

INTRODUCTION

Investment in transportation infrastructure has traditionally been closely linked to economic development. The ability of Mississippi's transportation system to move people and freight, as well as to expand linkages to a global economy, will be an important foundation for future growth and of critical concern for the MULTIPLAN. This chapter identifies these trends and relationships. It further examines opportunities for MDOT in areas of policy and finance to position the state for strong economic growth and enhanced quality of life.

ECONOMIC TRENDS AND RELATIONSHIPS

Economic Development & Transportation Infrastructure Linkages

It is a widely accepted notion that increases in economic output and growth are partly the consequence of investment in a state's capital stock¹. A state's capital stock consists of two components. Directly productive investments include factories, machinery, equipment and supplemental investments. Supplemental investments are generally thought of as infrastructure investments – transportation, electricity, water, communications, sanitation and education. All supplemental investments serve to facilitate and integrate economic activity.

Within this context, state transportation policy-making should be oriented toward supporting existing or anticipated capital investment in productive activities. As business investment grows or is expected to grow, transportation infrastructure should seek to keep pace. Only under rare and isolated cases can transportation infrastructure investment be expected to lead investment in productive assets. The classic example illustrating this point is when a transportation project is "built ahead of demand." Investment in infrastructure far in advance of its anticipated need produces significant misallocations and inordinate expenditures of scarce financial, material, land and labor resources.

Confronted by the growth consequences of their decisions, today's transportation analyst must now grapple with more complex questions than before. As Mississippi's transportation system matures and competition between modes intensifies for limited government funds, the issue is simply not where to build another highway segment or which airport to expand. Complex issues that must be addressed include²:

- In meeting a region's needs, what mode is most cost-effective?
- How should MDOT prioritize its modal investments to maximize growth?

¹Michael P. Todaro, "Economic Development," 5th Ed, 1994. The other two factors driving growth are population/labor supply changes and technological progress.

²Randall Eberts, "Understanding the Impact of Transportation on Economic Development," TRB, A1A06, Committee on Transportation and Economic Development.

- What trade-offs exist between additional urban growth and expanding transportation systems to accommodate growth?
- What effect will transportation investments have on the need for other types of infrastructure?
- What are the economic consequences of innovative traffic management systems?
- What will be the effects on productivity of various investment options to reduce congestion?

The preceding questions and discussion serve to strengthen the case for strategic, multimodal planning by Mississippi. To ensure that economic growth is optimized, facilitated and funded at the appropriate level, planners must address many issues and questions. Limited transportation investment monies are expected to have the greatest impact when transportation planning is forward looking, multimodal integration occurs and all cost and benefits are carefully weighed.

International Trade and Transportation Infrastructure Linkages

Increasingly, world economies are embracing free market economics. As a consequence, a large majority of the world's economies have liberalized trade policies. With increased open trade, economic development among trading partners has benefited substantially. Trade as an "engine of growth" has been accelerated through increasing usage of international trade organizations such as the World Trade Organization (WTO) and associated trade agreements such as the General Agreement on Tariffs and Trade (GATT).

In the U.S., international trade as a share of Gross Domestic Product (GDP) has grown from 10.7 percent in 1997 to 26.9 percent in 1999. This growth and its impact on the evolution of transportation networks is a reflection of not only increasing liberalization, but three additional trends³:

- Multinational trade blocks (NAFTA, EU, MERCOSUR) have emerged facilitating linkages within broad regions of the world;
- Supply chains have become globalized as industries seek comparative advantages in production costs and technologies that different segments of the world offer for different elements of the supply chain;
- Advances in information and communication technologies allow these supply chains and distribution channels to improve spatial and temporal integration.

Mississippi as a gateway state has benefited from these international trade trends. For example, from 1993 to 2000 Mississippi merchandise exports to the world increased 121

³ "Trade-From National Markets to Global Markets," Cambridge Systematics, Inc., for FHWA, Office of Freight Management and Operations.

percent, ranking it 8th among the 50 states in percent change over the period⁴. This type of growth compels state planners to take steps to ensure that needed infrastructure is in place.

In fact, international trade has a profound impact on transportation infrastructure and on economic development in general. In order for the citizens of a state to benefit optimally from increased trade, planners must focus upon the modal impacts of increased freight passing through and out of their state. Increased freight traffic will directly impact ports, highways, railways and airports. Mississippi waterborne international cargo throughput, for example, is expected to grow by 232 percent from 2000 to 2020. Additionally, Mississippi international air cargo tonnage and rail tonnage are both expected to increase nearly fourfold from 1996/1997 to 2020⁵.

