LEVERAGING GLOBAL RAILWAY INSIGHT INTO SOUTH AFRICA AND AFRICA

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ABSTRACT

Railways no longer dominate land transport, but are corporate citizens of a complex, multivariate, economic-, political-, and social space. In entering the industry's third century, railways will differ from their forebears in the first two, because their environment has changed. Research on a globally-representative database revealed latent factors driving railways into distinct clusters. This paper analyses genetic railway technologies and variables grouped by Competitiveness, Market, Networkability, Ownership, Presence, Society, Sustainability, and Time, to reduce global railway industry complexity to a level where usable insights emerge. It concludes that railways in South Africa and Africa are not progressing because of endemic impediments to global adaptation. An agenda to build capacity as worthy global corporate citizens is therefore recommended.

1. INTRODUCTION

1.1 Railway renaissance and globalization

Post World War II, railways in many countries were state-owned. Social criteria informed their objectives, and many did not adapt spontaneously to their shifting environment. Deference to government, and insulation from competition, stifled the organizational introspection, research and development, and culling and renewal, of perceptions, processes and technologies, that drive vital adaptation. Despite that setting, high-speed intercity passenger trains did appear in the 1960s, followed by heavy haul bulk-commodity unit trains in the 1970s, and double-stack container trains in the 1980s, a sequence hailed as a railway renaissance. As leading railways transformed from regulated- to commercial entities, they manifested a new global order. No longer the preeminent land transport mode, they now define and dominate distinct, unique, market spaces. They are corporate citizens of a complex, multivariate, economic-, political-, and social space demarcated by contending poles—command- and free economies, competitive- or monopolistic route structures, open access and vertical integration, heavy haulers and supranationals, monolithic state railways and independent operators, to mention some. The process has accelerated in the past decade, as leading railways have expanded operations, renewed assets, and generally raised their contribution to society**,** while laggards have atrophied.

1.2 Railways' third century

Railways are entering the industry's third century: Those that prosper will be very different corporate citizens from their forebears in the first two, if only because their environment has changed immeasurably. South African rail policy objectives are clear and logical: Support exports and mobility, shift freight traffic from road to rail, and reduce the cost of logistics. Yet stasis has impeded their implementation: Sustainable renewal and enhanced contribution have remained elusive. The weight of empirical evidence suggests that, with

few exceptions, such as Gautrain, South African- and African railways could be losing their struggle against unsustainability. The problem thus is to leverage global railway insight from developed regions into South Africa and Africa.

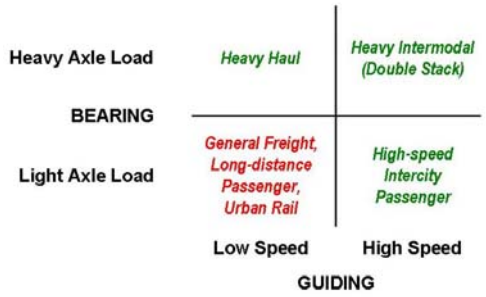
1.3 How to position South African and African railways?

Using a globally-representative database, this author and a co-author presented a paper at World Congress on Railway Research 2006 (Van der Meulen & Möller, 2006) that revealed latent factors driving railways into distinct clusters. The general findings are applicable to all countries with railways: The logical next application of those findings is to examine South African and African railways in this paper, with a view to building capacity as worthy global corporate citizens.

