# Competitiveness and Sustainability: Scenarios for Rail Redevelopment in South Africa

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## 1 Introduction

### 1.1 The role of scenarios

Scenario methodology is valuable for constructing views on significant future developments that may fundamentally change an industry. Scenarios can of course not accurately predict the future. Their value lies rather in enabling stakeholders to identify interactions among the forces driving change and their possible outcomes. One challenge in constructing scenarios is to reduce the forces to those that materially bear on significant outcomes. The author will propose scenarios that are neutral with respect to forces that cut across the entire socio-economic spectrum—such as demographics, economics, politics, and many others—to enable focus on scenarios for rail redevelopment.

Numerous stakeholders should be interested in rail redevelopment scenarios—the Department of Transport, responsible for rail policy; the Department of Public Enterprises, representing the current owner; the present incumbent infrastructure-, train- and station operators, PRASA and Transnet; organized labour; potential funders and investors; logistics and mobility providers and users; road operators and users who experience the good or bad outcomes of the present rail situation; and lastly, the broad population, which lives with the outcome of uncompetitive railways, and its negative influence on the competitiveness of their nation against other nations.

To the extent possible, reducing driving forces to the two most important gives a simple but clear comparison of a small number of key scenarios. The author will now seek out and examine two such forces, with a view to developing a set of scenarios that will frame views on South Africa's future railway development.

# 2 Scenario drivers

## 2.1 Forces affecting railway competitiveness and sustainability

### 2.1.1 Underlying research findings

For the present purpose, sustainability, which follows from competitiveness, means an ability to renew assets from self-generated funds as a going concern. Research into the corporate citizenship of railways in a global comparison yielded several factors that describe how railways position themselves for competitiveness and sustainability (Van der Meulen & Möller, 2008). The following three relate to line haul applications: They have not yet published their definitive research into urban rail positioning, but §4.1 reflects applicable preliminary findings.

***Positioning Freight Rail*** identified an association among presence of Heavy Intermodal, Distributed Power, and Heavy Haul; Infrastructure Ownership Locus; Maximum Axle Load, and Infrastructure Operator Diversity. These variables connote heavy freight railways, with private infrastructure ownership, and competing routes. Standard gauge track and private ownership dominate that setting.

***Positioning Passenger Rail*** identified an association among Maximum Speed; Information Technology Leverage; presence of High-speed Intercity; Electric Traction; and R&D Level. Once again, standard gauge track implicitly dominates high-tech passenger rail solutions.

***Pursuing Competition*** identified an association among infrastructure-operations separation, train operator diversity, and private rolling stock ownership. It also speaks to the positive role of private ownership in structuring an industry for contestability.

The forces driving scenarios for a particular country or region will depend on where it has intentionally positioned its railways, or where by default they find themselves. The foregoing research findings indicate that two forces drive future railway scenarios in South Africa. First, narrow track gauge impedes further advancement of inherent competitiveness, with partial exception of urban rail as discussed in §4.1. Railways built to colonial standards, either ab initio or as extensions, have discounted the present value of sunken investments to near zero. Most assets are obsolete (or as some mistakenly believe, *underutilized*), while sustainability through self-renewal is beyond reach. Second, their state ownership impedes private participation in contestable markets. The author will now develop these forces further.

### 2.1.2 Stimulating competitiveness: Standard gauging

By common consent, standard gauge is superior to narrow gauge in supporting competitiveness of railways against other modes. To recapitulate briefly, appreciate that narrow gauge railways have stretched rail's Bearing and Guiding genetic technologies, which underpin high speed and heavy axle load respectively, to their respective limits. Whatever stretch remains will asymptotically approach natural limits in a domain of diminishing returns (Van der Meulen, 2007). Existing railways in South Africa can therefore not enter the naturally competitive applications *container double stacking* (leaders operate at 32.4 tonnes/axle) and *high-speed intercity* (leaders operate at 350-380km/h). Outside urban

areas, they must therefore remain at a disadvantage vis-à-vis competitors, domestically against other modes, and internationally against other countries. Furthermore, narrow gauge railways and -suppliers undertake little R&D at all, let alone improve their competitiveness, so their competitive disadvantage compounds over time. Interestingly, narrow gauge railways compensate as best they can by exploiting the third and last genetic technology, Coupling, to run the world's longest freight trains. South Africa's TFR and Brazil's EFVM are in the lead, although TFR is facing stiff domestic competition from side-tipper interlinks.

