

The Public Transport Crisis in South Africa: Through the Eyes of the Four Revolutions

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Abstract

Debates on the Fourth Industrial Revolution have tended not to focus on the direct relationship between all four technological revolutions and transportation – a crucial element of all technological surges. At the same time, scholarship on transportation has generally ignored the significance of transportation in all the revolutions. This article therefore seeks to strike a balance between these two extremes by showing that all the technological revolutions were also about transportation. In other words, the debates on the technological advances provide scholars, researchers, engineers, and working-class organisations with the space to foreground transport as an issue requiring special attention,

especially in South Africa where the public transport system faces many challenges. Critically applying the prism of the four industrial revolutions, the article demonstrates that South Africa lags behind from a transport perspective, and still relies on the transportation of the Second Industrial Revolution when other countries are utilising technologies of the Fourth Industrial Revolution. Compounding matters is that even transport technologies invented in the 1800s are being stolen and vandalised, and the maintenance of the system is extremely poor. The article then submits that these transport problems may be solved by mobilisation and advocacy led by working-class and poor communities negatively affected by the crisis.

Introduction

Despite the ongoing academic and policy debates on the urgent need for South Africa to embrace the Fourth Industrial Revolution (4IR) (Xing and Marwala, 2017; Doorsamy et al., 2020), the reality on the ground is that the transport infrastructure and the public transport system are nowhere near the conditions forecast as required for the 4IR. The notion of the 4IR as a framework for understanding technological surges and development has been questioned by some leading scholars of innovation and development (Maharajh, 2019; Cooper, 2021). Others have gone as far as to argue that the 4IR is a myth created to defocus the marginalised and workers from the struggles of the social, economic, and ecological crisis facing the world today (Moll, 2021). The periodisation of technological development as four technological revolutions is also contested. In this regard, Cooper (2021) claims that the current phase of technological development is the second phase of the Third Technological Revolution, and is characterised by driverless cars, renewable energies, and other advanced technologies. For example, Maharajh (2019) indicates that there were five technological waves, starting with water-powered mechanisation in the 1780s to computerisation in the current era. Like this article, other scholars are sceptical about the use of 4IR to debate technology and development as South Africa has not even realised the uninterrupted technologies of the

Second Industrial Revolution (2IR), such as electricity and public transport (Bond, 2020; Hlatshwayo, 2021).

Exacerbating this dire situation is that the transport infrastructure that is being neglected and destroyed emanates from the era of the 2IR which also did not meet the needs of road users and commuters in South Africa. The destruction of the transport infrastructure in conjunction with the electricity crisis that negatively affects the working of traffic lights, the flow of traffic, and the running of electric trains makes a mockery of the call of the state and State President, Cyril Ramaphosa, for economic growth and investments in the country (Ntingi, 2021).

Transport, particularly public transport, plays a major role in development and the expansion of economic activities, especially in the developing countries of Africa that continue to face many transportation challenges (Adeniran, 2016). The National Development Plan (NDP) (2013) proposes that South Africa needs to invest in public transport to improve the lives of low-income households by facilitating mobility to enable them to access economic opportunities in various parts of the country (National Planning Commission [NPC], 2013). Therefore, the current debates on the 4IR pave the way to discuss the role of transport in South Africa as all four industrial revolutions have had transport as one of their core deliverables.

One of the key elements of all four technological revolutions is transportation, which has been disregarded by the scholarship on the 4IR (Marwala and Xing, 2017; Matheba, 2019; Rodny-Gumede, 2019). Another strand in the literature on transport downplays the role of transport in all four revolutions by merely focusing on transport without locating it within the context of the technological revolutions (Walters, 2008; Luckan, 2022). A concession needs to be made here that a few transport scholars and researchers have discussed and debated transport and mentioned the 4IR (Mbatha et al., 2021). Both strands of the literature – the 4IR and the transport strand – are significant and help other scholars to understand the four technological revolutions and transport, although this is not done in a manner that demonstrates that the four technological

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revolutions were also explicitly about transport, especially public transport.