1.4 Railway corporate citizenship fundamentals

Corporate citizenship describes how businesses manage economic-, social- and environmental relationships, how they engage stakeholders, e.g. investors, employees, customers, business partners, governments and communities, and impacts on their long-term success (World Economic Forum, 2007). The notion *railway corporate citizenship* is useful in examining positioning of railways from an external perspective. It starts with competitiveness, without which railways are unsustainable, and ripples out to corporate strategy attributes that distinguish railways from other modes and other businesses. Guided transport rests on a vehicle-guideway pair, which ensures precise application of vertical loads, and secure application of lateral loads. Steel-wheel-on-steel-rail contact mechanics develop vertical and lateral force components, technologies the author named *Bearing* and *Guiding*: They support respectively heavy axle load and high speed, and define four railway market spaces, in Figure 1, of which three are intensely competitive against other transport modes—Heavy Haul, High-speed Intercity, and Heavy Intermodal—and have demonstrated inherent sustainability. One may leverage all four market spaces by linking vehicles, to scale capacity as required, a technology that the author named *Coupling*. Bearing, Guiding, and Coupling are the three *genetic technologies* that distinguish railways from all other transport modes: Railway competitive-ness is determined by the extent to which railways exploit their genetic technologies. Beyond genetic technologies, variables in several further groups, namely Competitiveness, Market, Networkability, Ownership, Presence, Society, Sustainability, and Time, typify positioning and fit of railways with respect to their relevant environments. The author will take them up later in this paper. For now, note that railways in the following market spaces, in chronological order of appearance, are global corporate citizens of good standing:

Figure 1 Railway market spaces



1.5 Railways as corporate citizens

1.5.1 High-speed Intercity

This market space requires wide curves, but accepts relatively steep gradients because of its high momentum and -power. High-speed Intercity ideally requires new, dedicated infrastructure to fully exploit rail's genetic technologies. Where railways already exist, such lines recycle legacy infrastructure to heavy freight. High-speed intercity competes in the 300-1000km mobility market space: At the lower limit, private and public road transport offer more competitive solutions: At the upper limit, air transport is more competitive.

1.5.2 Heavy Haul

This market space requires easy gradients, to limit coupler forces in heavy trains, but accepts relatively tight curves, because permissible maximum speed is relatively low. It typically conveys bulk commodities, which are sufficiently dense that a heavy, competitive axle load can be achieved within a modest loading gauge. Heavy Haul competes over haul distances of less than 1000km against sources in other countries or other regions.

1.5.3 Heavy Intermodal or double-stacked containers

This market space is similar to Heavy Haul, except that it requires high vertical clearance: Unless built for double-stacked containers, routes typically require special clearance. It competes in the 3000-12000km market space against road- and maritime transport, providing a basis for globally-aware railway positioning strategies: Heavy Intermodal is crucial to railway strategic horizon—the two other competitive market spaces max out at 1000km, whereas Heavy Intermodal supports continental- and intercontinental networking.

1.5.4 Potential weakness

Figure 1 defines a weak market space—light axle load in combination with low speed. It is exemplified by general freight-, traditional long-distance passenger-, and urban rail applications. In monolithic railways, such applications frequently share infrastructure and operations. Their natural speed differential imposes irreconcilable claims on line capacity, while their natural riding quality differential imposes irreconcilable claims on permissible axle load. Neither application can exploit rail's genetic technologies to offer significant advantage over competitive modes: Depending on whether economic-, political-, or social objectives determine their destiny, such applications are respectively eliminated, protected, or subsidized: Whichever way, their worth as corporate citizens is diminished.

1.5.5 Urban rail

Notwithstanding that it is popular in many cities, urban rail resides in the weak market space. Human beings as payload do not attain heavy axle load, and maximum line capacity is attained at relatively low speeds: The Bearing and Guiding genetic technology strengths are elusive. However, the Coupling genetic technology combines vehicles into trains, thereby attaining higher capacity within given headways than autonomous vehicles can: This leverages rail's throughput beyond the domain of competitive urban transport modes. This author excluded urban rail, to focus on line haul railway applications, a subset of railways that represents the lion's share of current applications in South Africa and Africa. Line haul railways are corporate citizens of continents, and perhaps very large countries, while urban railways are corporate citizens of local environments. In recognizing that urban rail can add value to society, more so in the burgeoning mega-cities that typify developing countries, the author is creating an urban railway database for future research.

2. RESEARCH METHODOLOGY AND FINDINGS

2.1 A railway corporate strategy research paradigm

The research methodology and generalized findings on which this paper is based have been reported previously (Van der Meulen & Möller, 2006; Van der Meulen, 2006b), so they are only briefly recapitulated here, to leave space for adequate discussion of the paper title *Leveraging global railway insight into South Africa and Africa* within the page length limitation.

