

# The Year 2020

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We are gathered here in Boston today in the year 2020 at the behest of two organizations, one called the Transportation Research Corporation, a privatized version of what used to be known as the Transportation Research Board (TRB), and the other one called AAPPMO, the American Association of Public and Private Mobility Officials, which used to be the American Association of State Highway and Transportation Officials (AASHTO) back in the twentieth century.

I am pleased to be here to talk to you today in 2020, and to have been invited by you to review the history of surface transportation in the early part of the twenty-first century, especially the last 20 years.

In preparing my history of the twentieth century portion of the last 31 years, I found a kind of schizophrenia when looking back at the transportation sector in the 1990s. Certainly on the passenger transportation side, public sector institutions were frustrated by lack of progress.

The eighties and nineties seemed to be a low point in productivity increase, owing in part to static institutions, unyielding stakeholders' positions, rigid program structures, lack of program structures, lack of technical innovation, declining investment, and all being held hostage to a funding system that was mired in national and state politics.

Perhaps more important in the eighties and nineties, the provision of public infrastructure—transportation infrastructure and services, highway and transit—was isolated from the economic expression of consumer demand and from effective means of responding innovatively to its market.

As the service economy continued to evolve during those decades, and as the new economic geography continued to scroll across the landscape and new society and lifestyles emerged, transportation appeared to stand still.

In the freight transportation sector, deregulation in the eighties and nineties had unleashed some enormous private-sector entrepreneurial energies. The freight transportation industry, in dramatic contrast with passenger transportation, had substantially reorganized, with blurring and consolidation among modes and service providers, and rapid market entry and departure. It invented new forms of service and value-added niches, incorporated new technology, and passed on substantial savings to shippers.

Thus, consumers of publicly provided transportation infrastructure and services in those days appeared to view the transportation system more as a problem than as an opportunity. They saw it as simply an obstacle to be overcome. In the face of growing congestion, the transportation sector appeared to have no clear program to increase speed, reliability, or comfort. Rather, it was faced with a growing backlog of physical deterioration and a history of underinvestment.

In retrospect, it should not be surprising that America's business leadership, once aggressive supporters of major new public investment in transportation infrastructure, saw the transportation structure program as just another form of pork, based as it was on formula entitlements.

With 20-20 hindsight, we can now state the key question that actually faced us. It was, in fact, facing transportation professionals at the close of the twentieth century. That was, what kind of a transportation system did a postindustrial service economy, geography, and society really need, and how was society going to shape it and pay for it?

It's pretty clear from our vantage point in 2020 that the twentieth century institutional structure itself was a major impediment to the new system which has been developed. The old structure, in fact, lacked several key characteristics that we in the year 2020 now take for granted.

What are these? The ability to detect and respond to different market segments seeking a range of service attributes and the ability to build those into our overall system. We in 2020 take for granted

- The dominance of a management perspective oriented to operating our transportation systems at maximum efficiency;
- The rapid incorporation of the best available technology with minimum disruption of our infrastructure and services;
- The ability to harness entrepreneurial energies and place the major components of our transportation system on a profit-making basis;
- The ability now to mobilize substantial capital on an international basis relatively independent of politics; and
- The substantial differences in approach from region to region around our country.

Given where we are today, the big story must have been how the dramatic transition took place from the twentieth to the twenty-first century in transportation. It is perhaps no surprise that, given the state of the system back in the dim years of the late eighties and early nineties, the focus was on preserving infrastructure and maintaining existing levels of service just to cope with existing demand.

Despite that pessimistic outlook, three areas had major progress. The first was the partial completion of what turned out to be the last great round of federally sponsored interregional highway and transit development. Limited in scope as it was (because it turned out to be based on the last of the great federal fuel tax increases), it nonetheless contributed substantially to the nation's economic development. In some ways, the fortunate delay in implementing this program permitted the concept of systems operation and management to penetrate more thoroughly into highway agencies as efficiency became a precondition of federal aid. Highway agencies became

increasingly led and staffed by MBAs, electrical engineers, logicians, and economists.