The First Industrial Revolution (1IR), Transport and Coal

The 1IR, which roughly began in 1769 and ended in 1870, was driven by coal and steam engines, the textile industries, and iron. Later, James Watt designed a steam engine that was energy efficient and widely used by British industries from 1776. The cities of Manchester and Liverpool in England of the 1IR benefitted from the coal-powered engine when the steam engine was used as a mode of transport to move goods and people between the two cities. The very first public steam railway system was between Britain's Stockton and Darlington in 1825. Steam power of the 1IR enabled the expansion of transportation and the development of rail, sea, and road transportation of goods and people (Acerta, 2022).

The discovery of diamonds and gold in South Africa in 1867 and 1886, respectively, accelerated industrialisation under British colonial rule. Machinery, tools, and equipment used in the 1IR of Britain were instrumental in the mining, manufacturing, and transportation sectors of the economy. The process of colonisation and industrialisation in southern Africa was violent and predicated on the mass killings of Africans and land dispossession – an issue the country is still grappling with to this day (Van Eck, 1953; Callinicos, 1985). The turning of black peasants into proletarians or workers who had to sell their labour power to survive changed the social, political, and economic landscape of South Africa. This means black migrant workers were forced to live in rural areas to work in the industrial cities and towns, such as Kimberley and Johannesburg when diamonds and gold were discovered and mined. As part of South Africa's 1IR, the Point to Durban – the steam train public railway line – was launched in 1860. This was a time lag of 35 years, if we consider that the first steam railway line in Britain was completed in 1825 (Kirby, 2002).

The Cape Main Line that connected Kimberley and De Aar came after the discovery of diamonds in 1866. In 1890, a six-mile steam railway line between Johannesburg and the Boksburg coal mines was the

first railway line in the then Transvaal, which became one of Africa's economic hubs after the discovery of gold in 1886 (Delano, 2014). To show the significance of the steam-driven trains, according to the railway statistics, an annual average of 638,000 African migrant workers were transported between 1911 and 1920, while in the period 1921–1930, the number increased to 708,000 (Pirie, 1990: 728).

Moreover, transport in southern Africa connected South Africa and Mozambique. The coal-powered trains were the mode of transport used to move migrant workers from the eastern part of southern Africa (now called Mozambique) to the mines in the cities and towns of South Africa. In his book entitled *Night Trains*, van Onselen (2021) details the encounters of migrant workers travelling from Ressano Garcia, in Mozambique, to the Booyens station in Johannesburg between 1905 and 1955. The steam trains (later electric trains) carried men who had to work in the mines of South Africa at night. Those who were ill and injured due to minework were then transported by the same trains from the mines to Mozambique, as they were no longer considered to be useful by the mine employers. Workers of these privately-owned trains, using tracks owned by the state, were treated like goods and crammed into compartments which violated their dignity as human beings (van Onselen, 2021).

The 2IR and Transport

Largely led by national corporations of the Global North, such as Germany's Siemens and Bayer, and the USA's Edison Electric Illuminating Company of New York, the 2IR began after the 1870s. In essence, this revolution was comprised of electrification, chemicals, petrol, diesel, electric trains, diesel trains, and the subsequent rising output of petrol and diesel vehicles (Cooper, 2011). In the 1890s, Rudolf Diesel invented an engine that was named after him, paving the way for the elimination of steam-driven engines in the railways. By the 1930s, the latter replaced steam trains in Europe and in the USA on a massive scale. Economically, the diesel engines were efficient (Bryant, 1969).

The first electric passenger train was launched by the German inventor, Werner von Siemens, in Berlin in 1879. Visitors attending the Berlin Industrial

Exposition on May 31, 1879, were astonished to see a locomotive pass by without any smoke or steam. Unbeknownst to them, they were witnessing a ground-breaking technological innovation of the 19th century, the electric railway, which in its various forms – trams, subways, or high-speed trains – would come to dominate public transport (Hebestreit, 2022: 1).

