Creating a future for Australian Rail

As deregulation and privatisation bite, Australia's rail operators can succeed by optimising their networks and services – or risk being derailed.

The future success of Australia's rail industry depends upon higher traffic volumes, higher revenue yield on the traffic mix, while ensuring operating capacity is sufficient to match demand, and unit costs are lowered.

How can this be achieved? Superior economic performance will flow from rail operators getting better at managing new core competencies like pricing, capacity, networks and schedules. Better cost management will mean that, in addition to making general productivity improvements, operators will need address the current disparities in costs compared with other transport modes.

In moving from a constraint-driven environment to a market-driven one, the strategic objective for rail will be to capture and retain market share by providing the most adequate service to customers. Simultaneously, there will be a need to ensure best use of resources. Complicating the issue, however, is that increased market orientation will lead to both a proliferation of new services and to growing price and cost pressures.

This paper looks at some of the ways to superior economic performance which have been adopted by the rail and transport industries worldwide.

How to increase traffic and yield using new market planning and scheduling technology

Prior to the deregulation of the industry, rail operators were focused mainly on cost reductions rather than good marketing techniques.

However, the movement toward the production of high-valued goods and the implementation of more efficient (e.g., just-in-time) inventory policies created a demand for highly reliable and flexible freight transportation services. As a result, the rail industry now needs to invest in new market planning and scheduling technology.

For CSX transportation, a US rail operator, freight railroad performance hinges upon the ability to leverage the network. This means the ability to schedule trains frequently enough to be service-responsive to customers, long enough to be cost effective, and spaced so as to minimise transfer time in yards and congestion over the right of way.
(Huntley et al, 1995)

According to one US rail marketing survey, a one per cent improvement in the reliability of cargo delivery time could yield as much as a five per cent revenue increase in several markets. (Hertenstein and Kaplan, 1991)

Like airlines, rail operators are looking for advanced decision-support tools in the areas of yield or revenue management, schedule planning, and control.

The job of yield management is to forecast demand by market segment, and optimise the decision of whether or not to sell at a price the customer is willing to pay now or wait for higher-value, late-arriving demand. It's the classic decision of whether to take a bird in the hand or go for two in the bush. Yield management assists the decision process by using sophisticated forecasting and optimisation techniques to determine how much to overbook each individual service, and how to allocate capacity amongst the hierarchy of customer segments.

Robert Crandall, former chairman, president and CEO of American Airlines, stated, "I believe that yield management is the single most important technical development in transportation management since we entered the era of airline deregulation in 1979... (Dynamic pricing) creates a pricing structure which responds to demand on a flight-by-flight basis. As a result, we can more effectively match our demand to supply". (Bell, 1998)

Matching operating capacity to demand and lowering unit costs

Rail operators worldwide are now applying management science techniques of queuing, games, decision, information and statistics as well as simulation, operations research and linear programming in a wholly integrated way. For example, these new approaches for planning and re-configuring rail networks are opening up key opportunities and major dollar savings.

Because of upcoming deregulation and the advent of high-speed rail networks, European passenger railroads are battling for customers among themselves and with other means of transportation. To maintain a competitive advantage, they are developing advanced scheduling solutions as a key factor in matching output to demand - and lowering unit costs. (Ben – Khedher et al, 1998)

Today scheduling has become more complex. This complexity stems from the operator's need to build schedules to fit a changing demand, to meet both constraint-driven and market-driven criteria, and to allow adjustments. The scheduling process has also become more quantitative.

The heart of these scheduling systems is a set of advanced operations research models that enable managers to take a global approach to decision making. Based on the European experience, these systems deliver revenue increases of tens of millions of dollars per year and substantially reduce operating costs.

Optimisation models for train routing and scheduling have advanced tremendously in the last few years. Although early models were often based on very crude approximations of reality, the situation has now changed. Latest optimisation approaches make it possible to choose between all alternatives to find best arrangements – and tailored to each organisation's unique conditions.
(Cordeaux et al, 1998)

For example, the optimal routing and dispatching support system now used by US-based Southern Railway delivers US$3,000,000 annual savings from reduced train delay. Comparing the first year of implementation with the previous year, traffic increased nearly nine percent; yet delay per train operated and delay per meet were both down more than twelve percent. (Sauder and Westerman, 1983)

Being able to find the "best" in such a difficult choice environment is a strong competitive advantage. Moreover, the tools for maintaining this position can now be located in desktop computers alongside the decision-makers.

FedEx exemplifies a company that has succeeded by applying these advanced network optimisation methods to its operations. Models and analysis have informed FedEx's managers on crucial, business-shaping decisions. (Bell, 1998)

The time is right to dramatically increase the use of network and service optimisation in the rail industry.

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