2.2 Distinctions among countries and their railways

This paper builds on research that defined cases by country, because railways were generally legitimized by national legislation (Van der Meulen & Möller, 2006). The global population of meaningful[1] line-haul railway countries is 114, hence global comparison of railways is feasible at high level only. Longitudinal analysis, 2002 through 2005, multiplied that number of cases to support the forty variables in Table 1, which adequately describe essential distinctions among countries and their railways. Turbulence between railways and their environments indicated that they were open systems constructively positioning themselves with respect to global drivers: By contrast, railways that did not have the managerial freedom, or the stakeholder will, to expose their positions, depleted the entropy in their closed systems, until they no longer related meaningfully to their environment. It is thus appropriate to research railways within a global behavioural paradigm: Public-domain observations readily support such research, and avoid the need for confidential data. A dedicated, data base was created using ratio data, extracted directly from trade directories, and ordinal data extracted by content analysis from trade periodicals. Readers will find the definitions, scales, and database at www.railcorpstrat.com. Table 1 is colourless, to suggest that while relevant variables are known, their relations are veiled. Multivariate statistical techniques extract rigorous, comprehensible relations among them, which the researcher must interpret in the light of knowledge about the setting. The paper length limit does not permit discussion of all factors and clusters: They are nevertheless mentioned in their entirety, but only discussed where applicable to the title.

Table 1 List of variables and their types

Group	Variable	Type
Competitive-ness	Research & Development Level	Ordinal
	Relative Maximum Axle Load	Ratio
	Relative Maximum Speed	Ratio
	Distributed Power Presence	Ordinal
	Heavy Haul Presence	Ordinal
	High-speed Intercity Presence	Ordinal
	Double Stack Presence	Ordinal
	Diesel Traction	Ordinal
	Electric Traction	Ordinal
	Attitude to Competition	Ordinal
Market	Route Diversity	Ordinal
	Operator Diversity	Ordinal
	Concerned Stakeholder Sensitivity	Ordinal
Network-ability	Narrow Gauge	Ratio
	Standard Gauge	Ratio
	Broad Gauge	Ratio
	Networkability	Ratio
	Strategic Horizon	Ordinal
Ownership	Infrastructure-operations Separation	Ordinal
	Infrastructure Ownership Locus	Ordinal
	Rolling Stock Ownership Locus	Ordinal
	Infrastructure Commitment Horizon	Ordinal
	Rolling Stock Commitment Horizon	Ordinal
Presence	Route km	Ratio
	Freight Traffic Volume	Ratio
	Passenger Traffic Volume	Ratio
	Employee Count	Ratio
Society	National Economic Freedom	Ratio
	National Population	Ratio
	Gross National Income	Ratio
	Country Physical Size	Ratio
	Initiative Source	Ordinal
	Determinism	Ordinal
Sustain-ability	Infrastructure Investment Capacity	Ordinal
	Rolling Stock Investment Capacity	Ordinal
	Stakeholder Satisfaction Level	Ordinal
	Service Reputation	Ordinal
	Safety Reputation	Ordinal
	Subsidy Influence	Ordinal
Time	Calendar Year	Ratio

[1] That is, those with track gauge equal to or wider than yard, meter, or 3 foot 6 inches.

2.3 Cluster analysis

The first statistical technique, *cluster analysis*, reduced all the cases, or countries, to a smaller number of clusters having within-cluster homogeneity, and between-cluster heterogeneity. The technique assigns the total population to a discretionary number of clusters. Four were selected for this article, shown with thumbnail descriptions of their essential attributes in Table 2. They are: Cluster 1, *Constrained Railways*, constrained by one or more of economy, politics, society or technology; Cluster 2, *Railways in Intense Competition; Cluster* 3, *Railways in Privatization*; and Cluster 4, *Railways in Emerging Economies*. Countries in Clusters 2 to 4 harnessed rail's competitive strengths, allowed business common sense to prevail, participated in significant larger railway networks, and were sustainable to varying degrees. Appreciate that South Africa's heavy haul lines entered it in Cluster 4: However, its other railways, as well as those in the rest of Africa, are generally constrained and unsustainable. The clusters themselves are examined in more detail in a companion paper at Southern African Transport Conference 2007 (Van der Meulen & Möller, 2007).

