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All Roads lead to Traffic: Challenges and Solutions for the Northern Italian Transport Infrastructure

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Introduction

Historians maintain that the protection from land invasion that the Alps offered the Italian peninsula helped the Roman Empire flourish. The mountains that hampered ancient invading armies today serve as the EU's geographic center, the "crossroads of Europe," where Italy shares borders with France, Switzerland, Austria and Slovenia. The efficient transport of goods and services between these nations depends on the unimpeded flow of cross-border traffic through these Alpine crossroads.

At the base of the crossroads lies one of Europe's economic hot spots, the area of northern Italy consisting of Lombardy, Piedmont and the Veneto. The cities of Turin, Genoa, Padua, Venice and Italy's financial center, Milan, sprawl across a region that owes much of its economic success to trade with the rest of the EU. From 1999 to 2000, north Italian exports rose from €162.4 billion to €185.8 billion, encompassing 72.3% of all of Italy's exports in 2000 ("Italy in Figures 2001") and representing 15.9% of Italy's €1.17 trillion GDP for that year. ("Economy and Finance") Between September 2002 and February 2003, trade with EU neighbors constituted just over half of this valuable foreign trade. ("Foreign Trade") The ability to exchange these goods and services with international neighbors is a fundamental component of the north's economic prosperity and the Italian economy's success. Northern Italy's continued growth, therefore, relies on the unencumbered movement of goods and services. Only the existence of unhindered, high-quality passenger and freight transport can guarantee this vital traffic flow. Although Italy has some of the highest passen-

ger and freight traffic volumes in Europe, very few resources are directed towards enhancing the transport infrastructure. ("ANFIA News") In this article I discuss the problems impeding the flow of traffic throughout northern Italy and across the Alps, review some of the solutions being explored to alleviate the situation and conclude that only a balanced combination of new construction and traffic planning can ameliorate Italy's traffic problem.

Northern Italy's Road Traffic Problems

Today's Italy boasts an impressive transport infrastructure in terms of size as reported in 2001: 19,471 km (12,098 mi) of rail track and 444,241 km (267,038 mi) of roads. ("Italy in Figures 2001") However, traffic demand on the northern road infrastructure exceeds capacity, and traffic bottlenecks throughout northern Italy have intensified in recent years to the extent that the EU considers them a priority crisis. ("White Paper") Between 1998 and 2001 alone, road use in terms of vehicles/km expanded 10.7%. ("Short-Term Trends Survey") Such an expansion is no surprise in a country that holds the rank of third largest passenger and freight vehicle-owning economy in the world. ("Traffic and Congestion") The largest burden on the road network, however, stems from the overuse of road transport by freight companies. As one component of the transport infrastructure, Italian roads currently receive a disproportionate share of total freight compared with rail, sea and air transport. While road use has increased, demand for rail and other forms of freight transport has declined. This unbalanced distribution has led to highway bottlenecks at border crossings and other arterial choke points.

All the energy poured into solving the Italian traffic situation may be summarized, at least in the short run, as a concerted effort to clear northern road bottlenecks. Between 1998 and 2001, road traffic in billion vehicles/km (BVkm) grew from approximately 66 BVkm to 73.1 BVkm. ("Short-Term Trends Survey") National road freight traffic also has increased, growing from 144 billion tonne/km (BTkm) in 1985 to approximately 159 BTkm in 2000 ("Short-Term Trends Survey") and peaking at roughly 198 BTkm in 1996. ("Road Transport") Roads in northern Italy are used more than any other mode: in 1998 they handled 86.1% of the total tonne/km of freight traffic. ("EU Intermodal...") This significant freight transport share reflects the large number of trucks on the road: trucks represented 43% of the total European road traffic in 2001. (Molitor et al) Although truck saturation is a serious traffic problem along the open plains that cover 35% of northern Italy ("Italy in Figures 2001"), its contribution to the staggering traffic slowdowns at Alpine routes and crossings in the mountainous terrain that covers 46% of the region ("Italy in Figures 2001") serves as the leading cause of the congestion situation.

