in many areas where the plans being made are great, grand expectations are high, and the potential disillusionment of reality testing is perhaps a year or so off. Some realism and healthy skepticism is in order.

Now with the advent of expanded funding from TEA 21 many states are ill staffed and only inadequately prepared to undertake the tasks expected of them.

IV. PAST, PRESENT AND FUTURE FAILURES AND SOME SUCCESSES

IV.A. IMPORTANT TRENDS WE MISSED

The history of our professional era is the history of the baby boom. "Demography is destiny."

We missed the trends on job growth in the seventies, eighties and nineties. There was an explosion in workers and jobs as baby boomers reached working age, and women jumped into the labor markets in vast numbers.

We missed the trends on truck travel growth in total VMT on our roads and in share of freight activity. Do we understand freight movement at all in the public sector? It seems not.

Our lack of recognition of economic trends and basic economic skills in transportation policy and planning especially at the state and local level has hurt us time and time again. Understanding that public investment is an enabling investment in and for our economic and social values is key. We are involved in an incredibly rapidly changing world in trade matters - which means freight flows - The logistics revolution some call it, that few understand and fewer plan for.

Most public actions get around to addressing a problem after it has past. We rarely see the trend when we are in it. We set programs into place to respond to the black migration from the south to the North East just about the time it ended. So it is with the baby boom. We have reached a stage of paralysis about our ability to respond to transportation demand, just as the determinants of that demand are behind us.

IV.B. PAST, PRESENT AND FUTURE SUCCESSES

The goal here is to think about what we were good at (and maybe will be good at) in the future. One immediate example comes to mind - the miracle of deregulation, already discussed. We shouldn't really be so negative; we have done pretty well. By and large, since World War II with colossal changes as the baby boom has moved through its life cycle, with the surge of women into the work place, and the national migrations first from the south to the north and then to the Sun-belt, we have managed to construct a transportation system that serves people and the larger society, well. Not perhaps the envy of the world that we like to think, but very good. In the last census the percentage

of the population commuting over 60 minutes to work was only about 6 percent of commuters and clearly some share of those consciously chose that arrangement of travel.

We have talked about being the safest transportation system in the world. We have made tremendous progress in fatality rates and accident rates, but we are no longer the safest in the world. A number of European countries have caught and passed us. There is clearly more we can be doing.

By and large, although some will disagree, we have been tremendously successful at responding to vehicle air pollution emissions, virtually eliminating some pollutants and sharply reducing others. The most astonishing measure of this was a statistic indicating that the Chevie of today traveling along the road pollutes less than one parked in a driveway in the sixties.

Some may argue about whether this is success or failure, but we have seen the share of car-less households decline from 21 percent in 1960 to around 10 percent today - and that occurred in the presence of a dramatic surge of immigrants throughout this period. This has meant a great increase in people with free choice and a greater range of job and other opportunities. It has given us Walmarts and other "big box" retailers with its attendant huge selection, low prices, responsive hours, and ugly sterility. A large share of the remaining households without vehicles are minorities and when they reach the same levels of vehicle ownership as the non-Hispanic white population then we will have completed the democratization of mobility.

IV.C. TRENDS WE MUST NOT MISS

There are forces of stability and, forces of change now acting in our society and the world. Among the future sources of growth and change are:

- **EVER MORE SPECIALIZATION IN THE ECONOMY**
- **SOURCES OF NEW LICENSES; NEW CAR OWNERS - *THE DEMOCRATIZATION OF MOBILITY***
- **IMMIGRATION**
- **SHIFTING AGE GROUPS**
- **IMPROVING INCOMES AND DISPERSION OF PEOPLE, JOBS, AND GOALS**

* SPECIALIZATION IN THE ECONOMY

Recent research[xiv] has shown that America's future lies largely with improved competitive access between suppliers and manufacturers and consumers. The two dominant factors in competitive success they cite are communications and transportation. The division of labor in society, permitting specialization of labor and investment, yields our tremendous productivity; division of labor also begets transportation, requiring both workers and products to move between dispersed sites.