Exhibit 4-1 illustrates the forecasted, long-term waterborne trade patterns anticipated between Mississippi as a gateway state and other major regions of the world. Interestingly, total trade volume with Asia is expected to diminish, but export activity will expand. Total trade with Europe and Canada will not significantly change in terms of magnitudes. However, trade with Latin America (including Mexico) and the rest of the world (Australia, Africa & Middle East) is expected to change significantly, both in magnitude and percent change. The significance of Latin America to Mississippi and its recent focus in the *Latin American Trade & Transportation Study (LATTS)* are discussed further in the following section.

Mississippi Waterborne Latin American Trade and Implications – A region that has become increasingly important to Mississippi is Latin America. In response to a number of factors, Latin America is experiencing unprecedented economic growth. Trade with the U.S. has increased with Latin American's increased appetite for goods as a consequence of their growing incomes.

A recent study (LATTS) conducted for an alliance of southeastern states, of which Mississippi was a member, examined in depth the impact of increased trade on transportation in the member states and the influence and impacts this trade would have on transportation infrastructure.

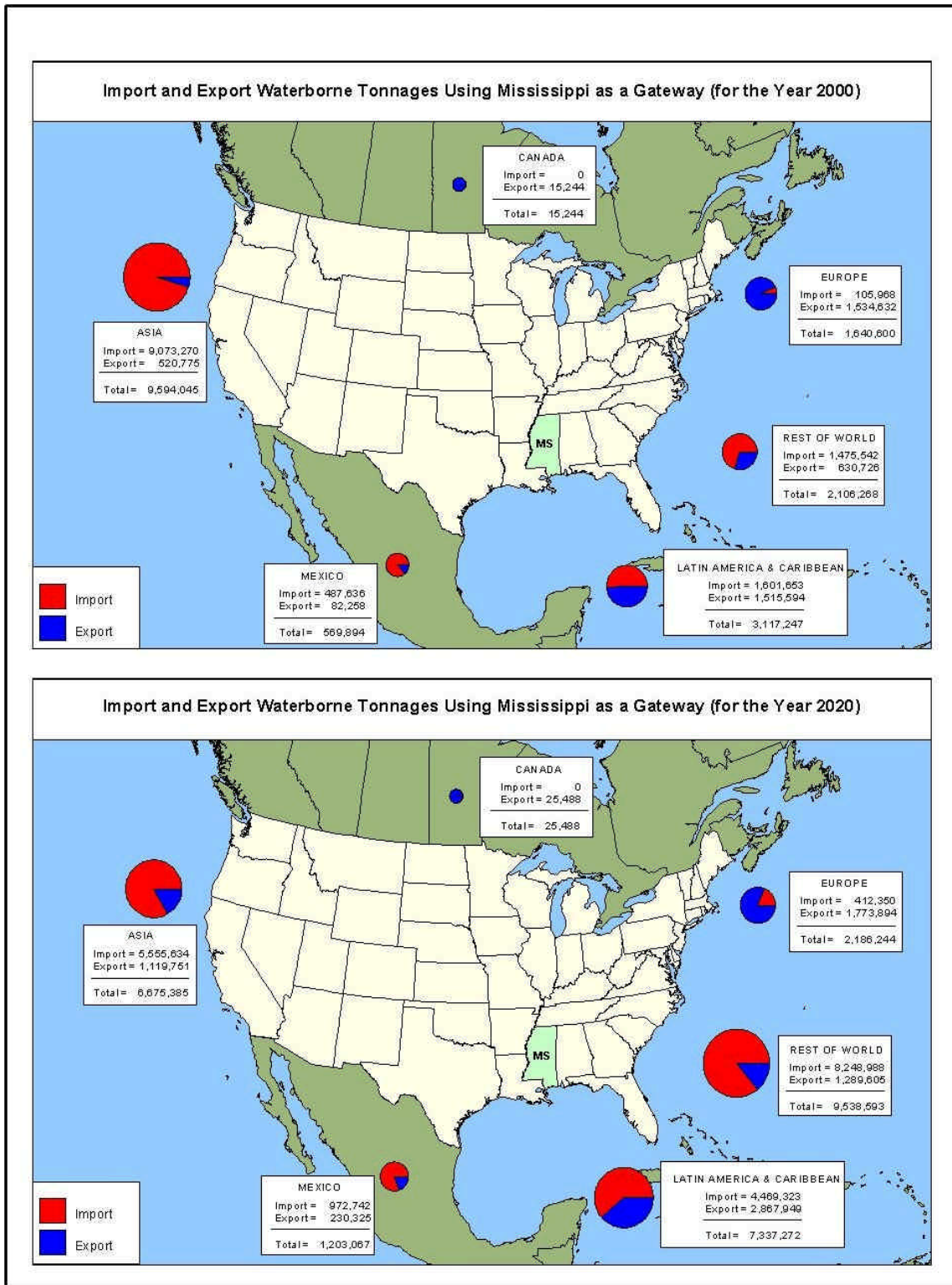
Table 4-1 shows anticipated Latin American trade growth for the Alliance states and Mississippi. Note the forecast for the Alliance states includes all modes, whereas Mississippi figures represent only waterborne trade. As a gateway and coastal state this comparison makes sense due to the magnitude of Mississippi's waterborne trade relative to its international trade by other modes.