Heavy goods traffic compounds the natural bottlenecking that already occurs at an Alpine crossing. The 150% growth in freight traffic since 1970 ("Let the Train...") on a road system whose capacity has not grown as rapidly has left all the Alpine border crossings operating at maximum capacity. In Italy's Alpine crossing network, total traffic saturation of the region means that each tunnel plays a vital role in conveying traffic across the border. So sensitive is this interconnectivity that after a 1999 fire took the Mont Blanc Tunnel out of service for almost two years, the single remaining Franco-Italian Alpine road connection suffered traffic increases that soared 20% above the EU maximum capacity. ("White Paper") International attention has focused on this overstressed border-crossing network:

> An alternative to the Alpine road routes and a complement to the present rail network is needed in the next 10 years... [the Lyon-Turin rail link, for example] must be acted upon without delay, failing which the regions concerned, mainly Rhône Alps and Piedmont, will see their economic competitiveness compromised. ("White Paper," p. 54)

Planners do not identify the growth in cross-border trade over the past decade as the sole cause of the heavy goods traffic that inflates Alpine bottlenecking. Poor policy making and law enforcement by the EU have facilitated freight companies' abilities to take maximum advantage of the competitive advantage of the

roads. The EU White Paper on Transport acknowledged that "the greatest competitive advantage of road transport is its capacity to carry goods all over the European Union, and indeed the entire continent, with unequalled flexibility and at a low price." ("White Paper," p. 25) Although this competitive advantage promotes an opportunity for the success of freight companies, it also leaves the Italian road network susceptible to crippling overuse. And while countries attempt to limit goods traffic by enacting regulations such as workday limits, many of the laws are ignored and underenforced. In 2001, for example, Italian freight haulers incurred the highest estimated costs in all of Europe — 1.10 €/km. Yet this number is suspect, because at the same time they willingly offered prices below this level. Therefore, analysts suspect that the Italian practice of driving beyond the legally limited driving time invalidates the cost estimates, which assume freight companies obey legal driving time regulations. (*CNT*, October 2001) In addition to poor enforcement, poor decisions by the EU only encourage freight companies' misuse of the Italian infrastructure. In 2001, for example, the EU offered tax relief to trucking companies suffering from a sharp rise in diesel fuel prices. By allowing trucking companies to operate unhindered, this subsidization increased road transport's competitive advantage. ("White Paper") The Italian road network, which carries freight haulers from all over the EU, continued to face traffic increases unaffected by fuel prices and world events.

The increasing number of trucks on the highways has been matched by the number of personal automobiles using the same infrastructure. In 1999, Turin and Milan had the highest cars/km^2 densities in Italy. ("Italy in Figures 2001") These high densities reflect the 1994 to 1999 trend showing the rise in car commuters (from 69.8% to 72.0% of all commuters) outweighing the rise in train commuters (from 2.1% to 2.4%). ("Italy in Figures 2001") The faster growth in personal automobile commuting in the world's third largest automobile-owning economy has augmented the north's existing traffic problems.

Detrimental Results of Road Traffic Congestion

In addition to stifling economic progress, the congested traffic situation in northern Italy poses safety and environmental hazards. The increased potential for highway accidents among frustrated or careless drivers is perhaps the most poignant effect of traffic congestion. Although Italian law requires seatbelt use, only 20% of Italians buckle up. ("ANFIA News") Furthermore, Italy has the highest highway speed limit (130 kph) and the highest legal blood alcohol level (0.8 mg/mL) in Europe. ("White Paper") These relaxed standards, combined with saturated roads, have contributed to northern Italy's having the highest automobile accident rates in Italy. (Giustini) In a country where traffic accidents are the leading cause of death in the 15-to-44 age group (Giustini), highway bottlenecking presents a serious risk.

