




Regulating the SADC Regional Railway Corridors for Investments



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Background: According to the Southern African Development Community (SADC) the Southern African railway network extends homogeneously through 1067mm cape gauge across 12 of the 15 SADC nations. Nonetheless, the network is constrained from efficient and effective operation due to insufficient investment in maintaining and upgrading affected tracks and equipment apart from inadequate human capital. This article presents the case of regulation as a plausible solution.

Objectives: To advocate for railway economic regulation as a means for enabling investment in SADC regional railway corridors.

Method: Literature review on global best practices on regulation that induces transport and infrastructure sector investment, and a market research study on railway corridor investment policy assertions and Economic Regulation of the Regional Railway Corridor for Investment.

Results: Current SADC regional railway corridor markets do not encourage steady or sustainable investments and there is a need for further exploration on more investment subsidies and crowding-in on intergovernmental agreements for pertinent development.

Conclusion: Attracting investments into a railway corridor market is an aspect of economic regulation, which necessitates the establishment of market confidence, predictability, and transparency, as observed in Brazil. The legislative provisions, market access codes, and incentives as implemented in the USA, Europe, Australia, and Japan are also crucial investment inducement.

Contribution: The articles presents a profound approach to regional railway corridor investments consideration as it puts to questions the current practice of isolated sovereign attempts. It advocates for joint intergovernmental effort for sustainable and competitive regional railway corridor investments.

Keywords: regional railway corridor; railway economic regulation; investment; transport policy; subsidies; economic rents.

Introduction and background

According to the Southern African Development Community (SADC) (2012), the Southern African railway network extends homogeneously through a 1067 mm cape gauge across 12 of the 15 SADC nations. Nonetheless, the network is constrained from efficient and effective operation because of insufficient investment in maintaining and upgrading affected tracks and equipment apart from inadequate human capital. As the SADC governments are primarily responsible for effective policy development and resource mobilisation in relevant railway expenditures (European Investment Bank 2003), operational challenges are observed in terms of maintaining the infrastructure, plant, and equipment owing to limited revenues generated from uncompetitive pricing compared to the actual transportation rates. Currently, the maintenance responsibility in most SADC countries is delegated to quasi-governments or parastatal institutions by respective governments since national independence or governance (Carlsson & Danielsson 1999).

The interests of consumers and logistic value chain stakeholders are neither fully appreciated nor contextualised. Gopa Decon International (2010) deduced that the current defective condition and performance of the SADC railway network are primarily engendered by a lack of maintenance and investment in both infrastructure and rolling stocks, destructive effects of various wars and civil disturbances in Angola, Mozambique, and the Democratic Republic of Congo, and theft and vandalism of equipment. The African Union (AU 2016) reported that numerous African railways possessed dilapidated tracks and gauges in different stages of disrepair. Furthermore, locomotives and waggons were obsolete after undergoing various maintenance procedures continuously.

Consequently, regional railway services were significantly hampered, which resulted in high transportation costs, reduced capacity, exorbitant maintenance costs, sluggish transport, and substandard yet expensive support services. To resolve the persisting issues, the rules or systems employed by railway operators and governments in relevant railway project appraisals, railway maintenance, operation activity and process regulations, customer engagement and quality service provision, statutory obligation compliance, and constant reporting of delegated responsibilities to superiors and shareholders must be thoroughly comprehended for appropriate corrective investments.

From Figure 1, it can be seen that with exception of South African rail traffic through the Port of Durban (mtpa:45, TEUs:3000000), other SADC ports were transporting very low traffic volumes ranging from mtpa:0.20 – mtpa 45 to TEUs: 0 – 300000 in 2012. Specifically, the SADC Regional Infrastructure Development Master Plan (2012) reports on Figure 1 that with the exception of the Transnet Freight Rail infrastructure and operations, most if not all Southern African railway lines are being operated well below 40% of their design capacity. The report attributes this level of performance to poor track condition, poor locomotive and wagon availability, and a lack of investment in repair, maintenance, or upgrading of the infrastructure and equipment or provision of the working capital to meet the customer demand. The deterioration of rail performance relative to the design capacity in developing economies raises the question of whether the railways retain relevance to these economies.

In view of the background provided, the article is logically structured as starting with a Contextual Framework, then followed by the Research Objectives. After the objectives is the literature review themed 'A Global Perspective: The Influence of Railway Regulation on Investment' which is followed by the Methodology as which is depicted under the subtopic 'Discussion on Transportation Experts' Perspectives' gathered from a purposive sample of experts. This is then followed by a presentation of the research findings and discussions, suggested Future Work, and then, the Conclusion.

Contextual framework

Owing to the discussed background, pivotal to addressing the need for SADC railway corridor investment needs, the applicable economic regulatory regimes need to be understood. This contextualisation should consider interest of customers and logistic value chain stakeholders in a transport market. According to Knemeyer, Murphy and Carroll (2015),

Economic regulation concerning transportation means the maintaining and being in charge of all the business activities. These business activities include:

1. Entry of new firms in the market;
2. Exit of the existing firms from the market;
3. Pricing of the goods and commodities by the firms in the market;
4. Services that are provided by the firms in the market concerning the various goods

5. Accounting of the firms;
6. Financial concerns that are related to the activities of the firms in the market; and
7. Mergers, purchases and acquisitions that the firms indulge in order to expand their activities.

