THE FAILURE OF PRIVATE ENTERPRISE AND THE ROLE OF THE STATE IN RAILWAY MODERNIZATION: THE IMPLICATIONS OF THE PENNSYLVANIA RAILROAD FOR MODERN EUROPE RAILWAY PRACTICE

ALBERT CHURELLA | SOUTHERN POLYTECHNIC STATE UNIVERSITY (USA)

achurell@spsu.edu

Careful study of the experiences of American railways in response to fluctuating traffic levels may offer valuable lessons for transportation planners contemplating the modernization of European rail networks. While scholars have explored the historical roots of technology transfer between Europe and the United States, few have examined the implications of the combination of private ownership and government oversight in the U.S. in relation to the more traditionally nationalized rail networks of Europe. In recent years many European transportation planners have embraced a false dichotomy between allegedly inefficient state-owned rail systems and the supposed virtues of more market-oriented privatized systems. This "either-or" mentality has led to ill-advised efforts at privatization, most notably in Great Britain, as the only viable alternative to "socialized" rail transport.

The history of rail transport in the United States has important implications for this ongoing debate over the merits of nationalization and privatization. In particular, the responses of the Pennsylvania Railroad (PRR) to periods of modernization suggest the possibility of a middle ground between those two extremes. As the self-proclaimed "Standard Railroad of the World," the PRR was at one time the largest privately owned transportation enterprise in the world, larger than the entire railway network of any European nation save Britain – and thus forms a useful basis of comparison with national rail systems in Europe.

At three readily identifiable junctures the PRR responded to changing freight and passenger traffic levels with modernization efforts. The first of these occurred during the late 19th and early 20th centuries, as explosive growth led the PRR to adopt faster schedules (in order to achieve greater throughput) and heavier freight equipment, creating a negative feedback loop that placed greater stresses on locomotives and track. The second period occurred during the 1920s and 1930s as the PRR and the federal government jointly funded the largest electrification program in North America, undertaken in large measure because elevated real estate values and the inadequacies of conventional steam locomotives left the Railroad with little choice other than to adopt an expensive new technology. The third period began after the Second World War, as the PRR attempted to increase efficiency through dieselization, and to preserve its traffic base by acquiring functionally specialized equipment, including flatcars for transporting highway truck trailers. These modernization efforts produced poor results because they required vast expenditures and attracted unfavorable attention from government regulators. Capital drains and political constraints dramatically retarded the PRR's ability to modernize its operations in response to changing traffic patterns, weakening considerably the Railroad's finances (in the first instance), producing an

uneasy and short-lived cooperation with the national government in the second instance, and driving the Company into an ill-advised merger and ultimate bankruptcy in the third.

This study, based on extensive archival research, not only illuminates the inner workings of a major American corporation at two critical junctures of modernization, it also provides valuable lessons for European transportation planners. Private ownership of rail networks will only succeed if national governments are willing to inject funds into those companies in the discrete instances when they are faced with new technologies or new traffic demands that require rapid modernization. Such moments of technological change require asymmetrical "lumpy" short-term capital investments that are generally beyond the accommodative ability of privately owned railroads, something that American regulatory authorities proved unable to appreciate until the near-collapse of the Northeastern railroad network induced the formation of Conrail in 1976.

The first great period of modernization on the Pennsylvania Railroad began in the 1880s, with the installation of airbrakes, automatic couplers, and other safety appliances on freight and passenger equipment. Passenger trains were the first to receive airbrakes and automatic couplers, because passenger equipment more directly affected public safety, and because such cars were relatively few in number and rarely strayed from PRR rails. Installations on freight equipment occurred much more slowly, however. As the historian Steven Usselman has pointed out in *Regulating Railroad Innovation*, this delay did not stem from an unwillingness by the PRR to protect its employees. Rather, the delay in the modernization of the freight car fleet occurred because PRR the outside firms that had developed airbrakes and automatic couplers refused to cede that technology to the PRR, and PRR executives in turn were reluctant to allow Westinghouse and other independent firms to control vital elements of railroad technology. Furthermore, the piecemeal addition of airbrakes to PRR freight equipment actually retarded productivity on that railroad, as train crews undertook numerous additional switching moves in order to isolate airbrake equipped cars at the front of the train, adjacent to the locomotive. The multi-corporate nature of the American railway network also retarded innovation, since other railroads were able to appropriate airbrake-equipped PRR freight cars in order to augment their own fleets.