Table 2 Railway clusters

Cluster 1: Constrained Railways All countries except those in Clusters 2, 3 and 4 (77% of total count)	**Cluster 2: Railways in Intense Competition** Australia, Canada, United States, Mexico	**Cluster 3: Railways in Privatization** Austria, Czech Rep., Italy, Sweden, Belgium, Netherlands, Switzerland, Denmark, Norway, Finland, S. Korea, Luxembourg, Germany, UK, Japan	**Cluster 4: Railways in Emerging Economies** Brazil, South Africa, China, India, Russia (all International Heavy Haul Association members)
Low freight and/or passenger traffic volume	Freight traffic dominates	Mixed traffic, moderate-volume freight, high-volume passenger	Substantial freight traffic, plus significant passenger traffic
Low operator- or route diversity	High operator- or route diversity	Operator diversity rising	Monopolistic markets
Low networkability, national strategic horizon	High networkability, continental strategic horizon	High networkability, conservative strategic horizon	Relatively low networkability, conservative strategic horizon
Low technology, members do not exploit rail's competitive strengths	High technology, exploiting freight competitive strengths (heavy axle load, double-stack, distributed power)	High technology, members deploy rail's high-speed competitive strength	Relatively high tech, occuping at least one competitive space (heavy haul, high-speed intercity, double-stack trains)
Public ownership, long commitment horizons	Private sector ownership dominates, relatively long commitment horizons	Emerging private sector ownership, moderate commitment horizon	Public ownership, relatively short commitment horizon
Low economic freedom, relatively low national income	Relatively high economic freedom, relatively high national income	Relatively high economic freedom, moderate-to-high national income	Low economic freedom, low national income
Low sustainability	Relatively high sustainability	Moderate-to-high sustainability	Relatively high sustainability

2.4 Factors

The second statistical technique, *factor analysis*, reduced the large number of variables, in Table 1, to a smaller number of underlying factors. The compressed factor loading matrix, in Table 3, shows each variable loading onto one of ten factors. Colour emphasizes the insight gained from finding relations among the variables. With due regard for passage of time, marked by the variable Time, the following interpretations explain the discretionary names:

Factor 1, *Societal Orientation*, suggested a corporate citizenship associated primarily with people. It suggested high-speed, high-tech, intense railway application. Freight traffic also loaded onto it, suggesting that such railways also accommodate mixed traffic. It reflected the Western European passenger-dominated archetype.

Factor 2, *Territorial Orientation*, suggested a corporate citizenship associated primarily with line-haul freight. It suggested liberal competition among technology-savvy railways with

strong private participation. It reflected the North American archetype—with long, heavy trains conveying bulk commodities or high-value goods over long distances.

Factor 1 and Factor 2, which together accounted for most of the variance in the underlying data, revealed a watershed distinction among railways: Passenger railways require large populations, which is why they can flourish in geographically confined market spaces, such as Japan, whereas freight railways require large spaces, which is why they can flourish in geographically expansive market spaces, such as North America.

Table 3 Factor loading matrix (compressed), showing Factors 1 to 10

Factor	1									2										3		4			5					6		7			8			9			10	
Variable	Employee Count	Route Kilometers	Passenger Traffic Volume	Freight Traffic Volume	Electric Traction	Relative Maximum Speed	National Population	Concerned Stakeholder Sensitivity	High-speed Intercity Presence	Route Diversity	Double Stack Presence	Heavy Haul Presence	Distributed Power Presence	Relative Maximum Axle Load	Rolling Stock Ownership Locus	Country Physical Size	Narrow Gauge (kilometers)	Networkability	Economic Freedom	Gross National Income	Stakeholder Satisfaction Level	Infrastructure-operations	Operator Diversity	Infrastructure Ownership Locus	Service Reputation	Strategic Horizon	Rolling Stock Commitment	Infrastructure Commitment	Calendar Year	Infrastructure Investment Capacity	Rolling Stock Investment Capacity	Subsidy Influence	Attitude to Competition	Research and Development Level	Initiative Source	Safety Reputation	Determinism	Broad Gauge (kilometers)	Standard Gauge (kilometers)
Loading	0.89	0.82	0.79	0.68	0.67	0.65	0.61	0.54	0.48	0.90	0.86	0.84	0.82	0.63	0.58	0.54	-0.86	0.75	0.84	0.73	-0.39	0.75	0.54	0.53	0.51	0.36	-0.88	-0.82	0.70	0.65	0.58	0.71	0.60	0.51	0.77	0.65	-0.44	-0.81	0.53