Transportation activities have economic significance as well as social importance. It is mandatory for government regulation to exist in order to make sure that society derives benefits from it. (Knemeyer et al. 2015:238–239)

A review of global railway practices has narrowed to four broad types of railway economic regulation: Concessions; Vertical (holding) Separation; Vertical Integration and Vertical Separation. These are explained in turn as follows:

1. **Concession (or Franchise):** A regulatory regime where the railway infrastructure management and rolling stock operations are conferred under the responsibility of a private operator for a fixed period of time using agreed terms and conditions agreed by the parties and constituting the Concession agreement. The State assumes a regulatory role using the Concession agreement as the regulatory instrument. Examples of this practice are seen in Argentina, Brazil, and regionally, in Malawi and Mozambique on some railway sections.
2. **Vertical (holding) Separation:** This practice is similar to that of Germany and Russia where, holding structure model is such that the national railway system is under an integrated company having accounts for railway infrastructure, transport activities, and services including signaling and communication being under different specialised legal holdings in terms of particular accounting, budgeting, and independent financial results. The industry therefore, operates as a competitive market where several legally separated legal persona companies control infrastructure charges, infrastructure capacity distribution, maintenance, and the other aspects of the railway system planning and operational processes. Case C-556/10 Commission vs Germany was heard and decided in the EC Court of Justice on 28th February 2013. Wherein, it was clarified and held that implementation of the essential rail function independence is a requirement for integrated railway companies practicing the holding model as that of Deutsche Bahn AG.
3. **Vertical Integration:** This is an approach where a railway company owns and manages both their rolling stock and infrastructure. Examples are Japan, the USA and Canada. These companies may allow for private sector operators to access the use of their infrastructure and support services.
4. **Vertical Separation:** This is a process that increases the number of independent actors interacting with one another, thus diffusing the governance of the system and potentially rendering each single actor less responsible towards the end user. It pronounces a recognition of complementarity between privatisation of the railways and vertical separation. Illustratively, because of vertical separation between control of the infrastructure for example by the Australia Rail Track Corporation (ARTC)



Source: Southern Africa Development Community, 2012, SADC Protocol on Trade in Services, SADC, Gaborone

FIGURE 1: The Southern African Development Community railway corridor performance from the Southern African Development Community transport sector plan (2012).

and running the trains, for example train operators such as Pacific National (PN), each participant has different objectives. Australia Rail Track Corporation sells capacity and so is interested in finding ways of running more trains. Pacific National wants competitive travel times at the least operating cost.

Adopting these definitions of transport and railway economic regulation as our working definitions, the interest of rail customers and logistics value chain stakeholders in railway corridor markets relating to the outlined railway infrastructure, rollingstock, operations, and service efficiency investment challenges necessitated the research ethos: Regulating the SADC Regional Railway Corridors for Investments.

Objectives

The overall objective of this article is to advocate for railway economic regulation as a means for enabling investment in SADC regional railway corridors. This is to be achieved by executing two specific objectives:

1. to appraise the influence of railway economic regulation on investment in the global market; and
2. to identify the SADC policy areas supported for pulling railway investments relative to railway economic regulation.

A global perspective: The influence of railway regulation on investment

Lipsky (2014) empirically investigated 100 major regulations in the United States (US) Office of Management and Budget from 2000 to 2010 and reported that imposing pertinent regulations was 3–10 times more beneficial than the incurred costs, which was perceived similarly by relevant regulatory agencies. Conclusively, regulations would not hinder operational activities or inhibit investment and job growth.

The European Union perspective

The European Union (EU) considers that railway project development and financing would be optimally facilitated after implementing the Railway Project Appraisal Guidelines of 2003, which aim to provide a universal framework for appraising railway projects across EU member countries. The guidelines acknowledge that conventional railway investment decisions are generally taken by the transportation ministry, particularly when certain projects are of national importance, or by the national railway enterprise monopolising the provision of railway services. Intimate and obscure relations between public railway companies and transportation ministries would prevent proper scrutiny of investment proposals, which frequently leads to resource misappropriation. As such, the deficient railway performance and decreasing market share are continuously observed despite high investment levels.

The United States perspective

The Stagers Rail Act of 1980 of the United States of America (USA) was enacted as the policy and legislative transformation to facilitate a system of balanced regulation in the railway

industry, as the American railways were constructed, developed, maintained and operated by the private sector since the inception. According to Martland (1999), the *Stagers Rail Act of 1980* encouraged railway companies to stipulate the most competitive prices based on the demands for transporting the most profitable cargoes, which significantly boosted railway prosperity. The Association of American Railroads (2019) propounded that the enactment provided a competitive advantage for U.S. businesses, created significant savings for consumers and contributed significantly to economic support. Specifically, the act facilitated balanced regulation by:

1. incentivising railway enterprises to price routes and services differently according to the market demand, which augmented operational freedom on preferred efficient routes;
2. allowing confidential contracts between railway companies and shippers;
3. streamlining the sales procedures of existing railway lines, which increased the number and specialisation of railway companies in terms of service provision;
4. explicitly recognising the importance for railway companies to earn adequate revenues; and
5. affirming regulators' authority to protect shippers and consumers against unreasonable railway practices and pricing.