Given the fragmented nature of the American railroad network, the modernization of safety equipment became universal only through the intervention of two supra-corporate entities. Public pressure ensured that the national government would implement safety regulations, yet such policies allowed for a long conversion period, one that was repeatedly extended at the request of the railroad industry. A non-governmental entity, the Master Car Builders Association, exerted considerably more influence over the conversion process. The MCBA included members from the operating and mechanical departments of every large railroad system in the United States, individuals who considered their scientific and engineering professionalism to be as important as the profitability of the railroads that they represented. As such, they were able to create standards that matched the needs of all American railroads – thus ensuring interchangeability – while mandating the simultaneous conversion of every railroad's freight car fleet – thus eliminating the possibility that slow adopters of the new technology would appropriate and thus take unfair advantage of the investments made by the more rapid adopters.

Airbrakes and automatic couplers, along with automatic block signaling, proved minimally successful at reducing freight traffic congestion on the Pennsylvania Railroad. In the first years of the twentieth century, during the administration of Alexander Cassatt, the PRR enjoyed greater success in facilitating train movements as a

result of its decision to undertake massive improvements to the physical plant, and to substitute steel for wood in freight car construction; yet both of these modernization efforts entailed considerable cost. The construction of new mainline tracks, switching yards, bridges, curve and grade reductions, and entirely new low-grade freight bypass lines consumed substantial quantities of capital at a time when investors were beginning to question the Company's longstanding strategy of reinvesting much of its earnings. This capital squeeze occurred simultaneously with tightened federal regulation of the entire railroad industry, ensuring lengthy delays in ICC approval of rate increases, which by definition now lagged well behind increases in wage and material costs. Even though the PRR developed more innovative financing methods in response to these conditions, American and European financial markets increasingly perceived the Railroad as overcapitalized, and unlikely to generate satisfactory rates of return.

The modernization of the freight car fleet also imposed significant costs on the Pennsylvania Railroad that extended well beyond the initial cost of the steel cars themselves. To a far greater extent than the composite cars (wood bodies mounted atop steel underframes) that had preceded them, all-steel cars provided a significant increase in cargo capacity. They also required the PRR to design and build larger and more powerful steam locomotives and to make further improvements to its physical plant, in order to accommodate the heavier equipment. Vastly more powerful locomotives not only increased the PRR's capital and operating expenses; they also persuaded the Railroad's Motive Power Department that exceedingly large locomotives offered the best method for the efficient movement of trains – a presumption that contributed to the enormous capital expense associated with electrification, as well as to the postwar delay in dieselization.

The modernization of passenger equipment and facilities that also took place during the first decade of the twentieth century proved even more destructive to the financial health of the Pennsylvania Railroad. Just as the Railroad could not lay additional tracks nor construct new routes quickly enough to unclog freight traffic, neither could it rebuild its terminals quickly enough to keep ahead of increases in passenger traffic. Even worse, terminals were located in congested urban environments; ensuring that the improvement of urban passenger termini would constitute engineering nightmares, with additional facilities shoehorned amongst existing buildings, busy streets, rapid-transit lines, and municipal utilities. Real estate was often hideously expensive, and occasionally subject to contentious condemnation proceedings. The most vexing problem, however, was that terminal improvements often reduced both efficiency and profitability, the twin goals that PRR executives held so dear. By the early twentieth century, «the heavy burden of terminals [was] no longer confined to operating costs but is largely one of interest and taxes», ensuring that, as the Railroad placed expensive new facilities in service, interest costs and taxes increased proportionately, thus driving up each terminal's operating costs, both in absolute terms and in the more critical measure of costs per train and costs per car. «The railroad cannot exist without terminals», Vice-President Samuel Rea laconically observed. «They are reservoirs for traffic and the entrance and exit to the system, and to justify the larger part of their capital outlay is like attempting to justify the expense of an entrance and exit to a building». Yet the man who helped to superintend some of the greatest civil engineering projects in the history of American railroading was cynical – or pragmatic – enough to admit that «any attempt to justify any modern passenger terminal investment on the ground that it will be directly profitable is unsatisfactory».