Factor3, *Global Networkability*, on which Narrow Gauge loaded negatively, suggested the intuitively obvious interpretation that sub-standard gauge track impedes continental- and intercontinental networkability.

Factor 4, *Rising Expectations*, on which Stakeholder Satisfaction Level loaded negatively, suggested that a free, developed, economy cultivates demanding logisticians and passengers, who have rising expectations.

Factor 5, *Competitive Freedom*, suggested that transformation from state ownership to private participation associates with good, ultra-long-haul, service.

Factor 6, *Continuous Improvement*, on which both variables loaded negatively, suggested that relatively short commitment horizons maximize the objective function, by encouraging up-to-date capital assets.

Factor 7, *Inherent Sustainability*, suggested that timely asset renewal or -expansion associate with inherent sustainability. By contrast, railways that show signs of deterioration, withdrawal or abandonment are unsustainable: For them, time is running out.

Factor 8, *Government Encouragement*, suggested the intuitively obvious interpretation that government encouragement, through subsidy influence and enabling competition, associates with developing railway genetic technologies to industry-leadership level.

Factor 9, *Self Regulation*, on which Determinism loaded negatively, suggested that railway self regulation associates with positive safety reputation in a laissez faire society: Railway operators who compete for custom and funding simply cannot afford the catastrophic accidents that might occur in protected railways.

Factor 10, *Broad-gauge Conundrum*, on which Broad Gauge loaded negatively, suggested that, despite arguable technical superiority, Broad Gauge opposes the critical mass of Standard Gauge. Broad gauge is not present in Africa, and is not discussed further here.

These factors are at work in the global railway industry: The author will now examine internalizing them in South Africa and Africa, to place railways on a sustainable trajectory.

3. SOUTH AFRICAN AND AFRICAN RAILWAY CORPORATE CITIZENSHIP

3.1 A sequel to Ten questions for South African railway stakeholders

At Southern African Transport Conference 2006, the author presented a paper *Ten questions for South African railway stakeholders* (Van der Meulen, 2006c). The questions are also applicable to sub-Saharan Africa: Generalizing the following discussion to that region is therefore externally valid. This paper is a sequel, integrated with the other work referenced in §5. The author recognizes that good form dictates external references: However, a sequel does unavoidably tend to lean on an author's previous work. The following are the ten questions, with light shed on them by Factors 1 to 9.

3.2 How will railway stakeholders ensure rail's sustainability?

Noting from Factor 4, Rising Expectations, that a free, developed, economy cultivates logisticians and passengers with rising expectations, and noting that many former users have voted with their feet, railway service in South Africa seems not to fit expectations. Factor 7, Inherent Sustainability, suggested further that timely asset renewal or -expansion associates with sustainability. Railways that deteriorate, withdraw or abandon, as do several in South Africa and Africa, are unsustainable. Railway stakeholders thus need to broadly raise competitiveness. That will require exploiting one or more of rail's competitive market spaces, described in §1.5.1, §1.5.2, and §1.5.3. Although Heavy Haul is present in South Africa, Heavy Intermodal and High Speed Intercity, rail's two leading growth market spaces, are absent. It is therefore necessary to either consider how to realize them, or accept that railway routes that cannot support them need to be harvested or pruned.

3.3 How will railway stakeholders establish market contestability?

Factor 2, Territorial Orientation, suggested corporate citizenship associated with line-haul freight, built on competition among technology-savvy railways with private participation, conveying bulk commodities or high-value goods over long distances,. Furthermore, Factor 5, Competitive Freedom, suggested that transformation from state- to private participation associates with good, ultra-long-haul, service. These two market spaces are South Africa's and Africa's prime future railway applications: Retaining state ownership, with its burdens of deficient competition, over resourcing, political interference, and under investment, is likely to kill the goose that could lay golden eggs. There are many examples of successful introduction of competition, with the Mexican solution demonstrating that even parallel competition is attainable. Railway stakeholders in South Africa will have only themselves to blame if they forego the opportunity to establish a contestable market.