Given that the colonies in southern Africa were dependent on the transportation technologies of the Global North, it took South Africa 45 years to have her first electric train, and that was after long economic and political processes. The formation of the Union of South Africa in 1910 paved the way for further industrialisation in South Africa and the formation of state-owned national corporations that pioneered industrialisation and development. This included the formation of the Iron and Steel Corporation, a state-owned steel company, and the Electricity Supply Commission (ESKOM), a national electricity generation and supply state company, in 1924. In the same year, the first electric train moved between Ladysmith and Chieveley in what is now known as KwaZulu-Natal, facilitating the massive expansion of the railway networks connecting various economic nodes of southern Africa (Hlatshwayo, 2021). Subsequently, diesel-electric driven trains were introduced in South Africa in 1939 and transported goods and people (Paxton and Bourne, 1985).

2IR, Ford and Fordism

Pivotal to the discussion on 2IR is the contribution Henry Ford made to manufacturing, especially transport. In 1903, he founded his Ford Motor Company, and half a decade later, its Model T was produced. Due to the high demand for the vehicle, Ford introduced Fordism – a production method based on the assembly line – characterised by standardised, sequenced production processes and mass production. Fordism was later adopted by manufacturers of other products globally, demonstrating that transportation, such as the production of motor vehicles by Ford, had far reaching implications not only in transportation but in other industries as well (History.com Editors, 2020). Using similar principles for manufacturing cars, Ford began manufacturing buses for transporting the public in 1937 (Johnson, 1977).

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2IR, Apartheid and Transport

Diesel-driven buses became a common mode of transport in South Africa from the 1940s. The first political activity of the former President Nelson Mandela was the Alexandra mass march against bus fare increase and the bus boycott of 1943 (Khosa, 1995; Walters, 2008). During apartheid, buses and trains were designed to move black workers from the overcrowded townships, often called ‘dormitories’, to their far away workplaces. The train stations in the towns and cities were clearly segregated with markings such as ‘Europeans only’ or ‘Whites only’ (Pirie, 1990).

Besides the buses, another mode of transport that evolved in the period of the 2IR was the minibus taxis. Fobosi (2021) reports that in the 1930s, Natalspruit, on the East Rand, had Valiants, Chevrolets, and other sedan vehicles with permits allowing them to ferry a limited number of black passengers from the black townships to town. Apartheid law, which limited the business activities of black people and controlled their movement through the pass system, made it impossible for the emergence of a black-owned and successful transportation system until the 1970s. However, from the late 1970s to the 1980s, the minibus taxi industry was deregulated, becoming a dominant mode of transport in the 1990s. The growth of the black-owned taxi industry was accompanied by

violence and killings caused by competition for lucrative taxi routes.

The Third Industrial Revolution (3IR) and its Implications for Transport

Beginning in 1969, the 3IR was engineered by the increased usage of electronics, information and communication technologies (ICTs), and computers. In 1969, the US Department of Defence developed systems that are used for Internet communication today. Facebook was launched in 2004, marking the beginning of the social media era (Metz, 2021). The 3IR led to the use of electronics and computer systems in cars and buses. These informed the drivers of the vehicles of malfunctioning parts, a function that was previously conducted manually by a mechanic. This in turn helped the driver to timeously attend to technical problems to avoid breakdown and other mechanical failures. Another example is the use of the global navigation system (GPS), smartphones, and online banking – all tools of the 3IR – which have made traveling by bus, trains, aeroplanes, and taxis easier for passengers who live in areas that have developed and sophisticated transport systems (Jurgen, 1986).

What is disappointing of the public transport system in South Africa is that the state has not embraced the technologies of the 3IR fully to improve the conditions of the poor and working-class people. Consequently, the benefits of ICTs enjoyed by other people in the world who use public transport have not been realised by South African passengers. According to Pertsovsky (2017), the Metrorail of the Western Cape region has not used ICTs to enhance the traveling experiences of commuters. In fact, Riana Scott, Head of Marketing and Communication at Metrorail Western Cape Region, commented: 'The primary reasons for delays are old and obsolete technology as a result of decades of disinvestment in rail and perpetual vandalism' (cited in Pertsovsky, 2017: 1). However, the private bus system that connects the towns and cities uses the Internet, making it easier for passengers to make bookings at their convenience. Another blow for passengers using a bus system called Autopax Passenger Services (SOC) Ltd was when this state company was put under business rescue in 2021 due to mismanagement. The

company was struggling to pay salaries for its close to 1,000 employees, crippling its services. Previously known as *Transtate* and *Translux*, this service was safe and comfortable for passengers, and also used the Internet for bookings and to advertise its services (Autopax, 2022; Koka, 2021).