Fatal accidents do not constitute the only threat to life brought about by congested highways. Large concentrations of trucks and automobiles on the road bolster harmful emissions levels around bottlenecks. Noxious emissions of carbon dioxide and nitrogen oxide compounds pose health risks to humans and the local ecosystem. Throughout the EU, road transport generates a lion's share of carbon dioxide emissions, accounting for 84% of the carbon dioxide generated in the transport sector. (Tronet, "Highlights...") Italy's aging automobile fleet, in which the percentage of cars more than 15 years old is four times that of other EU countries, only amplifies the emission growth rates. ("ANFIA News") The Alpine border crossings are particularly vulnerable to transport-generated air pollution. Mountains such as the Alps typically force traffic flows and consequently pollution into amphitheater-shaped valleys that trap combustion emissions. In Alpine valleys, nitrogen oxide levels are almost ten times those found on open plains. (Molitor et al) This concentration of emissions, combined with the proximity of Alpine transport infrastructure to living and recreation areas, poses a significant threat to the quality of life around Alpine border crossings. (Molitor

et al) Areas where air pollution kills erosion-controlling vegetation also bear a greater risk of mudslides and avalanches, events that inflict human casualties. (Molitor et al) These health and environmental concerns have a matching economic effect, for areas susceptible to heavy pollution may not be targeted for development.

Underutilization of Other Modes

Rail

The economic, environmental and health concerns of congested highways have not diminished road traffic trends. Whereas the Italian road network has suffered an increase in passenger and freight traffic, the rail network has conversely experienced a decline in its share of traffic. Over the past 30 years, infrastructure planners have given the road sector first priority. Between 1970 and 1999, the length of Italian highways increased from 3,913 km to 6,621 km. At the same time, the length of Italian railways remained almost stagnant, numbering 16,018 km in 1999. (*CNT*, July 2002) Rail passenger traffic during this period has met success, but its virtues have been undermined by the fact that "freight is still an underdog fed with the leftovers of passenger transport... [rail freight transporters] are impeded more and more by passenger trains that go faster and faster." (Ambrogio, p. 46) While Italian rail freight volumes in tonne/km decreased 7.9% between 1998 and 2002, passenger volumes in passenger/km increased 13% over the same period. ("Short-Term Trends Survey") The scheduling priority given to passenger trains has left freight trains with a second-rate status and a second pick at time slots. Whatever the Italian rail network does to mitigate road passenger traffic, therefore, does little to remove heavy goods traffic from the northern highway bottlenecks. If properly managed and prioritized, Italy's rail infrastructure can shoulder more of the road sector's heavy goods traffic, especially traffic across long distances. Unfortunately, rail freight's second-rate status has limited opportunities for improvement.

Italy's policy of giving first priority to passenger service has led to a "playing field [that] is not level when it comes to public support for rail freight: This includes aspects of taxation, infrastructure fees, [and] treatment of external costs." (Lewis et al, p. 25) The Italian rail freight shippers must therefore fend for themselves against the competitively advantaged road freight haulers. The lack of support has left Italians with a downtrodden rail sector that suffers poor communication, poor tracking, missing drivers and late trains. ("White Paper") These problems plague the rail systems of Italy and her neighbors, resulting in a European average rail freight speed of 18 kph, a rate slower than an icebreaker clearing a route in the Baltic Sea. ("White Paper") Rail system incompatibilities at border crossings contribute to the slow European average. Because many European countries use different types of electrified rails, engines can operate at full power only on their home country's track. Italian regulations that permit only Italian drivers to operate engines on Italian tracks, and similar regulations in other nations, add complications. These incompatibilities constitute a particular problem between Italy and Germany, where differences in rail systems and shortages of Italian drivers delay train passage between the two countries. ("Italy")

The decline of rail freight transport in Italy, therefore, is self-perpetuating. Priority granted to passenger transport has impaired a rail freight sector that struggles to compete with a more flexible, timely road freight sector. Burdens like these have curtailed the rail freight share of total freight transport from a strong 32% market share in 1970 to a meager 12% market share in 2000. This trend indicates rail will fall to a 9% market share by 2010. ("Let the Train...") Only a properly managed and prioritized rail freight sector can reverse this trend. Despite the highway bottlenecking problem in Italy, road freight transport holds an increasing edge over its under-prioritized rail counterpart.