The Association of American Rail Roads (2019) conveyed that

[S]ince the Stagers Act was passed, average rail rates have fallen 44%, train accident rates are down 77%, rail traffic volume is up 90%, and railroads have poured more than \$685 billion – their own funds, not taxpayer funds – back into their systems. (p. 1)

Similarly, Japan presents a unique case of a vertically integrated railway structure amongst several railway conglomerates, although numerous smaller private operators possess access rights. According to Griek (2016), Japanese railway operators collaborate with internal groups of the same enterprise or with external companies through decades of stable working relationships. The companies essentially provide necessary services for the entire operational value chain, including infrastructure construction, manufacturing of rolling stocks, and pertinent operations. Thus, the Japanese railway sector is perceived as possessing the highest business optimisation model in an isolated domestic environment through self-reliance. The Japanese refer to the inward-looking approach as the Galapagos effect, wherein internal business networks or the integrated group of companies are obstinate and intolerant to individuals, products, and services offering different values. Therefore, insufficient knowledge regarding the Japanese market would pose a high difficulty for foreign railway companies or suppliers to penetrate the market.

The Japanese perspective

According to the Asia-Pacific Economic Cooperation (APEC 2008), the current Japanese railway market was fostered by the Japanese national railway law reformation in 1987 by

transforming the railway from a state-owned asset into a private operation. Subsequently, the establishment of the Japan Railway Group with six regional and one freight private companies was witnessed before the complete privatisation of the three major Japanese Railway Group companies in 2006. As of 31 March 2006, the Japanese railway market comprised 203 enterprises categorised as passenger railways (6 companies), major private railways (16 firms), semi-major private railways (5 companies), railways owned and operated by local governments (11 firms), small and medium-sized railways (117 companies), freight railways (13 firms), monorails (9 companies), automated guided transport (11 firms), and others (15 companies). Meanwhile, the Japanese Ministry of Land, Infrastructure, Transport, and Tourism (MLIT) retained the responsibility for determining and implementing policies, including sector regulation. Specifically, the MLIT prioritises the assurance of railway safety, upkeeping and strengthening of the railway network, promotion and application of railway-related research and development, improvement of railway services through oversight of fares and accessibility, and infrastructure expansion of Japanese railways.

The Australian perspective

In Australia, Forsyth (1992) interpreted transport deregulation as weighing public and private interests by creating an equilibrium between the economic theory of regulation preferring private interest regulation and governmental actions to maximise political support through public interest regulation in reducing the negative impacts of market failure. Particularly, deregulation is the removal of entry and capacity controls to allow unlimited competition or contracting out certain responsibilities in the value chain. Australian PricewaterhouseCoopers (2018) rated increased railway accessibility on the scale of light-handed (deregulated) on one end to heavy-handed (regulated) on the other end, which was analysed in terms of regulatory approach, access charges, access undertaking procedures and agreements, dispute resolution processes, and ringfencing requirements. Moreover, the railway market power is reviewed amongst three actors, namely railway infrastructure managers, operators, and regulators. Hence, Forsyth (1992) realised that the regulation costs with respective gains and losses would constantly be subject to contemporary shifts.

A review of Australian railway industry development by the Commonwealth of Australia (2017) discovered regulation importance regarding regional procurement and policy levers as the enablers of improved value for money, competitiveness, work stability, and capability of the railway manufacturing industry within a harmonised and coordinated regional scope. The relevant benefits were derived from economies on the scale from interoperability to continuity of production and innovation. As such, the regulation process is inclined towards a similar application of the 'Galapagos Effect' practiced in the Japanese railway market. Wills-Johnson (2006) recognised that the railway market naturally contained monopolistic components in

respective infrastructure, which highlighted the requisite of economic regulation in preventing power abuses, especially in the logistic chain. Subsequently, Wills-Johnson (2006) revealed that economic regulation of railways was directed at the below-rail infrastructure instead of above-rail services as the below-rail infrastructure represents a natural monopoly where tracks and trains are owned by the same company. Thus, regulatory interventions in vertically integrated railways would be more effective than in vertically separated railways, although the current study excluded passenger railways from economic regulation owing to high operational costs (Wills-Johnson 2006).

Will-Johnson (2006) posited that various characteristics of logistic chains contributed to significant market power, which allowed a high possibility of power abuses in Australia. Accordingly, a deep understanding of the logistic chain market power could be achieved by assessing the types of economic rents and the relevant effects. Specifically, three types of economic rents were identified, namely market power rents, Schumpeterian rents, and Ricardian or resource rents, distinguished by the types of behaviours induced as follows:

1. Market power rents refer to the monopoly or competitiveness of the railway logistic chain;
2. Schumpeterian rents are transient surplus earnings above the costs necessary to deploy and use a resource. They emerge in the process of creative destruction in markets and result from new combinations of resources (including new modes of organisations) that entrepreneurs initiate (Ferreira, Reis & Pinto 2017); and
3. Ricardian rents on land are the value of the difference in productivity between a provided piece of land and the poorest piece of land (or the land most distant from the market) when producing the same goods (bushels of wheat) under equivalent conditions, such as labour, capital, technology, and climate (Ricardo 1821).

Will-Johnson (2006) concluded that the induced behaviours through the three economic rents necessitated railway economic regulation to promote efficient resource allocation, as applying a particular rent would ineffectively alter economic behaviour.