Important changes are occurring, mostly positive. As we grow richer as a nation, we consume more tons of stuff and therefore ton-miles of stuff per capita than ever before. But that is changing in fascinating ways. We are downsizing everything, thus weights of things being moved are diminishing. Improved fuel efficiencies reduce the tonnage of fuels to be moved about. The amount of "stuff" needed to produce a dollar of GDP is declining partly due to the factors above but also to the fact that services are now and will be dominant in our economy. (A dollars worth of steel output takes more tons of inputs than a dollars worth of radio station output.) Another important effect of all this is that the average value of goods moved is increasing dramatically. (Think of a ton of computer chips.) This means greater need in shipping for speed, reliability and security. That equals a greater tolerance to higher transport cost modes - air freight and trucking.

It is recognized that the nation is very weak in terms of its ability to understand major trade flows; domestic and international; passenger and freight. In the last few years DOT BTS has helped resurrect the surveys of the seventies that measured the intercity movement of both freight and passengers, after a 20 year gap.

The dominant factor among states and smart metro areas is a major focus on the economy. In the economic sphere it is a period of globalization of almost everything - production, markets, both supply and demand. New economic arrangements - NAFTA, the Common Market - define new competitive and cooperative arrangements. Both freight and passenger markets are affected. It is becoming increasingly clear that domestic markets are sharply affected by international services and competition.

States are struggling to expand their ability to respond to these challenges and to use the new statistical and analytical resources at their disposal. At the same time it is clear that these new capabilities, while very useful, are often inadequate to many state needs for more fine-grained information.

Among the areas where tremendous gaps exist are:

- **Just-in-Time patterns and trends**
- **Current and Prospective NAFTA flows**
- **Intermodal freight movements**
- **urban goods movement**
- **inland movements of goods moving in foreign trade**
- **Travel and tourism, both intercity and international**
- **Major new trade corridor flows**

* **SOURCES OF NEW LICENSES; NEW CAR OWNERS - *THE DEMOCRATIZATION OF MOBILITY***

Just above we introduced the thought that we could be proud of the fact that our car-less households had declined from 21 percent to about 10 percent. That number when disaggregated by race and ethnicity indicates that while the share of white non-Hispanic households that are car-less is about 8 percent, that percentage for Hispanic households is closer to 19 percent and for the black population, 30 percent. Clearly those numbers are not permanent and we can expect that these minority populations will have vehicle-owning characteristics like the larger population in not too many years, meaning that we will have about 1.7 or 1.8 vehicles per household in America.

It is noteworthy that national data show that vehicle ownership and use mirrors the general population starting at a household income level of $25,000; and that is the average household income level for the black population as of today. The arrival of the minority populations at levels of auto ownership more like the general population will tell us that the democratization of mobility in this country will have been largely completed. For those who might argue that the black population is largely center-city based and therefore not needing/wanting cars, consider that the black rural car-less rate is 20 percent contrasted to white non-Hispanic rates of 5 percent and Hispanic rates of about 8 percent.

We have done a very bad job of measuring the travel requirements of these populations, describe them as you will: the car-less, the phone-less, the low income, the inner-city population, the minority populations. We need survey tools that will provide real descriptive power in increasing our understanding and guiding our policies. The DOT must develop such a program.

* ***IMMIGRATION***

U.S. population growth in the nineties has been the lowest in the century, short of the great depression. We are growing at well below 1 percent a year; and would be growing at even lower rates than that absent strong foreign immigration. That immigration accounts for about 35 percent of our population increase. Why does this matter for future transportation policy and planning? A few thoughts:

- **When you add one to the population from a birth you get a commuter in about 18 years; when you add one to the population by immigration you have an instant commuter. Most immigrants are in their early working-age years and a safe guess is that a job and a car were high on their list of motivations in coming here in the first place.**
- **Trend data have indicated that immigrants are a major source of travel on America's mass transit systems. This is largely a transitional phenomenon. Research has shown that transit use halves by generation among immigrants and by the third generation looks like that of other Americans. This may be a very valid and attractive role for transit - mainstreaming immigrant populations. We must think in terms of increasing opportunities for these groups rather than see them as an opportunity for transit markets and appreciate transit's broader social goal.**
- **Where the immigrant populations go will matter greatly in our plans. At this point they tend to locate where other Americans are: in the largest metro areas, where the jobs are; but are more likely to go directly to suburbs than past immigrant waves; yet their significant tendency to locate in center cities is one of the few population highlights of our center cities.**
- **A great concern must be that this population exists at the whim of Washington and the stroke of a pen can change the number, composition, and location of these groups.**

* **SHIFTING AGE GROUPS**

The history of our era since World War II has been the baby boom working its way down the age-cohort system like a pig swallowed by a boa constrictor. Have you noticed the number of 50th birthday parties lately? In this period - 1995-2005 - the number of persons in their fifties will increase by 50 percent. This phenomenon has important implications for travel:

- **This is the high travel propensity period, especially for long distance business and vacation travel.**
- **This groups travel growth levels seem to be stabilizing. There are signs of a ceiling on total vehicle miles of travel here.**
- **Maybe, just maybe baby boomers will tire of crabgrass and opt for higher density living**
- **Just around the corner, about 2010 these boomers start crossing the 65 year old barrier and then the world changes dramatically.**

*** IMPROVING INCOMES AND THE DISPERSION OF PEOPLE, JOBS, AND GOALS**

Let us make believe that rising incomes are good! They permit people to act on their needs and desires in ways they prefer. Rising incomes also: increase auto availability and use; increase trips per household; and increase average trip lengths. There is obviously something in travel that people value because as the means to do so increases people consume more transportation.

Along with increasing incomes comes an increasing value of time. The pressures of time will dominate commuting and other local travel purposes, pushing trip-chaining and faster modes, i.e. the single occupant vehicle. Dispersal will be abetted by employers in search of skilled employees locating where those employees are, or want to be. The dominant economic reality of the new century will be a shortage of skilled professionals; employers will go where access to skilled workers is high to gain advantage over their competitors. Employer location choices will be guided by the facts that they can locate almost anywhere near a mailbox, phone and airport; access to skilled employees who just might as well be in a nice place to be, and the search for capacity - road and air. Efforts to squeeze people to get them to behave in "socially acceptable" ways will generate more dispersal, as the public runs away from costs, crime, and congestion - and central planners.

There has been considerable over-hyping of the long-awaited high tech boom in working at home with phrases like "30 million Americans work at home." These numbers typically count anyone who ever takes a brief-case load of work home. The present reality is more modest, although still a significant story. There were about 4.3 million people working at home full-time in 1990, up 56% from 1980, but still not back to the 4.7 million who worked at home in 1960. (Many of whom were farmers.) A lot of the growth of the past decade was more mundane than booming high tech, with many of the work-at-homers often lower-income women engaged in daycare.

But there is a story to tell about the future. Downsizing and out-sourcing are creating mini home-based businesses in many areas. The availability of telecommunications technologies have broken down many of the distance and personnel barriers of the past. Small firms can be almost anywhere. Back-office functions are dispersing to low-cost areas. Many of the logistical needs of

businesses are now ubiquitous, and skilled people can be where they would like to be, rather than where the jobs might be; jobs will follow the skilled. Self-employment has grown at roughly the same rates as overall job growth in the country over the last 10-15 years - roughly 20% per decade. This will continue and even accelerate. The year 2000 census should indicate continued extensive growth in working at home, with an increased but still minor share of all commuting.

True tele-commuting, where a person is an employee with a work site to go to usually, but on an occasional, or scheduled basis, works at home or at a local work site, is suffering from the negative reactions to some of the first stage over-enthusiasms. A lot of what was easily doable has been tried with varying levels of success. But the big future change I foresee is that of working women, particularly working mothers, creating a strong force for more flexible working arrangements. In many instances increased pay will be secondary to better control of personal time. This will result in more flexible hours and days of work with some work being done at home. The key effects here are that these patterns will abet further dispersal of the population and further support orientation to the single-occupant vehicle. But small shifts here can take the edge off of peak hour travel demand and make for a more operable public investment climate.