The figures suggest that Mississippi's long-term trade with Latin America is expected to grow at rates exceeding that of the Alliance as a whole. For the 14-year period 1996-2010, Alliance trade growth is expected expand by 5.9% with Latin America, but Mississippi trade will grow by 7.5 percent. Similarly, for the 24 year period (1996-2020) trade growth between Alliance states and Latin America will increase by 7.2%, but Mississippi's trade will grow by 8.5 percent.

⁴ Office of Trade and Economic Analysis, International Trade Administration, U.S. Dept of Commerce.

⁵ Latin America Trade and Transportation Study, Wilbur Smith Associates, Mississippi Report, March 2001.

Exhibit 4-1
ANTICIPATED LATIN AMERICAN TRADE GROWTH



**Table 4-1
TRADE WITH LATIN AMERICA
(LATTS Base Case Forecast, Metric Tons)**

	1996	2010	Average Annual Growth '96-'10	2020	Average Annual Growth '96-'20
Alliance States (All Modes):					
Exports-All Commodities	98,885,602	217,039,012	8.50%	340,912,256	10.20%
Imports-All Commodities	241,036,076	403,853,781	4.80%	590,229,000	6.00%
Total Alliance Trade	339,921,678	620,892,793	5.90%	931,141,256	7.20%
Mississippi (Waterborne):					
Exports-All Commodities	1,248,846	2,264,176	5.80%	3,098,274	6.20%
Imports-All Commodities	1,568,518	3,503,498	8.80%	5,442,065	10.30%
Total Mississippi Trade	2,817,364	5,767,674	7.50%	8,540,339	8.50%
Source: LATTS, Mar 2001					

International trade growth has major implications for Mississippi's transportation systems:

- Increased infrastructure investment is needed to meet exceptional growth in trade with Latin America, Africa, Australia and the Middle East.
- Trade gateways that currently are experiencing congestion will come under increased pressure to expand capacity. However, lack of suitable land, environmental concerns, "no growth" social elements and funding constraints may dampen response to capacity growth demands.
- As reliance on trade grows, Mississippi transportation policy makers must increase involvement in U.S and state trade policy formulation. State government transportation officials must remain responsive to international changes in trading patterns and policy.

Manufacturing And Production Trends

Industrial organization and production technologies have evolved significantly in recent years. Changes in products and services demanded, delivery and distribution systems and process technologies all have influenced transportation and freight networks. The remainder of this chapter discusses a few of the more significant trends and how they influence transportation infrastructure and the transportation planning function.

Transition to Service Based Economy⁶ – The shift from manufacturing to services is neither a new nor a short-term phenomenon. Earlier productivity improvements in the agricultural, communication and mining sectors permitted the development of an efficient manufacturing sector. These changes set the stage for rapid growth of the services sector following World War II. While the service sector has not displaced the manufacturing sector in terms of its contribution to Gross Domestic Product (GDP), it has taken on far greater importance in terms of sheer size and employment levels.

Service sector growth has led to new demands and expectations of transportation providers. In turn, these new demands and expectations have led to changing expectations and requirements of transportation providers in the manufacturing sector.

These changes have an important impact on the movement of goods, both directly and indirectly:

- *Customers demand service that is more flexible, reliable, on time.* Carriers must tailor service offerings closely to shipper product and delivery requirements. While some customers prefer inexpensive transportation, others require fast and reliable transportation. The net result has been far greater differentiation in transportation service offerings than has been the case in the past.
- *Traffic growth is greatest for smaller shipments.* A variety of factors including the proliferation of products and suppliers, increased direct delivery to end users, and lean inventory strategies are driving down the average shipment size.
- *Employees expect better working conditions; employers, better-educated and trained employees.* A shift to a service-based economy raises expectations of business, customers and employees. Businesses raised expectations spread to freight transportation and logistical support. Labor resources demand less evening and weekend work and attractive and noiseless working conditions. To overcome unattractive working conditions, trucking firms must offer high wage differentials to attract and retain the quality employee they seek. Consequently, labor costs in the trucking industry continue to escalate.
- *Societal concerns with transportation's effect on the environment.* Society is concerned about the environment, whether from the impact of more trucks on neighborhood streets, a new intermodal terminal in a rural environment, or the long-term effect of emissions on global warming.
- *Demand for traditional, high volume transportation service will continue to grow, but account for a smaller portion of the transportation industry's revenues and volumes.* This relates closely to the finding that traffic growth is greatest for small shipments. Users of high volume transportation service are primarily in the resource extraction, agricultural, and certain manufacturing sectors that have all experienced slower growth.

⁶ "Economy-The Rapid changes in both Manufacturing and Service Sectors," Reebie Associates, for FHWA, Office of Freight Management and Operations.

Each of the preceding trends raises issues and concerns relevant to Mississippi's transportation planning. Two fundamental questions emerge:

- Will carriers be able to meet the raised standards demanded by both a manufacturing and service economy?
 - Carriers as a group acknowledge problems in meeting service levels demanded by customers. It is likely that service requirements from customers will always be somewhat higher than the services that are provided because of societal and economic constraints. Customers can be expected to continually push for better service, and carriers and transportation planners will struggle to respond.
 - As Mississippi's service economy expands, transportation becomes even more important. Private businesses and public service organizations (hospitals, schools and government offices) all require reasonable accessibility to serve the public. Metro highway networks must be funded and constructed to support the freight and passenger service required by the service economy.
- Will Mississippi and its citizens be willing and able to provide the resources required for efficient transportation?
 - As noted above, carriers' wage costs are under pressure to retain and attract qualified personnel. Quality of life issues among the industry's work force have driven up labor costs while demand for smaller shipments and direct delivery to small businesses increases the need for drivers and related personnel. The cost of providing this type of service could escalate if current wage trends continue. Congestion and metropolitan mobility are also a great concern to shippers. Greater transit times because of congested infrastructure means fewer deliveries and higher costs to shippers.
 - Efficient freight transportation requires terminals, rights-of-way, and operations that may well be viewed as noisy, unclean, unsightly, or otherwise intrusive and objectionable by society. Natural desires to mitigate the environmental impacts of transportation facilities may lead to policies that hinder or prevent efforts to enhance transportation capacity and service. Conflicts can be expected to continue between intermodal terminal and port expansion needs with alternative opportunities for using the lands under consideration. Planning can help manage these conflicts, but serious questions will remain concerning public agencies and society's awareness and recognition of the relationship of freight and logistics activities and growth prospects.
 - As an international gateway state, access to Mississippi's intermodal terminals and ports becomes an increasingly critical issue in locations where truck traffic associated with these facilities is rapidly rising. Rail and waterborne transportation networks also require investment upgrades to meet the demands of increases in shipment activity. These issues should raise concerns about the ability of the state to enhance transportation capacity.

Redistribution of Industrial Production Centers⁷ – Companies are constantly changing the way they manufacture, and where they manufacture. This impacts the way goods flow, which in turn creates new freight densities and corridors. Emerging corridors provide challenges and opportunities for both transportation facilities providers (providers of highways, rail lines, intermodal facilities) and sellers of transport services (trucking companies, railroads, grain elevators, etc.)

- NAFTA has led to the development of a de facto trade and industrial complex that stretches across North America and reaches into Mississippi. While NAFTA is conventionally viewed as a tool for expanding markets into neighboring countries, it is more than that. NAFTA trade includes trade in intermediate goods between plants/suppliers located in member countries. U.S. manufacturers have established multinational production bases across North America that allow them to effectively manage their factors of production (labor, capital and raw materials), thereby allowing them to maintain a competitive advantage in the global market place. An example is the popularity of “maquiladora” factories in Mexico, which are used by U.S. companies to lower production costs for labor intensive processes. Maquiladora activities largely involve manufacturing plants in Mexico, which assemble products using U.S. or other foreign components⁸.

This trend presents an economic development opportunity for Mississippi. Developing transportation infrastructure to support the growth of this new industrial complex will give the state an edge in attracting industrial development.

- NAFTA's emerging north-south freight densities are manifesting themselves in the form of north-south trade corridors that intersect with the traditional east-west corridors. The emergence of the north-south trade routes presents an opportunity for Mississippi to capitalize on freight densities as a means of attracting industry. Lower transportation costs are an important site location criterion for industry. Developing adequate transportation infrastructure in response to NAFTA-induced corridor traffic flows is critical to maintaining Mississippi competitiveness.