The extent of standard gauge track must thus be one driver of railway scenarios in South Africa. Standard gauge has attracted pushback on the ground that converting the entire network will be unaffordable. While that may be true, one must question whether it is actually necessary to convert the entire network. Reasoning from first principles, it is evident that a network of some 6000km will suffice (Van der Meulen, 2010). This paper will not canvass that topic—it is sufficiently important to justify its own paper. Here the author simply submits that a *None* and *Sufficient* categorical scale will break scenarios.

### 2.1.3 Stimulating competition: Private participation

The first force, standard gauging, relates to railway competitiveness. It suggests that the second force may relate to the setting in which competitiveness plays out. As point of departure, appreciate that even well developed railway intramodal competition typically involves only few competitors: Customers therefore seek contestability to secure fair pricing. Like most economic models, markets for railway service are not perfectly contestable: Nevertheless, the notion does convey shippers' expectations.

Contestable market theory holds that potential competition, not actual competition, is essential. A perfectly contestable market allows recovery of entry costs on exit, i.e. there are no sunk costs. Low entry barriers allow potential entrants to enter the market quickly if abnormal profits are made, to ensure that in the long run firms in the industry earn only normal profits, and deliver allocative and productive efficiency. However, despite its attraction as a force in scenario development, contestability and sustainability are not necessarily congruent: The contest may leave incumbents or entrants bloodied, which jeopardizes sustainability.

The author therefore proposes private participation as the second force. Competition associates with private participation: While contestability may rule the game, the requirement to invest in assets and earn an acceptable return thereon is a strong driver of sustainability. One may therefore consider private participation to be a superset that subsumes contestability and sustainability.

State owned railways must meet expectations regarding equity among enterprises, exemplary compliance with policy, parsimonious financial management, avoidance of risk, and more, which may dull their competitiveness. Around the world, state owned enterprise rarely holds its own in fair competition with private enterprise in the same business sector. South Africa well knows the outcome of state-owned railways competing with private road hauliers.

Freight transport is a ruthless, low margin, competitive market, not suited to a government player. It is difficult to see why some governments continue to see freight transport as a core government function. Railway privatization has therefore generally improved business efficiency, service performance and markets (Amos, 2006: Slide 18). As a way station to full privatization, public-private partnership can share risks, resources, and rewards with the private sector. The latter's contribution—innovation, access to finance, knowledge of technologies, managerial efficiencies, and entrepreneurial spirit—is combined with the social responsibility, environmental awareness and local knowledge of the public sector to address problems (Phang, 2009: 24). Private participation will give greatest benefit to the community when competition (freight) or periodic contestability (passenger) accompanies it (Amos, 2006: Slide 19). Its mechanism allows and encourages railways to exploit their inherent strengths and so adapt aggressively to market challenges and opportunities.

The amount of private participation may range from none for a state owned railway, to 100% for a privately owned railway (e.g. a mine-to-port heavy haul railway). The critical amount for the present purpose is that which is sufficient to influence, directly or indirectly, the strategic direction of the railway. The author posits that, by influencing strategic direction, a private investor can influence the markets in which the railway competes, its risk profile, and its aspirations. This amount need not necessarily be 100%, and examples of smaller proportions exist. Even a concession such as Gautrain, which may appear to offer private participants limited influence over strategic direction because the conceding authority established that up front, needs its strategic direction endorsed by attracting voluntary private participation. Thus, once again a simple categorical scale ranging from *None* to *Sufficient* will break scenarios.

### 2.1.4 The essence of scenarios—railway renaissance

Decades of state intervention or -ownership stultified development and exploitation of the inherent competitive strengths of many railways. Nowadays, competitive, liberalized railways are renascent in developed- and developing countries, clawing back markets that they lost or that rejected them. The following four events triggered the global railway renaissance: Now it is the essence of all credible railway scenarios.

In 1964, introduction of high-speed railways changed Japan's economic geography. They subsequently spread to France with the first TGV in 1981, then to Western Europe and on into the rest of the world. The 2010 7$^{th}$ World Congress on High Speed Rail indeed sealed this as the way to do passenger trains. High-speed has even spread to some of South Africa's economic peers, while others are kicking tyres (Van der Meulen & Möller 2010).