The second major achievement of the nineties related to what came to be known as the "Metro-Flex Program," that is, the increasing ability of metropolitan areas to expand and extend their systems. This process, which took various forms around the country, did not follow the handbooks, and it was funded by a dazzling array of new financing sources at the state and local levels.

The flexibility and the discretion that was built into the legislation of the late nineties expressed itself in some very unusual ad hoc and custom approaches that squeezed new capacity into constrained environments and dissolved most internodal barriers. These approaches brought new transit service products that turned regional transportation agencies into service managers and brokers.

At the same time, converging state and local attitudes on land use control and transportation facility development, together with new funding sources, facilitated the emerging "concurrence concept." An ability to balance supply and demand emerged at last.

While these two program activities dominated transportation infrastructure development and resources in the nineties, a third and parallel activity was taking place, although it had very little impact at the time. This was the gradual extension of advanced traffic management systems on an areawide basis and state and local acceptance of responsibility for system operation. Conventional forms of traffic operations and driver information systems were installed on a widespread basis, and an entire new array of methods to avoid and minimize incidents developed. My favorite was the famous flying traffic crane to lift out-of-gas vehicles off congested freeways.

Let me now, however, turn to the twenty-first century proper, because by this time the potential of an entirely new type of synergism had become apparent: a new interplay between demand, supply, and institutions. We here today in 2020 are so accustomed to these changes that we have forgotten how unanticipated they were in the past.

First, I think we have to remark on what had become known around the turn of the century as the "economic geography." In its spatial guise, this was the postindustrial service economy with lighter, higher-value products moving around with global sourcing, a more dispersed pattern of production in small units, and a more direct producer-consumer linkage.

Combined with the need for low-cost land for affordable housing, this trend encouraged low-density development dotted with service nodes. It took advantage of abundant, cheap, attractive land suitable for development, land that was a major resource in North America.

Together with this spatial extension, the new economic geography was also based on time shifting. The continuing penetration of information technology contributed to fundamental changes in temporal activity patterns, especially with regard to the organization of work. The dominance of the office complex and the urban landscape ceased altogether. District clerical brokers employed exurban work forces and small groups linked electronically to decision makers in the few remaining central cities. Time-shifting technologies eroded the need for physical and temporal assembly and more and more workers made their own hours, their own days, and their own seasons.

The third major change was social. I will not go into this in any depth, except to remind you that there was a period

when it was very difficult for the elderly and the young to attain personal mobility as the spatial extent of development increased.

The forces and the early effects of these changes interacted in a variety of patterns that were difficult to anticipate, and they were, in a large sense, visible before the turn of the century. The relative importance seemed obscure at the time.

These demand-side changes, were taking place simultaneously with new concepts and technologies on the supply side. These included improvements in traffic management and driver information, advances in technology and automatic vehicle controls, institutional acceptance of the concept of system management and market responsiveness, and radically changing roles for the public and private sectors. The interactions among these concepts in technology have made the 20 years between the year 2000 and today most interesting.

The intelligent vehicle and highway system technology was introduced initially in the nineties to reduce congestion when peaks, as they were known in those days, were still a major problem. Interestingly enough, the intelligent vehicle highway system did not take off until the privatization of major highways began. Private sector entrepreneurship, and international capital and innovation and management, seemed necessary to make this work. The need for entrepreneurial leadership and the importance of common ownership of guideway, hardware, and software, coupled with the problem of assigning liability, led to major private consortium involvement, which I will discuss shortly. Privatization was actually postponed until the direct user charges became more widely used. Road pricing, as it was then known, in turn became increasingly attractive. Fuel and excise taxes became increasingly unreliable sources of revenue as alternative fuels became necessary and vehicle efficiencies increased.

Fortunately, about that same time, automated vehicle identification and credit card technology made equitable transportation user fees possible; road owners, many of whom were private by this time, could bill road users directly. The potential of road pricing for improving productivity was only gradually realized, however, and its introduction was uneven. As we know, substantial portions of local systems continue to be funded by nonuser fees today.