Changes in Manufacturing Practices – There are a core set of manufacturing practice changes that relate to trade. These are summarized as⁹:

- Shorter Product Life Cycles – Consumer demand domestically and internationally is driving the growth of the new high tech consumer industries such as computing, communications, household electronics, computer games, and the automotive sectors. These industries, to varying degrees, all have short product life cycles. For example, computer chips double their speed every 18 months. The result is high tech industries have less time to get a product from the drawing board to the shelf, which translates into shorter transport windows, which in turn places great demands on the transportation systems.

⁷ Western Transportation Trade Network, Final Report-Phase II, Wilbur Smith Associates, 1999.

⁸ Binational Border Transportation Planning and Programming Study; 1997, La Empresa, Barton-Aschman

⁹ “*Role of the National Highway System Connectors: Industry Context and Issues*,” FHWA; Feb 1999.

- Specialized Freight Requirements – High tech industries also have special freight requirements. Their products tend to be smaller in size (cube and weight) and higher in value. These characteristics, combined with the aforementioned time sensitivity, differentiate them from traditional freight handling requirements. Such shipments tend to be more frequent, smaller in size, and to a much broader customer base. Because these shipments have the price margins to overcome the cost of more efficient and faster modes, they are biased toward air and truck (LTL – less than truckload) modes. A great deal of the Asian air cargo growth is driven by the high tech industries. Also, NAFTA trucks are laden with high tech parts and components to and from the maquiladoras.
- Remanufacturing and Replacement – The onset of remanufacturing, especially on the high tech end, is increasing and also impacting the nature of freight shipments. Although this segment is arguably small when compared with the more traditional volumes, it is unique in the way it influences advances in logistics services. An example of remanufacturing is printer cartridges that are shipped to service centers to be cleaned, retooled and refilled for resale. This is an example of small, frequent shipments that come in from a broad customer base, before being redistributed. Again, small frequent shipments tend toward more efficient, and costly, modes such as trucking. Another example is replacement parts and accessories for the automotive after sales market. These are typically time definite shipments that tend towards air and/or trucking.
- Core Competencies – Complexity breeds specialization. In order to cope with all of the challenges of operating in external markets such as Asia, Mexico and Canada, industries are turning to their core competencies. In other words, industries are outsourcing, including parts of or all of their transport, warehouse, distribution and logistics activities. While this is not the case with all industries, many industries reason that they are not in the trucking and logistics business. Transport and logistics is viewed as one of the frontiers for cutting costs, and to effectively do so typically requires specialization in that business. Industries are therefore looking at third party specialists to cut costs and improve efficiencies, thereby allowing them to focus on their core competencies. One example in the high tech semiconductor business is National Semiconductor which relies on air freight integrators (like FedEx and UPS) to manage their entire logistics chain, including ground and air transportation (makers of semiconductors rarely use ocean freight), as well as warehouse and distribution.
- E-Commerce – The Internet is the driving force behind the growth in e-commerce trade. Customers are able to order products online and expect delivery within hours or days. Vendors are able to delay the final assembly and packaging of products until the order is taken. The benefits include allowing vendors to customize products, improve cash flow by delaying final stage costs until the order is taken and lowering distribution/retail costs by cutting out a whole layer of distributors/resellers and the cost of retail shelf space. The impact on transportation is that shipments are small, frequent and high in value. As stated earlier, such shipments tend toward the more efficient and costly modes such as air and trucking.
- Just-in-Time (JIT) – In recent decades industry has increasingly sought to minimize its investment in inventories. Wide spread introduction of Just-in-Time inventory

management systems has been one response by industry to reduce inventory-holding costs. Regardless of where a firm resides in a product's production and distribution chain, JIT can and often is a significant component in the firm's cost containment strategy. By its nature, this system has placed greater stress on existing transportation infrastructure due to increased freight movements and the time sensitive nature of the movements. As a consequence, planners must consider the ability of their region's network to provide a reliable and efficient transportation platform.

TRANSPORTATION TRENDS

Transportation Investment & Environmental Goals Linkages¹⁰

Policy makers did not consider the environment when modern transportation policy was born 40 years ago. Their principle concerns were mobility -- making it easier to get around -- and economic strength. However, today communities and regions generally place more emphasis on quality of life issues to include environmental factors. Now policy makers must factor in environmental externalities in their decision making.