For taxis, there were attempts to introduce 3IR technologies, such as smart card systems, so that cash could be centrally collected in some taxi ranks in Gauteng. However, this system collapsed because taxi drivers did not have cash at hand to cover their daily expenses. Also, it compelled them to declare their exact earnings to the taxi owners. Normally less would be declared so that they could pocket the difference. Following bloodshed and the death of 15 passengers, this system was discontinued. Violence, intimidation, and taxi wars characterise the taxi industry in South Africa, in which countless numbers have lost their lives since the 1980s. The safety of commuters is another concern for passengers and the general public. For instance, in 2020, taxis accounted for close to 20% of major collisions, although they only represented 16% of vehicles using South African roads (Vegter, 2020).

Measures to reform and modernise the taxi industry have failed. For example, in 2006, a taxi recapitalisation programme was introduced by the state to ensure that modernised and safer taxis were on the roads to minimise road carnage. Another concern was that passengers had to sit comfortably in a taxi, because the existing taxi tended to be very uncomfortable and overloaded with limited space. In 2018, 72,653 old taxis were scrapped and the state paid R4,4 billion as a scrapping allowance. However, many of these old taxis were returning to the road illegally, undermining the very purpose of the recapitalisation programme (Raseroka, 2019).

The above facts regarding public transport in South Africa indicate that the 3IR is phantastic as the South African transport system has not adopted ICTs to enable it to function effectively and efficiently. The technology is very old and tends to be dysfunctional; vandalism, theft, corruption, lack of investments, and mismanagement within the transport system hinder the introduction of key elements of the 3IR that would have improved the conditions of transport users.

The 4IR and Transport

The 4IR commenced in 2008, and relies on artificial intelligence, the internet of things, sophisticated robots, 3-dimensional (3-D) printing, block chain bullet trains, and cloud technology. All these technologies have revolutionised production in profound ways. The modes of transport for this revolution are bullet trains, self-driving trucks, and cars travelling faster than the speed of aeroplanes (Lanzetti et al., 2021).

Table 1: *World's Fastest Trains*

| World's Fastest Trains | Country | Speed record |
|----------------------------------|-------------|--------------------|
| L0 Series Maglev | Japan | 374 mph (602 km/h) |
| CRRC Qingdao Sifang 2021 Maglev* | China | 373 mph (600 km/h) |
| TGV POS | France | 357 mph (575 km/h) |
| CRH380A Hexie | China | 302 mph (486 km/h) |
| Shanghai Maglev | China | 268 mph (431 km/h) |
| HEMU-430X | South Korea | 262 mph (422 km/h) |
| Fuxing Hao CR400AF | China | 260 mph (418 km/h) |
| Frecciarossa 1000 | Italy | 245 mph (394 km/h) |

(Source: Wallach, 2021)

The table above shows that in 2021, Japan had a bullet train with a speed of 602 km/h. However, Japan faces tough competition from China, which has the largest speed train network in the world (Wallach, 2021). A method that enables trains to run on the rails without touching the steel of the track but supported and controlled by the magnetic field is called the magnetic levitation (maglev) whose origins date back to the early 1900s. This method has been developed over the years, making it possible to have bullet trains today (GraduateWay, 2017).

South Africa's Failed Transport Revolution

Inspired by the 4IR, during his State of the Nation (SONA) address in 2019, President Ramaphosa exclaimed: 'We should imagine a country where a bullet train passes through Johannesburg as it travels to Musina and it stops in Buffalo City on the way from eThekweni to here in Cape Town' (Staff Writer, 2020: 1). However, there is a huge disjuncture between what Ramaphosa said about bullet trains as one of the key modes of transport and the actual reality of public transport in South Africa (BBC, 2019). Below, I demonstrate this point further.