The Chinese perspective

The Chinese government possesses comprehensive control over all businesses, including railways. The Organization for Economic Cooperation and Development (OECD 2003) reported that the Chinese railways are centrally planned and state-owned by appreciating the 1998 and 1999 responsibility system reformations in delegating certain management roles to the railway bureau, which allows the Ministry of Railways to focus on monitoring the value of state assets, profit levels and economic returns. The government also strictly regulates prices and investment levels in the railway market by solely stipulating the basic rate per tonne-kilometre through the State Planning Commission without differentiation in speeds, service reliability, or ultimate destinations, particularly in

nine predominant freight categories. Moreover, coal accounts for 42% of all Chinese railway traffic of freights, which mainly contributes to the 31% freight transport market share. Simultaneously, the OECD (2003) reported on other sector regulatory reformations, including delinking enterprises and activities indirectly related to transport services from the Ministry of Railways, transforming branch lines through lean staffing to increasing job efficiency and train speed on trunk railway lines, improving services by streamlining business operations, and optimising train dispatch schedules. To correspond with the rapidly transforming Chinese economy, the State Council of the People's Republic of China (PRC) delineated further required railways reformations, such as separating governmental functions from enterprise management and state asset management, promoting competition within the railway sector, generating incentives for market-oriented investment, and establishing a sound, unified, impartial and highly efficient regulatory framework.

The Brazilian perspective

Lodge et al. (2017) demonstrated that the Brazilian regulation of logistic infrastructure is centred on fostering predictability and credibility to attract sufficient investments, improve capacities, resolve policy inconsistencies, and clarify stakeholders' (ministries, regulators, operators, investors, and customers) responsibilities and relationships. The regulation was implemented after realising significant regulatory capacity defects in vertically integrated railways, owing to inadequate analytical and strategic considerations, insufficient direct coordination and oversight, and limited capacities.

The Russian perspective

Russia, contrary to other countries, has implemented a different form of vertical separation. Murray (2014) discovered a maintained monopoly on network services, including tracks, dispatching and scheduling, locomotives, and drivers, although the provision of waggons and coaches was liberalised. Horizontal separation is not feasible in Russia as different cities and regions, such as Siberia, possess a single railway line because of a low network density. The state infrastructure management company Russian Railways Corporation (RZD) is frequently regarded as practicing monopolistic approaches for personal benefits and those of subsidiaries over private companies. In terms of economic regulation, the Russian railway market is recorded as experiencing a reduced share in the Gross Domestic Product (GDP), because of the impact of the governmental policy capping the annual freight and passenger tariffs equivalent to or below the inflation rate during periods of significantly increasing commodity pricing. According to Murray (2014), the tariff policy causes underinvestment in railway assets.

Russian railway reformations over the years were reported by the OECD (2014) to achieve significant milestones in shifting the railway market towards a flexible regulatory model to complement the developing economy. For instance, the model separates policy and regulatory frameworks from operations,

thus improving the freight tariff system to attract investments into freight waggons, creating competitive provision of freight waggons by the private sector, and eliminating the cross-subsidy of passenger freight services with several direct subsidies from both central and local or regional governments for improved service profitability. In addition, the reformations attracted over US\$50 billion of private investment in the sector, which assisted in renewing the fleet and other equipment by applying the latest technologies. As a result, financial transparency is highly enhanced by issuing euro and rouble-denominated bonds in accessing capital markets. The Russian railway market continues to undergo structural reformations for further improvements.

The World Bank perspective

The World Bank conducted several studies in the past half-century on railway reformations for increased competitiveness (World Bank 2017), which suggested several improvement approaches to persisting key issues, namely (1) removing restrictions on competing transport modes by imposing appropriate taxes while limiting subsidies to railways, (2) restructuring existing railway enterprises by introducing new management to execute optimal marketing skills in commercial operations and (3) ensuring that investment projects fulfil customer or operation requirements to avoid creating burdensome assets. Subsequently, the World Bank restricted loans solely to railway companies which consent transforming managerial and structural processes thoroughly (World Bank 1982). Railway lending has been evolving from the previous model of investment focus to a model consistently endeavouring to address underlying institutional defects in rendering railway defaults, including prior railway loans (Galenson & Thompson 1994). The shift was because of rapidly accelerating global economic alterations, which elevated the focus on preventing institutional failure instead of merely proceeding with asset repair. As such, the early 1990s witnessed the emergence of two additional powerful forces supporting railway transformations. Specifically, the European Commission's Directive 91/440 (European Economic Commission 1991) initiated a process of separating railway infrastructure from operations by requiring all operators to pay non-discriminatory access charges, which aimed to abolish the 'fortresses' of national railways while elevating transport market accessibility to positive competition with the optimal provision of railway services.

Economic regulation of infant and ailing industries

Plotkin and Albert's (1996) investigation of 'Smart Card' recognised the importance of empirical rationales for governmental interventions to protect consumers or the railway industry, as a dearth of empirical evidence would render:

1. prophylactic regulation being non-economical when regulation is a cost manifested in terms of compliance and opportunity costs in altered product designs, which are ultimately transferred and borne by consumers; and

- all infant industries to compete not only on cost, convenience, and value factors but also on consumer disclosure, protection, and privacy when consumers perform individual choices with competing industries without a need for regulation. Furthermore, existing consumer protection laws have encompassed all infant industries.

Plotkin and Albert (1996) argued that the absence of market failure and the ability of the marketplace to provide consumers with protections in satisfying personal needs required limited regulations on infant industries. Instead, prudently observing relevant development would be a positive approach by the government, which prompted the current study to assess the regulatory environment in different SADC regional railway corridor markets.

Significance of global railway economic regulation for the Southern African Development Community

An appreciation of the global railway economic regulation practices has informed the research on the four broad types of railway economic regulation: Vertical Separation; Vertical (holding) Separation; Vertical Integration and Concessions. Despite the type of political governance systems of a country or region, it has been appreciated that recognition of all stakeholders and their rights and obligations in a railway operating environment needs categorical recognition and provision despite the type of railway economic regulatory regime adopted. Lipsky's (2014) study's conclusion that economic regulation does not hinder operational activities nor does it inhibit investment and job growth further motivated the research as regards what facets of railway economic regulation will pull and secure investment in the SADC railway markets.