In 1991, Congress and the Bush Administration created the Intermodal Surface Transportation Efficiency Act (ISTEA), which laid the ground work for a new era of transportation thinking, where the environment is a principle focus when decisions are made. The Act includes programs that provide federal funding for state and local governments to plan and develop transportation systems that address environmental concerns.

Working within the framework of ISTEA, state policy makers must more than ever consider the environmental impacts of transportation. Some of transportation's environmental externalities:

- Air Pollution – Emissions from motor vehicles are a major source of air pollution in the U.S. Although technology applied to cars has reduced the amount of pollution each year, growing congestion problems, increased vehicle miles driven and population growth threaten this progress.
- Water Pollution – Urban and suburban areas often experience significant motor vehicle runoff from roads and parking lots. Leaking fuel tanks, automobile junkyards, and battery and tire storage facilities all add to water pollution. Reabsorption of air pollutants into surface waters near urban and suburban areas is a source of growing concern. Road expansion and the sprawl development that follows exacerbate water pollution problems by spreading pollution out, consuming wetlands and other habitats that help the environment absorb pollution, and paving previously unpaved areas.
- Land Use, Sprawl and Habitat - The paving of urban and suburban areas for roads and parking is dramatically reducing the amount of land available for agriculture or open space. In most metropolitan areas the conversion of forest, farm, and open

¹⁰ The 1991 ISTEA and the Greening of Transportation Policy in the U.S., Surface Transportation Policy Project.

space to sprawled residential and commercial development is outpacing population growth by factors ranging from 3-to-1 to 15-to-1. This is reducing the economic viability of many U.S. urban areas and creating an economic imbalance between cities and inner suburbs and the newly created ex-urbs.

- Threatened Lands & Buildings – Expansions and enhancement projects often threaten scenic vistas, historic structures, wetlands, water resources or wildlife habitats. Meeting growing transportation needs often bring planners in conflict with groups seeking to preserve these resources.

Mississippi's transportation planning process must acknowledge these impacts of transportation and be receptive to the growing concerns for quality of life issues by its citizens. Strategies to curb these externalities and satisfy quality of life concerns should include:

- Provide Transportation Choices – Greater investment in public transit, bicycle facilities, and walkable neighborhoods are strategies that can minimize further sprawl-inducing highway expansions.
- Smart Growth – Encourage developers to build according to the principle of smart growth, accepting that MDOT would have a very limited role in land-use issues. This may require revision of building and zoning codes, which suggests greater involvement in this process by state planners.
- Innovative Traffic Management – Planners should investigate ways of improving the efficiency of existing infrastructure. Encouragement of car-pooling, offering lanes for high-occupancy usage, peak period pricing and congestion pricing schemes are a few examples of tactics that might be introduced.

Expanding the Transportation Financing Base

As demand for transportation services grows, funding requirements can be expected to expand proportionally. However, transportation planners seeking to finance a robust transportation system frequently encounter resistance to raising user-based taxes. As a consequence, many states are actively exploring alternative, nontraditional methods to finance their programs. The following discussion considers the more popular and innovative forms of alternative transportation financing methods embraced in recent decades.

Privatization

Privatization is becoming increasingly common as a means to leverage limited public resources for transportation investments; increase the efficiency of transportation (and thereby improve service, reduce costs or both); and provide new, needed facilities and services. Privatization is not new in the history of transportation infrastructure, although its application has changed in recent decades.

Privatization is not limited to the financing function however. It can be applied to construction, operations, and maintenance of transportation systems. As discussed, the motivation is the belief that the private sector can be more efficient than the public

sector, and the fact that public funds have become scarce. Further, it can be applied to all modes of transportation. A few of the more widely recognized forms of privatization follow:

- Airport Privatization¹¹ – Since the privatization of the British airports in 1987, over 20 countries have privatized airports by means of equity divestitures, leases, and incentive-laden contracts. After more than a decade of experience, many of the benefits of airport privatization are becoming more discernible:
 - *Capital Infusion*: Privatization enables airports and DOTs to raise additional capital and avoid potential severe congestion due to funding constraints.
 - *Cost Saving*: Privatization brings gains in efficiency by means of effective cost management.
 - *Revenue Windfall*: Privatization provides governments with budget relief generated from the proceeds of the sale or lease of airports.
 - *Passenger-Friendliness*: Privatization stimulates a managerial culture at airports that is highly responsive to passenger needs.

In recent years the possible sale or lease of commercial airports in the United States has generated considerable attention. Congress approved a pilot airport privatization program in 1996. However, there have been only a few applications to participate in the program. Consequently, relative to the rest of the world, privatization in the U.S. airport industry remains modest.