The Gautrain, a train system operating in the north of Gauteng, was launched in 2010, just before South Africa's hosting of the FIFA World Cup. The highest speed of the train is 180 km per hour – making it to be the slowest train when compared to the fastest trains in the world (see Table 1 above; Jennings, 2015). The train links Johannesburg, Pretoria, and OR Tambo International Airport. There are also buses that take passengers from the train stations to their workplaces in areas where the Gautrain

operates (Uys, 2021). One of the biggest challenges with the Gautrain is that it does not reach working-class areas that desperately need public transport. It is also unaffordable for working-class people who earn meagre wages or the unemployed (Thomas, 2013). In 2022, a trip from Park Station in Johannesburg to Hatfield in Pretoria cost between R70 and R148, which is much higher than the minimum wage of R23.19/hour by more than sixfold (Republic of South Africa [RSA]: Department of Employment and Labour, 2022; Rome2rio, 2022). However, there is a plan to extend the Gautrain to Soweto, a black area in the south of Johannesburg. This would add 150 kilometres of

railway tracks to the 80-kilometre network (Prinsloo and Henderson, 2020).

Just before the World Cup in 2010, the Rea Vaya Bus Rapid Transit (BRT) system was introduced between Soweto and Johannesburg in 2007. Some bus lines were added later, and there is a plan to expand the service to other black townships. The bus system seeks to integrate and link the Metrorail system, a Gauteng local train network, and the Gautrain. However, users of the system have serious complaints about the function of the service. Also, President Ramaphosa understands the transport crisis or the failed transport revolution, because in 2019, during his participation in the electoral campaign of the African National Congress (ANC), he was stuck in a train for three hours on his way to Bosman train station in Tshwane (Mnukwa, 2020).

From a survey conducted by a University of Johannesburg (UJ) research team with 16,000 daily users it was found that approximately 46% considered the price of the Rea Vaya system to be fair. Evidently, the majority of the users were dissatisfied with the pricing of the service. There were also concerns raised about the lateness, reliability, and overload of the Rea Vaya system (Lengana et al., 2018).

Like the Rea Vaya BRT, the MyCiti BRT was initiated by the City of Cape Town to transport hosts during

the World Cup in 2010. Although the routes are in predominantly white areas, there are attempts to build bus stations in some of the black townships, such as Mitchells Plain and Khayelitsha. The biggest weakness of the service is that it does not reach big, black townships such as Gugulethu, Nyanga, and the rest of the Cape Flats (MyCiti, 2022).

The problems of the BRT systems are exacerbated by the poorly run Metrorail system. In 2021, vandalism of the Metrorail system, cable theft, and the general destruction of the train infrastructure in Cape Town and the surrounding areas compounded the transport crisis in Cape Town. A more recent challenge is the cutting of critical fibre optic cables resulting in major delays in operations (Petersen, 2021). Transport Minister, Fikile Mbalula, blamed the vandalism and theft on the lockdown which began in March 2020. The lack of security on the train lines, at the train stations, and the general rail infrastructure were cited by Action SA, a new political party, as reasons for the damage and general collapse of infrastructure (Bhengu, 2022).

The complete destruction of train stations, such as the Kliptown station, took place during the Covid-19 lockdown in 2020. Other stations and railway lines, such as Park Station, Kempton Park, Elandsfontein, and others, were destroyed by thieves and vandals (Chothia, 2020). After the destruction and theft of the Metrorail infrastructure, which included rails and cables, only two lines out of 34 were operating using diesel-powered trains. Subsequent to that, 300 security guards were hired to protect the Metrorail line in Gauteng (Burroughs, 2020).