What the Southern African Development Community protocols provide on transport economic regulation

Southern African Development Community regional economic regulation is generally guided by the SADC Protocol on Trade in Services (2012) whilst the particular SADC regional aspirations for railway transportation are provided in the SADC Protocol on transport Communications and Meteorology (1996).

The SADC Protocol of Trade in Services (2012) objectives express the member states commitment to enhance regional economic development, trade capacity, and competitiveness of the service sectors through liberalisation of trade in services. The Protocol was drawn in alignment with the World Trade Organization (WTO) General Agreement on Trade in Services (GATS) and services are therein defined as any services in any sector except services supplied in the exercise of government authority. It is further clarified that a service supplied in the exercise of government authority is one which supplied neither on a commercial basis nor in competition with one or more service suppliers. The Trade in Services Protocol (2012) further and explicitly recurs all member states freedom to

adopt and implement measures that see them ensuring their universal access to essential services.

More particularly on regulation, the SADC Protocol on trade in Services (2012) is stated as a regulatory Article 1 (2) where it states, 'All other terms relating to any matter directly regulated by this Protocol not defined herewith are deemed to have the same meaning as in the WTO GATS' (SADC 2012:4). It is further provided in the SADC Protocol on Trade in Services (2012) that each member state has the right to regulate and therefore, may regulate and introduce regulations on services for as long as they do not weaken or abrogate the rights and obligations as per provisions of the said Protocol on Trade in Services. On this right, the Protocol further acknowledges the plausibility of asymmetry of member states services regulations and directs for granting of flexibility to member states found to be at a disadvantage by either size or structure or vulnerability or level of development of economy in the use of the right to regulate. The granting of this flexibility shall be determined by the Committee of Ministers responsible for Trade matters.

The SADC Protocol on Trade in Services further provides for: effective and transparent regulations which are to be published (Articles 8 and 9); appropriate use of subsidies (Article 11); treatment of monopolised service sectors (Article 12), regulation of market access (Article 14); acceptable business practices with a pronouncement of encouraging effecting of competition business frameworks for the development of service sectors coupled with cooperation strengthening of national actors in the particular sectors (Article 19); and it empowers the Committee of Minister responsible for Trade matters to preside over any waivers and special grants.

The Protocol on Transport alludes to the entirety of the transport sector in each Member State and the region including but not limited to all policy, legal, regulation, financial, operational, and international regional and continental dimensions (Article 2.1). This is with a general objective of establishing transport systems which provide efficient, cost-effective, and fully integrated infrastructure and operations to meet customer needs and sustainably promote economic and social development (Article 2.3).

Discussion on transportation experts' perspectives

Why should railway economic regulation be considered an investment and efficiency enabler in regional railway operations and service delivery?

Relevant transportation experts in different disciplines were engaged to gather respective perspectives regarding railway economic regulation, as illustrated in Table 1.

In the current study, the experts were enquired about two topics as follows:

1. Investment into the Regional Railway Corridor Market; and
2. Economic Regulation of the Regional Railway for Investment

Investment into the regional railway corridor market

The first topic enquires four direct policy assertions on investment into the regional railway corridor market, as depicted in Graph 1.

Graph 1 summarises the research participant's support for the respective policy assertions on Investment into the Regional Railway Corridor Market. The responses are discussed in turn further in the text.

The policy ranking first was 'An improvement room exists in the railway service capacity on international trade corridors', which received 90.9% affirmative responses from research participants. Specifically, the affirmation was concurrent with the principles outlined in the Australian railway access codes by the government of Western Australia (Commonwealth of Australia 2017), the OECD (2003) recommendations in China, Murray's (2014) assertion for Russia and the Association of American Railroads (AAR 2019) report. Specifically, the

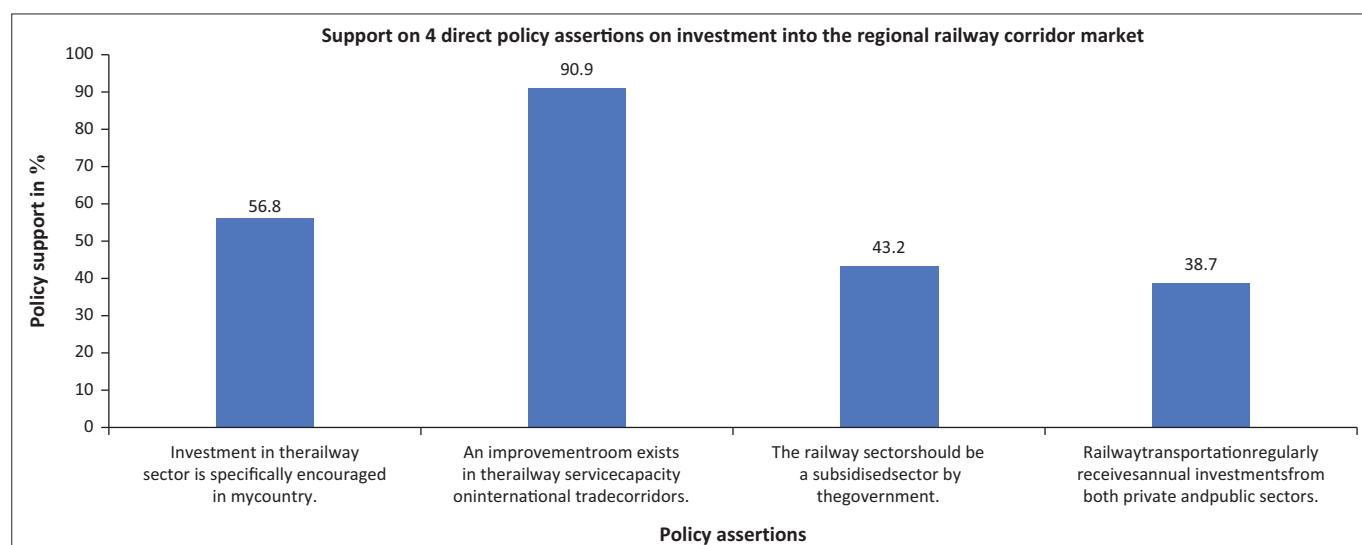
TABLE 1: Purposively selected transportation experts.