V. CONCLUDING THOUGHTS

The good news in all of this is that we have largely passed through an extraordinary one-time event, a bubble, as the baby boomers marched through the life-cycle, frequently overwhelming our attempts to keep up with schools, roads and other public services. The decades of explosive growth in our metropolitan areas, particularly those of the Southwest, are largely behind us. The major factor often will be where do immigrants come from and where do they choose to locate.

V.A. THE SEARCH FOR SILVER BULLETS

Our problems in the future will be much more operable. We will add 25 million to our population each decade for the foreseeable future, as we have since 1950. Our ability to respond to that growth will grow faster than that. Our public investments won't be overwhelmed by dramatic growth and our resources should be greater, as well, to deal with the smaller scale of problems we will face. It would be tragic if our failures to keep pace with the astonishing levels of growth of the last few decades would weaken our resolve to deal with the problems of the future.

This will create the opportunity to make a shift from continuously playing catch-up in our transportation investments to acting more strategically and focusing investments where potential economic and social benefits are greatest. We can separate current needs from future prospective needs and respond to them individually.

One wag once said that Washington was the city where every action has several equal and opposite reactions. This seems to be certainly true in building transportation facilities today, especially roads. The notion that roads fill up as fast as we build them and therefore all is for naught - Transportation Nirvana we used to call it back in the sixties when transportation and land use were being studied more thoughtfully. Thus roads are the only public investments that are condemned for being successfully used. The fact that people find opportunities for economic and social interactions enhanced by roads and use them is what we should mean by success not failure. Consider the problem of those who build roads in the vain hope of "build it and they will come" when in fact "nobody comes." Are their empty roads successes, in the same way that empty transit systems are, perhaps?

Most trips have economic transactions at their ends, and if not they have social interactions of great value to those making the trips. Induced travel seems like a very attractive concept to me. Think of all the induced travel we will produce from getting autos into the hands of minority populations! We should celebrate it not condemn it.

It seems that somehow we are cowed by the growth rates of the past and can't see the utility of any action, other than marginal responses to the problem. We have convinced ourselves that all we can do with demand is manage it - Giving ourselves the controlling role.[xv]

Much is made in "Transpeak" these days of treating the traveler as our "customer" - hardly - we have little or no interest in what our customers want - only our view of what we think they should want. We talk about being customer-based but the question to be asked must be "Is the public our customer, our client, or our patient?" Does our profession respect the traveler? The answer has to be almost certainly not. In most of our thinking they are the great boobourgoise, thoughtless, recalcitrant children, who need to be educated in what to want by those of us who know better. Many of our metropolitan exercises have more of the character of plotting against the public rather than planning for them.

V.B. CONGRESS, THE FEDERAL AID PROGRAM AND DEVOLUTION

We need to ask ourselves about the present state of the federal transportation program and where does it go from here. It has been observed that TEA 21 was not so much federal legislation as legislation crafted between the Congress and the States. In that process it is clear that DOT/FHWA has a weaker role to play. In that environment how do we function: how choose, design, build our facilities.

Interestingly, the new users of federal funds, in transpeak "constituencies" - i.e. people who are willing to accept federal money - are now the most dependent on the federal program, and most of those are arguably the activities that have only the slightest claim on a national program. The course of devolution it seems will continue, abetted by the pressures to use funds for less than national needs. While it has been possible in the past to convince states and users that certain national priorities (global competition, for example) argue for transfers between states - cross subsidies if you will - that concept is harder

(impossible?) to sell when the dollars are purely discretionary (and going for a bike path).

What is not federal? In order to gain some sense of scale on our programs we have to answer that question. The present answer is "nothing"; in fact the more local it is the more federal it is. We need to recognize that the fundamental reality of the program is the federal gas tax - and what will we do with those taxes. The federal fuel charges are a colossal cash cow generating money rather casually. Once the program has run out of an overriding rationale for existence it degenerates into a source of funds without a purpose (a special case of revenue sharing) not that there aren't things that need to be done but we have not made that case. Given the demise of most of the great society programs the transportation program is the only game in town and attracts anyone with a "good" idea.

