Driving High Performance in Freight Rail
Leveraging Next-Generation Technology to Drive Productivity
Historians and rail veterans alike refer to the ‘golden age of railways’ to mean that period in the 20th century when railroads played a major role in transportation and commerce, before containerization of ocean freight and the advent of air freight. Today, another golden age may be in the making for freight rail as a result of heightened environmental awareness, desire for cost-effective shipping options and government interest in rebuilding and better leveraging the rail infrastructure. To benefit from the improved outlook, freight rail executives will need to assess the challenges that this second ‘golden age’ may bring and determine the implications to their services, operations and capabilities to take advantage of the anticipated opportunities. These industry challenges include:

**Balancing capacity with current and future service demands.**
To increase productivity and profitability, railroads need to make continuous service improvements. Europe and China have already invested in expanding their rail systems in anticipation of higher freight traffic and potentially heightened interest in environmentally friendly transport. In the southern United States and northern Mexico, freight rail companies might see demand increase where population growth and the expansion of the Panama Canal could potentially add pressure to the network.

**Expanding infrastructure to meet demand.**
In order to meet future demand and move more freight volume safely, capacity needs to increase across existing infrastructure. In addition, the rail infrastructure itself needs to be expanded geographically, especially as the environmental and economic advantages of freight rail become more evident and businesses in more markets demand access to these advantages.

**Capturing more operational efficiencies between international networks.**
Due to the large number of different IT systems used in the industry, there are gaps in systems integration, as well as data and schedule synchronization, all of which undermine efficiency. These gaps exist even in Europe where integration across borders is tightest.

While these challenges are significant, they also present great opportunities. By addressing them with proven and strategic investments, the 21st century could again be a golden age for freight railways. Based upon our experience within and outside the rail industry, Accenture believes that leveraging technology in new and different ways should be the focus of the next wave of productivity improvements. Technology-enabled business solutions—such as enhanced business analytics providing real-time data—allow rail companies to look ahead and focus on increasing network productivity.

Leaders in freight and logistics will be those that can create differentiated products and services—to drive growth and break out of the commodity trap—while containing their operational costs. By proactively and strategically investing in technology-enabled solutions now, rail companies can build on previous operational improvements and develop competitive advantage.
Past as Prologue: 
An Industry Committed to Continuous Improvement

Over the past 30 years, railways in North America and Europe, as well as in some other markets, launched and for the most part have completed two distinct waves of operational improvements. The first wave ran from 1980s to the mid-1990s and was largely driven by the effects of deregulation, consolidation and increased competition, as well as soaring energy costs. In this period, railways made significant gains in productivity by using a number of levers, including streamlining crew size, increasing locomotive horsepower and tractive effort, and improving freight car capacity—all in a quest to reduce operating costs. As these improvements were made during a period of economic growth and expansion, profitability and productivity both increased. In the last decade, however, research shows that the momentum of productivity gains began to decrease and then level off (see Figure 1).

The second wave, spanning 1996 to the present, saw a sharper focus on network performance and continuous improvement, with efforts to increase fuel efficiency during periodic oil crises as well as moderate investment in technology to improve internal processes. This is particularly true in Europe where the European Union required greater network operational efficiency in many areas, ranging from data interchange to terminals. In North America, companies sought productivity gains either by employing distributed power to improve operating productivity or by increasing the efficiency of back-office or centralized operations through standardizing processes on a single platform. Many freight rail companies now have a single enterprise resource planning (ERP) system that performs all these functions.

The current wave of systemic and organizational improvements needs to address the new challenges facing the industry. A key challenge will be enabling long-term growth in traffic and avoiding route congestion, while simultaneously maintaining a high-level of safety. Optimizing line and car capacity also remain a concern, one that will grow more acute if the projected increases in tonnage are accurate.