Occupation	Frequency	Percentage
Academician	4	9
Businessman	2	5
Economist	2	5
Employed in the transportation industry	25	57
Government Employee	3	7
Ministry of investment, trade, and industry	1	2
Public administration	1	2
Quasi public sector	2	5
Research economist	1	2
Senior data analyst – Data intelligence	1	2
Statistician	1	2
Telecommunications	1	2
Total	44	100

principles highlight that a balanced economic regulatory scheme would facilitate railway capacity growth, before translating into increased freight volumes and revenues. As a result, a significant re-investment into provided railway infrastructure and services was observed for sustained capacities and growth. Thus, investment packages or options should consider optimal rolling-stock resource mobilisation, increased accessibility for corridor operations, elevated train frequencies, and the availability of ICT-enabling features to improve operations, infrastructure conditions, and service capacities to fulfil customer demands through market intelligence and forecasts. Furthermore, by referring to the practices in the USA and Canada, Bereskin (2000) and Cairns (2014) propounded that an appropriate structure of service-level agreements between railway operators, customers and suppliers is pivotal to improving the railway service capacity.

Ranking second is 'Investment in the railway sector is specifically encouraged in my country', which received 56.8% consent from the research participants. Particularly, member states jointly establishing an investment plan were perceived to be a prerequisite for a railway corridor. The investment plan should not only consider direct investments and returns into railway infrastructure and rolling stocks, but also incorporate competitiveness factors to ensure fair distribution of economic rents across stakeholders and related sectors. As a result, the railway corridor would be strengthened by the entire support system. Meanwhile, most incentive schemes for investors would be subject to the investment areas of the respective regional corridor members. For example, Sampaio and Daychoum (2015) discovered that concessions were applied in Brazil as a viable economic regulatory approach, with Argentina similarly applying in the economic regulatory system (Estache, Carbajo & Rus 1999).

Concession agreements should be performed with firm policy and legislative provisos, which not only prescribe investment incentives but also provide independent



GRAPH 1: Four direct policy assertions on investment into the regional railway corridor market.

regulations with stakeholders' clarified roles to guarantee investors' market security and predictability. As observed from the concessions established by the World Bank (2010) and practiced in Brazil, Argentina, and Zambia, concession agreements are not sufficient to facilitate the desired incoming investment. Lodge et al. (2017) recommended three investment attraction strategies for logistic infrastructure development as follows:

1. creating special purpose vehicles with clarified strategic coherence for all stakeholders through legal and governmental arrangements;
2. expanding existing institutional capacities for logistic infrastructure planning and involving regulatory agencies; and
3. employing coordination protocols to establish a mutual understanding of roles and responsibilities.

Accordingly, the SADC regional railway corridor economic regulation, the SADC protocols on Trade in Services (2012), and the Protocol and Transport Communications and Meteorology (1996) adhere to the proposed strategies. Nevertheless, depending on the selected railway economic regulatory framework, each option requires pertinent executive interpretation for practical implementations and most importantly, for the simultaneous applications of all options in a regional corridor.

The third ranked policy assertion, 'The railway sector should be a subsidised sector by the government', received only 43.2% of the research participants' support. In considering the discussed issues related to corridor competitiveness and distributions of economic rents, subsidies to the railway sector might not be encouraged when alternative investment options leveraging on the private sector, such as public-private partnerships (PPPs), are available. Moreover, subsidies might be considered redundant when adhering to