Short-Sea and Inland Waterways

Although Italian sea freight transport does not encounter the same problems as the rail freight transport sector, it does not adequately draw freight traffic away from congested roads.

Geographic location limits Italy's 41 ports (Strelow) to offering goods shipments between specific points, a problem that road haulers do not encounter. At the same time, their location offers them a chance to draw on the "growing percentage of the maritime traffic [that] is entering Europe from the Mediterranean ports, which have increased their share of the total European traffic from 22% in 1990 to 36% in 2000." (Capocaccia, p. 91) Poor linkages between port quays and rail or road freight terminals, however, hinder the opportunity to capitalize on this growth. ("EIB Finances...") With 389.1 million tonnes of freight traffic transferred between transport modes at Italian ports in 1999 (Xenellis), the ports may serve more to deliver traffic to the roads than to relieve them of it.

Like the nation's ports, Italy's inland waterways suffer increasing traffic flows. From 1998 to 2001 alone, traffic flows on inland waterways increased 43.2% to 180.6 billion tonne/km. ("Short-Term Trends Survey") Between 1990 and 1999, however, only 100 km of inland waterways were opened, bringing the total length to 1,466 km. (Strelow) The restricted geographic reach of these waterways limits their potential to nothing more than alleviating specific, local highway bottlenecks.

Air

Unlike sea and inland waterway transport, air transport offers point-to-point service with an unrestricted geographic reach. Between 1993 and 1998, Italian air passenger volumes experienced an 8.2% average annual growth, with an additional 6.4% growth from 1998 to 1999. (Tronet, "International...") Despite this growth, no Italian airports are among the top 15 for intra-EU passenger volumes. (Tronet, "International...") The recently completed Milano-Malpensa airport has not lived up to initial expectations; it is not the hub many hoped it would be, for much of the domestic traffic remained at the existing Linate airport. (*CNT*, October 2001) Until Italian airports like Milano-Malpensa achieve higher passenger volumes, the reported growth in air passenger traffic cannot significantly reduce border-crossing road traffic.

Solutions

Fortunately, both the EU and the Italian government have taken steps to address the burdens of traffic congestion in northern Italy. These remedies focus on reducing highway bottlenecks, particularly at Alpine border crossings. The general approaches taken to alleviate these stresses fall into three categories: new construction, intermodal projects and improved traffic management. Neither building miles of expensive new roads alone nor solely focusing on traffic management and planning procedures can foster realization of what Marini called a 1960s-era infrastructure. Only a balanced approach can ameliorate northern Italian traffic congestion.

New Construction

European transport leaders announced their ambitious approach to improving traffic flow in the 2001 EU White Paper on Transport Policy. The paper includes new construction solutions for Italy's transport infrastructure, including the recently completed Milano-Malpensa airport, the Verona-Naples and Bologna-Milan extensions of the Munich-Verona high-speed rail line, the Turin-Milan-Venice-Trieste high-speed rail line and the Lyon-Turin high-speed rail connection. ("Trans-European Network") These projects' costs represent a significant portion of the €110 billion that the EU intends to spend on ongoing priority projects ("A Few..."), with the Verona-Naples and Bologna-Milan extensions of the Munich-Verona "Brenner Axis" alone costing almost €14 billion. ("White Paper") Estimates of construction costs, however, do not guarantee monetary allocations toward projects. The European Commission found that despite the political attention to the various projects, work is not progressing on schedule and public funding is being invested too slowly ("Trans-European Network"), delaying construction of the Lyon-Turin route, a French-Italian connection that boasts a 54-km and a 12-km Alpine tunnel. ("White Paper") This technically difficult project underscores the need for foresight during planning and flexibility during construction.