V.C. MAKING THE CASE FOR THE VALUE OF TRANSPORTATION IN SOCIETY

We need new mechanisms for evaluating and justifying transportation investments and policies. We need tools to transmit the basis for investment decisions to the public. What is the nature of what constitutes a solution - is it new institutions, new paradigms or what? Although we are celebrating the big dollar flows from TEA-21 that looks like success, it is, in my view, the last hurrah of a bankrupt program.

Tea-21 forces us to address the need to put reauthorization on a sounder basis. In the past the program used jobs creation as the nexus of its justification. That was wrong - and successful. We need a more sound economic and social understanding to base our work on. We are close - there is very good work being done[xvi] - that can expand our understanding and our horizons. How can research carry us forward? A sense of history would help. The interstate program had both the power to attract and to repel. The NHS has shown no such power; perhaps the corridors program or the ITS might! Without such power the entire surface transportation program degenerates into a highway tax-based federal revenue sharing program, better managed back home at the local level.

Too often when we talk about transportation we focus narrowly on passenger travel and then further focus on commuting issues, from there we go to an argument about transit versus highways. This is a far too narrow perception of our subject. As associated as my work has been with commuting I understand that it is a small and declining component of our concerns. Americans must recognize that there are at least eight forms of transportation activity that need our concern and response in public policy, as shown in the list below.

FORMS OF TRANSPORT

- ⇒ **COMMUTING**
- ⇒ **OTHER LOCAL PASSENGER TRAVEL**
- ⇒ **TOURISM**
- ⇒ **SERVICES VEHICLE MOVEMENT**
- ⇒ **PUBLIC VEHICLES MOVEMENT**
- ⇒ **URBAN GOODS MOVEMENT**
- ⇒ **THRU PASSENGER TRAVEL**
- ⇒ **THRU FREIGHT TRAVEL**

Some have said that Commuting in America has been useful because it describe a new reality with an intensive, hopefully objective, statistically-based, interpretive portrait. If that is so then we certainly need much more of that kind of approach to many of the subjects of concern to us today. We need to provide the data that can produce such portraits; we need the skills to interpret and display this information insightfully; and we need more public officials that recognize this need and will act to inform decisions with them.

A MODEST INVESTMENT LIST - AN ADDENDUM

While there is a current tendency to believe that most of our high-payoff investments in infrastructure have already been made, The future holds great opportunities for investments in surface transportation with high economic and social yields. Overall our investment thinking will have to be "nimble," i.e. responsive to a rapidly changing world, and "smart" using well-trained people properly prepared with the necessary statistical data and analytical tools. Everyone of these is information-intensive in that we will need to educate ourselves, decision-makers, and the public about the nature of these problems and the nature of the solutions. Among my high pay-off list:

1. **Safety-related Investments - The deaths on our nation's highways are unconscionable, particularly because investments can be made that can sharply reduce the toll. Of course, a large part of the causes of fatalities are linked to vehicle characteristics and driver behavior, but all contributory factors linked to the highway itself must be addressed including highway condition and design. Much of this needed investment will be on the National Highway System.**

   The aging of the population will be another factor that contributes to increased traffic risk. We need to re-think and perhaps retrofit our highways, particularly the high speed facilities, to respond to the changing visual acuity, reaction times, etc. of our aging population.

   It is frightening to think that in the past we consciously accumulated highway trust fund revenues to artificially balance the budget only to forego making safety investments that could save lives. We must commit to a date certain in the future (2010?) when these problems will have been addressed, with timely monitoring of progress. The public wants a menu for action in highway safety which ISTEA and TEA 21 lacked.

2. **International Competitiveness - Expansion of interstate trade corridors between and into our metropolitan areas that serve our international trading needs can sustain and extend our international competitiveness. Major choke-points at our borders and in and around metropolitan areas need to be addressed. Most of our cities exist because of these trading realities and then grow up and try to destroy them. A large**

part of America's comparative advantage lies in the speed, reliability and low cost of its transportation system.