Even though PRR executives understood that new passenger stations would never recoup their initial investment, they saw those improvements as necessary in order to placate local political interests and to assure the general public that theirs was a modern and progressive corporation. The Railroad accordingly spent well over $100 million on the New York Improvements, in order to dig tunnels under the Hudson and East Rivers, and to construct Penn Station, all to allow travelers to reach Manhattan without the inconvenience of a ten-minute ferry ride from New Jersey. During Cassatt's presidency, the Railroad invested some $400 million in the New York Improvements and other betterments, and the expenditures continued virtually unabated through the terms of his successors. A substantial portion of that $400 million was necessary to increase capacity in existing markets, but perhaps half was devoted to projects, like Penn Station, that produced little or no competitive advantage for the Railroad. Given declines in passenger traffic during the 1920s, the Philadelphia Improvements further to the south made even less financial sense, yet went ahead nonetheless.

The Hudson and East River Tunnels in turn mandated the adaptation of fireproof steel passenger equipment throughout the PRR system. In contrast to the upgrading of the freight car fleet, the conversion of passenger cars to steel did little to increase capacity; it did, however, increase the weight of each car, putting a further strain on motive power and substantially increasing operating expenses. In the competitive marketplace of rail passenger service in the United States, travelers did not merely demand safer steel equipment. They also valued more comfortable accommodation, in the form of sleeping cars, lounge cars, and dining cars, all of which generated additional costs with little corresponding increase in revenue. Axle-driven electric lighting increased the tractive effort needed to pull passenger trains, while the installation of air conditioning (beginning in the early 1930s) caused a further decrease in operating efficiency. In short, every step undertaken by the Pennsylvania Railroad to make its passenger services more competitive *vis-à-vis* other railroads or the highways detracted from the most efficient use of its resources, that lay in providing basic coach transportation in intermediate-distance markets.

A second pulse of modernization peaked during the depression decade of the 1930s, when the PRR developed the most extensive system of railroad electrification ever adopted in the United States. Planning for this project began during the 1920s, as the main line between New York and Philadelphia was increasingly overwhelmed with traffic, despite its expansion to as many as six tracks in some areas. Increasing real estate prices in the heavily urbanized Northeast precluded the acquisition of real estate necessary to add further tracks or to build freight bypass lines. As such, PRR motive power officials felt that they had little choice other than to incur the heavy capital expense associated with electrification, in order to reap the benefits of higher train speeds, faster acceleration, and increased loads per train. The cost of the project required the PRR to suspend most other improvements to the physical plant, increasing the company's funded debt while depriving it of the opportunity to compete more effectively against other railroads and highway vehicles on the remaining portions of its system. Even so, the PRR threatened to curtail work on the northeastern electrification during the winter of 1932, in response to the Great Depression. The project would have faltered had it not been for a massive infusion of government funds, through two New Deal agencies, the Reconstruction Finance Corporation and the Public Works Administration. Any concern regarding the government's assistance for private enterprise were assuaged by confident assurances of job creation at a time of national economic crisis. And it was the transitory nature of

that crisis that helped convince both the federal government and the Pennsylvania Railroad that, under normal circumstances, private enterprise should be able to cope with the financial imperatives of railway modernization.

The inauguration of electric service between New York and Washington, in January 1935, reveled that the private company and the public agencies saw very different roles for the modern new technology. PRR Vice-President Martin Clement noted the Railroad's «appreciation to the Administration for the pleasure we have had in working with them», but heaped far more praise on «a smooth-running army of railroad employees numbering in the thousands, backed by many more in industry, [who] have again come through in the American way». Harold Ickes, the head of the Public Works Administration, in contrast thanked the Railroad for its help in demonstrating «what actually has been accomplished under [the] PWA when private initiative aids the Administration in carrying out its reemployment plans». There was, in other words, scant evidence of the possibility of coordinated long-term public-private cooperation to manage the application of expensive new technologies to the American railway network.

The third period of modernization began immediately following the Second World War, as most firms in the American railroad industry rushed to replace steam locomotives with more efficient diesels. The Pennsylvania Railroad lagged well behind the rest of the industry in this instance, in part because its managers sought to placate on-line coal producers, and in part because its Motive Power Department was confident that it could develop a new generation of highly efficient steam locomotives. That confidence was sadly misplaced, however, contributing to the first deficit in the PRR's history – incurred, embarrassingly enough, in the company's centennial anniversary year of 1946. By the following year, the PRR Board of Directors had forced President Martin Clement into retirement, had engaged in a wholesale purge of the Motive Power Department, and had promoted James M. Symes to the presidency. Symes had been the PRR's Western Region Vice President, based in Chicago, and from his office window he could see firsthand the superior operating performance of diesels employed by competing railroads in that gateway city, and was determined to bring these benefits to the PRR.