In 1972, Railway Gazette International recognized heavy haul as a distinct railway application. It reflected current North American practice applied to railways dedicated to bulk traffic, often from a mine to a port. Since then, it has spread to several countries and regions—the International Heavy Haul Association has nine members, including South Africa. However, narrow gauge does impede the extent to which such railways can realize their full competitiveness.

In 1980, the US deregulated its railway industry, thereby releasing pent-up pressure to raise competitiveness through innovation. That event triggered development of double stack container trains, which extended rail competitiveness to high-value low-density goods. They subsequently spread to the entire NAFTA region, and beyond to Australia, the Middle East, China, and India. Narrow gauge track cannot support double stack container trains.

In 1989, the fall of the Berlin Wall removed the constraining influence of the second world. The ensuing economic globalization among other rationalized the railway supply industry, which in turn stimulated urban rail through intense competition among aggressive suppliers.

## 2.2 Scenarios for South Africa

South Africa's 150-year railway history has had formative influence on its economic geography. However, rail's relevance to a developing economy has gradually waned due to emergence of other transport modes and its failure to maintain competitiveness against them. Its right-of-way footprint could nevertheless still contribute to the role of competitive railways in South Africa's future. What follows applies this perspective to line haul freight, high-speed intercity passenger, and urban rail. The underlying principles hold for all three settings: Key stakeholder positions and the concomitant maneuvering room do however yield a different outcome set for each case. Cross breaking the two scenario drivers in the light of the global railway renaissance reveals the six scenarios developed in §3 and §4.

# 3 Freight rail

## 3.1 Scenario 1: Moribund

### 3.1.1 Description

This scenario features railways with no standard gauge track and no private participation. Challenged by intense competition from other transport modes, railways around the world have either adapted regarding these two attributes, and flourished, or stagnated, and atrophied. This outcome of course applies to all businesses that do not rise to their challenges.

### 3.1.2 An intractable situation

With the exception of the Ermelo-Richards Bay and Sishen-Saldanha heavy haul lines, which no longer lead the world as they once did, both freight and passenger line-haul railway applications in South Africa are moribund. One need not delve into detail—broad media coverage has reported the situation from a lay perspective while, among other, Van der Meulen (2010) has expanded on particular aspects from an informed railway perspective. Appreciate that absence of standard gauge excludes South Africa from market spaces in which railways are renascent in other countries, namely Heavy Intermodal, which belongs in §3, and High-speed Intercity, which will be addressed in §4. Furthermore, to expand on §2.1.2, it cannot follow Heavy Haul industry leaders who exploit the superior axle load and traction motor ratings that standard gauge track enables.

Furthermore, South Africa's requirement for non-industry-standard narrow gauge rolling stock means that it cannot access state-of-the-art railway technology (or adapt it to narrow gauge) at competitive prices and short lead times. On the contrary, narrow gauge locomotives attract a price premium, and haul smaller loads, compared to standard gauge locomotives, while narrow gauge wagons have lower load-to-tare ratios than those of industry leading standard gauge wagons. Insignificant narrow-gauge-specific research and development has compromised design capability. More resources are therefore required to perform a given task on narrow gauge than on standard gauge, which increase both capital- and operating costs.

Under such conditions, narrow gauge railways compete unequally against trucks bred to compete internationally against the best standard gauge railways. However, to handicap such trucks in South Africa by restricting their axle load, so that inherently uncompetitive railways can compete with them, is perverse. Narrow gauge railways have already damaged the South African economy: Exacerbating that damage by making trucks less efficient is unconscionable.

Absence of private participation also excludes intra-modal competition: Customers and potential customers have no credible evidence that they are not being gouged. They are reputedly even informed that physical resources to meet specific service requests are not readily available. However, it is well known that competition reduces price and increases quality. The consequences of high priced, poor quality line haul railway service in South Africa are self-evident. Ineptitude in matching willing funders to willing customers is characteristic of state owned enterprises.

This, the status quo scenario, deserves its name.

## 3.2 Scenario 2: Unstable

### 3.2.1 Description

The second scenario depicts railways sufficiently liberalized to allow private participation to determine strategic direction, but no standard gauge infrastructure. Liberalization takes many forms, but for narrow gauge railways, it typically involves a concession over existing assets. A concession is a form of public-private partnership (PPP) under which the state entrusts operations on a railway network to a concessionaire, while it directly or indirectly retains ownership of the infrastructure (World Bank, 2003). One reason that narrow gauge railways up for concessioning already exist is that few have been built for several decades, in either South Africa or elsewhere. Those that history has passed on to the present generation now challenge stakeholders to sustain them in the face of aggressive competition from other transport modes.