Figure 1. Flattening Operational Productivity (1980-2009)

Revenue Ton Mile Dollar of Inflation Adjusted Operating Expense (1980-2009)

Revenue Ton Mile (millions) per Employee (1980-2009)

Source: Accenture analysis using data obtained from the Association of American Railroads
In order to serve more freight customers, freight rail companies need to increase investment now to maintain and upgrade assets to improve productivity and reliability as well as meet new safety requirements, such as Positive Train Control (PTC) in the United States. As a result, freight railways are already looking for ways to free up capital to put toward these investments so they can meet expected future demand.

Despite these challenges, the economic and environmental benefits of rail are becoming increasingly clear. Over the long run, this, combined with congestion and fuel cost issues in other modes of transport, will shift more traffic to rail. Coping with such an influx in volume will require investment toward infrastructure, but that alone will not be sufficient. The key is increasing network velocity that is achieved through more efficient use of rolling assets such as locomotives and cars and linear assets including track and structures. The net effect is an increase in capacity and network performance without major infusions of capital. Increasing velocity in the network is therefore the single, largest productivity gain that can be achieved across the industry as a whole.
A study suggested the United States needs to invest "at least $225 billion" a year for the next 50 years to upgrade the existing system to a state of good repair, but less than half of that amount is being spent today. Although the levels of investment required in Europe and Asia are not as large as in the United States, railways in those regions still need to do more with less to find ways to close the funding gap.

Going forward, much of the success of the freight rail industry will depend on its willingness to adopt a new operating paradigm. Our view is that the next generation of productivity improvements will come from the implementation of industry-specific and leading-edge technology solutions (see Figure 2). Industry solutions can enable a quantum leap in improved asset utilization—both rolling and linear—as well as better collaboration and sharing of network resources—from workforces to data to capital assets—that dramatically increase network efficiency. On an enterprise level, technology investments that deliver valuable data and operating insights and simplify complex back-office functions will strengthen the bottom line. In sum, the technology initiatives proposed below can significantly improve efficiency across network.

1. Take technology standardization across the enterprise and industry
Companies that have deployed ERP solutions continue to reap the benefits of standardizing processes on an integrated platform. Yet there are still untapped opportunities, particularly in the category of inter-railway integration. While many railways are gravitating to a common software provider for their back-office and front-office functions, true interoperability would be greatly enhanced if the industry could standardize a number of interdependent functions and processes on a common platform. Collaborating to find and fund a common industry solution will be more cost-effective than each company developing and implementing a system that they then have to customize to connect to their network partners and other companies. Examples would be:

**Figure 2: Building Blocks of High-Performance Rail Businesses**

<table>
<thead>
<tr>
<th>Growth Creation</th>
<th>Customer-Centric Commercial Operations</th>
<th>Value-Based Pricing and Selling</th>
<th>Strategic Partnerships</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Internal- and External-facing, processes built around the requirements needs, and buying patterns of shippers</td>
<td>Implement commercial capabilities to create pricing leverage and demand-pull based upon relative value-add</td>
<td>Progressive partnerships coupled with the ability to efficiently put together and/or take apart networks</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Operational Excellence</th>
<th>Enterprise Asset Management</th>
<th>Operational Transperancy</th>
<th>Lean Enterprise Management</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Capital utilization decisions enabled by visibility to lifecycle returns, service implications and risk mitigation</td>
<td>Create line-of-sight across the full lifecycle of operations to drive productivity and service reliability</td>
<td>Lean support operations and functions ‘variabilized’ to underlying demand levels</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Technology Enablement</th>
<th>Technology Backbone</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Key System/Technology)</td>
<td>(Key System/Technology)</td>
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</tbody>
</table>

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1"Transportation for Tomorrow" Report of the National Surface Transportation Policy and Revenue Study Commission–December 2007
Many companies view regulations—such as those required by the European Treaty Series or PTC in the United States—as adding significant investment for little benefit in the early stages. Yet our perspective is companies that leverage the data requirements in innovative ways will benefit in the long run. Investments to comply can be an opportunity to upgrade overall technology architecture and operating infrastructure to expand capacity and increase standardization—two outcomes that benefit all railways. For example, employing wireless or global positioning system (GPS) technology can generate precise positional and condition data. With real-time data in hand, companies have better and more efficient location control, as well as the ability to schedule maintenance at an optimal time or location to minimize disruption.