3. **Operations Improvements - Investment in and greater application of traffic engineering and ITS technologies to expedite traffic flows and increase capacity of our highway systems, reducing waiting times and delays, can pay big air quality and time savings dividends. We will need to invest in the research, the technologies, the data but most of all the skilled operators to make these systems work.**

4. **Job Access - We need to invest in better ways to get inner city residents to jobs that are now more likely to be at highly dispersed locations in the suburbs. Rather than "big" transit projects we should invest in jitney-like systems or van-pools, where, frequently, it will be inner-city entrepreneurs who become "small" bus company owners to meet these needs. This will take both some investment and some regulatory treatment.**

5. **These are likely to be among the few successful transit strategies in responding to overall metropolitan and suburban travel demands. Other high payoff transit investments are likely to be related to rehabilitating and upgrading many of our aging transit systems, particularly those in the Northeast.**

6. **Metropolitan Capacity - We actually are going to have to build roads in the suburbs and the outer fringes of our metropolitan areas. There will be a search for capacity across America in the coming years - both highway and air capacity - for both passengers and freight. Unless we provide some of that capacity in our metropolitan areas, businesses and high skilled employees will disperse even farther afield. Such investment will help keep our metropolitan areas competitive and make the life-styles of a majority of our population more livable.**

7. **Whether this is part of the solution or the problem is not clear but at some stage, and sooner than later, we will be faced with the need to separate cars and trucks - as cars get smaller and trucks get bigger.**

8. **The simple commandment is "Make things better" - Improve transit - yes; improve pedestrian and biking facilities - yes; improve highways - yes. Trying to congest people into preferred modes - the theory that says that if we just can**

make people miserable enough we can solve the problem, is a bankrupt public policy.

9. **Make the auto a good neighbor. We have made believe the auto was going to go away. Our homes, job sites, shopping centers have not recognized how to make the pedestrian and auto interact safely, comfortably and attractively. It can be done. Those who work it out will be richly rewarded. The future belongs to the personal vehicle and walking. They used to say that Californians were the people who drove to where they wanted to walk. Better said today, Americans are a people who fly to Europe to go for a walk. (And who drink water imported from France or Switzerland or wherever)**

10. **my proposed goal for transportation would be to reduce the effects of distance as an inhibiting force in our society's ability to realize its economic and social aspirations - to "destroy" distance as a factor in meeting society's needs. I would hope this would be everyone's goal.**

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[i] as observed by the sage Peter Koltnow

[ii] Read Edward Weiner's historical overview on Urban Transportation Planning in the United States, fifth edition, US DOT, 1997

[iii] Read CATS I, II and III from 1959 ,sometime to see how little we have changed in 40 years.

[iv] National Transportation: Trends and Choices, USDOT, 1978

[v] Moving America and its companion volume National Transportation Strategic Planning Study, USDOT, 1990

[vi] National Transportation Policies, NPTSC, 1979

[vii] Transport Tomorrow; A National Priority, 1982

[viii] Excluded from these are the how-goes-it administrative statistical programs of agencies that measure their internal activities.

[ix] House Report 1596 DOT Appropriations Bill 1969 as in Transportation Information, US DOT, May 1969

[x] Transportation Information, US DOT, May 1969

[xi] See Statistics for Transportation, Communication, and Finance and Insurance: Data Availability and Needs, National Academy Press, 1984

[xii] "Deregulation has changed both the structure of those industries and the statistical reporting systems that support our understanding of them"

Information Needs to Support State and Local Transportation Decision Making into the 21st Century, TRB Conference Proceedings 14, March 1997

[xiii] A Review of CTIPS capabilities and State Data Needs, AASHTO,Oct. 14, 1997

[xiv] University of Illinois and Federal Reserve Bank of Chicago REAL Discussion paper on the structure of spatial interaction in the Midwest

[xv] One effect is that we could expect highway cost to be about 20-30 percent operating costs in the future.

[xvi] Nadiri's work for the FHWA for instance, or the work of the BTS and BEA in National Accounts.