Furthermore, Prasa, a state-owned company responsible for short and long-distance public trains, had no train service linking the cities and towns for the whole year due to cable theft, vandalism, and other forms of destruction during the lockdown periods between 2020 and 2021. Towards the end of 2021, Prasa announced that some services were to resume. However, no detailed plan was announced to respond to the inefficiency of the rail system, which included extreme lack of reliability and poor integration of ICTs within the system (Ash, 2021; Emeran, 2013). In delivering a report on the state of Prasa last year, the company's Chief Executive Officer (CEO) commented that years of sabotage

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and vandalism have cost Prasa more than R4 billion, of which more than a quarter was incurred during lockdown (Omarjee, 2021).

While passengers in the Global North, some parts of Asia, and other parts of the world are accessing public transport that is relatively reliable and affordable and that could be regarded as part of the 4IR, public transport in South Africa remains a curse that has been exacerbated by the Covid-19 pandemic. The failed transport revolution was further confirmed by the release of travel statistics by Statistics South Africa (StatsSA) in 2020. About 17,4 million South Africans walked to their destinations. The taxis are the largest mode of transport used by 10,7 million people; this is followed by 6,3 million people who used cars or trucks as drivers. Trains were not a popular mode of transport, except in the Western Cape and Gauteng where 1,6% and 1,5% of household members use this mode of transport, respectively. The survey also reports: 'Train passengers have higher dissatisfaction rates, with the exception of fares, while Taxi and Bus passengers are particularly dissatisfied with facilities at taxi rank or bus stop, the behaviour of the taxi/bus drivers' (StatsSA, 2021: 1).

Poor access to transport has negative consequences for passengers, drivers, and other road users. Proper public transport enhances one's quality of life as it minimises stress caused by delays in public transport. It also assists in arriving on time at school, university, or at work, which improves productivity. In 2021, Numbeo, a company that monitors the cost of living globally, ranked South Africa as the 15th most traffic congested country in the world and reported that South African passengers spend 39.39 minutes extra per commute in traffic (Numbeo, 2022).

On a more positive note, it appears as if platform workers using smartphones have managed to fill what can be regarded as 'the transport gap', albeit in the cities and affluent areas. About 30,000 workers in South Africa are involved in various forms of e-hailing platform work (IOL, 2021). Relying on smartphones regulated by algorithms and GPS, which is built upon the sophisticated work of Albert Einstein, platform workers are able to process and deliver food orders and other goods to customers who would normally have to drive and collect these items themselves. Furthermore, passengers can

be moved around using the same platforms from shopping centres to their homes, for instance. The platforms are owned by Uber, Bolt, and others – and the workers pay in order to be able to use them (Giddy, 2019). It can be argued that this is the only technological innovation that has been witnessed in South Africa in the phase of 4IR. The general failure to realise transportation in South Africa, especially in the context of the debates about 4IR, require some explanation.

Transport and Leadership Crises

Cronin (2006) writes about how the current transport challenges date back to the dark days of apartheid that entailed having black-working class areas in the outskirts of the cities, towns, and areas of economic activities surrounded by road networks and railway tracks. However, in post-apartheid South Africa, Cronin (2006) concedes that the building of new houses for the black majority in areas that are far away from the urban centres and where people work has entrenched the apartheid geography and exacerbated the transport crisis.

The failure of the South African state and its agents to deliver was not preordained. In other words, South Africa is a well-resourced and well-endowed country with an abundance of mineral resources. It is thus not a poor country. However, the policy choices made by the current leadership of the country since 1994 have deepened the social and economic divide. Furthermore, the ongoing corruption has also diverted the resources that were supposed to be used to build the transport infrastructure to individual leaders of the ruling party and their networks. States and sub-states, such as China, Taiwan, Hong Kong, Singapore, Malaysia, Mauritius, and South Korea, were all colonised, but have been able to invest in research and development, enabling them to develop transport systems that are reliable and affordable (Goldin, 2019). Therefore, the transport crisis in South Africa is, in large part, a result of poor leadership of the state where the government has failed to mobilise resources to maintain the transport system inherited from the apartheid regime and to develop a new system of transport that subverts the apartheid geography that removed the working class and the poor from economic zones.