While there is little doubt that private participation is the way to go, there is also abundant evidence that efforts to revitalize narrow gauge railways in this way have been less than successful: Around the world, as in South Africa, they are not inherently competitive. Note, by contrast, that standard- or broad

gauge private participation does exist and can work[1]. It occurs in regions such as South America, where concessions have advanced railways noticeably since the 1990s, and Europe, where PPPs are emerging as a mechanism to fund new infrastructure.

Private participation therefore does not provide a financing solution to investment in relatively low-density freight lines, or in most passenger networks. Only the very busiest railways are likely to generate sufficiently high financial returns to attract substantial risk capital in long-term railway infrastructure (Amos 2006: Slide 18). Hence, few private entities have succeeded in rendering moribund narrow gauge railways formerly belonging to a state sustainable, i.e. able to renew assets as a going concern from self-generated funds. Like perpetual motion, they cannot conjure profits ad infinitum from inherently uncompetitive assets.

Initial concession agreements often envisage concessionaires investing in asset renewal or -upgrading. However, if revenue cannot service the cost of such investment, then it will simply not happen. Worse, if the revenue stream is less than expected, or costs more than expected, a concessionaire may forego or postpone maintenance, and harvest the assets until they can no longer produce revenue.

With few exceptions, their ultimate outcomes have disappointed conceding authorities. The author has therefore named this scenario *Unstable*, because the probability that the outcome will differ from expectations is high, and the probability that it will be reversible is low. Please see the examples that follow. South Africa should contemplate this scenario with caution.

### 3.2.2 A risky course

Qualified concessionaires generally possess adequate business acumen, so one should reasonably expect them to succeed. Nevertheless, it is appropriate to examine outcomes that have missed expectations. For context, distinguish these examples from concessions over new railways such as Gautrain, and similar examples around the world, where a conceding authority develops a new railway using inherently competitive technologies.

In South Africa, Orange River Rail Company (Dreunberg-Barkly East), and Alfred County Railway (Port Shepstone-Harding), offer case studies in concessioning. Revenue underperformances forced both to shorten their operating distance salami-style, until revenue ultimately failed to cover unavoidable operating costs. Maintenance was literally reduced to keeping lines clear of obstruction by fallen rocks, overgrowth, and soil erosion: Anything else was deferred. Kei Rail (Mthatha-Amabele), a project of the Eastern Cape Provincial Government, was recently grounded for not paying its way (Kei Rail, 2010). Does South Africa need more lessons?

[1] Broad gauge railways escape the competitiveness handicaps of their narrow gauge counterparts. While not interoperable with standard gauge, and therefore constrained by the extent to which it can network, broad gauge is as technically competent as standard gauge. It attracts only a small cost premium, because the slightly wider track gauge accommodates adapted standard gauge components without compromising performance.

Elsewhere in Africa, Côte d'Ivoire and Burkina Faso, Cameroon, Congo-Brazzavile, Kenya, Madagascar, Malawi. Mali, Mozambique, Senegal, Tanzania, Uganda, and Zambia have concessioned narrow gauge railways. While productive efficiency improved, freight service improved and attracted traffic, passenger service obligations were met despite payment difficulties, investments in infrastructure were almost fully funded by donors, with little private investment in railway networks—many lines are not sustainable without future public capital injections (Amos, 2006: Slide 12).

In South America, overall results have been positive, especially for freight, with increase in productive efficiency, traffic volumes, and market share. Government operating- and capital subsidies were reduced, but private investment has rarely met concession promises, or led to major network upgrade or expansion (Amos, 2006: Slide 11).

However, the process went full cycle in New Zealand, from national railway through privatization to renationalization, in the span of about a decade. Allegations of underinvestment and capital stripping accompanied the ultimate round (Is New, 2010), requiring major new government funding commitment (Amos, 2006: Slide 13). The summary *When you privatize something that shouldn't exist in the first place, you are asking for political and economic trouble* (Is New, 2010) is apposite.

Many railways in Scenario 1 and Scenario 2 are in a cluster named *Insecure* (Van der Meulen & Möller, 2008). Their inherent uncompetitiveness, despite private participation, holds them captive in this cluster. When unable to cover full costs, they unavoidably defer maintenance, plunging ever deeper into ignominy. Evidently, private participation in an Insecure railway does not enhance its sustainability.