The burden of project costs combined with relatively low returns on transport infrastructure projects unfortunately discourages investments in new construction that have a future economic viability dependent on the traffic fluidity these projects provide. In an effort to provide investment incentives and reduce financing problems, the EU has established a financial support policy that permits EU monetary support of up to 20% of the total cost to border-crossing rail projects that provide significant benefits for traffic flow. ("White Paper")

The increase in EU funding from 10% to 20% of total project cost demonstrates the EU's prioritization of the highway congestion problem. The new policy also represents a commitment to completing the Trans-European Network (TEN), a multi-modal transport network that includes all 14 priority construction projects identified at the 1994 Essen Conference. This ambitious network, however, will take almost 20 years to complete ("Trans-European Transport Network"), a time frame that does not keep up with the projected traffic increases in northern Italy. With 75% of the road network already completed and only 20% of the rail network completed ("Trans-European Transport Network"), the TEN's future impact on cross-border traffic mobility depends on the completion of new rail lines. Because bottlenecking already occurs along 20% of the TEN's existing rail lines ("Trans-European Transport Network"), northern Italian planners cannot bank on EU initiatives alone when considering the region's future traffic mobility.

The Italian government, therefore, has undertaken national projects independently to improve traffic flows throughout northern Italy. The Bologna-Florence rail link, a 78.3-km rail route with 73.1 km of tunnels through the Apennines, is one such national project. This high-speed rail line, intended to reduce the travel time on the route by 30%, is one component of the Italian government's 1300-km *Alta Velocita* plan to connect Bologna and Florence to Rome and Naples. ("Tunneling...") The Italian government needs these national projects to enhance communications and bring additional prosperity to the connected regions. ("Tunneling...") The European Investment Bank, an organization that has provided Italy €2.07 billion for the construction of a high-speed train network, assists in funding these projects. ("10 Years...")

The substantial costs and lengthy timetables associated with projects like the Lyon-Turin and Bologna-Florence lines show that new construction cannot single-handedly reduce the north's traffic problems. Many initiatives that favor intelligent traffic planning can harness the existing infrastructure's untapped potential and achieve enhanced traffic mobility at significantly lower investment costs and waiting times.

Intermodal Projects

For years, Italian planners have focused on congestion-alleviating alternatives to new construction. They, along with their European counterparts, acknowledge that the future of intelligent traffic management lies in the concept of intermodality. Intermodal transport methods combine the best qualities of each available mode of transport — road, sea, air and rail — to compete with the traditional unimodal freight and passenger transport methods. Rail freight terminals adjacent to port quays, high-speed passenger train connections at airports and short sea connections that bypass clogged highway arteries exemplify intermodality in action. Fabio Magni, managing director of the Costamasnaga Group, an intermodal transport products supplier, notes that the intermodal concept "integrat[es] rail as much as possible with other modes of transport...without changing container, thus effectively providing a competitive door-to-door service." ("Let the Train..." p. 1) The international acknowledgment of rail's place in intermodal projects, a realization that has granted the struggling rail freight sector much needed attention, serves as a fortunate by-product of intermodal considerations. Intermodal projects, therefore, have a dual benefit: traffic planners are inspired to develop creative solutions to highway bottlenecking, and they also are required to prioritize the underutilized rail freight sector.

A number of successful projects demonstrate the potential for the intermodal concept and other traffic management techniques to

alleviate northern Italy's traffic problem. All these projects share a common gauge of effectiveness by estimating the number of trucks they remove from the road. The Pilot Action for Combined Transport (PACT) program demonstrates intermodality's bright future. Between 1992 and 2000, the project initiated 167 combined transport projects at a cost of only €53 million. ("White Paper") The program competes with unimodal road freight options by establishing projects such as a Swedish-Italian rail-sea link that cuts transit times by 48 hours and removes 500,000 tonnes of freight yearly from the road network. ("White Paper") The PACT program also incorporates a rail-air link between airports in northern Italy and Austria that, within a year, transferred 45 airfreight pallets from the roads to the skies on a weekly basis. ("White Paper") Italy and Greece also have worked together under the PACT program to develop a Northern Europe-Italy-Greece corridor between the two nations, a one-train-per-day system that can successfully compete with existing road freight transport options. ("Combined Transport...") That the PACT program has established successful projects such as these at a relatively low cost puts the future of intermodal endeavors on solid ground.