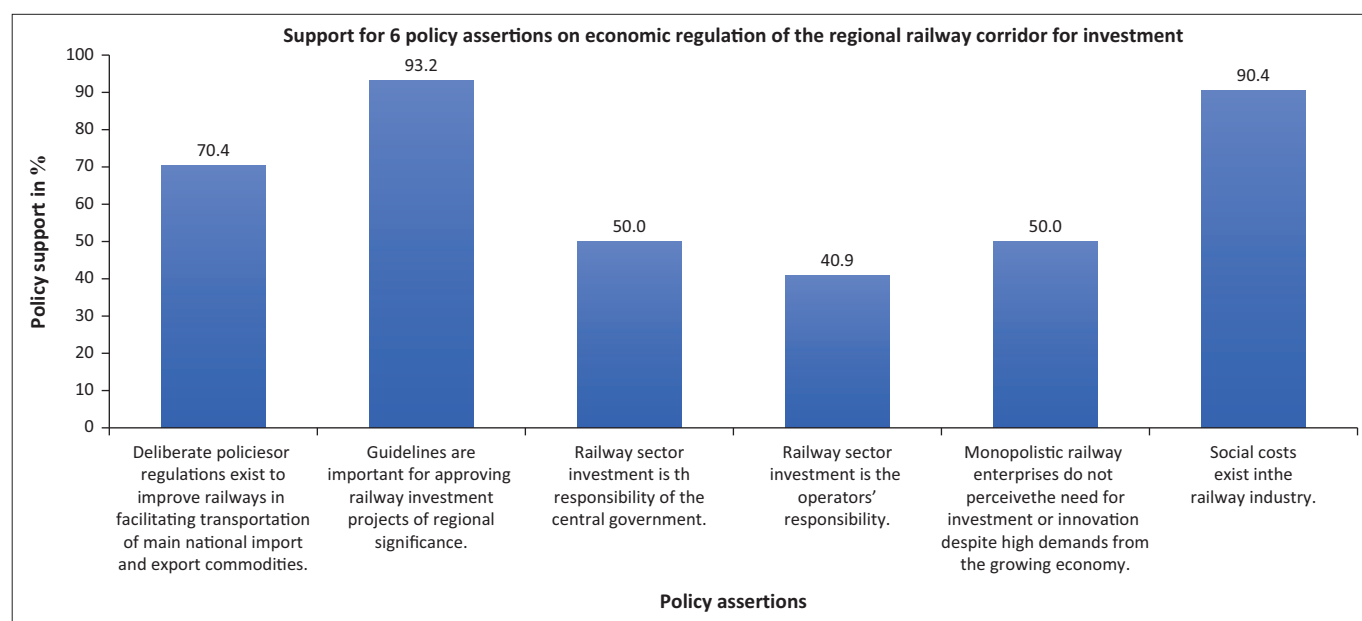
Lodge et al.'s (2017) three recommended investment strategies practiced in Brazil. Subsidies are regarded as specific government grants and contributions to the railway sector, which implies diverting public resources from other important socioeconomic sectors, including healthcare and education sectors. Conversely, Wang and Zhou (2020) posited that the relationship between government subsidies and private investments would vary contingent on the subsidy types when encouraging crowding-in. For example, government subsidies include investment cost subsidies, research and development subsidies, investment tax reductions, and a bonus depreciation policy (Kang 2022). Hence, the optimal subsidy amount should be guided by the characteristic value of the investment and the competitive environment of the market. Meanwhile, only 38.7% of the research participants supported the policy assertion, 'Railway transportation regularly receives annual investments from both private and public sectors'. The finding postulated that the current SADC regional railway corridor markets do not encourage steady or sustainable investments, which requires further exploration of more investment subsidies and crowding-in in intergovernmental agreements for pertinent development.

Economic regulation of the regional railway corridor for investment

The second topic comprises six direct policy assertions on economic regulation of the regional railway corridor for investment, as elucidated in Graph 2.

Graph 2 summarises the research participant's support for the respective policy assertions on Economic Regulation of the Regional Railway Corridor for Investment. The responses are discussed in turn further in the text.

Economic regulation of the regional railway corridor for investment was discussed via six policy assertions, with the



GRAPH 2: Six direct policy assertions on economic regulation of the regional railway corridor for investment.

policy assertion ranking first being 'Guidelines are important for approving railway investment projects of regional significance', which garnered 93.2% of research participants' agreement as the policy could ensure an objective project evaluation irrespective of the investment destination. Guidelines are integral to mutually provide benefits to all involved corridor members while protecting and managing investment interests and risks, as recommended by Wang and Zhou (2020) and Kang (2022) after referring to the European Commission and European Investment Bank (2003) Railway Project Guidelines.

Ranking second was 'Social costs exist in the railway industry', which garnered 90.9% positive responses from the participants because of the importance of considering the social impacts of regional railway corridor operations. Liu (2014) elucidated social regulation as an integral part of economic regulation to ensure adequate environmental protection, product quality, service provision, and citizens' security and safety, while minimising any emerging negative effects. Therefore, the moral efficacy of railway economic regulation could be sustained by introducing green transportation modes and investments with reduced social costs through minimal carbon emissions, noise pollution prevention, and increased public health by avoiding railway corridor pollution. Liu (2014) argued that social regulation would not diminish the protection of market stakeholders' property rights (Coase 1960), as property rights are constantly protected by powerful groups of the nation or monopolistic or competitive market traits. Nevertheless, a regional railway economic regulatory framework should possess sufficient social considerations.

The policy assertion with the third highest support was 'Deliberate policies or regulations exist to improve railways in facilitating transportation of main national import and export commodities', receiving 70.4% of research participants' consent. As the national revenue and economic activities of the SADC developing nations primarily depend on international trade, efficient facilitation of trade is imperative to achieve the most cost-effective and beneficial outcomes. Specifically, railway corridors possess a high advantage in bulk and heavy cargo movement and delivery, which could generate significant economic gains. Concurrently, a pertinent economic regulatory system could incentivise public investments to further promote imports or exports of specific strategic commodities, including petroleum, fertilisers, and grain, vital for populations and economies of most corridor members through freight transportation. Kang (2022) supported the assertion as government subsidies could effectively attract private investments, while commercial investments could be promoted in the transportation of other goods and minerals, such as copper and manganese.

Ranking fourth were two policy assertions both getting 50% support. These being 'Railway sector investment is the responsibility of the central government' which would be applicable only when the regional railway corridor is restricted to governmental participation in vertically

integrated regulatory frameworks as observed in most SADC nations. As such, most investments would be required to be guaranteed or incentivised nationally. Kang (2022) emphasised that the government would be responsible for providing relevant subsidies, including investment cost subsidies, research and development subsidies, investment tax reductions, and a bonus depreciation policy. Nevertheless, when other economic regulatory schemes exist, private investments based on commercial terms could be more favourably encouraged and appropriately advocated, as the AAR (2019) demonstrated that a balanced private investment would generate sufficient returns to promote further reinvestments into the railway sector.