## 3.3 Scenario 3: Neverland

### 3.3.1 Description

The third scenario depicts railways that have sufficient standard gauge infrastructure to be inherently competitive, but no private participation. It represents state-funded conversion of railways to standard gauge, while leaving the existing institutional arrangements unchanged. That would render railways inherently competitive, but the ability of state owned enterprise to exploit that potential is questionable. Absence of private sector allocative- and productive efficiency promotes a lethargic approach to business, rather than vigorous exploitation of inherent competitiveness.

### 3.3.2 Institutionalized lethargy

In previous research, Van der Meulen & Möller (2008) identified a cluster that they named *Fortuitous Railways*. Its members were all standard gauge or broad gauge state-owned railways, whose sole redeeming quality was an axle load that was sufficiently high to support a modicum of competitiveness. However, they lacked attributes with which to project a distinctive corporate citizenship.

Their fortuitous advantage was that their track gauge supported a fair axle load. The allowable axle load on low-end standard- or broad gauge railways is naturally higher than that on low-end narrow gauge railways. Furthermore, their rolling stock incurred no or little cost handicap. However, notwithstanding

their fortuitous positioning, and despite their potential to become highly competitive railways, their state ownership desensitized them to opportunities in a competitive dispensation.

Applying this scenario to South Africa would risk expensive investment in standard gauging becoming a white elephant.

## 3.4 Scenario 4: Renascent

### 3.4.1 Description

The fourth scenario depicts railways that have sufficient standard gauge infrastructure together with sufficient private participation. They are positioned to exploit all the competitive strengths that rail's genetic technologies can draw from standard gauge, while private participation allows equity ownership to exercise its entrepreneurial drive. Such inherently competitive railways pursue profitable opportunities that generate sufficient funds to replace assets timeously, thereby achieving economic sustainability within the railway renaissance.

A fully developed renascent scenario should, on the one hand, yield a fair return after covering its capital- and operating costs and, on the other hand, return a tax on profits while encumbering government with no more than the cost of regulation. Naturally, if government chooses to use railways to further social or developmental objectives, it should contribute the fair incremental costs thereof. The US is developing transparent intellectual approaches to this issue, as a way to accommodate government funded programs to implement high-speed passenger rail services that will need to share capacity on existing private infrastructure developed by freight operators in support of their core business.

### 3.4.2 For what are we waiting?

If South Africa is serious about applying integrated transport planning to support its logistics- and mobility requirements in an intensely competitive world, it needs to reposition its railways to participate in the global railway renaissance. It needs to pursue vigorously all avenues to raising inherent railway competitiveness and attracting private participation.

As its railway renaissance gathers momentum, the country will need to recognize, and regulate where appropriate, the at once contending and symbiotic claims on railway rights-of-way, of freight rail in Scenario 4 and high-speed- and regional rail in Scenario 5.

# 4 Passenger rail

## 4.1 Scenario 5: Green Urban Mobility

Urban rail dominates market spaces where rail provides higher capacity than other modes at lower total cost—the latter of course includes the carbon footprint. Optimum solutions require relatively low speed, around 80km/h maximum, with closely spaced stations that demand high acceleration and retardation,

and short station dwell times that favour single deck vehicles. Narrow track gauge does not frustrate any of these requirements, although standard gauge potentially offers the price advantage of standard products. Renewal and expansion of urban rail in South Africa, where appropriate off the existing base, is therefore a strategically sound scenario.

Scenario 5 represents a quick hit for rail in a significant market space. Rolling stock and signaling should be upgraded concurrently, so that they can deliver immediate benefits in combination, rather than waiting for decades until the entire system has been updated. To the extent that revitalized urban rail can shift passengers from road to rail, it can also substantially reduce transport's carbon footprint. Note that the market has already rejected the status quo scenario by voting with its feet: It is therefore pointless to present such a scenario.

## 4.2 Scenario 6: High-speed Development Booster

Other than rare luxury tourist trains, e.g. Blue Train and Rovos Rail, long-distance low-speed passenger trains are history. Regional passenger rail, over intermediate distances, typically shares infrastructure with freight operators, or where they exist, high-speed operators. However, with the notable exception of Gautrain, South Africa does not yet have contemporary regional rail or high-speed rail, so no status quo scenario exists. Nevertheless, while freight currently dominates attention, it is important to balance freight- and passenger rail against other modes across all economic activities, to maximize their economic-, green-, and social benefits.