The relative lack of success in airport privatization is due to considerable legal and regulatory constraints that serve to impede progress of airport privatization efforts. Until the federal legal and regulatory framework is amended, this source of innovative financing will remain mostly out of reach to airport planners.

- Urban Transport Privatization – A service that has traditionally been provided by local and regional transit authorities, recent efforts have begun where local transport is “contract tendered” to the private sector. Through competitive contracting efforts service is provided according to public specifications. The intent is to save costs and improve service, and without exception the results have been positive. Again, the U.S. lags the rest of the world in embracing this innovative process of providing urban transport.
- Toll Roads - Fiscal crisis and competing demands for scarce capital resources are forcing governments to consider public-private partnerships for providing and operating roads. However, worldwide experience indicates that effective private participation in toll roads does not come about easily. Many issues have to be considered carefully, including planning, contracting, tariff setting, risk sharing, concession period, etc. An additional advantage of a successful toll program is its ability to serve as a congestion management tool. By varying pricing throughout a

¹¹ “*Airport Privatization: Issues Related to the Sale or Lease of U.S. Commercial Airports*,” U.S. GAO, Nov 1996 and Asheed Advandi, “*Passenger-Friendly Airports: Another Reason for Airport Privatization*,” Reason Public Policy Institute, Mar 1999.

given period, traffic flows are moderated during peak periods and congestion is mitigated.

State Infrastructure Banks (SIBs)¹²

SIBs are infrastructure investment funds created at state or regional (multi-state) levels. They are designed to provide states or regions with a new financing capability to complement other parts of the US DOT Program. SIBs are created with federal seed money (also known as capitalization grants), offer a menu of loan and credit enhancement assistance (such as line of credit), and give state/local agencies greater flexibility regarding financial management of projects.

SIBs are designed to complement traditional funding programs and give states significantly increased flexibility regarding project selection and financial management.

The benefits of SIBs include:

- Facilitate projects that would otherwise be delayed or infeasible;
- Offer many types of financial assistance for transportation projects;
- Enable states to tailor financing to fit project need;
- Enable states to "recycle" funds by reloaning funds as they are repaid; and
- Use limited grant funds more effectively and, therefore, free grant funds for projects that most need traditional funding.

Innovative Taxing & User Fees

To finance their roads and highways, states have increasingly turned to other revenue sources such as new vehicle impact fees, rental car surcharges, general sales taxes, alternative fuel vehicle fees, and weight-distance taxes. Some states have indexed their motor fuel taxes to inflation or instituted percentage taxes -- with a ceiling and floor mechanism -- instead of a fixed "pennies per gallon" rate as is common with excise taxes.

To finance their aviation systems, states have learned the advantages of a dedicated taxing regime. A dedicated state-level tax structure has two specific advantages: bringing equity to existing funding processes and increasing aviation's capital funding to levels more in line with the aviation sector's capital requirements. Aviation fuels taxes (excise & sales) are the primary taxed source supporting a dedicated aviation fund. However, more imaginative programs levy taxes upon aircraft sales, leasing, aircraft repair (labor & parts), and registration fees for aircraft and pilots.

Federal and State Responsibilities

On June 9, 1998, the President signed into law PL 105-178, the Transportation Equity Act for the 21st Century (TEA-21) authorizing highway, highway safety, transit and other surface transportation programs for the next 6 years. TEA-21 builds on the initiatives established in the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA), which was the last major authorizing legislation for surface transportation. This new Act

¹² "State Infrastructure Banks: A Primer," U.S. DOT, Nov 1995.

combines the continuation and improvement of current programs with new initiatives to meet the challenges of improving safety, protecting and enhancing communities and the natural environment.

Significant features of TEA-21 include¹³:

- *Assurance of a guaranteed level of federal funds for surface transportation through FY 2003.* The annual floor for highway funding is keyed to receipts of the Highway Account of the Highway Trust Fund (HTF). Transit funding is guaranteed at a selected fixed amount. All federal highway user taxes were extended at the same rates when the legislation was enacted.
- *Extension of the Disadvantaged Business Enterprises (DBE) program,* providing a flexible national 10 percent goal for the participation of disadvantaged business enterprises, including small firms owned and controlled by women and minorities, in highway and transit contracting undertaken with federal funding.
- *Strengthening of safety programs across the DOT.* New incentive programs, with great potential for savings to life and property, are aimed at increasing the use of safety belts and promoting the enactment and enforcement of 0.08 percent blood alcohol concentration standards for drunk driving. These new incentive funds also offer added flexibility to states since the grants can be used for any Title 23 U.S.C. activity.
- *Continuation of the proven and effective program structure established for highways and transit under the landmark ISTEA legislation.* Flexibility in the use of funds, emphasis on measures to improve the environment, focus on a strong planning process as the foundation of good transportation decisions -- all ISTEA hallmarks -- are continued and enhanced by TEA-21. New programs such as Border Infrastructure, Transportation Infrastructure Finance and Innovation, and Access to Jobs target special areas of national interest and concern.
- *Investing in research and its application to maximize the performance of the transportation system.* Special emphasis is placed on deployment of Intelligent Transportation Systems to help improve operations and management of transportation systems and vehicle safety.