International dialogue through initiatives like PACT has generated benefits beyond establishing transport corridors: regulatory agreements between Italy and its neighbors also have sought to increase traffic fluidity. The EU Transfer Point consortium (EUTP) notes that "intermodality in Italy has been strongly and positively harmonized by the policies of the neighboring countries, which have imposed limits to the transit of road vehicles... [and] give intermodality a competitive advantage in relation to road transport." ("Italy," p. 2) By mandating that more cross-border traffic arrive via rail, Italy's neighbors have pressured the nation into developing more intermodal rail options. Such cross-border dialogue also sparks the creation of joint rail ventures between neighboring nations. Switzerland and Italy have formed one such company to join with Railion, a Netherlands-Germany venture, in opening up Scandinavian rail shipping options to Swiss and Italian freight companies. (Lewis et al) Such joint agreements at the national level represent a fundamental step towards harmonizing the dissimilar rail standards that impede the expansion of international rail shipping initiatives.

In addition to specific projects, intermodal research plays a fundamental role in boosting the efficiency of the existing Italian infrastructure. Intermodal research focuses on improving transport efficiency through projects such as Flexible Intermodal Horizontal Transshipment Techniques (FLIHTT). Horizontal techniques research involves exploring methods of maneuvering (usually sliding) cargo containers from one mode to another without the use of a crane, a vertical transshipment technique. Magni believes that cost-effective horizontal techniques can reduce cranes' 92% to 95% market share and improve intermodal competitiveness. ("Let the Train...") Cost-cutting, time-saving measures like FLIHTT help narrow the competitive gap between intermodal transport and unimodal road transport.

Transshipment techniques do not constitute the sole focus of intermodal research. Projects that improve the efficiency of transport terminals play a vital role in bolstering the competitiveness of intermodal transport. Many of these projects focus on logistics and efficiency issues at Italian ports' intermodal terminals. Overcrowding, vertical transshipment techniques and large distances between port quays and rail terminals spawn logistical problems that increase container transit times between modes. Projects such as the Automated Shuttle for Augmented Port Performance (ASAPP), contracted by Fantuzi-Reggiane SpA, study using automated shuttles around a quay area to facilitate the movement of unloaded containers. Such a system could accommodate up to 200 containers per hour. ("Integrated...") This low-cost system requires few changes to the quays and, when fully implemented, promises to "[lower] the break-even distance for intermodal transport to around 200 km" and remove 2000 trucks per day from around the port area. ("Integrated...," p. 2) Alleviating port bottlenecks ultimately can reduce road bottlenecks by reducing truck traffic at quays and by efficiently directing more cargo to waiting rail cars. Efficiency improvements at transport terminals through methods like FLIHTT and

ASAPP give intermodal transport an edge in its competition with road freight transport.

Traffic Planning

In addition to intermodal projects and research, unimodal traffic planning plays a vital role in alleviating highway bottlenecks. Unlike other methods that seek to route around highway bottlenecks, traffic planning projects like the Intelligent Transport System (ITS) initiative address the problem directly. Comparatively cheap and effective, the proposed Real ITS Solutions include emergency call services, traffic information broadcasts, road monitoring infrastructure, traffic management and control centers and electronic fee collection systems. ("Introduction. ITS...") Implementation of these proposals has already commenced. This concerted effort to provide information to road users can improve traffic fluidity by offering drivers the opportunity to avoid bottlenecks. The crux of the ITS effort exists in the establishment of the GALILEO satellite positioning system, a network similar to the Global Positioning System (GPS) used by many Americans. The plans for GALILEO include more than navigational positioning and fleet tracking. The system will integrate many of the ITS services already found in today's European transport infrastructures into a single, integrated network. ("Vision and Policy") When GALILEO's 30 satellites become operational in 2008, traffic planners will have a powerful, uniform system for delivering and disseminating traffic information.