Furthermore, the country's existing line-haul rail infrastructure, currently under TFR stewardship, has limited high-speed relevance, even if converted to standard gauge. Colonial narrow gauge curvature standards do not support speeds much above 100km/h: Standardizing track gauge would only increase curve speeds by the square root of the gauge increase, some 16%. It is therefore axiomatic that high-speed- and regional rail will need dedicated standard gauge infrastructure. Expect South Africa therefore to advance project-by-project into such applications. Gautrain, and the prospect of Moloto Rail, already portend this scenario. A Gauteng-Durban high-speed railway would likely also follow suit.

High-speed rail competitiveness peaks at 3-4 hour journeys and diminishes beyond that. China provides useful benchmarks—Wuhan-Guangzhou, 968km, three hours, 313km/h average; and when commissioned, Beijing-Shanghai, 1318km, four hours, 329km/h average. Gauteng-Cape Town thus seems beyond reach of current high-speed rail technology.

Economic justification of high-speed rail subsumes agglomeration economies, core-periphery theory, ethnic- and gendered economies, location of industries, property development, trade and development, transportation itself, urban form, and relations with the environment, globalization, and many other. Therefore, expect Scenario 6 to materialize as a T-shaped PPP network that boosts development of communities on the Gauteng-Durban and Polokwane-Bloemfontein axes.

## 4.3 Opportunities for private participation in the industry value chain

### 4.3.1 Setting strategic direction

Public passenger rail transport, whether urban-, regional-, or high-speed, is generally not commercially viable, but necessitates a subsidy to close the gap between what the service costs and what passengers pay. What they actually pay is a complex function of considerations such as what they can afford, rail's priority relative to other transport options, pursuit of larger developmental- and environmental objectives, and many more. The gap arises when stakeholders initiate a project knowing that the public sector needs to contribute an indispensable portion of the funding, and bear the concomitant risk.

Public funding may support capex, opex, or both: It requires that the relevant authority take a leading role in determining strategic direction. He who pays the piper calls the tune, and in public transport, whoever pays the subsidy calls the strategic direction. Consequently, private participation tends to be relegated further down the value chain, provided of course that the opportunities, risks, and returns still satisfy the appetite of the investor community. Nevertheless, there remain very many opportunities, which the next section will examine.

### 4.3.2 Adding value

After the responsible authority has set strategic direction, it can procure the plethora of project requisites through private participation. This introduces competition among suppliers and provides opportunities to create local jobs in project development, financial engineering, turnkey realization, startup management, operations and maintenance, and ultimately restructuring and refurbishment.

Greenfields project costs comprise 60-80% infrastructure construction and 20-40% rolling stock plus train control: Costs for brownfields projects would depend on scope. Infrastructure design**,** -construction, and –reconstruction are by nature largely indigenous, so the lion's share should be accessible to local participants. In addition, local assembly of trains is likely, extending to partial manufacture if quantities are sufficient. As caveat, appreciate that railway equipment manufacture has become specialized business in a competitive global market. High technology in compact packages, for example propulsion- and signaling systems, is concentrated in global centres of excellence, and high-speed trains have become as proprietary as airliners. While that ensures competitive prices and high quality, localization has become a challenge.

High-performance high-technology equipment requires skilled maintainers: There is a global trend to outsource this function to original equipment manufacturers or to specialist service providers. Maintenance would likely represent a major element of local participation: If properly structured, it could stimulate emergence of competitive maintenance suppliers.

Overall, the critical mass of private participation in urban-, regional-, and high-speed passenger rail would comprise construction and services, such as operations, maintenance, information technology, legal services, property management, and so on. If passenger rail realized its rightful share of the South African transport task, its corporate citizenship, market presence and value added should significantly exceed its present stature.

# 5 Discussion

## 5.1 Points to ponder

Scenario planning provides a framework within which stakeholders may think about their future, with regard to drivers of more or less desirable outcomes. The author has presented six key scenarios that frame the landscape within which South African railway stakeholders should explore the ramifications of their positions. They juxtapose the status quo and alternative outcomes. The associated migration path options should guide stakeholders to avoid those that do not get directly and quickly to viable outcomes. They should adapt where appropriate their perspectives and behaviour to seek more desirable outcomes and avoid less desirable outcomes.