Interestingly enough, the major impact of this technology in some areas was to improve efficiency through better use and better user information. Nonetheless, the continued decline in densities, which I already mentioned, and the introduction of road pricing had almost an equal impact on improving service levels. Indeed, the interactions of the intelligent vehicle highway system technology, road pricing, and lower densities eliminated substantial capacity constraints on all but some of the oldest and largest traditional cities by 2020.

Surprisingly enough, the same technologies actually had a much greater and less expected impact in other areas: safety, freight operations, and speed increases.

From a safety perspective, it is hard to imagine today how our adolescents and elderly would have achieved the mobility required in today's society without the automated vehicle operation that allows both 14-year-olds and 84-year-olds to operate vehicles.

Another interesting side effect of the technology was the great speed war of the teens. Improved crash avoidance and crashworthiness technology, together with smarter roads and vehicles, encouraged higher speeds. Spurred on by competition from Japan, the United States, and Europe, major speed

breakthroughs were made after 50 years of almost continually lower average speeds.

The first speedways around 2015 were private speedways, that required special licenses but offered speeds of 120–130 miles per hour. The impact of these new speeds, along with the reduced need for living near one's place of work, had an enormous impact on urban geography. Urbanized areas were extended rapidly along the speedways as commuters' lifestyle options expanded dramatically. Commuting from a vacation home was now possible. Welcome the twenty-first century metroplex of exurbs, reburbs, and distinct lifestyle villages, all on less than 2 percent of the nation's land.

The evolution in freight technology that took place was also strong, but I will only touch on that lightly. Developments included internodal blurring. Major road/rail companies ran their in-train, multiunit, multiwheeled turners on exclusive freight ways. Penetration of what used to be airline corporations and the major inner-city ground transportation took place. All of these developments obviously had a dramatic impact.

Thus, these developments indicated the potential of a real market in transportation services and spawned the various kinds of specialized facilities that we enjoy today. The speedway, for example, and the shareway (you can guess what that was), and now the freightway and the parkway.

Although I will not discuss each of these today, they represent an important matching of the smart vehicle/smart road technology, with an individual market in terms of a specialized facility. Each had a dramatic impact on the mobility of our society in the early part of this twenty-first century.

Let me just finish now with a brief discussion of institutional evolution, which in many ways was a necessary precondition for introducing these new systems and services.

In one way, the institutional structure that we have in the twenties—that is the 2020s—represents continuity with the past. There is a division of roles between the public and private sectors, between individuals and businesses, and between governments.

In the twentieth century, guideways were a public monopoly financed by taxes and users and determined by the political process, as was the nature and distribution of service. Vehicles were produced by large private corporations, but they were

owned and operated by individuals and were regulated primarily by state and local governments.

The irony of the twenty-first century has been that the old system has literally been stood on its head, reflecting the logical outcome of our capitalist and federalist system. First of all, road pricing reduced the need for government finance, particularly for the upper-level and specialized systems. Indeed, the great road asset sale bonanza of the 2020s fueled the bailout of the Social Security system that was desperately needed at that time.

At the same time, the closely linked vehicle guideway technology, with its operating requirements, liability problems, and dynamic technology, made privatization both a necessity and an opportunity. It was simply a course of action that government could not keep up with.

It is not surprising that the major transportation corporations, the internodal carriers who combined with the major airlines and evolved into the first major service provider consortiums came in with important players from both the vehicle and electronic industries. We had great corporate giants that we take for granted today: CSX-Ford dominating the Northeast, GM-IBM dominating the Midwest, and TransWorld-DEC dominating the Southwest.

Each of these competing transportation corporations owns and operates the speedways, the shareways, the freightways, and even the parkways. Federal and state governments now, as we know, play a largely regulatory role. The upper-level systems, of course, organized by the 12 federal economic development regions, like so many other services have replaced the role and function of state governments.

Local governments, both urban and rural, still struggle with local access roads, although divestiture has substantially reduced their burdens and better pricing has improved their economics.

The regional mobility corporations of most metropolitan areas work with the major road transportation corporations to supply the array of transit services now available in most areas.

These are just some of the highlights, and I could go on and on to bring you up to date and even speculate a little bit about tomorrow; but, of course, that would be dangerous. I will just call it a day here because I have to catch the Stratoliner back to Paris for my afternoon meeting.