The aforementioned successful initiatives demonstrate the importance of intermodal projects, intermodal research and traffic planning in improving traffic flow. As with new construction, intermodal transport and traffic planning cannot by themselves remedy the situation, as Ambrogio notes: "the space in which intermodality can expand and be successful is big, much bigger than today but not unlimited." (p. 46)

Although the aforementioned projects exemplify cost-effective means of addressing traffic congestion, they still require significant financial investment. The most effective projects have high costs and widespread effects; for example, the high costs associated with converting a port's transport terminal to intermodal capacity can have unforeseen consequences on the entire transport infrastructure. Because only large ports can afford these improvements, the intermodal cargo is forced through a limited number of terminals. The improved ports, overwhelmed by redirected traffic flows, can experience a *decrease* in efficiency. ("Integrated...") Likewise, ITS solutions designed to mitigate road bottlenecks can spawn a reverse effect: motorists inadvertently may create new bottlenecks by avoiding ones announced via traffic reports. Intermodal transport and traffic planning cannot stand without the backbone of an improved infrastructure. Italy's rail situation perfectly exemplifies this relationship, for without infrastructure prioritization along with improvement to the rail freight sector, the pursuit of intermodal projects that rely on rail cannot expand successfully.

Conclusions

Italian planners and legislators must balance the resources directed towards intermodal transport, traffic planning and new construction before any marked improvements to the north's traffic congestion can appear. Much like intermodal concepts that use the best of every mode to create an ideal shipping option, planners must utilize the best of every option to achieve optimum traffic flows. Perhaps the solution lies in a higher priority for the second-rate rail freight sector, the transport mode that shows the most potential in effectively reducing truck traffic on the roads. Completion of rail lines combined with intermodal initiatives and intelligent traffic planning will ensure the rail sector's contribution to decreasing traffic congestion. This balanced "concrete and brains" problem-solving approach to all modes of transport can mitigate the traffic problem in the future.

Although improving the fluidity of traffic in the north depends on a successful balance, the focus of these efforts should be considered carefully. Many of the aforementioned projects gauge their success by the number of trucks or cars they take off the road, but should that be

the long-term goal of the overall traffic-reducing initiatives? Concentrating only on removing highway bottlenecks reflects a dangerously narrow mindset towards relieving traffic congestion and may not contribute to long-term traffic fluidity in northern Italy. By expanding the scope of their traffic management mission, planners simultaneously can set local and global goals. Locally, they can concentrate on improving the quality of service offered by Italian ports, rail stations, border-crossings and airports. Globally, they can pursue international initiatives that focus on shifting freight volumes into a configuration conducive to the optimum flow of goods and services.

Fortunately, Europe's concerted efforts to develop meaningful proposals such as the White Paper on Transport and successful initiatives such as the PACT program suggest that planners labor with global goals in mind. Projects like the TEN and the GALILEO satellite navigation system indicate the willingness of Europeans to develop integrated, efficient transport options. Only the pursuit of these global goals along with local goals — improving the Italian transport infrastructure's components — can complete this path to progress. The steps taken so far by Italians and their European counterparts demonstrate their seriousness in committing funding, time and innovation to tackling transport congestion in northern Italy. Although some initiatives have experienced setbacks, intensive research and successful projects have demonstrated the importance of a balance between new construction, intermodal transport and traffic planning. European and Italian traffic planners must commit themselves wholeheartedly to achieving a balance of local and global goals before a comprehensive solution to northern Italy's traffic problem can be within reach.

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