In the context of this paper, this issue is not the PRR's delay in dieselization, nor even the obvious benefits provided by the fragmented American railroad network – one that allowed diesel locomotive technology to be adopted incrementally, rather than as an "all-or-nothing" decision on the part of a single nationalized rail system. Rather, it is the extent to which diesel locomotives saved the Pennsylvania Railroad from financial disaster. Unlike any of the other instances of modernization discussed in this chapter, dieselization could be justified on purely financial grounds, producing such substantial returns on investment as to preclude the necessity for governmental support of modernization.

While dieselization increased the efficiency of the PRR's operations, it did little to generate additional traffic. By the mid-1950s, PRR executives hoped that they could recapture traffic lost to the highways by modernizing and diversifying their freight car fleet. Despite the conversion from wood to steel in the construction of freight cars in the early decades of the century, the overall designs of those cars had not changed to any appreciable degree. By the 1950s, however, the standard forty- and fifty-foot long boxcars, hopper cars, and flatcars (which had been designed for the movement of bulk cargoes at relatively slow speeds) were ill-suited to the transport of compact, high-value, and time-sensitive commodities. This deficiency allowed independent trucking companies to

siphon off a large portion of the Pennsylvania Railroad's freight business, contributing to chronic declines in net income.

The most effective method of meeting this competition from highway vehicles was to simply put them on extremely long flatcars, in trailer-on-flatcar (TOFC) service. Such operations were not feasible until 1954, when the Interstate Commerce Commission reversed its earlier opposition to integrated rail-truck operations, and allowed the PRR and other railroads to move their own trailers via rail without the necessity of securing certificates of convenience and necessity. This change in regulatory practice enabled the PRR to establish a wholly owned subsidiary, TrucTrain, to transport highway trailers on flatcars.

TrucTrain was only modestly successful, in large part because its operations were restricted to PRR rails. By 1956, the PRR had signed interline agreements with the Norfolk & Western, the Chicago & North Western, the Missouri-Kansas-Texas, the St. Louis-San Francisco, the St Louis & Southwestern and the Santa Fe, allowing for the off-line movement of TOFC equipment as far west as Dallas-Ft. Worth and Houston. Since each railroad employed different types of equipment, they were forced to transfer trailers from one set of flatcars to another at gateway cities such as Chicago and St. Louis – thus delaying shipments and negating much of the potential efficiency associated with coordinated rail-truck transport. In essence, the PRR faced the same problem that it had faced in the late nineteenth century, when it delayed the conversion of its freight equipment to airbrakes and automatic couplers, fearing that other railroads would "poach" these upgraded cars.

The engineering and professional expertise of the Master Car Builders Association had solved that difficulty, in tandem with the federal government, by imposing industry-wide safety standards. The Pennsylvania Railroad adopted a somewhat different solution in the case of TOFC service. In 1956, the PRR organized a consortium of railroads to form the Trailer Train Company, creating a nationwide pool of cars suitable for TOFC service. In subsequent years, Trailer Train added specially designed carrier racks to many of these cars, allowing the railroad industry to recapture much of the automobile haulage business that had previously been lost to highway carriers.

While Trailer Train proved a great success for the railroad industry as a whole, it entailed far more deleterious effects for the Pennsylvania Railroad. TOFC service required a significant capital investment, not only for the cars themselves, but also for loading and unloading facilities and betterment projects to increase clearances for the higher-than-normal equipment. The operation of other types of large and heavy specialized equipment, such as "jumbo" covered hoppers and "high-cube" boxcars, placed further demands on a decrepit track structure. At a time of declining traffic revenues, the PRR could not generate this capital internally, and Wall Street proved increasingly reluctant to provide funds to a company that was clearly in desperate financial circumstances. As a result, the Pennsylvania Railroad was unable to undertake the improvements to its physical plant that were necessary to profitably operate TOFC and other types of specialized equipment. This situation created a "death spiral" in which inadequate service, delayed and damaged shipments, and wrecked equipment eroded customer confidence in the PRR, which led to further declines in revenues, and thus further reductions in the maintenance budget, followed by even less adequate service and additional concomitant revenue losses. The creation of the Consolidated Railroad Corporation in 1976 halted this downward spiral through massive infusions of federal funds into the Penn Central (the successor company to the PRR) and other bankrupt northeastern railroads.