2. Exploit operating data by using analytics that improve resource efficiency within the enterprise and across the network.

Advanced analytics enable companies to gain insights about future demand, allowing for immediate decisions that translate into improved business performance. This will make it easier for freight railway companies to increase efficiency within the enterprise and across the network, from more balanced staffing and timely maintenance to delivering services that match supply and demand more closely.

Value-creating strategies—ones built on generating and analyzing multiple data sources—will allow railways to improve overall network efficiency and asset utilization. Employing analytics to increase visibility into traffic and availability can enhance network and enterprise operations in a variety of ways. These range from minimizing traffic interruptions (which decreases crew changeovers and their attendant costs, and improves customer satisfaction) to optimizing the position of cars in terminals and rail yards to save wear and tear on track and rolling stock. Using analytics in an innovative way can help freight rail companies develop a more predictive data strategy that improves investment decisions and ultimately yields more value.


Tighter collaboration across the value chain can provide a comprehensive view that ultimately improves demand planning and reduces costs. Influxes or shortages of unanticipated tonnage causes crews to be out of position and impacts service, schedules and upsets the network. It also leads to excessive deadheading and empty miles. Collaboration will increase utilization and visibility into the location of shipments for everyone from dock workers at shipyards to retailers in order to plan better. Rail companies can make better use of the advanced yield management and supply and distribution planning applications already embedded in many ERP systems to make sure they deliver the right product to the right place at the right time.

4. Employ mobile solutions more systemically to increase productivity.

Development and execution of a robust mobile strategy across the enterprise to improve maintenance of way equipment, engineer staffing and crew management. Expanding mobile access and use of mobile work management applications can help companies address maintenance issues quickly, thus reducing expensive repairs, and also eliminating the employee downtime and staffing delays that slow throughput. Many companies still rely on labor-intensive dispatch operations to coordinate staffing, yet we live in an era where smartphone applications can coordinate crew schedules and GPS devices can facilitate and confirm check-in of employees more efficiently. While developing a mobile strategy and equipping personnel with complementary devices constitutes a substantial upfront investment, the savings in efficiency over the mid-term will be well worth the effort.

Every freight rail company works hard to choreograph activities to be as efficient as possible, yet efforts of individual companies by definition do not permit optimization of the national network on a more holistic basis. The benefits of the technology investments identified here will be highest, and the costs lowest, if the industry collaborates on their development to ensure standardization of technology where it makes the most sense. The ability to capture and integrate more data quickly, will allow rail companies to look outward and focus on increasing network productivity. The industry as a whole will benefit from higher productivity and profitability if companies work together, and freight customers will benefit from safer, more efficient and predictable high quality service.
Despite the challenging economic cycle and increase in regulation, it is a good time to be in the freight rail business given the expected increase in freight traffic. Freight rail companies have the opportunity to target investments to meet this stronger demand and the higher expectations that come with them for more efficient, responsive service. Technology-enabled business solutions can be a strategic weapon that, if employed well, can help rail companies make the most of this opportunity, and extract the maximum value from underused assets such as operating data. By proactively and strategically investing in technology-enabled solutions now, rail companies can build on previous improvement efforts and develop competitive advantage for their businesses for decades to come, thus securing their place as a mode of choice in the freight transportation industry.
About Accenture

Accenture is a global management consulting, technology services and outsourcing company, with more than 215,000 people serving clients in more than 120 countries. Combining unparalleled experience, comprehensive capabilities across all industries and business functions, and extensive research on the world’s most successful companies, Accenture collaborates with clients to help them become high-performance businesses and governments. The company generated net revenues of US$21.6 billion for the fiscal year ended Aug. 31, 2010. Its home page is www.accenture.com

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