Responses to the Failed Transport Revolution

Sociologically and politically speaking, one cannot write any balanced narrative of the failed transport revolution in South Africa without examining the role played by various social agents and actors capable of shaping public transport policy and action, especially in the context where there is public and academic discourse on the need for South Africa to move towards the 4IR when the country has not even begun to use the transport technologies of the 2IR to move people around.

The state and its various agencies are supposed to maintain the road, rail and transport infrastructure, which includes traffic lights. However, potholes, dysfunctional traffic lights, traffic congestions, traffic lights and cable theft, road accidents and fatalities seem to occur on a regular basis. The transport crisis is exacerbated by the lack of investment to improve the road and transport infrastructure. In 2022, Mbalula addressed the Road Construction and Maintenance Indaba, highlighting that about R75 billion needs to be invested over the next five years to prevent the decay of the country's roads. Mbalula further stated that the total paved and gravel network at provincial level is 184,816 km; the biggest problem is that 40% of this network has reached its life cycle. According to Mbalula, about eight tenths of the road network has surpassed its 20-year life cycle (Cokayne, 2022).

The state has intensified the transport crisis through alleged cases of corruption and incompetence. For example, before 2015 Prasa planned to spend R7 billion (about R3.5 billion paid in 2015) to purchase trains which were too tall for the country's railway system (Open Secrets, 2021). The alleged corruption in Prasa, which also controls Metrorail, must have had a direct impact on the passenger rail system. The national travel survey published in 2021 revealed that: 'The number of people who regularly used trains dropped by 80% since 2013...The average time of a trip on a train has increased by 45% over the past eight years to 107 minutes' (cited in Daniel, 2021: 1).

One of the reasons that the working class and poor communities have very poor access to public transport is because their organisations, such as trade unions and community structures, are extremely weak and unable to pressurise the state

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sufficiently to promote access to safe and reliable public transport. However, there are attempts by organisations like the #UniteBehind, a coalition of organisations formed in 2017 seeking to use protests and the law to struggle for accessible, safe transport for the working class, particularly women and children. The organisation also uses the tools of the 3IR, such as Facebook, the Internet, and WhatsApp to achieve its aims (#UniteBehind, 2017: 1).

Conclusion

As shown in this article, numerous countries, including Japan, China, Germany, Singapore, Hong Kong, and many others are enjoying sophisticated public transport systems that enable workers, students, the general public, and tourists to freely move around the cities and towns (Pallavi, 2019). These countries have what can be regarded as 4IR transport systems with functional bullet trains and other complex transport systems, while South Africa faces its own 'Dark Age' with no end in sight.

These aforementioned countries have viable and expansive national systems of innovation that have developed, adopted, and advanced their technological and economic paradigms. They are enjoying the benefits of endogeneity and progressive systems of innovation with adequate public and private expenditures in research and development consistently over long histories.

However, South Africa is unable to even deliver the transport technology of the 2IR in the form of electric trains and diesel buses to move people efficiently around its towns and cities. The National Travel Survey of 2020 indicates that South African commuters are abandoning the trains because they are extremely unreliable and inefficient, causing them to be late for work and school. Instead, unsafe taxis are the dominant mode of transport (Daniel, 2021). It appears as if attempts to reform transport for the better require organising civil society structures, such as #UniteBehind, around concrete demands that include additional investment in safe public transport and transport infrastructure. In the context of decay, potholes, vandalism, and cable theft, localised community organising and vigilance is the only possible solution that can help improve public transport in South Africa. Commuter associations are another possible organisational response that can help commuters negotiate fares with the train, bus, and taxi authorities. Taxi violence and general lawlessness associated with the taxi industry require a state that can use its powers to protect commuters, especially women and children using this mode of transport.

To sum up the points made in this article, public transport and its current crisis has entrenched racial and class inequity in South Africa because the black population in the townships and rural areas do not have access to quality public transport – even after 28 years of democracy. Vandalism, theft of transport infrastructure, and the lack of adequate investment in public transport are most likely to entrench inequality with regard to access to transport.

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