by Andrew Nash

Could railways in Central Eastern Europe take a lesson from mobile phone networks in Africa and skip a generation of technology? In so doing could they show the rest of Europe how railways can reinvent themselves into highly efficient and attractive transport systems?

Building infrastructure networks is difficult and expensive. However, enterprising Africans have adopted mobile phones rather than waiting for traditional telephone networks to be built and have used these mobile phones to revolutionize their society. These entrepreneurs have skipped land-based telephone lines and gone directly into the wireless generation.

Telecommunications, like transport, is a complex socio-technical system. In these systems social behaviour works closely with technology to determine how the system is used and whether it is successful. The clearest example of this interaction is in the uptake of new technologies: social factors play a pivotal role in determining which technologies capture the market. History is lit-

think how they market their produce. For example, Amazon's customer recommendations have revolutionized how people choose books and consumer products.

What can IT do for the railways? As a starting point it can be used to develop better schedules, provide recommendations for handling delays and help prioritize investment decisions. Railways in Western Europe are using IT in these roles today, but they have failed to fully embrace the potential of IT to revolutionize their product mix and operating model. This is where CEE railroads can skip a generation.

Start with capital investment planning. Railways in Eastern Europe require substantial investment in infrastructure and rolling stock to address years of deferred maintenance and reach the level of western European railways. The western European model is for each national railway to rebuild its own network and buy its own rolling stock, often maintaining the existing incompatibilities with networks in adjoining countries.

A great deal of effort is being made at the European level to reduce incompatibilities and

introduced innovative ticketing schemes. Unfortunately, no one has (yet) combined these services into a single product.

The next step – developing a passenger service attractive for many different types of trips – will require the railways to break down preconceived notions of how they operate and develop products that integrate high speed, coordinated and price sensitive qualities (as well as other qualities designed to attract today's customers) into a single service offer. Railways will need to use IT-based schedule development and simulation tools to conceptualize, evaluate and ultimately operate schedules that provide these new integrated services. It will not be easy, but imagine the benefits of creating a CEE-wide integrated rail network with fully coordinated ticketing and schedules.

The problem with freight is similar but more complex. All railways, with the exception of bulk-freight oriented railways, are having trouble in significantly increasing their freight business. Many specific improvement ideas can be taken from the trucking industry, but the key will be using IT to offer truly new products.

Poised to skip a generation?

tered with "better" technical solutions that were pushed-aside for technologies with more social relevance.

The social side of socio-technical systems determines both the types of services and products offered by a company as well as how the company uses technology to produce them. As industries move through their lifecycles they continually adopt new technologies, but often fail to fully integrate these new technologies into their social systems and therefore miss opportunities to expand and re-position their businesses.

Returning to Africa, the new mobile phone networks have had profound social impacts. Now farmers can learn where they will receive the highest prices for their produce and travel to these markets, rather than accepting a lower price at their local markets. Entirely new industries have sprung-up based on the new network including mobile phone banking – creating new opportunities for development and further stimulating the uptake of mobile telephones. Could railways – by fully integrating new technologies into their social systems – create changes of a similar order of magnitude? The answer is yes, but it won't be easy.

CEE railways share two significant problems with all railways: they have insufficient capacity to meet the growing demand and service quality is not good enough to attract highly profitable traffic. It's a death spiral: without additional funding generated by more lucrative traffic, there will be even less money available for increasing capacity.

Taking full advantage of new information technologies could break this death spiral. While companies in all industries are embracing IT applications, successful companies are also rethinking the social side of their business model to make full use of IT opportunities – just as the enterprising Africans are using mobile phone networks to re-

increase interoperability, but progress is slow. From a technical standpoint the answer for CEE railways is clear, as railroad companies rehabilitate old railways and build new lines they must implement interoperable systems (e.g. electrical power, signalling, track gauge) based on the accepted European standards.

More interesting is how CEE railways could integrate new technologies into the social side of their business model and skip forward a generation. For example railways could focus on developing product-oriented corridors. These corridors would provide specific transport services (e.g. fast container trains from Sophia to Bratislava, or high speed passenger services from Budapest to Warsaw) across many different countries. (The generation skipping idea is that countries would work together on prioritizing investment plans and service offers – rather than alone). Information technology, specifically train simulation combined with schedule development applications can be used to develop these products.

Determining what specific transport services should be offered on a given corridor depends on thinking outside the railroad's "normal" mindset. This mindset can be summarized as, "we operate passenger trains every hour that stop at these stations", or "we operate freight trains at night between these points." This is only a successful business strategy for monopolies; today's customers have many potential transport options and to be successful railways must fight for customers by offering attractive products and services.

In recent years Western European railways have successfully introduced some attractive new products for their passengers using IT to help design and implement the new services. For example, France has built an excellent high speed network, Switzerland has coordinated its service to enable fast trips throughout the country and Germany has

For example, could estimated time of arrival information be used to help set factory production schedules? This sets the normal just-in-time production process on its head, instead of waiting for delayed freight to arrive, the factory plans what it will produce based on when – using ETA information – the different raw materials arrive. This type of system would require new IT systems to provide ETA information, but more importantly, new ways of doing business that would enable factories to revise their production plans on short notice and railway tariff systems that would encourage factories to adopt these types of production schedules.

Of course there are also many less dramatic changes that IT could facilitate to improve railway service. Simply using IT applications to develop and evaluate several different timetables early in the schedule development process could help increase capacity and service quality. Adopting advanced IT-based dispatching systems that can help identify the best ways of responding to a delayed train can significantly increase network efficiency. Improving customer information by introducing IT-based systems for travel planning and network status will help bring railways into the 21st Century. But, as this article has attempted to show, railways should consider these steps as only the beginning and seek to use IT to change their entire orientation and business model.

In summary, if combining social change with the introduction of new telephone technology can make a great difference in Africa, why couldn't combining IT with new ways of doing business lead to success for railways in Central Europe?

Andrew Nash, PE is Managing Director of Vienna Transport Strategies, a transport management consultancy (www.andynash.com).