The three periods of modernization on the Pennsylvania Railroad offer several insights that may be of interest to those studying the European railway experience. First, efforts at modernization require close coordination among various operating entities. Since the for-profit corporation is the primary unit of railroad organization in the United States, such coordination has taken place primarily within the private sector, through such company-sponsored entities as the Master Car Builders Association and the Trailer Train Company. National boundaries constitute the primary unit of railroad organization in Europe (with the notable exception of the privatized systems in Britain), suggesting that governments, and not companies, must take primary responsibility for coordinating the technological changes necessary to achieve modernization.

Second, the debate over the relative merits of the nationalization and the privatization of the railroads, in both Europe and the United States, pays far too little heed to the financial requirements of modernization, and is frequently channeled through the extremist rhetoric of political discourse into an "all-or-nothing" proposition. With the exception of a few economists and the more radical elements of the labor movement, Americans have been steadfast in their opposition to railway nationalization, a process that Pennsylvania Railroad president William Wallace Atterbury frequently referred to as "bolshevization." This intransigence nearly destroyed the Pennsylvania Railroad (and indeed the entire railroad industry in the Northeast), until the creation of Conrail led to wholesale government intervention that stopped just short of outright nationalization. Such intervention rescued a large portion of the railroad industry from its death spiral, yet political conservativism during the Reagan years led the national government to privatize Conrail, for far less than its true value, even as large infusions of capital from the federal treasury had finally succeeded in modernizing the railroad and restoring it to profitability. While more varied than the situation in the United States, European nations have likewise veered between the extremes of complete nationalization and privatization, each based on the presumed failings of the other system.

The lesson from the Pennsylvania Railroad is that selective nationalization is preferable to either complete nationalization or complete privatization. The intimate relationship between railroad operations, railroad equipment, and railroad track indicates that all three should be owned and operated by the same company – and the experience of Railtrack / Network Rail in Britain and the far more deplorable state of Amtrak's long-distance passenger routes in the United States supports this line of argument. However, the enormous cost associated with Penn Station in New York and with the Philadelphia Improvements indicates that, while private railroads should build, maintain, and own the *tracks*, governments should build, maintain, and own the *stations* and ancillary facilities.

The Pennsylvania Railroad also indicates that railroads can operate efficiently, with socially optimal results, as private companies, but only so long as the national government is willing to intervene during pulses of modernization. These pulses of modernization included the installation of airbrakes and automatic couplers during the last decades of the nineteenth century, the conversion to steel freight and passenger equipment during the first two decades of the twentieth century, electrification in the 1930s, and the acquisition of specialized freight equipment in the 1950s. In each case, the national government might well have intervened by providing sufficient capital to fund modernization efforts without requiring that the Railroad to increase its funded debt or overtax the private capital markets. In only one instance did the national government intervene, through the creation of

Conrail as a delayed response to the collapse of the physical plant in part induced by specialized equipment, but that intervention came far too late to save the PRR. There was one exception to this rule, however – diesel locomotives. Diesels generated such massive gains in productive efficiency that they recouped their initial investment within a very few years, and thus effectively funded themselves. Conversely, the emergence of radical new technologies (such as automobile and truck transport over paved highways) merited both substantial infusions of capital to the railroads, accompanied with the development of a coordinated multi-modal national transportation plan that would exploit the comparative advantages of each mode of transport, even though there was no corresponding burst of modernization on the part of the railroads. Needles to say, this was not done in the United States.

The European experience differs from that of the Pennsylvania Railroad, to be sure, with the most obvious contrast involving the relative importance of freight and passenger services. There have nonetheless been similar pulses of modernization, including the advent of steel equipment, electrification, the restoration of the network following the Second World War, the development of new high-speed lines, and the construction of such massive civil engineering projects as the Channel Tunnel. While national governments have helped to fund many of these projects, whether through private companies or nationalized rail systems, it is important to remember that the future development of the European – and the American – rail networks need not rely on exclusively private or exclusively public operating entities, so long as national governments exhibit the political will – something that has often been sorely lacking in the United States – to inject massive quantities of public funds into private enterprise at the specific moments of railway modernization.