Also, the other in fourth place, 'Monopolistic railway enterprises do not perceive the need for investment or innovation, despite high demands from the growing economy', which also garnered virtually half of all participants' consent. Schumpeterian rents would be anticipated in monopolistic, vertically integrated, and parastatal regional railway corridor operations in a short to medium period, although governance and political investigations would be ensured to protect national interests. Nonetheless, similar national-level challenges and compromises would emerge at the regional level as independence, objective safety, and technical and economic regulations might not be fully implemented by parastatal operators. Resultantly, a monopolistic approach would engender crowding out of investments (Kang 2022; Wang & Zhou 2020) without a competitive environment attracting investments.

The sixth policy assertion, namely 'Railway sector investment is the operators' responsibility' received a higher disagreement percentage as only 40.9% of the participants supported it. This may be because various investment decisions in a vertically integrated economic regulatory regime are not solely dependent on the operator. Instead, the responsibility belongs more to the country with intertwining political interests. Contrastingly, private operators would only be more obligated when performing business decisions solely based on commercial interests and market demands. Wang and Zhou (2020) espoused the assertion by elucidating that private investments are highly dependent on the competitive environment of the market. The regional railway corridor is required to establish competition levels according to the economic regulatory model.

Findings and discussions

The research findings deduce investment in the railway sector to being a long-term commitment requiring policy consistency and appropriate institutional structuring for the safeguard of all market players and investors. The research findings and discussions may thus be summarised under the two focus policy areas as follows:

1. Investment into a Regional Corridor Market: Investment into a regional corridor market requires consented efforts by all corridor constituting governments. Practical demonstration of this would be harmonised

policies and commitments on investor rail sector investor incentives and rights; joint and transparent reporting on railway operations, infrastructure, rollingstock, pricing and service designs as platforms for railway corridor capacity assessments for performance improvements and investment. There is an eminent need for a regional corridor market to have a structured development plan. Such a plan will categorise investment requirements and expectations from both the governments and the private sector. The railway market development plan will also serve as the basis for long-term investment planning, incentives, and innovation. Such a plan will also inform the capacity enhancement space in the market and when existing plant and equipment scope and technology will need to be changed. Investments into the regional corridor market would then be prioritised and logically incentivised within informed timeframes and scope. Success of such an investment drive, for a regional corridor market, also necessitates the existence and increased powers of autonomy for independent railway corridor regulation. This is to ensure that the market players all uphold and comply to the policies, regulations, incentives, and market rules established; and

2. **Economic Regulation of the Regional Railway Corridor for Investment:** The research has illuminated that whilst the roles of government and the private sector are both important, regardless of the regulatory regime applied, what is most critical is effective profiling and allocation of the roles and responsibilities of all market players: investors, customers, manufacturers, and suppliers, rail operators, infrastructure managers, regulators, and other affected social and economic actors. Whilst a corridor market may opt for a concession, or vertical integration, vertical holding separation or even vertical separation with dimensions of open access or their multiple access economic regimes, investment and market conditions shall be most encouraged if the railway corridor market rights of each profile of stakeholders are outlined and recognised for shared prosperity and security of investments. Each profile of stakeholders has its focus and drive for economic rents and without agreed economic regulatory rules of governance, be it market access codes, tariffing, subsidies or service level agreements.

Future works

This research has presented an epitome of demand pull and push policy factors for a regional railway market. Drawing from the research findings and discussions, more in-depth studies may be undertaken for respective SADC Member States. The research areas may include the following:

1. narrowing the focus to a particular member state's regulatory regime being practiced;
2. considering the national railway standards and economic regulations being applied relative to the contextualised facets of railway economic regulation;

3. reviewing the comprehensiveness of national railway policy in recognising the importance of all rail market stakeholders; and
4. assessing member states effectiveness of railway economic regulatory practices on pulling investment into the railway (and other) transport sectors.

Conclusion

The current study pronounced that the regulation of regional railway corridor investments was realised contextually in multiple aspects, with the economic regulation of the sector appreciated from four facets, namely verticle integration, vertical separation, vertical holding separation, and concessions, as per globally reviewed practices. The need for investment was identified objectively as evidenced by the Guidelines for Railway Projects Appraisal of 2003 applied in Europe. Simultaneously, attracting investments into a railway corridor market is a separate essential aspect of economic regulation, which necessitates the establishment of market confidence, predictability, and transparency, as observed in Brazil by Lodge et al. (2017). The legislative provisions, market access codes, and incentives implemented in the USA, Europe, Australia, and Japan are also crucial to elevated investments. Meanwhile, the SADC regional railway corridor markets require large investment amounts in different operational procedures and increasing demands for regional freight transportation services, owing to expanding economic activities. Subject to the type of economic regulatory regime opted for, railway, the Economic regulatory regime should be comprehensive and legally instituted to facilitate elevated investments in railway corridors for sector development and optimal service delivery for fulfilling the market demand and customer satisfaction.

From the summary of the research findings and discussion, it is clear that the SADC regional railway corridor policy and planning for desired investment and satisfaction of customer interests and those of other rail logistics stakeholders need intergovernmental agreements on rail market operations; harmonised corridor development plans and joint corridor enforceable safety and economic regulations overseen by an independent regulatory entity.

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Authors' contributions

All authors contributed equally to this work.

Ethical considerations

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