3.4 How will railway stakeholders leverage rail's genetic technologies?

Noting that Factor 1, Societal Orientation, and Factor 2, Territorial Orientation, represent mutually exclusive railway orientations, it is clear that South Africa and Africa must take a position on the respective roles that freight-, passenger-, and urban railways should play. At present, one or more of three weak railway applications burden countries in Sub-Saharan Africa—general freight, mainline passenger, and urban rail. Their low axle load and low speed exploit neither Bearing nor Guiding genetic technologies, precluding further leverage by the Coupling genetic technology. Noting also that while governments that own railways seem ever ready to intervene, Factor 8, *Government Encouragement*, suggested

that intervention should be by encouragement, to develop railway genetic technologies to industry-leadership level and hence to enable intramodal- and intermodal competition. Of applications that strongly exploit rail's genetic technologies, only heavy haul is present. Whatever new railway market spaces are to be pursued will therefore need new investment, such as Gautrain, rather than expansion of present assets.

3.5 How will railway stakeholders enhance safety?

From a corporate citizenship perspective, railways that\ compete for custom and funding simply cannot afford accidents that might be tolerated in protected railways. Factor 9, *Self Regulation*, suggested that railway self regulation associates with positive safety reputation in a laissez faire society. Competition strengthens rail's genetic technologies, thereby rendering old equipment obsolete: The resultant replacement of assets creates regular opportunities to upgrade to contemporary safety philosophies. In addition, Factor 6, Continuous Improvement, suggested that short commitment horizons maximize the objective function, by encouraging up-to-date capital assets. The factors are independent, so it is noteworthy that a well-positioned railway is probably an inherently safe railway.

3.6 How will railway stakeholders fortify rail's franchise?

Competitors and nature are literally eroding the railway franchise in South Africa and Africa, thereby threatening its sustainability. Note that Factor 7, Inherent Sustainability, suggested that timely asset renewal or -expansion associate with inherent sustainability. While it is axiomatic that the ability to renew indicates sustainability, railway stakeholders also need to adapt the existing extensive but unfocused network to exploit heavy axle load and/or high speed. It may be prudent not to retain all of the existing network, but rather to deliberately shrink it where it is inherently unsustainable, and to focus the remainder and any new investments on what rail does well. In this regard, Factor 1, Societal Orientation and Factor 2, Territorial Orientation, provide clear guidance on target market spaces that rail can realistically defend. Note that track gauge is a critical issue that should be resolved before entry (or refraining from entry) into the remaining market spaces.

3.7 How will railway stakeholders extend rail's domain?

Africa's rail network comprises Standard Gauge 7%, Narrow Gauge (1067mm) 55%, Narrow Gauge (1000mm) 5%, and Isolated Fragments (all gauges) 33%. Recognizing that network economics requires linked networks to support long hauls, railway stakeholders in Sub-Saharan Africa will need to align the requirements of existing short haul heavy services, and aspirations for a continental network that, as a realistic railway application, could only be driven by substantial heavy intermodal growth. One thus expects a realistic take on the role, if any, of continental-scale railways in Africa. One should reckon the complementarity between rail and road in promoting African development (Van der Meulen, 2006a) into that context. Note that Factor 3, Global Networkability, suggested that sub-standard gauge track impedes continental- and intercontinental networkability. The issue is already under discussion in South Africa (Republic of South …, 2006) and elsewhere, but its ramifications deserve wider appreciation.