Readers are encouraged to think about how these scenarios would accommodate their view on railway solutions in South Africa. Given current positions, several stakeholders might need to concede territory to find a shared solution. Consider the following seed issues:

Opponents of standard gauging should consider that perpetuation of narrow gauge line haul railways allows no relief from their terminal decline: Could all stakeholders agree on a smaller, more competitive standard gauge network that would be both affordable and sustainable?

Even if current interest in branch line revitalization ameliorates their inherent uncompetitiveness, the question of how narrow gauge branchlines would interoperate with a standard gauge core network remains. Is there common ground within which to seek a solution?

On the one hand, there exist potentially symbiotic relations between freight rail and regional rail, and between regional rail and high-speed rail: On the other hand, urban rail and line haul rail characteristics are so diverse that ideally their networks should be physically separate. How does one resolve an intractable narrow gauge legacy, while compounding complexity with standard gauge requirements for high-performance applications such as heavy haul and high speed?

Railway privatization is anathema to organized labour, because jobs might be lost. However, continued industry decline could threaten even more jobs as rail market share dwindles. Conversely, a smaller but more competitive railway could directly generate more jobs, through winning back lost market share and securing future growth. It could also indirectly create more jobs by reducing South Africa's high cost of logistics, and thereby raise the global competitiveness of the nation.

## 5.2 Modalities

In a world where railways in many countries are in renaissance, South Africa's railway objectives should be the Renascent Scenario, the Green Urban Mobility Scenario, and the High-speed Development Booster Scenario. This paper does not consider roadmaps to these scenarios—that task stakeholders must set themselves. Nevertheless, the following considerations are critical to success.

Stakeholders should seek creative solutions that avoid the Neverland and Unstable scenarios. Moving directly from Moribund to Renascent scenarios will require aligning standard gauging with liberalization. Concessioning combined with secured investment is not without precedent: Spain and Portugal have started using infrastructure concessions to design, build and fund new high-speed lines.

Synchronization of the Renascent Scenario and the High-speed Development Booster Scenario, where high-speed-, regional- and freight rail might benefit from standard gauge in a shared corridor, will be a particular challenge. A complex cluster of stakeholders will need to develop shared vision and common purpose.

State railways are a state creation: A government should not abdicate its parental responsibility to the private sector when dire circumstances demand fundamental reform, more so where an investment backlog is part of the problem. Doing so will play into the Unstable Scenario, rather than rise to the challenge. Do not underestimate the importance of achieving a sustainable intervention. Harvesting assets until only an empty shell remains is not unknown. While the intention may be to run down an unsustainable railway to convince those who thought otherwise, the converse, renationalization or recapitalization by a conceding authority, is also not unknown.

# 6 Conclusions

South Africa's railways face a high challenge. Some countries have changed track gauge, while others have liberalized their railways. So far, Spain is the only country to have tackled both together. Looking to the future, Southeast Asia is likely to follow a similar development trajectory. Similarly, if Kenya's standard gauge line from Mombasa to Malaba on the Ugandan border materializes, Africa could follow suit. This combination is likely to set a precedent, because standard gauge liberalized railways are the way to go.

Railways are no longer the common carriers of yesteryear, the dominant mode of overland transport without significant competition. Exposure to aggressive competition has turned them into strong competitors in high-volume long-haul corridors, where *fast* and/or *heavy* are the operative words. Standard gauge track and private participation are the enablers: This paper has addressed the essential modalities of achieving them.

The desirable scenarios show the value of integrated solutions, and the futility and disappointment of tackling only one issue, or only one issue at a time. While temptation to do the minimum Is ever present, South Africa's railways have fallen way behind competitors, so it cannot afford missteps during catch-up. Nevertheless, this is not a magic wand job, so the railway renaissance will need to be phased and sequenced to extract maximum value from existing assets while cutting over to the new dispensation.

At a time when South Africa has begun to appreciate that its economic growth is well below that of many other developing countries, it is apposite to reflect on what it should do with its railways. Many of

its income-per-capita peers are stimulating renaissance in one or more of heavy haul-, heavy intermodal-, high speed-, and urban railways. They have found a way to use railways creatively to support economic growth. Recognizing that railways can play a significant role in transport market spaces where they can position themselves aggressively, can South Africa dilly dally longer, and risk falling further behind its economic peers?

The country needs a process by which to engage all railway stakeholders. Not all of them would immediately go along with the drift of this paper, but that is its intent—to stimulate awareness of contending perspectives as a precursor to developing a realistic shared vision of the contribution that competitive railways can and should make to South Africa.

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