Implications of the Act for MDOT are considerable. Strategies and goals will require modifications. Greater latitude is given in specific areas of funding and emphasis on public participation will be greater. Statewide transportation planning process will be required to consider projects and strategies that¹⁴:

- Support economic vitality by enabling global competitiveness, productivity, and efficiency;
- Increase the safety and security of the transportation system for motorized and nonmotorized users;

¹³ TEA-21 – Transportation Equity Act for the 21st Century, U.S. DOT, Jul 1998.

¹⁴ Michael D. Meyer & Eric J. Miller, Urban Transportation Planning, 2nd Ed, 2001.

- Increase the accessibility and mobility options available to people and freight;
- Protect and enhance the environment, promote energy conservation, and improve air quality;
- Enhance the integration and connectivity of transportation systems, across and between modes, for people and freight;
- Promote efficient system management and cooperation; and
- Emphasize the preservation of the existing transportation system.

Although national legislation such as TEA-21 play an important role in setting the context for state transportation planning, Mississippi has its own laws and regulations that will continue to affect transportation planning in more direct ways. State environmental laws, regulations establishing institutional relationships for project approval, zoning requirements and growth management legislation will continue to define state transportation planning processes and procedures.

Operations Planning

Managing the transportation system by adding new facilities or by making operational changes to improve system performance has been the most common response to transportation problems for many years. Increasingly, transportation professionals have become interested in strategies that minimize the effects of accidents and other nonrecurring incidents on traffic flow, including incident detection programs, motorist information systems, and towing/enforcement efforts. The application of information processing, communications technologies, and advanced control strategies, and electronics, known as intelligent transportation systems (ITS) to improve the safety and efficiency of the transportation system has become a major tool used within state transportation strategies. **Table 4-2**¹⁵ shows an operations-oriented strategies approach with ITS that is often considered when planners are faced with various types of problems.

Intelligent transportation systems offer a viable alternative solution to address mobility issues. Through coordinated transportation management and traveler information strategies, ITS promotes the concept of “Smart Travel” – reducing delays, improving connectivity for all travel modes, and increasing safety. Intelligent transportation systems can thus benefit both personal and commercial transportation. The benefits of ITS implementation strategies, however, must be easily explained and understood in environments that traditionally respond to mobility and safety needs through expansions of infrastructure.

¹⁵ Michael D. Meyer & Eric J. Miller, 10.

**Table 4-2
OPERATIONS ORIENTED ITS STRATEGIES APPROACH**

Problem	Operational Approach Solution with ITS
<i>Traffic Congestion</i>	<ul style="list-style-type: none"> -Advanced traffic control -Incident management -Corridor management -Advanced vehicle systems -Real-time ride matching -Integrated transit and feeder services -Flexible route transit -New personalized public transit -Telecommuting -Transportation pricing
<i>Lack of Mobility & Accessibility</i>	<ul style="list-style-type: none"> -Multimodal pretrip & enroute traveler information -Real-time response to changing demand -Personalized public transportation -Enhanced fare card
<i>Crashes, Injuries & Fatalities</i>	<ul style="list-style-type: none"> -Partial/full automated vehicle control systems -Vehicle conditions monitoring -Driver condition monitoring -Advanced grade-crossing systems -Automated detection of weather, road conditions, vehicle warning, road viewing notification -Automated emergency notification

SUMMARY

International trade expansion and related economic growth have placed considerable stress on transportation networks in Mississippi. As an international trade gateway, Mississippi has and will continue to experience significant pressures on its transportation systems. Long-term trade patterns between Mississippi and Latin America will exceed that of the Latin America Trade and Transportation Study (LATTS) Alliance states collectively.

These trends suggest that increased transportation infrastructure investment is needed in Mississippi. As a trade gateway, increased congestion will stress existing capacity, but expansion will be difficult due to land, environmental, social and funding constraints. As reliance on trade grows, state transportation officials must involve themselves in U.S. and state trade policy formulation to remain responsive and informed.