3.8 How will railway stakeholders achieve scalability?

Acquiring affordably-priced rolling stock, at short lead time, to expand capacity in step with market opportunities, is a major challenge for South African and African railway operators. Africa's railways are generally not aligned to international standards regarding track gauge, axle load, vehicle profile, and power supply, not to mention second-tier items such as couplers and brake systems. Rolling stock that is acquired is produced in small batches, with concomitant price and maintainability premiums. Note that Factor 5, Competitive Freedom, suggested that transformation from state ownership to private participation associates with good, ultra-long-haul, service. Private participation is arguably a key

prerequisite to commercial freedom to acquire the most appropriate equipment the market can offer. Note also the importance of Factor 7, Inherent Sustainability, which suggested that timely asset renewal or -expansion associate with sustainability. This is only feasible when requirements can be met from current production by global suppliers.

3.9 How will railway stakeholders diversify ownership?

Reference to Factor 2, Territorial Orientation, suggested a corporate citizenship particularly relevant to South Africa and Africa, namely line-haul freight, Africa's likely first exposure to competitive railways, with liberal competition among technologically-savvy railways and strong private participation. Note also that Factor 5, Competitive Freedom, suggested that transformation from state ownership to private participation associates with good, ultra-long-haul, service. Although they address different issues, these factors nevertheless complement one another regarding diversity of operators and owners, a scenario can only play out with substantial private participation. Whether that is palatable to stakeholders is not material: The essence is that state railway resource allocation is so inefficient that such railways are not competitive in free markets.

3.10 How will railway stakeholders manage change, and act before it is too late?

The heading above combines questions nine and ten from the paper *Ten questions for South African railway stakeholders* (Van der Meulen, 2006c). Its substantial scope justifies its own treatment, in a companion paper at Southern African Transport Conference 2007 (Van der Meulen & Möller, 2007).

4. CONCLUSIONS AND RECOMMENDATIONS

4.1 Positioning railways in South Africa and Africa

Railways are complex systems within complex environments. Many variables pertinent to their positioning and fit are well known, but relations among them are too complex for the human mind to comprehended without statistical analysis. The author has demonstrated that such analysis can reduce global railway industry complexity to a level where a range of usable insights emerges, which one may then intuitively apply to specific situations, South Africa and Africa in this instance, to build capacity for good corporate citizenship.

4.2 Impediments are endemic

Railways in South Africa and Africa face well known problems. Readers are therefore encouraged to peruse the companion paper, to note the likely ending of state railways in a competitive setting (Van der Meulen & Möller, 2007). Recapitalization of an ailing state railway risks history repeating itself. Reflection on the nine factors, namely Societal Orientation, Territorial Orientation, Global Networkability, Rising Expectations, Competitive Freedom, Continuous Improvement, Inherent Sustainability, Government Encouragement, and Self Regulation, shows that they do not yet find general and ready acceptance in South Africa and Africa. The author therefore concluded that railways in South Africa and Africa are not advancing because of endemic impediments to global adaptation. While the parlous state of the physical legacy is evident to a lay person, statistical analysis has given insight into competitive and institutional impediments that should be removed. To venture an informed prediction, line-haul railways will ultimately be less extensive than at present. Some network may be added, but more will be pruned. Operations that remain will only survive because they are competitive and sustainable. Operations beyond those will need to be subsidized, attracting the double whammy of the subsidy itself, and the inefficiency that comes with uncompetitive railways, and that cannot be good corporate citizenship.

4.3 An agenda for progress

Societies eventually correct deviant citizens, corporate or other. One must thus conclude that the following agenda will emerge. Railways will want to enter new competitive market spaces, or decline further. This will drive new forms of ownership, and longer strategic horizons. Market contestability is inevitable: One hears of open access, which is justifiable where no alternative routes exist, but nothing of parallel competition, which is both more competitive and attainable. New investment is starting to flow in South Africa, but little of it is at the cutting edge of railway technology: Railways will want to channel funds into investments that leverage rail's genetic technologies. Contending perspectives on private participation need alignment—profit-seeking investment will not commence flowing until then. Safety generally does not do railway corporate citizenship proud: Society needs to let go, railways need to restore their reputation. Track gauge, branch line utilization, and networking into Africa need resolution. Non-scalable technologies need to make way for scalable ones, to allow capacity to follow market demand. The only overall recommendation can thus be to take inventory of all stakeholders and their positions, canvass all issues thoroughly, and then negotiate effective and sustainable interventions.

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